



21st Health Sciences Centre Poster Conference; 2-4 May 2016

21st HSC POSTER CONFERENCE 2016

Under the patronage of the president of Kuwait University



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21st HSC Poster Conference 2016
Organizing Committee

- Prof. Rajaa Al-Attiyah, *Vice Dean Research & Postgraduate Studies, FOM*
- Prof. Sirkka Asikainen, Chairperson, Dentistry, FOD
- Prof. Yunus Luqmani, Pharmaceutical Chemistry, FOP
- Prof. Nasser Behbehani, Medicine, FOM; Acting Dean, FOPH
- Prof. Ludmil Benov, Biochemistry, FOM
- Dr. Joseph Longenecker, Community Medicine, FOM, Vice Dean, FOPH
- Dr. Andreas Henkel, Physiology, FOM
- Dr. Issa Loutfi, Nuclear Medicine, FOM
- Dr. Leila Vali, Medical Lab Sciences, FAHS
- Dr. Hanady Amoudy, Microbiology, FOM; Director, CRC
- Dr. Alya'a Mousa, Anatomy, FOM
- Dr. Areej Al-Khabbaz, Dentistry, FOD
- Dr. Laila Qadan, Medicine, FOM
- Dr. Jehad Al-Harmi, Obstetrics and Gynecology, FOM
- Dr. Maamoun Al-Aynati, Pathology, Oncology, FOM
- Dr. Gursev Dhaunsi, Pediatrics, FOM
- Dr. Munya Al-Fulaij, Pharmacology and Toxicology, FOM
- Dr. Fawzi Abul, Surgery, Transplantation, FOM
- Mr. Jassim Al-Khorafi, Administration Manager, FOM
- Mr. Dheya H A Al-Hasan, Finance Manager, FOM
- Ms. Amna Safar, Technical Service Administration, HSC

Special Acknowledgements

- Prof. Adel K Ayad, *Dean, Faculty of Medicine*
- Mrs. Teena Sadan, *Technical Staff, CRC, Faculty of Medicine*



Photograph of Organizing Committee



Prof. Rajaa Al-Attiyah, Vice Dean for Research & Postgraduate Studies, FOM



*Prof. Sirkka Asikainen
FOD, Chairperson & Coordinator*



*Prof. Yunus Luqmani,
Pharmaceutical Chemistry FOP*



*Dr. Leila Vali,
Medical Lab Sciences, FAHS*



*Dr. Alya'a Mousa,
Anatomy, FOM*



*Prof. Ludmil Benov,
Biochemistry, FOM*



*Dr. Joseph Longenecker,
Community Medicine, FOM*



Dr. Areej Al-Khabbaz,
Dentistry, FOD



Prof. Nasser Behbehani,
Acting Dean, FOPH; Medicine, FOM,



Dr. Laila Qadan, Medicine, FOM



Dr. Hanady Amoudy,
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Dr. Issa Loutfi,
Nuclear Medicine, FOM



Dr. Jehad Al-Harmi,
Obstetrics and Gynecology, FOM



Dr. Maamoun Al-Aynati,
Pathology, Oncology, FOM



Dr. Gursev Dhaunsi,
Pediatrics, FOM



Dr. Munya Al-Fulaij,
Pharmacology and Toxicology, FOM



Dr. Andreas Henkel,
Physiology, FOM



Dr. Fawzi Abul, Surgery,
Transplantation, FOM



Mr. Jassim Al-Khorafi
Administrative Manager, FOM



Mr. Dheya HA Al-Hasan
Dept. of Finance, FOM



Message from the Dean, Faculty of Medicine



It gives me great pleasure to write the introductory remarks of the Abstract book for the 21st Poster Conference 2016. The Poster Conference throughout the years has continued to achieve the goals of fostering high quality medical research, stimulation of scientific endeavor and collaboration and interaction of faculty and students. This meeting is important as it provides a forum for all researchers to present and discuss basic and clinical research conducted in Kuwait.

We are extremely fortunate for this year to have one of the pioneers in the field of Infectious Disease, we would like to welcome Prof. Bernhard Moser, Chairperson of Infection and Immunity at Cardiff University, who will give the keynote speech on “Chemokines: Key players in immune surveillance and aging”.

The total number of research abstracts accepted this year is 285, which reflects the good progress in research in the Health Sciences in Kuwait. I am grateful to the Vice Dean Research and Postgraduate Studies Prof. Rajaa Al-Attiyah for her continuing support for the Poster Conference. I also thank the Chairperson of the 21st Poster Conference Organizing Committee, Prof. Sirkka Asikainen, and the Organizing Committee from HSC Faculties. They have all worked so hard to ensure the good quality of selecting abstracts and to make this conference successful.

Professor Adel K. Ayed
Dean, Faculty of Medicine



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Message from the Vice Dean for Research & Postgraduate Studies Faculty of Medicine



The first Poster Conference was introduced in April 1996 in the Faculty of Medicine. We have since then held this conference annually with great success with staff and students of all the faculties of Health Sciences Centre participating and presenting their research. Strong research is a prerequisite for academic excellence, and this concept was clearly understood when the First Poster Day was held 20 years ago, in April 1996, in the Faculty of Medicine. The founders of Poster Day started this event with a premise that scientific progress depends on investigation, critical analysis and exchange of ideas. The Poster Day started with an aim of stimulating communication between scientists in various health-related specialties and has grown progressively to involve diverse scientific fields in all the faculties of the Health Sciences Center (HSC).

In continuing the tradition of inviting internationally recognized Scientists whose work has great impact upon the Health Sciences, this year we would like to welcome Prof. Bernhard Moser, Chairperson of Infection and Immunity at Cardiff University, who will give the keynote speech on “Chemokines: Key players in immune surveillance and aging””. This year we have 283 poster abstracts and I have no doubt that the 21st HSC Poster Conference will be a great success. I would like to thank Kuwait Foundation for the Advancement of Sciences (KFAS) for their sponsorship and support for this scientific event. I thank Kuwait University for the continuing support and sponsorship of the Poster Conference and Prof. Bernhar Moser for accepting our invitation as a keynote speaker in this year Poster Conference. I would like to express my appreciation to the Vice-President Health Sciences Centre, Deans of different Faculties of



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HSC for their encouragement and support and to all HSC technical and support staff who assisted in the organization and implementation of this meeting. I am especially very grateful to the Chairperson and the members of the Organizing Committee for their commitment and efforts to make this a very successful event.

Prof. Raja'a Al-Attiyah

Vice-Dean for Research & Postgraduate Studies

Faculty of Medicine



**Message from the Chairperson,
21st HSC Poster Conference Organizing Committee**



I wish you cordially welcome to the 21st Poster Conference and to start another 20 years of scientific challenge and thrill. This annual event has already created a rich scientific tradition with its local essence. The main purpose of the conference is to collect together researchers and students from Health Sciences Center but also from other faculties, institutions and hospital departments in Kuwait and abroad. It provides a forum for participants to display their research work, exchange views and thoughts and to initiate collaborations.

Kuwait University supports science in various ways and one of them is the Poster Conference. It has been realized from the beginning that the main task of any university is to produce new knowledge, which guarantees students a high level of education. The Health Sciences Center Poster Conference gives an example to future physicians, dentists and other health care professionals how to do research in various fields and learn to critically evaluate the outcome and progress of the projects shown as posters.

One of the Poster Conference traditions is to invite distinguished scientists as Keynote Speakers. This year we have the honor of having as our guest Professor Bernhard Moser, the Chairman of the Institute of Infection and Immunity in Cardiff University School of Medicine, United Kingdom. He will share with us his vast knowledge of the topic “Chemokines: key players in immune surveillance and aging”. Professor Moser’s scientific research focuses on human chemokines and their receptors expressed by immune cells. His research group was e.g., the first to identify several human chemokine receptors and to discover follicular B helper T cells that control antibody responses. His basic findings in immunology were applied to his studies on the role of homeostatic chemokines in tissue homeostasis and immune defense. Recently his group identified a small subset of T-cells with professional antigen presentation functions. This discovery is now being translated into the clinics e.g., in the form of cellular immunotherapy of cancer patients.



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Finally, I express my sincere thanks to my colleagues in the Organizing Committee, who gave their time and effort to our mutual task. I also extend my thanks to Kuwait University for financing this conference and to Professor Rajaa Al-Attiyah, the Vice Dean for Research and Postgraduate Studies, Medical Faculty, for her tireless interest and advice during the preparation phases of the conference. And lastly, I would like to acknowledge Mrs. Teena Sadan and her group in the Centre for Research Support and Conferences for the outstanding commitment and help.

Professor Sirkka Asikainen
Chairperson, 21st HSC Poster Conference Organizing Committee



Keynote Speaker

Prof. Bernhard Moser

Chair (Infection & Immunity)

Institute of Infection and Immunity

Cardiff University, Heath Park

Cardiff, UK

Professor Bernhard Moser holds the Chair of Infection and Immunity at Cardiff University. He studied at the Federal Institute of Technology, Zürich (Diploma in Biochemistry, 1981) and at the University of British Columbia, Vancouver (PhD in Microbiology and Immunology, 1988). He was promoted to Privatdozent (PD in Medicine and Natural Sciences, 1995) and to Professor (2006) at the University of Bern. He spent his sabbatical leave in the laboratory of Prof. M. Brenner (Harvard University, 1997-98). Distinctions include the Pfizer Research Award (1997, jointly with Dr. P. Lötscher), the Prof. Dr. Max. Clöetta Price (2003) and the Royal Society-Wolfson Research Merit Award (2007). He is a member of many academic societies, including the Henry Kunkel Society. Research of Prof. Moser's group centers on human chemokines and their receptors expressed by immune cells. Initial work focused on the identification of chemokine receptors (starting with the IL-8 receptors, CXCR1 and CXCR2), followed by their biochemical and functional characterization. His group was first in identifying the human chemokine receptors CXCR3, CXCR4, CXCR5, CXCR6, CCR3 and CCR8. These findings enabled them to investigate (i) the role of CXCR4 in HIV infection, (ii), chemokine receptor antagonists, (iii) control of T cell migration (discovery of follicular B helper T (TFH) cells), and (iv) role of homeostatic chemokines in tissue homeostasis and immune defence. Finally, his group identified $\gamma\delta$ T-APCs, human $\gamma\delta$ T cells with professional antigen presentation functions, and this discovery is now being translated into the clinics (cellular immunotherapy of cancer patients). Long-standing collaborators included Prof. C. Mackay (Monash University, Melbourne). Prof. F. Arenzana-Seisdedos (Pasteur Institute, Paris) and Prof. I. Clark-Lewis (UBC, Vancouver). Several of these findings led to patents, and Prof. Moser is frequently asked for advice by major pharmaceutical companies.



Keynote Abstract

Chemokines: Key players in immune surveillance and aging

What are chemokines? The term "chemokines" stands for chemotactic cytokines and has been coined >20 years ago. This large family of cytokines are composed of >45 individual members of structurally related proteins that bind to either a single or multiple cell surface receptors expressed on immune cells. Since their discovery, chemokine research has rapidly progressed into a major field in immunology.

What do chemokines do? The primary function of chemokines is the control of immune cell traffic throughout the body under conditions of immune homeostasis as well as infections and inflammatory diseases. Accordingly, chemokines are grouped into two classes: "homeostatic" chemokines and "inflammatory" chemokines. Early research has focused on inflammatory chemokines, i.e. those that are produced at sites of inflammatory diseases. Since inflammatory diseases are caused by continuous recruitment of immune cells, all major pharmaceutical companies worldwide have invested in new drugs that target inflammatory chemokines and their receptors.

What is the role of chemokines in health? This area of research deals with homeostatic chemokines, i.e. those that control immune cell traffic under steady-state (non-inflammatory) conditions, and is less well understood. However, it is becoming increasingly clear that the health of body-lining tissues, such as skin, lung and intestinal tract, fully depends on a complex immune surveillance system composed of different types of local immune cells. The control of tissue localization of these immune surveillance cells by homeostatic chemokines is the topic of this lecture. We conclude that the proper functioning of our peripheral tissues is critically dependent on immune surveillance cells that keep our tissues healthy over a very long period of time. The key for understanding why we can reach old age (80 years or more) lies with research focusing on immune processes controlling tissue integrity and health.



Best Poster Award Winners: 20th HSC Poster Conference 2015

PhD, MSc, Undergraduate, Graduate Resident Original Research and Case Report

Award Winners Poster Conference 2015

Undergraduate

- 17
ThymoiquiNone protects the spinal cord neurons from degeneration by enhancing GAP-43, Bcl-2 and decreasing Bax expression in sciatic nerve lesion model
*Eliwa J, Al-Ali H, Smitha S, Rao MS; Department of Anatomy, Faculty of Medicine, Kuwait University

- 184
The long lasting impact of prenatal immune challenge on the process of remyelination
*Al-Hashash H, Rakhshani-Moghadam S, Kalakh S, Mouihate A; Department of Physiology, Faculty of Medicine, Kuwait University

Graduate MSc: Basic Science

- 172
Investigating the desensitization and internalization of the incretin receptors
*Shaaban G, Oriowo MA, Al-Sabah S; Department of Pharmacology and Toxicology, Kuwait University, Faculty of Medicine

- 27
Mn(III)N-alkylpyridylporphyrins increase vitamin C anticancer activity through generation of reactive oxygen species
Bader B*, Benov L, Craik J; Department of Biochemistry, Faculty of Medicine, Kuwait University

Graduate (Resident)

- 191
Estradiol dampens the recruitment of oligodendrocyte precursor cells to the site of brain inflammation: Role of COX-2
*Dawi B, Kalakh S, Mouihate A; Department of Physiology, Faculty of Medicine, Kuwait University

- 254
Follicular lymphoma in situ with hyaline vascular Castleman disease-like features: A case report
*Al Taleb A, Ali A, El-Kabbany M; Kuwait Cancer Control Center



Graduate PhD (Basic Science)

- 145
Associations of leukocyte telomere length with cardio-metabolic risk factors and circulating biomarkers of inflammation and oxidative stress
*Al Khaldi R¹, Mojiminiyi OA¹, Al Mulla F¹, Abdella NA²; Department of Pathology¹; Department of Medicine²; Faculty of Medicine, Kuwait University

Young Researcher

- 158
Low-grade appendiceal mucinous neoplasm (LAMN): Eight cases from Mubarak Al-Kabeer Hospital
*Salmeen J, *Ali R; Kuwait Institute of Medical Specialization, Mubarak Al-kabeer hospital

- 148
Identification of the first gene CCNO causing a novel congenital ciliary respiratory disorder
*Al-Mutairi DA¹, Alsabab BH², Loges NT³, Pennekamp P³, Dougherty GW³, Köhler G⁴, Alkuraya FS⁵, Omran H³.
Department of Pathology¹, Faculty of Medicine, Health Sciences Center, Kuwait University, Kuwait; Zain Hospital for Ear, Nose and Throat², Kuwait; Department of Pediatrics³, University Hospital Muenster, Germany; Department of Pathology⁴, University Hospital Muenster, Germany; Department of Genetics, King Faisal Specialist Hospital and Research Center⁵, Saudi Arabia.



Past Poster day Keynote Speakers and Lectures

2015

The Future Healthcare: Personalized Medicine for Cancer Patients; Prof. Ramzi M. Mohammad, Ph.D., Director, GI-Cancer Research, Karmanos Cancer Institute, Michigan, Department of Immunology and Microbiology, Barbara Ann Karmanos Cancer Institute, Wayne State University, MI

2014

Image-guided surgery – from bench to bedside; Professor Samuel Achilefu; Professor of Radiology, Mallinckrodt Institute of Radiology, Washington University School of Medicine

2013

Stem Cells: Building and Rebuilding the Nervous System; Professor Freda Miller; Senior Scientist, Research Institute, Developmental & Stem Cell Biology, University of Toronto

2012

Cardiovascular health in the 21st century; Professor Barry McGrath, Professor of Vascular Medicine & Medicine, Southern Clinical School, Monash University, Australia

2011

Cardiovascular Outcome Trials in Diabetes.; Prof. Rury Holman, Director of the University of Oxford Diabetes Trials Unit, University of Oxford, Canada

2010

New mycobacterial vaccine candidates: from lab to clinical trials. Prof. Abu Salim Mustafa, PhD, FRC Path. Department of Microbiology, Faculty of Medicine, Kuwait University

2009

Evidence-Based Medicine and Knowledge Translation Research for Better Health Care.; Prof. Brian Haynes, Professor of Clinical Epidemiology and Medicine, Chief of the Health Information Research Unit at McMaster University, Hamilton Ontario, Canada

2008

What Ails The World? How Do We Respond? Prof. Abdallah S Daar, D.Phil (Oxon), FRSC, FRCP (Lon), FRCS (Eng), FRCS (Ed), FRCS (C), Director of Ethics and Policy, McLaughlin Centre for Molecular Medicine, Professor of Public Health Sciences and Professor of Surgery, Senior scientist and Co-director, Program on Life Sciences, Ethics



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and Policy, McLaughlin Rotman Centre for Global Health, University of Toronto, Ontario, Canada

2007

From Molecular Imaging to Molecular Medicine.

Prof. Henry N. Wagner, Jr. MD, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA

2006

Stem cell research.; Prof. Sir Martin Evans FRS, DSc (Nobel Laureate), Director of the School of Biosciences and Professor of Mammalian Genetics at Cardiff University, UK.

2005

How Corticosteroids Work in inflammatory Diseases: New Molecular Insights.; Prof. Peter Barnes is of Thoracic Medicine at the National Heart and Lung Institute, Head of Respiratory Medicine at Imperial College and Honorary Consultant Physician at Royal Brompton Hospital, London, UK.

2004

The Nitric Oxide/Cyclic GMP Pathway: Targets for Drug Development Prof. Ferid Murad, Nobel Prize recipient, Chairman, Department of Integrative Biology and Pharmacology, Director, Institute of Molecular Medicine, University of Texas Medical School, Houston, Texas, USA

2003

The Post-Genomic Era: Global Impact on Medicine and Health Care Delivery Prof. Seyed E. Hasnain, Director, Centre for DNA Fingerprinting & Diagnostics (CDFD) Hyderabad, India

2002

Genetics and World Health: Fact or Fantasy Prof.(Sir) David J Weatherall, Emeritus Professor, Weatherall Institute of Molecular Medicine, University of Oxford, UK

2001

Genomic View of Human History Prof. Mary-Claire King, American cancer Society Research Professor, Department of Medicine and Genetics, University of Washington, Seattle, Washington, USA

2000

Molecular Mechanisms and Biomedical Implications of Apoptotic Cell Death Dr. Sten Orrenius, Professor and Chairman, Division of Toxicology, Institute of Environmental Medicine, Karolinska Institute, Stockholm, Sweden



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1999

Nutrition, Immunity and Infection: Basic Considerations and Public Health Significance Dr. Ranjit Kumar Chandra, Professor & Director, Allergy, Asthma and Immunology Centre, Gurgaon, India

1998

Futurology in Biomedical Research: From Crystallography to Crystal Gazing Prof. Jasbir S. Bajaj, All India Institute of Medical Sciences, New Delhi, India

1997

The Impact of Research on the Development of an Academician Dr. Elia Ayoub, Distinguished Professor of Pediatrics, Department of Pediatrics, Pediatric Immunology and Infectious Diseases, College of Medicine, University of Florida USA.



Original Research Abstracts List By Subject Area



Academic Development

1

*Al-Jarallah K, Shehab D, Moussa MAA, Abraham M, Baghdady M: Academic staff development in the Faculty of Medicine, Kuwait University: Review in two decades.

Allied Health

2

Al-Jafar HA: A comparison study between regional and manufacturer hematology reference ranges for adult complete blood count.

3

*Al-Awadhi AM, Al-Sharrah SK, Jadaon MM, Al-Sayegh F: Investigating the influence of age, gender and ABO blood group on ADAMTS-13 antigen and activity levels in healthy Arabs.

4

*Al-Sayegh N, Al-Obaidi S, Al-Shuwai N, Ramadan S, Al-Qurba T, Dean E: Are We Truly Dedicated to Improving Health?

5

*Al-Shemmari M, Mathew F, Vali L: Molecular Typing of Methicillin Resistant Staphylococcus aureus (MRSA) isolates with reduced sensitivity to chlorhexidine in Kuwaiti hospitals.

6

Dehyan ML*, Jadaon MM: High prevalence of Factor V leiden mutation among the Armenian population in Kuwait.

7

*Jena N, Muneer Y, Al dallal S, Refai TMK, Mojiminiyi OA, Abdulsalam S: Hospital based evaluation of vitamin D status in the capital governorate of Kuwait.

8

*Morad T, Nosraty TM: Teaching a practical clinical skill (Peripherally inserted central catheter dressing) to nursing students using educational theory by simulation.

Anatomy

9

Abd-El-Basset EM*, Joy J, Najem A: Role of pro-inflammatory IL-1BETA in stab wound brain injury model.

10

*Ala` AbdelQader A, Al-Bader M, Kilarkaje N: Diabetes does not induce parthanatos of testicular cells but Resveratrol modulates poly (ADP-ribose) polymerase signaling in testes of diabetic rats.

11

*Al Hamdan FB, Rezqalla JA, Smitha S, Al-Hussaini H, Rao MS: Adult neurogenesis declines at an early age in dark agouti rats in comparison to wistar rats.



12

*Al-Mohri SFA, Renno WM, Rao MS: (-)-Epigallocatechin-3-gallate (EGCG) enhances learning and memory and adult neurogenesis in streptozotocin induced diabetic rats.

13

Allothman O*, Lo C, Althalji K, Alshimali H, Chang D, Zhou FC: Oxygen-loaded nanobubble administration normalizes alcohol-induced DNA demethylation in rat dorsal root ganglion neural stem cells.

14

*Al-Shimali HM, Kayali NM, Al Salem A, Renno WM, Rao MS, Khan KM: Monoamine Oxidase-B inhibitor Protects Degenerating Spinal Neurons, Enhances Nerve Regeneration and Functional Recovery in Sciatic Nerve Crush Injury Model.

15

*Kayali NM, Al-Kandari AH, Smitha S, Rao MS: Thymoquinone enhances neurogenesis, learning and memory in young adult rats born to diabetic rats.

16

*Mousa A, Bakhiet M: ISRAA modulate microglial growth via STAT1- activation.

17

*Rao MS, Sony AM, Smitha S, Shaikh S: Neurogenesis during pregnancy and non-pregnancy period in young female rats-Effects of diabetes.

18

*Shaikh S, Smitha S, Rao MS: Thymoquinone enhances survival of neurons in hippocampal cultures exposed to kainic acid.

Assessment, Behavioral Sciences and Clinical Opera

19

*Alrashed F, Gill J: Effects of aggressive vs. non-aggressive exercise on insulin sensitivity.

20

*Alotaibi N, Aljadi S, Alrowayeh H: The reliability, validity and responsiveness of the Disability of Arm, Shoulder and Hand (DASH-Arabic).

21

Elamir HE: Emergency Department overcrowding and increased length of stay: Identifying the causes in a secondary care general hospital.

Biochemistry

22

*Alenezi K, Benov L: Zn-porphyrin-based photosensitizers as antimicrobials: cellular uptake and subcellular localization.



23

Al-Jarallah A, Oriowo MA: A role of sphingosine-1-phosphate in colonic smooth muscle contractility.

24

Al-Maghrebi M, Renno WM, *Pattillath S, George P: Regulation of glycolytic enzymes in testicular ischemia reperfusion injury.

25

*Athab A, Al-Maghrebi M, Renno WM, Pattillath S, George P: The tACE/Angiotensin (1-7)/Mas axis protects against testicular ischemia reperfusion injury.

26

Benov L, *Thomas M: Effect of symmetry, flexibility and size on photosensitizer efficiency.

27

*Matar B, Cheng B: Opposite effects on plasma arachidonic acid levels in ACTH-stimulated and dexamethasone-treated rats: a new insight into the anti-inflammatory role of glucocorticoids during stress.

284

*Iskandarani I, Cheng B, Kilarkaje N: Novel aldosterone autocrine/paracrine mechanism in the adrenal cortex.

Cell Biology and Cytopathology

28

*Kapila K, Al-Shaheen A, George SS, Al-Juwaiser A, Sharma PN, Al-Awadhi R: Prevalence of gynecologic infections observed in conventional smears and thin prep preparations (1997-2014) in Mubarak Al-Kabeer Hospital, Kuwait.

29

*Pramod S, Gabriel J, Luqmani Y, Mustafa AS: Effect of long-term subculturing/passaging on fluorescence emitted by GFP-transfected E2 Cell line using flow cytometry and confocal microscopy.

Community Medicine

30

*Abdullah EJ, Badr HE: Quality of life and performance of daily life activities among multiple sclerosis adult patients in Kuwait.

31

*Abdulrasool MJ, Al-Shanfari SH, Boalayan HS, Boujarwa AS, Al-Mukaimi AS, AlKandery OM, Shukkur M, Akhtar S: Exposure to environmental tobacco smoke and allergic conditions among high-school students.

32

*Abohaimed SS, Alshimali HM, Althalji K, Alothman O, Matar B, Zurba YF, Shah N: Physicians' attitudes towards different types of euthanasia in Kuwait.



33

Al-Aqeeli A, Al-Sabah A, Thekrallah J, *Al-Enezi M, Ebrahim M, Al-Sahly Q, Longenecker J: Cardiovascular risk factors and preventative practices among MOH primary care physicians in Kuwait.

34

*Al-Awadhi SH, Al-Batineh A, Al-Majran A: Knowledge, attitude and practices among physicians working in MOH hospitals towards notifiable diseases surveillance system in Kuwait: a cross-sectional study.

35

*Al-Enezi L, Osman A, AlMulla A, Al-Zamanan F, Al-Herz A, Sayer K, Tadros N, ElReda D, Longenecker J: Knowledge of coronary heart disease risk factors and prevention among patients attending Ministry of Health Primary Care Centers in Kuwait.

36

*Al-Mathkoori R, Al-Taiar AB: Age at menarche in relation to breastfeeding and academic performance among high school girls in Kuwait.

37

AlMujaibel A, Jamal D, *AlQattan H, AlJuwaihel H, AlAli Z, Al-Taiar A: Maternal body mass index [BMI] and breastfeeding initiation and practice.

38

*Almutairi R, Wais F, Khaled M, Ayed N, Alqattan M, Ziyab AH: Prevalence and risk factors of food allergy among children in Kuwait: A cross-sectional study.

39

Al-Roudhan Y, Al-Abdeen Y, *Saleh E, Al-Fodari N, Al-Saqer H, Alhumoud F, Thalib L: Obesity and maternal perception among children aged 6 to 8 years in Kuwait.

40

Alsalem A, Al-Lumai D, Al-Kandari S, Dawoud A, Al-Mutairi S, Gomez J, Moussa MAA: Association between sleep hygiene awareness and practice with sleep quality among Kuwait University students.

41

*Altayar EB, Mitra AK: The association between fast food consumption and obesity of high school students in Kuwait.

42

*Ben Haider NY, Ziyab AH: Obesity as a risk factor for prediabetes and prehypertension among youth in Kuwait: A cross-sectional study.

43

*Boshehri F, Al-Harbi H, Dawoud M, AlRashed R, Al Ben Ali S, Al-Rumaih Y, Shah NM: Cosmetic procedures amongst male and female university students in Kuwait: attitudes, motives, and prevalence.



44

Farouk N, Farahat M, Gheith O, EL-Derea H, Abd EL-Moneim AL-Ahwal, *Othman N: Chicken and meat products preservation by *origanum majorana*.

45

Farouk N*, Farahat M, Gheith O, EL-Derea H, Abd EL-Moneim AL-Ahwal: *Origanum majorana* as an organic food preservative for milk products.

46

*Jalai M, Mahmoud F, Othman N, Al-Arouj M, BenNakhi A: Impact of structured education on diabetes management during Ramadan.

47

*Kamar M, Al-Sayegh R, Al-Majid S, Al-Enzi M, Al-Hammad L, Al-Bloushi S, Ziyab AH: Prevalence and associated factors of musculoskeletal pain among medical and dental students in Kuwait: a cross-sectional study.

48

*Khalidi L, Al-Saffar N, Faraj H, Alipour M, Bin Salama Sarah, Borahmah A, Albatineh AN: Quality of life comparison between hemodialysis and peritoneal dialysis among end-stage renal disease patients in Kuwait.

49

*Najla Al-Ayyadhi, Akhtar S: Self-reported ill-health conditions among fuel pump workers in Kuwait: A cross-sectional study.

285

*Behbehani Y, Al-Majran A, Al-Refaie A, Al Fahad F, Al Mulla F, Al Tarakumah H, Ramadhan F, Badr H: Prevalence, Associated Factors, and Low Back Pain Disability Assessment among Government Employees in Kuwait.

Dentistry

50

*Alanzi A, Honkala S, Honkala E, Varghese A, Tolvanen M, Söderling E: Effect of *Lactobacillus rhamnosus* LGG and *Bifidobacterium lactis* BB-12 on Gingival Health and Dental Plaque in Healthy Adolescents: A Randomized Controlled Clinical Trial

51

Arab M, Al-sarraf E, Al-shammari M: Microshear bond strength of different restorative materials to teeth with Molar-Incisor-Hypomineralization (MIH).

52

*Al-Asfour A, Waheedi M, Koshy S: A survey of patients' experience of orthognathic surgery: Health related quality of life and satisfaction.

53

Alkhabbaz A, George S: The effect of risk factors on the outcomes of non-surgical periodontal therapy.



54

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**Original Research Abstracts
by Subject Area**



Academic Development

Category: Clinical

1

**Academic staff development in the Faculty of Medicine, Kuwait
University: Review in two decades**

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Introduction:

Objective: To determine the size, structure and academic progress of the academic staff of Faculty of Medicine (FOM), Kuwait University (KU), Kuwait, during the past two decades with emphasis on recruitment of Kuwaitis, academic leadership positions, staff number, rank distributions and gender.

Methods:

A retrospective analysis was done using the data from the Departments of Recruitment and Student Affairs, FOM from 1995 to 2014.

Results:

The number of medical students in the FOM, increased from 520 to 636; an increase of 22.3 %. The total number of academic staff increased from 114 (59, 51.8% in basic and 55, 48.2% in clinical sciences) to 207 (103, 49.8% in basic and 104, 50.2% in clinical sciences) from year 1995 to 2014. The academic leadership positions in 2014 were occupied by 29 males and 4 females, the male: female ratio being 7:1, while there was no females in administrative positions in 1995. The number of Assistant Professors decreased from 50 (43.9%) to 69 (33.3%), Associate Professor number increased from 34 (29.8%) to 65 (31.4%) and full Professor rank number increased from 30 (26.3%) to 73 (35.3%) from 1995 to 2014. There was a significant increase of Kuwaiti nationals, 30 (26.3%) and 133 (64.2%) vs. 84 (73.7%) and 74 (35.7%) non-Kuwaitis during 1995 and 2014 respectively, (p<0.0001). Kuwaiti nationals occupied clinical posts more than basic sciences posts, 18 (32.7%) and 77 (74.0%) vs. 12 (20.3%) and 56 (54.3%) respectively, (p<0.0001) in 1995 and 2014. Female academic staff increased significantly, 16 (14.0%) and 59 (28.5%) vs. 98 (86.0%) and 148 (71.5%) males, during 1995 and 2014 respectively, (p<0.0001).

Conclusions:

Our study indicated an increase in academic staff with an advancement in academic ranks, especially by Kuwaiti nationals, in the FOM, KU, during the past two decades. The recruitment of female academic staff increased significantly, which in future might restore the gender disparity in the leadership positions.

Key Words: Academic development; Academic leadership; Kuwait

Funding Agency: None



Allied Health

Category: Clinical

2

A comparison study between regional and manufacturer hematology reference ranges for adult complete blood count

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Introduction:

Reference ranges provide valuable information in offering a correct interpretation of laboratory results for a proper diagnosis and treatment. It became known from research work that European population's reference ranges are not identical to the reference ranges for other populations in other continents. Establishing an appropriate reference ranges is a complex and difficult process.

Methods:

The complete blood count results were collected from 1000 Kuwaiti adult individuals from the electronic data system. To ensure the accuracy and validity of the results, the Chi-square significant statistical value was taken in analytical stages. It was analyzed by excels Microsoft 10. Our CBC obtained results compared with the apparatus manufacture's supplied results. Also a comparison was made between our obtained results and the international hematology reference range.

Results:

Significant differences were found between our obtained results and the provided hematology reference ranges supplied by the apparatus manufacturing country. CBC: The obtained result made the marginal anemic patients with slight hypochromic microcytic picture within the normal HRR. WBC: The slight increase in white cell counts in this study excluded infection or any underlying disease because the increase in white cell count was within the obtained normal results. Platelets: Found in the lower normal range in comparison to platelets normal range supplied by the apparatus manufacture.

Conclusions:

The regional factors including ethnicity, genetics and other environmental factors could affect the complete blood count. So setting and standarizing a local regional HRR is mandatory requirement for each region and must be compared with the HRR supplies by the apparatus manufactured in other country or affected by other local environmental factors.

Key Words: Hematology Reference Ranges; Complete Blood Count; Comparison

Funding Agency: None



Allied Health

Category: Basic Sciences

3

Investigating the influence of age, gender and ABO blood group on ADAMTS-13 antigen and activity levels in healthy Arabs

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Introduction:

ABO blood group is a major determinant of plasma von Willebrand factor (vWF). Elevated levels of vWF are associated with non O blood group while O blood group individuals have less vWF in their plasma. Studies on the association of ABO blood group with the vWF cleaving protease ADAMTS-13 are limited. In this study we aim to investigate the effects of ABO, age and gender on vWF and ADAMTS-13 levels in subjects of Arab ethnicity.

Methods:

Venous blood samples were collected from 200 healthy Arab nonsmokers (100 males and 100 females). Plasma was separated and used to measure ADAMTS-13 antigen and activity levels, as well as vWF antigen levels using commercial ELISA kits.

Results:

vWF antigen levels increased with age ($R = 0.269$, $p < 0.001$), while ADAMTS-13 activity decreased ($R = -0.257$, $p < 0.001$). O-blood group subjects had significantly lower vWF antigen levels compared to non-O blood group subjects ($p = 0.003$), but ADAMTS-13 antigen and activity levels were indifferent. Females had significantly lower levels of vWF ($p < 0.001$) and higher levels of ADAMTS-13 antigen ($p < 0.001$) compared to males (irrespective of blood group type). Only O-blood group females had significantly lower vWF levels compared to non O-blood group females ($p = 0.009$). ADAMTS-13 antigen and activity levels were not affected by ABO group in males or females.

Conclusions:

In the Arab population, age and gender are important factors to consider when vWF and ADAMTS-13 levels are investigated. ABO blood group had no influence on levels of ADAMTS-13 in healthy Arabs. Lower levels of vWF in group O subjects (mainly females) were not mirrored with increased levels of ADAMTS-13, hence the variation in vWF levels between different blood groups cannot be attributed to changes in ADAMTS-13 levels.

Key Words: von Willebrand Factor; ADAMTS-13; ABO blood group

Funding Agency: Research Sector, Kuwait University



Allied Health

Category: Basic Sciences

4

Are we truly dedicated to improving health?

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Introduction:

The Health Sciences Center of Kuwait University states that it is “dedicated to saving lives and improving health”. Theoretically, health care professionals should lead healthy lifestyles because of the fact that they advocate these lifestyles to their patients. However, it is unclear how “healthy” these professionals are in reality.

Methods:

Longitudinal collection to evaluate health indicators of students, and staff of the Health Sciences Center of Kuwait University. Health assessment included a health questionnaire and objective measures (heart rate, blood pressure, waist-to-hip ratio, and random blood glucose testing).

Results:

This study included 849 subjects (231 staff, 606 students). Students and staff had evidence of sub-optimal health, overweight/obesity (68.7%, 48.1%, $p < 0.001$), 57% of staff demonstrated high blood pressure. The majority of students and staff reported moderate/high stress levels (91% and 89%). Only 25.1% of staff and 27.9% of students slept an average of eight hours per night. Approximately half of students and staff reported being moderately physically active (2.5 hours of activity/week) (44.8% and 52.6%). The majority of students and staff reported eating fast-food more than once per week (92.3% and 79%).

Conclusions:

Our findings demonstrate the poor health status of our Health Sciences Center community. This poor health status is a potential danger to the general community as many patients look up to their healthcare providers. In general, the sampled population indicated their knowledge of healthy lifestyle behaviors. However, time, attainable exercise facilities, and the discipline to pursue these healthy lifestyle behaviors have been a challenge to many. Methods to encourage healthy lifestyle behaviors in this community need to be identified.

Key Words: Healthy lifestyle; Overweight/obesity; Physical Activity

Funding Agency: None



Allied Health

Category: Graduate MSc (Basic Science)

5

Molecular typing of methicillin resistant *Staphylococcus aureus* (MRSA) isolates with reduced sensitivity to chlorhexidine in Kuwaiti hospitals.

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Introduction:

To control hospital-acquired infections, it is essential to reduce the bacterial load and ensure the effectiveness of hygienic conditions. Chlorhexidine is one of the most widely used biocides. It is commonly used as skin antiseptic prior to clinical procedures, in dressings, hand disinfections and when bathing patients. Since resistance genes to quaternary ammonium compounds have appeared more frequently in staphylococcal isolates, we aimed to identify if the MRSA with reduced sensitivity to antibiotics and biocides are clonal in Kuwait.

Methods:

Ninety-seven clinical MRSA were collected from nine different hospitals in Kuwait. PCR was used to amplify genes including *mecA*, *blaZ*, *qac A/B*, *qacH*, *qacH2*, *qacG*, *smr*, *norA*, PVL and *agr* genes. Antibiotic sensitivity testing for 10 antibiotics and MIC / MBC of chlorhexidine was determined for all isolates. MLST, *spa* and PFGE were used for typing.

Results:

The predominant identified genes were *mecA* (100%), *blaZ* (76.2%), *norA* (37.1%), *qacA/B* (6.1%), *smr* (1%), while *qacG*, *qacH*, *qacH2* were not detected. All isolates were sensitive to vancomycin, teicoplanin and tigecycline. The MBC for chlorhexidine was statistically greater than MIC with $p < 0.0001$ which ranged from 0.94-60 mg/l. Typing methods showed genetic variations between the isolates. However the majority of isolates were HA-MRSA ST239-III PVL- and HA-MRSA ST22-IV PVL-.

Conclusions:

In total 44% of MRSA contained at least one of the resistance genes to chlorhexidine. All *qacA/B* positive isolates with reduced sensitivity to chlorhexidine (MBC 30-60mg/ml) were HA-MRSA-ST239-III-t945 PVL- and had identical PFGE patterns. Reduced sensitivity may be a contributing factor to survival of this clone in hospitals.

Key Words: MRSA; qacA/B; MLST

Funding Agency: Kuwait University Grant



Allied Health

Category: Undergraduate

6

High prevalence of Factor V leiden mutation among the Armenian population in Kuwait

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Introduction:

Venous thromboembolic disorders (VTE) are serious cardiovascular diseases that account for high morbidity and mortality rates worldwide. One of the most important risk factors for developing VTE is factor V Leiden genetic mutation (FVL: G1691A). Studies reported that FVL was present mostly in populations of Caucasian origin in Europe and other countries, but was almost absent in non-Caucasians. Armenia is considered a European country but no one had studied FVL in Armenians before. In addition to Armenia, Armenian people live in many other countries including Kuwait, and they are known to almost always marry from only each other. This study was conducted to explore the presence of this mutation in the Armenian population living in Kuwait, which is the first of its kind on Armenians worldwide.

Methods:

Whole blood samples were collected from 102 apparently healthy Armenian individuals living in Kuwait. DNA was extracted from the blood samples and analyzed for FVL mutation by real time PCR using primers and probes specific for FVL.

Results:

27 cases (26.5%) were found to have FVL (26 heterozygous and one homozygous) with an allelic frequency of 0.137.

Conclusions:

FVL mutation was present in Armenians with a relatively high prevalence rate (26.5%) compared with populations of other European countries (1-15%), other neighboring countries like Turkey and Iran (5-10%), and Arabs of the East Mediterranean countries (10-27%) and the Arabian Gulf countries including Kuwaitis (0-5%). Armenia appears to have one of the highest, if not the highest, prevalence rates of FVL in the world as shown by this study.

Key Words: Factor V Leiden; Armenia; Venous Thrombosis

Funding Agency: None



Allied Health

Category: Graduate (Resident)

7

Hospital based evaluation of vitamin D status in the capital governorate of Kuwait

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Introduction:

Vitamin D (Vit D) is a unique hormone as it can be synthesized in the skin from exposure to sunlight apart from dietary supplementation, and yet there is ever growing evidence of its widespread deficiency and insufficiency. The aim of our study was to determine the age and sex wise vitamin D insufficiency and deficiency in the capital governorate of Kuwait.

Methods:

Results of Vit D tests done between the period of 28 June 2010 to 12 December 2014 in Amiri Hospital Biochemistry Laboratory were retrieved from Laboratory information system (LIS) and taken up for this study. All the serum samples were run on Roche Cobas-e-411, based on the principle of electro-chemiluminescence using competitive protein binding assay (CPBA). The subjects were grouped based on their age, gender and nationality.

Results:

Results of different age groups, nationalities and sex were compared. Results: Serum 25 (OH)Vit D results of 85598 subjects were collected. The mean Vit D level was 51.798 (+/-37.75) nmol/L. Out of the total no subjects, 73.71% were females and 26.29 % were males. The study comprised 45.17% Kuwaitis and 54.83% non Kuwaiti subjects. About half the subjects (54.9%) were Vit D deficient (≤ 50 nmol/L) and about a fifth (18.22%) were found to have Vit D insufficiency (≤ 75 nmol/L). Bulk of the deficiency was seen in the age group of 0-20 years in Kuwaiti males (10.1%) and females (8.14%) and non Kuwaiti females (7.8%). Age group with maximum Vit D insufficiency was 41-60 years and mainly females of non Kuwaiti origin (12.3%) were found to have insufficiency.

Conclusions:

Vit D deficiency was found to be common among young Kuwaitis. On the other hand, Vit D insufficiency was more common in the non Kuwaiti population especially in women of perimenopausal age group.

Key Words: Vitamin D; Deficiency; Insufficiency

Funding Agency: No



Allied Health

Category: Clinical

8

Teaching a practical clinical skill (Peripherally inserted central catheter dressing) to nursing students using educational theory by simulation.

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Introduction:

The teaching project plan was to incorporate specific teaching topic on PICC line care (dressing) into nursing students' internship program in KCCC hospital and establish a workshop on training clinical skills for small group of nursing students that are in their last semester of their study in the nursing college. Anon-invasive but important clinical skill was chosen to make the students feel confident and at the same time gain competency in doing and learning important aspects of a clinical skill as a professional nurse.

Methods:

Three sessions of teaching were planned, in the first session to review and recall the anatomy of cardiovascular system and discuss the medical implications of inserting peripheral central catheter and common complications and how to prevent those complications. In the second session a simulation workshop was designed to enhance and underpin the results among educational theories. Kolb's experiential learning theory provides a useful model for using simulation in training. On session 3, that was the most challenging for the students they applied their knowledge by practicing PICC dressing in oncology unit on patients.

Results:

The most important learning outcome of this workshop was met and all students competently performed the expected clinical skill.

Conclusions:

I would like to recommend to establish simulation based education for teaching clinical skills for students to apply on simulated patients safely and demonstrate their theoretical knowledge and upgrade from level 1 of Bloom's taxonomy to higher level

Key Words: clinical skill, peripherally inserted central catheter; nursing students, educational theories, simulation; simulated patient, competency, Bloom's taxonomy

Funding Agency: none



Anatomy

Category: Basic Sciences

9

Role of pro-inflammatory IL-1 beta in stab wound brain injury model

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Introduction:

It is widely known that inflammatory events following brain injury contribute to the widespread of cell death and brain degeneration. Astrocytes and microglia are considered as key players in initiating inflammatory response after brain injury. The pro-inflammatory cytokine IL-1 β is released by and also acts on astrocytes and microglia which could modulate the neuronal survival. Objective of this study is to examine the effect of IL-1 β on the survival of cortical neurons in stab wound brain injury.

Methods:

Two groups of mice were used. The first group (I) was subjected to stab wound brain injury. This group was subdivided into IA and IB groups. The second group of mice (N) was not subjected to injury and subdivided into NA and NB. Groups IA and NA received five IP injection of IL-1 β (0.5 μ g/12h), whereas, groups IB and NB received five IP injections of PBS. Animals were killed 1, 2, 5 and 7 days after last injection. Immunostaining of frozen brain sections for glial fibrillary acidic protein (GFAP) specific for astrocytes, Iba1 (specific for microglia) and Fluoro-Jade (specific for degenerating neurons) were used. Western blotting was done from the tissues isolated from the injured sites of group I.

Results:

In group N (NA and NB) there was no significant changes in the number of astrocytes or microglia. In group I there was a gradual increases in the number of both astrocytes and microglia with a significance increase in IL-1 β treated group IA. The number of degenerating neurons significantly decreased in IL-1 β -treated group IA.

Conclusions:

This study indicates that IL-1 β has no effect on normal brain cells, whereas, it affects the survival of cortical neurons in stab wound and both activated astrocytes and microglia can contribute to the neuronal survival. This study supports the strategies of preserving the activating astrocytes and microglia in the planning of future therapies to promote neuronal regeneration in brain injury.

Key Words: Astrocytes; Microglia; Neuronal survival

Funding Agency: Kuwait University grant # MA01/14



Anatomy

Category: Graduate MSc (Basic Science)

10

Diabetes does not induce parthanatos of testicular cells but Resveratrol modulates poly (ADP-ribose) polymerase signaling in testes of diabetic rats

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Introduction:

Male reproductive dysfunction is a common secondary effect of diabetes, which warrants newer strategies to alleviate these adverse effects. Resveratrol (trans-trihydroxystilbene), a stilbene compound extracted from red grapes, seems to have several beneficial health effects. In this study, we investigated the modulatory effects of Resveratrol on diabetes-induced alterations in poly (ADP-ribose) polymerase (PARP) signaling in testicular cells.

Methods:

Adult male Wistar rats (n=6-8) were segregated into control, Resveratrol-treated (5 mg/kg; ip), Streptozotocin (55 mg/kg)-induced diabetic, and diabetes+ Resveratrol-treated groups. The last group received Resveratrol from days 22 to 42. The rats were killed on day 42 after the diabetes induction. Total antioxidant (TAS) and oxidant (TOS) levels were estimated in testes samples by using plate reader assays. The PARP signaling (total PARP, PARP1, SirT1, PARG, pADPr, AIF and AIMP2) was evaluated by using Western blotting and immunohistochemistry. Data were analyzed by one way ANOVA and LSD tests by using SPSS software and P<0.05 was considered significant.

Results:

Diabetes-induced oxidative stress in testes had increased total PARP, but decreased PARP1 via caspase-3-mediated cleavage. Resveratrol recovered diabetes-induced decrease in SirT1 (Sirtuin). Resveratrol alone reduced the pADPr accumulation but diabetes increased it, while PARG levels did not change. Resveratrol aggravated diabetes-induced up-regulation of Aminoacyl tRNA synthetase complex-interacting multifunctional protein 2 (AIMP2) expression in the testis. Diabetes with or without Resveratrol did not induce nuclear translocation of apoptosis-inducing factor (AIF) suggesting the lack of parthanotos.

Conclusions:

Diabetes with or without Resveratrol does not induce parthanatos of testicular cells. Resveratrol is useful to minimize oxidative stress and to modulate PARP signaling in diabetic rat testes.

Key Words: Antioxidants, Hyperglycemia; PARP, Oxidative stress; Parthanatos, Resveratrol

Funding Agency: Supported by Kuwait University grant # RM01/12, YM10/13, College of Graduate Studies and SRUL02/13



Anatomy

Category: Undergraduate

11

Adult neurogenesis declines at an early age in dark agouti rats in comparison to wistar rats

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Introduction:

Adult neurogenesis is a continuous process of addition of new neurons into the nervous system after birth. Newly born neurons in the dentate sub granular zone integrate with dentate gyrus granule neurons and play a role in learning and memory. Adult neurogenesis declines in an age dependent manner in albino rats. However pattern of adult neurogenesis in pigmented Dark Agouti (DA) rats is not known. Objective of the present study was to explore the pattern of neurogenesis at different ages in DA rats and compare it with age matched Wistar rats.

Methods:

DA rats aged 1, 2, 4, 6, 8 and 10 months were euthanized with CO₂ and perfused with saline followed by 4% paraformaldehyde. Brains were dissected and processed for doublecortin (DCX, marker for new neurons) immunostaining. Number of newly born neurons in the dentate gyrus were quantified. Unfixed hippocampal tissues were used for Western blot analysis of DCX content. Hippocampal tissues from age matched Wistar rats were processed in the similar way for comparison. Data were analyzed with one way ANOVA and Bonferroni's test.

Results:

Neurogenesis declined progressively in both DA and Wistar rats. Number of new neurons in the dentate gyrus of 1 month and 2 months old DA rats were similar to each other as well as to age matched Wistar rats ($p > 0.05$). However neurogenesis commenced to decline as early as 4 months in DA rats as number of new neurons significantly less in them compared to age matched Wistar rats ($p < 0.05$). At 6, 8 and 10 months of age, neurogenesis further declined in DA rats compared to Wistar rats ($p < 0.01$). Neuronal count data was supported by Western blot analysis for DCX content in the hippocampus.

Conclusions:

In conclusion, extent of adult hippocampal neurogenesis in DA rats is significantly less and declines at an earlier age than in Wistar rats. Mechanism, cause, and functional implications of such a decreased neurogenesis at an early age needs to be explored further.

Key Words: Hippocampus; Dark Agouti rat; Neurogenesis

Funding Agency: None



Anatomy

Category: Graduate MSc: Basic Science

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(-)-Epigallocatechin-3-gallate (EGCG) enhances learning and memory and adult neurogenesis in streptozotocin induced diabetic rats

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Introduction:

Diabetes mellitus is a chronic disease characterized by high level of glucose in the blood. (-)-Epigallocatechin-3-gallate (EGCG), found in green tea proved to be responsible for its beneficial effects. The objective of this study was to examine the effects of EGCG on learning and memory and adult hippocampal neurogenesis in streptozotocin (STZ) induced diabetic rats.

Methods:

Male Wistar rats (3months old) were divided into vehicle control (VC), EGCG, Diabetic (DI), and Diabetic + EGCG treated (DI+EGCG) groups (n=12 in each group). Diabetes was induced in DI and DI+EGCG groups with STZ (40 mg/kg i.p.). EGCG and DI+EGCG rats were treated with 50mg/kg of EGCG (ip) for 3 weeks. The VC group were injected with 1 ml of saline for 3 weeks. Learning and memory were assessed in all animals during 3rd week. Rats were perfused with 4% paraformaldehyde for immunohistochemical analysis of neurogenesis and astrogliosis. Data were analyzed with one-way ANOVA and Bonferroni's test.

Results:

Learning and memory test showed a significant memory deficit in DI rats compared to VC and EGCG groups (p<0.001). In contrast, memory was significantly improved in DI+EGCG group compared to DI animals (p<0.001). Doublecortin (DCX-marker for new neurons) and glial fibrillary acidic protein (GFAP, a marker for astrocytes) showed significant decrease in neurogenesis and number of astrocytes in DI compared to VC and EGCG groups (p<0.01). Neurogenesis was found to be significantly increased in the DI+EGCG compared to DI (p<0.001). Western blot analysis of DCX and GFAP protein content confirmed the immunostaining data.

Conclusions:

EGCG enhances astrocytes number which provides neurotrophic support for neurogenesis, thereby enhancing neurogenesis and cognitive function. We conclude that EGCG has a beneficial role in minimizing the effects of diabetes on the hippocampal neurogenesis.

Acknowledgment:

This work was supported and funded by Kuwait University Research Grant No [YM01/14].

Key Words: EGCG; Diabetes; Neurogenesis

Funding Agency: Yes



Anatomy

Category: Undergraduate

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Oxygen-loaded nanobubble administration normalizes alcohol-induced DNA demethylation in rat dorsal root ganglion neural stem cells

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Introduction:

Nanobubbles [NBs] are gaining attention as potential vehicles for the delivery of biological molecules. Alcohol consumption during pregnancy can lead to fetal alcohol spectrum disorder, which has been shown to occur in part due to epigenetic changes. Alcohol and oxygen have both been shown to modify epigenetics, including DNA methylation. In this study, we investigate whether oxygen-loaded nanobubbles [OLNBs] could alter alcohol-induced changes in DNA methylation in alcohol treated neural stem cell cultures.

Methods:

Twelve adult rat dorsal root ganglion cell cultures were prepared. The cells were isolated from adult rats and maintained in a culture for more than ten years. They were divided into four groups, with one group serving as the control while the other three groups were treated with 175 mg/dL alcohol and different concentrations of NBs [0, 0.01, 1 mg/ul]. Harvested cells were subject to quantification of global DNA methylation and gene expression analysis of *Ascl1*, *Egln1*, and *Hif1-alpha* genes. In addition, two chamber slides, with one serving as the control, were prepared for 5-methylcytosine [5mC] and DNA methyltransferase [DNMT] immunostaining.

Results:

Global methylation was reduced in the alcohol group as compared to the control ($p=0.058$), while OLNb treatment at 0.01 mg/ul maintained methylation near control levels with significant difference to the alcohol group ($p< 0.001$). Immunostaining and cell counting demonstrated a marginally insignificant ($p=0.076$) higher level of 5mC-positive cells in the 0.01 mg/ul group compared to the alcohol group. The number of DNMT-positive cells was reduced in both alcohol and OLNb groups ($p=0.9$). Alcohol significantly increased expression of *Egln1* ($p<0.05$), while OLNb universally decreased expression of all three genes compared to the two other groups.

Conclusions:

OLNBs administration showed a potential to maintain Global methylation near control levels in the presence of alcohol.

Key Words: Oxygen-loaded nanobubbles; Alcohol; Methylation

Funding Agency: This work is supported by NIH AA016698, P60 AA07611 and W. M. Keck Foundation to Feng C. Zhou.



Anatomy

Category: Undergraduate

14

Monoamine oxidase-B inhibitor protects degenerating spinal neurons, enhances nerve regeneration and functional recovery in sciatic nerve crush injury model

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Introduction:

Monoamine oxidase (MAO) is a flavin adenine dinucleotide (FAD) containing an enzyme which catalyzes the oxidation of amines. MAO-B is proposed to play an important role in the pathogenesis of neurodegeneration through the production of reactive oxygen species (ROS) and neurotoxins. The present study was designed to outline the effects of the MAO-B inhibitor on sciatic nerve regeneration, neuroprotection of spinal neurons and sensory-motor functional recovery in the sciatic nerve crush injury model.

Methods:

Male Wistar rats (4-month-old) were assigned to i) Naïve (N), ii) Sham (S), iii) Sciatic nerve injured and treated with saline (I+Saline) and iv) Sciatic nerve injured and treated with MAO-B inhibitor (I+MAO-B-I) groups (n=10/ group). In group iii and iv, the injury was produced by crushing the sciatic nerve followed by treatment with saline or MAO-B-I (2.5 mg/kg) for 10 days. Behavioral tests were conducted from week 1 to week 7. At the end of the study sciatic nerve and lumbar spinal cord were studied by immunohistochemistry, light and electron microscopy. Data were analyzed with one-way ANOVA followed by Bonferroni's multiple comparison tests.

Results:

I+MAO-B-I treatment showed significant improvement in sensory and motor tests (Hopping reflex, hot plate test, tail flick test, extensor postural thrust, foot position, toe spread test, mechanical hyperalgesia test) compared to I+Saline group ($p < 0.05$ - 0.001). The morphological study showed a significantly increased number of nerve fibers in sciatic nerve ($p < 0.05$), with better myelination pattern in I+MAO-B-I treated group compared to I+Saline group. Spinal cord ventral horns showed a significant increase in the number of NeuN-immunoreactive neurons in the I+MAO-B-I treated group compared to I+Saline group ($p < 0.01$).

Conclusions:

MAO-B-I has a significant potential for protecting the degenerating spinal cord neurons and enhancing the regeneration of injured sciatic nerve following crush injury.

Key Words: Sciatic nerve; MAO-B inhibitor; Neuroprotection

Funding Agency: NONE



Anatomy

Category: Undergraduate

15

Thymoquinone enhances neurogenesis, learning and memory in young adult rats born to diabetic rats

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Introduction:

Our earlier study and literature showed learning and memory deficit in young rats which were born to diabetic rats. The present experiment was aimed to study the effects of thymoquinone (TQ, a constituent of *Nigella sativa* seeds) on neurogenesis, learning and memory in the young rats born to the diabetic rats.

Methods:

Diabetes was induced in pregnant rats on 10th gestational day by streptozotocin (50 mg/kg ip). Pups born were fostered to normal mothers. They were divided into diabetic control (DC), and Diabetic+TQ (D+TQ) groups when they were 40 days old. Age matched rats born to normal pregnant rats were divided into normal control (NC) and TQ groups (n=12 in each group). Rats in D+TQ and TQ groups were treated with TQ (10 mg/kg, ip) from postnatal day (PND) 41 to PND 60. Rats in all four groups were subjected to Morris water maze test and they were perfused with 4% paraformaldehyde. Hippocampal tissue was processed for doublecortin (DCX-marker for new neurons) and Glial fibrillary acidic protein (GFAP) immunostaining. Data were analyzed with one way ANOVA

Results:

Rats in DC group showed significant learning and memory deficit compared to NC group (p<0.001). Treatment with TQ normalized learning and memory deficit in D+TQ group. TQ alone did not show any effect on cognition compared to NC group (p>0.05). Number of new neurons and astrocytes were found be decreased significantly in DC compared to NC group (p<0.01), and number of new neurons and astrocytes in D+TQ group were not significantly different from NC group (p>0.05). TQ treatment alone increased neurogenesis in TQ group compared to NC group (p<0.05). Western blot analysis of DCX and GFAP protein content confirmed the immunostaining data.

Conclusions:

In conclusion, prenatal diabetes affects postnatal adult neurogenesis, learning and memory. Thymoquinone can enhance adult neurogenesis in the hippocampus of young rats born to diabetic mothers there by enhance the cognitive functions.

Key Words: Thymoquinone; Diabetes; Neurogenesis

Funding Agency: Yes



Anatomy

Category: Basic Sciences

16

ISRAA modulate microglial growth via STAT1- activation

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Introduction:

The Immune System-Released Activating Agent (ISRAA) was described as a nervous system factor inducing immune responses in the spleen. The aim of this study was to examine the effect of ISRAA on growth of microglial cells from mouse developing brain and investigate the role of the Signal Transducers and Activators of Transcription (STAT1) in this process.

Methods:

A standard procedure for primary culture preparation was employed from embryonic day 15 (E15) Balb/c mice embryonic brains. Cells were dissociated and cultured for 10 days in T-75 flasks. The primary microglial cells were isolated by 2-h shaking in culture. After 2 days in culture, the slides were divided into four groups; control, inhibitor group (S14-95) to block STAT1 activities), ISRAA group (50 pg of ISRAA for 5, 10, 15, 30, 60 min), the inhibitor + ISRAA group (S14-95 for 30 min + 50 pg of ISRAA for 5, 10, 15, 30, 60 min). The slides were used for immunofluorescence technique and evaluated by confocal microscopy. STAT1 protein phosphorylation was determined in cell lysate with STAT1 ELISA kit to verify pathway activation.

Results:

In microglial cell cultures stimulated with 50 pg ISRAA, significantly higher microglial -STAT1 positive cells were noted compared to untreated cells ($p < 0.001$). ISRAA had the ability to induce microglial -STAT1 positive cells in time-dependent manner with the highest induction after 60 min exposure ($p < 0.001$).

Conclusions:

ISRAA is a promising protein that has the capability to control microglial cells activity through STAT 1 pathway and enabled other neuronal cells to proliferate and grow again, which suggests a potential therapeutic role for this protein in neurodegenerative diseases.

Key Words: ISRAA; STAT1; Microglia

Funding Agency: KFAS, 2011-1302-02



Anatomy

Category: Basic Sciences

17

Neurogenesis during pregnancy and non-pregnancy period in young female rats-effects of diabetes

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Introduction:

During pregnancy many physiological and hormonal changes happen in the female body and nervous system which prepares them for the challenges of motherhood. Hippocampal adult neurogenesis increases during later part of pregnancy and decreases after delivery through lactation period in rats. Diabetes mellitus is known to affect the hippocampal neurogenesis. The objective of the present experiment was to study the effects of diabetes during pregnancy and non-pregnancy period on hippocampal dentate gyrus (DG) neurogenesis.

Methods:

Adult Wistar pregnant rats were divided into normal pregnant group (NP)-remained without any treatment till delivery and diabetic pregnant group (DP)-Diabetes was induced in these rats by injecting streptozotocin (50mg/kg) on 10th day of gestation (n=12 in all group). Immediately after delivery dams in both groups and age matched normal female (NF, n=12) and Diabetic female (DF,n=12) rats were anesthetized with halothane, perfused with 4% paraformaldehyde, brain was dissected and processed for frozen sections. Sections (30µm) were immunostained with doublecortin (DCX) to analyze the neurogenesis. Unfixed fresh hippocampal tissues were used for western blot analysis of DCX. Data were analyzed with one way ANOVA followed by Bonferroni's test.

Results:

Results showed significantly decreased DG neurogenesis in DF group compared to NF (P<0.001). Number of DCX positive neurons in NP rats were significantly more compared to DP group (P<0.001), however it was significantly increased compared to NF (P<0.001). Comparison of neurogenesis between DF and DP, DP showed significantly less new neurons (P<0.01). Results of our experiment suggests that, diabetes affects neurogenesis differentially during pregnancy and non-pregnancy period. Western blot analysis confirmed the immunostaining data.

Conclusions:

In conclusion, diabetes affects the neurogenesis adversely in the pregnant female rats, which may affect the maternal behaviour.

Key Words: Hippocampus; Diabetes; Neurogenesis

Funding Agency: No



Anatomy

Category: Basic Sciences

18

Thymoquinone enhances survival of neurons in hippocampal cultures exposed to kainic acid

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Introduction:

Thymoquinone (TQ), an active constituent of *Nigella sativa* seeds, possesses anti-inflammatory and neuroprotective properties. TQ is reported to enhance the neuroprotection in different CNS diseases and animal models of neurodegeneration. Aim of the present experiment was explore the efficacy of TQ in neuro protection against kainic acid excitotoxicity on cultured hippocampal neurons.

Methods:

Primary culture of hippocampal cells from the 18 days old embryonic hippocampus were grown for 7 days. These cultures were divided into control group (C), kainic acid group (KA), Kainic acid+Thymoquinone group (KA+TQ, n=6 in group). Control cultures continued to grow without any further treatment, KA cultures were exposed to media containing kainic acid (0.1 μ M) for 3hrs and thereafter continued to grow in the normal media for 1 week. KA+TQ cultures were exposed to media containing kainic acid (0.1 μ M) for 3 h and thereafter continued to grow in the media containing 0.1 μ M thymoquinone for 1 week. Cell proliferation was assessed in all cultures during first 24 h after commencement of treatment. Cell viability was assessed with MTT assay. Cultures were immunostained for doublecortin (DCX), Beta-3 tubulin (Tuj1) and glial fibrillary acidic protein (GFAP). Number of neurons (DCX and Tuj1 positive) and glial cells (GFAP positive) were quantified in all cultures.

Results:

Cell proliferation and cell viability were significantly increased in KA+TQ group compared to C and KA group (p<0.01). Thymoquinone treatment significantly increased the number of neurons in KA+TQ group compared to KA and C group (p<0.01). Number of astrocytes were also found to be significantly increased in KA+TQ group compared to KA and C cultures (p<0.01). The surviving neurons in the cultures treated with thymoquinone had larger cell bodies and longer processes.

Conclusions:

We conclude that Thymoquinone protects the neurons from kainic acid exitotoxicity, by increasing glial cell population.

Key Words: Thymoquinone; Doublecortin; Kanic acid

Funding Agency: Yes



Assessment, Behavioral Sciences and Clinical Opera

Category: Basic Science

19

Effects of aggressive vs. non-aggressive exercise on insulin sensitivity

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Introduction:

Insulin resistance syndrome (IRS) plays a central role in the onset of Type 2 diabetes (T2B), hypertension, dyslipidemia, cardiovascular disease and other abnormalities. The pathogenesis of insulin resistance in T2B is poorly understood but it is often associated with certain behavioural patterns and changes in behavioural strategies. Soldier to diplomat transition hypothesis is a new hypothesis introduced by Watve et al (2007) which gives a better understanding of the evolutionary origins of IRS. This soldier and diplomat dichotomy can be represented in our modern life as physically aggressive and non-aggressive behaviour. Understanding the effect of aggressive versus non-aggressive sport on insulin sensitivity, can provide a better exercise regimen for T2B patients.

Methods:

A total of twenty-seven subjects participated in this study. All subjects were men from one of the following backgrounds; aggressive exercise, non-aggressive exercise and controls (sedentary lifestyle). Body composition was measured using an air displacement plethysmograph, and all anthropometry measurements were performed under the same conditions. Both physical activity and dietary intakes were recorded and fasting glucose, insulin, and lipids were measured.

Results:

A higher score was given in the aggression questionnaire by the aggressive group (81.3 ± 14.12) compared with 64.5 ± 8.51 for the non-aggressive group and 67.1 ± 12.62 control group; $P < 0.013$). Overall aggression and aggressive exercise both showed negative significance with regard to the level of total glucose in the serum. HOMAIR showed a trend to be slightly but not significantly ($P < 0.063$) lower in the aggressive group. Correlations between anger scores and percentage of fat showed a good relation. This relation also included the effect of fat percentage on HOMAIR and ISI level.

Conclusions:

Results indicate that a lower level of 'aggressive' exercise has the potential to be more effective on insulin sensitivity.

Key Words: Diabetes; Exercise; Insulin

Funding Agency: Scholarship from Kuwait civil service commotion



Assessment, Behavioral Sciences and Clinical Opera

Category: Clinical

20

The reliability, validity and responsiveness of the Disability of Arm, Shoulder and Hand (DASH-Arabic)

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Introduction:

Purpose to investigate the psychometric properties (reliability, validity and responsiveness) of the DASH-Arabic in a cohort of Arabic patients presenting with various upper extremity conditions.

Methods:

Participants were 139 patients with various upper extremity conditions, who completed the DASH-Arabic at the baseline, 2-5 days later and 30-36 days later. Participants completed demographic data forms, the SF-36 and VAS at baseline, and a Global Rating of Change scale at first and second follow-ups.

Results:

Cronbach's alpha of the DASH-Arabic was 0.94. Test-retest reliability was excellent with an ICC of 0.97. The SEM was 3.50 and the MDC 95 was 9.28. Construct validity of the DASH-Arabic with the SF-36 subscales and VAS scores ranged from $r = -0.32$ to -0.57 , all statistically significant ($p < 0.001$). The effect size (ES) for the DASH-Arabic was 1.39 and its standard response mean was 1.51. The area under the curve was 0.82 (95% CI = 0.72 – 0.92, $p < 0.001$). The optimally efficient cutoff for an improvement was found to be a difference of 15 DASH points.

Conclusions:

The DASH-Arabic is a reliable, valid and responsive upper extremity outcome measure for patients whose primary language is Arabic; it can be used to document patient status and outcomes and support evidence-based practice.

Key Words: Outcome measure; Psychometric properties; Evidence-based practice

Funding Agency: Kuwait University (Research Grant NO. [NO01/13])



Assessment, Behavioral Sciences and Clinical Opera

Category: Basic Sciences

21

Emergency Department overcrowding and increased length of stay: Identifying the causes in a secondary care general hospital

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Introduction:

The author's hospital is a general hospital that provides 2ry and some 3ry healthcare services to 880,235 people. Emergency Department (ED) is amongst the most crucial departments in the hospital. It receives around 1000 patient/day. ED overcrowding (EDOC) and increased Length of Stay (LOS) are key global issues for more than 20 years, as they have serious repercussions. EDOC is defined as a situation where the demand for services exceeds the capacity of the department to provide them in a high quality and timely manner, and associated with increased LOS of some patients beyond the accepted limit that varies from above 4 h in UK to above 8 h in Australia. Kuwait general hospitals ED staff and ED patients are reporting a progressively increased EDLOS and EDOC. No measurements have been done to assess the situation nationally.

Methods:

The study used direct observation for 7 days to collect flow data on ED patients at a 2ry care hospital in Kuwait. It calculated wait times and services to identify the major causes of EDOC and increased LOS.

Results:

A total number of 6383 patient visits were registered, 1750 of them were referred to the ED observation room. Among these, 210 patients stayed more than 6 h as a total ED visit time. The aggregated time of the 210 patients was 1918.95 h. They spent 1078.98 h as wasted waiting time. (Waiting for a vacant in-patient bed) constituted 52% of that time, (waiting for a consultation reply) constituted 13.3% and (waiting for a radiology request to be executed) constituted 13.29%.

Conclusions:

Around one third of the ED design capacity was utilized by 12% of the ED patients. The wasted waiting time represents 56.2% of the aggregated LOS, and access block to inpatient wards was the 1ry cause of increased LOS and EDOC. A national-wide measurement project should be considered to assess the exact problem volume, its impact and test solutions, which should eliminate the waits before trying to reduce the service time.

Key Words: EDOC; Kuwait; Clinical operations

Funding Agency: NONE



Biochemistry

Category: Basic Sciences

22

Zn-porphyrin-based photosensitizers as antimicrobials: cellular uptake and subcellular localization

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Introduction:

Antibiotic-resistant microbes pose a threat for treatment of a wide range of infections. Applying new treatment modalities is one way of overcoming this global problem. Photodynamic inactivation (PDI) of microorganisms is alternative way for fighting drug-resistant pathogens. In PDI, visible light and a photosensitizer (PS) combine to produce reactive species that kill the cells. Ideally, damage should be limited to microbes only. Such selectivity can be achieved by rapid and efficient uptake of the PS by the microbial cells. The aim of this study was to reveal molecular features that are essential for fast uptake and high antimicrobial efficiency of PSs.

Methods:

Specially designed Zn(II)5,10,15,20-tetrakis(N-alkylpyridinium-2(3,4)-yl) porphyrins (ZnPs) were used as model compounds. Since Gram-negative bacteria are more resistant to PDI, a Gram-negative organism was selected as a testing system. Uptake of PSs was evaluated by fractionation analysis. Cellular localization was studied by confocal scanning microscopy. Photo-efficiency was determined by plating and counting colonies.

Results:

The cationic amphiphilic ZnPs differed by the position and nature of substituents at the periphery of the porphyrin ring. For all ZnPs tested, meta isomers were significantly more photo-efficient than their ortho analogues. All tested ZnPs were rapidly taken up by the Gram-negative bacteria and accumulated mainly in bacterial cell membrane with low distribution to the cytosol. Moving the aliphatic substituents from ortho to meta position increased membrane accumulation more than three fold.

Conclusions:

Cationic amphiphilic ZnPs with aliphatic substituents at meta position are highly efficient PSs with potential use for antimicrobial PDI.

Key Words: Zn N-alkylpyridinium porphyrin; Antimicrobia; Photosensitizer

Funding Agency: Kuwait University grant MB02/12



Biochemistry

Category: Basic Sciences

23

A role of sphingosine-1-phosphate in colonic smooth muscle contractility

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Introduction:

Inflammatory bowel disease including ulcerative colitis (UC) is being increasingly diagnosed in the Gulf area. Patients with UC often display colonic motor abnormality. Increased levels of circulating sphingosine-1-phosphate (S1P) were reported in UC. S1P stimulates smooth muscle contraction and relaxation, however the role of S1P and S1P receptors (S1PRs) in regulating colonic motility is not clearly understood. The aim of this project was to test the effect of S1P on the contractility of normal and inflamed colonic segments.

Methods:

UC was induced by intrarectal administration of trinitrobenzene sulfonic acid. S1PRs expression levels were detected by immunoblotting. Colonic responses to S1P, the role of S1PR isoforms and downstream signaling pathways were determined using organ bath experiments.

Results:

S1P induced colonic contractions in control and to a greater extent in colitic segments. S1P induced contractions were mediated by S1PR1 in control and by S1PR2 in inflamed colon segments. S1PR3 however did not play a significant role in S1P induced contractions in control or colitic colon. S1PR1 and S1PR2 expression levels were significantly enhanced in control and colitic colon segments, respectively while S1PR3 levels were not significantly different between the two groups. Calcium influx through L-type Ca²⁺ channels was indispensably involved in S1P induced contraction in control but not inflamed colon. On the other hand calcium sensitization pathways and calcium release from the ER were essential mediators of S1P induced contractions in control and inflamed colon. Their contribution however seems to be different in control and inflamed colon.

Conclusions:

S1P induced enhanced contractile response in colitic colon. Alterations colon responsiveness to S1P could be due to inflammation induced changes in S1PR isoform expression levels. Exacerbated response to S1P in colitic colon may explain altered colonic motility reported in patients with UC.

Key Words: Sphingosine-1-phosphate; colonic contractility; colitis

Funding Agency: Yes



Biochemistry

Category: Basic Sciences

24

Regulation of glycolytic enzymes in testicular ischemia reperfusion injury

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Introduction:

Testicular ischemia reperfusion injury (tIRI) is considered to be the mechanism underlying the pathology of testicular torsion, a urologic emergency. Left untreated, tIRI will induce testis dysfunction, damage to spermatogenesis and possible infertility. In this study, we aim to assess the gene expression and activity of major glycolytic enzymes during tIRI. Also, the effect of fructose-1,6-bisphosphate (FBP), a glycolytic intermediate will be investigated.

Methods:

18 Male Sprague-Dawley rats were divided into three groups: sham, unilateral tIRI, and tIRI + FBP (2 mg/kg, i.p.) The tIRI was induced by occlusion of the testicular artery for 1 h followed by 4 h of reperfusion. Damage to testicular tissue and spermatogenesis were assessed by histological analyses. Gene expression and activity of glycolytic enzymes were evaluated by real-time PCR and colorimetric assays, respectively.

Results:

Histological analysis and real-time PCR revealed a tIRI-induced spermatogenic damage in the form of significant decrease in the Johnsen biopsy score and mRNA down-regulation of the spermatogenesis transcription factors CREM¹, TRF2, and ODF1, respectively. This was accompanied with reduced levels of GSH and lowered SOD and catalase enzyme activities. In addition, tIRI induced ATP and NADPH depletion, inhibited the activities of hexokinase-1, phosphofructokinase-1 and glucose 6-phosphate dehydrogenase, and increased lactate dehydrogenase-C . Immunopositivity of p53 and TP53-induced glycolysis and apoptosis regulator (TIGAR) was markedly increased after tIRI. These tIRI-induced alterations were attenuated by FBP treatment.

Conclusions:

Our findings suggest that tIRI-induced spermatogenic damage is associated with dysregulation of glycolytic enzymes activities, which might involve the TIGAR/p53 pathway and could benefit from FBP treatment.

Key Words: Testis; Ischemia reperfusion injury; Glycolytic Enzymes

Funding Agency: Yes



Biochemistry

Category: Undergraduate

25

The tACE/Angiotensin (1-7)/Mas axis protects against testicular ischemia reperfusion injury

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Introduction:

The presence of the non-classical and intrinsic RAS: angiotensin-converting enzyme (ACE)/Angiotensin (Ang)-(1-7)/Mas receptor axis in the testis has been confirmed. However, its role in testicular ischemia reperfusion injury (tIRI) is not known. Thus, we aim to investigate whether exogenous Angiotensin (Ang)-(1-7) could have a protective effect against the damaging consequences of tIRI.

Methods:

Three groups of male Sprague-Dawley rats (6 rats/group) were used: sham, unilateral tIRI (1 hour ischemia followed by 4 hours reperfusion), and tIRI + Ang-(1-7) (0.3 mg/kg). Testicular tissue was evaluated for the expression of testicular ACE (tACE), Ang-(1-7), and Mas receptor by immunohistochemistry and ELISA. Damage to spermatogenesis, induction of caspase 8 pathway, and nitric oxide (NO) generation were assessed. The effect of tIRI and Ang-(1-7) treatment on the PI3K/Akt antiapoptosis pathway was also investigated.

Results:

Testicular morphological changes and damage to spermatogenesis associated with decreased expression of the tACE/Ang-(1-7)/Mas axis was demonstrated during tIRI. This was also accompanied by increased activities of caspases 8 and 3, down regulation of survivin and BAD mRNA levels, and decreased NO formation. During tIRI, PTEN expression was increased which led to inactivation of the PI3K/Akt pathway. Acute treatment of Ang-(1-7) prior to reperfusion was able to attenuate the above tIRI-induced damage.

Conclusions:

The expression of the tACE/ Ang-(1-7)/Mas axis was down regulated during tIRI. Administration of exogenous Ang-(1-7) prior to reperfusion regained the expression of tACE and Mas and protected against germ cell apoptosis and oxidative stress. Increased NO generation and activation of the PI3K/Akt signaling pathway may have partially contributed to this effect. tACE/ Ang-(1-7)/Mas axis could play a role in the maintenance of testis normal physiology and spermatogenesis.

Key Words: Testis; Ischemia reperfusion injury; Angiotensin (1-7)

Funding Agency: Yes



Biochemistry

Category: Basic Sciences

26

Effect of symmetry, flexibility and size on photosensitizer efficiency

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Introduction:

Uptake and subcellular distribution of photosensitizers (PSs) are the main factors that determine photo-efficiency, extent and sites of cellular damage, and as a consequence, the outcome of photodynamic therapy (PDT). Charges and lipophilicity are considered the main factors that determine uptake and subcellular distribution. Our preliminary investigation, however, revealed that size, flexibility and 3-D shape of the PS molecule are equally important. To further explore the contribution of these parameters to photo-efficiency, we developed non-charged porphyrin-based PSs with a particular shape, symmetry, and flexibility. The aim of this study was to relate these parameters to photo-efficiency.

Methods:

The photo-induced cell damage was measured by the 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyl-tetrazolium bromide (MTT) assay. Uptake and subcellular distribution were determined spectrophotometrically and by confocal microscopy, respectively. Experiments were repeated at least two times with 3 replicates. Where applicable, results are presented as mean±S.E. Significance was set at $p < 0.05$.

Results:

Since the tested PSs were not charged, their photoefficiency depended only on the special distribution of substituents at the periphery of the porphyrin ring. The symmetry of the molecule and the type and position of the substituents proved crucial for photo-efficiency. Results obtained with cis-trans isomers indicated that subcellular distribution is more important for PDT efficiency than total uptake.

Conclusions:

Manipulation of size, flexibility, and position of peripheral substituents at the porphyrin ring produced highly selective and efficient PSs that can be delivered to specific cellular compartments.

Key Words: Photodynamic therapy; Photosensitizer; Porphyrin

Funding Agency: KU Research Sector (Project number MB02/12)



Biochemistry

Category: Undergraduate

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Opposite effects on plasma arachidonic acid levels in ACTH-stimulated and dexamethasone-treated rats: a new insight into the anti-inflammatory role of glucocorticoids during stress

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Introduction:

Under stress the pituitary releases ACTH to stimulate adrenocortical production of glucocorticoids. This promotes the body utilization of fatty acids to deal with crisis. Unesterified fatty acids are ready substrates which serve as an energy source, and may act as second messengers, modify intracellular signaling, and target gene expression. Dexamethasone (DXM) is a synthetic glucocorticoid, used to treat certain types of disorders including inflammation. Our aim was to differentiate glucocorticoid - effect from ACTH-effect with respect to plasma composition of unesterified fatty acids.

Methods:

Twenty four Wistar male rats were injected with either ACTH (30 µg) or DXM (50 µg) per 100g BW/ day, for four consecutive days; rats injected with saline or 50% ethanol served as respective controls (N=6 rats/group). Plasma fatty acids were extracted with hexane (without hydrolysis). GC/MS was used to analyze fatty acids after heating with a methylation reagent at 60°C for 3 minutes, using heptadecanoic acid as an internal standard. Statistical significance was determined by Student's t-test.

Results:

ACTH-rats showed a decreased oleic acid (OLE) mol% ($p=0.002$) and an elevated arachidonic acid (ARA) mol% ($p=0.018$). DXM-rats did not show apparent changes of these fatty acids. However, when DXM-rats and ACTH-rats were compared, DXM treatment increased OLE mol% ($P=0.020$) and co-reduced ARA mol% ($p=0.003$).

Conclusions:

ARA is the principal precursor to synthesize prostaglandins which are pro-inflammatory. Thus, prolonged ACTH-stimulation which increases plasma ARA mol% can increase the chance of inflammation, while DXM suppresses inflammation by attenuation of the elevation. This can explain why the body needs steroids to cope with stress beside the purpose of regulating energy metabolism.

Key Words: Stress; Polyunsaturated fatty acids; ACTH, glucocorticoids

Funding Agency: NONE



Cell Biology and Cytopathology

Category: Clinical

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Prevalence of gynecologic infections observed in conventional smears and thin prep preparations (1997-2014) in Mubarak Al-Kabeer Hospital, Kuwait

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Introduction:

Gynecologic infections are common worldwide. In this study we wished to determine the prevalence and pattern of gynecologic infections in a hospital setting during the era of conventional smears [CS] and the currently used ThinPrep [TP] smears.

Methods:

Over an 18 year period 1997-2014, 8773 (7.12%) gynecologic infections were reported in 123159 satisfactory smears examined in Mubarak Al-Kabeer Hospital, Kuwait. Of these 5698 of 65407 (8.71%) were CS (1997-2005) and 3075 of 57752 (5.32%) were TP (2006-2014).

Results:

Maximum infections (36.9%) were seen in 35-44 years group followed by 30.9% in 25-34 years group. Infections were reported in NILM (89.2%), LSIL (8.2%), ASCUS (1.8%), HSIL (0.6%) and AGC (0.2%). Fungal organisms consistent with candida (76.1% CS; 77.6% TP), *Trichomonas vaginalis* (10.6% CS; 8.4% TP), HPV (8.4% CS; 11.1% TP), *Actinomyces* (3.7% CS; 2.4% TP), *Chlamydia* (1.6% CS; 0.6% TP), Herpes (0.4% CS; 0.5% TP) and clue cells (0.1% CS; 0.2% TP). Multiple infections were seen in 54 (0.9%) CS and 23 (0.7%) TP. Significant difference was observed in the two periods and the age groups ($p < 0.001$) especially a decrease in 25-44 years group during TP use. An increase in the proportion of candida, HPV, Herpes and clue cells was found during TP era with a decrease in the prevalence of chlamydia, TV and *Actinomyces* as well as multiple infections (0.9 vs 0.7).

Conclusions:

Few reports from the Middle East mention the prevalence of various infections in gynecologic smears. This study demonstrates the difference in the prevalence of gynecologic infections detected in conventional smear and ThinPrep preparations.

Key Words: Cervical smears; Conventional Smears and Thin Prep preparations; Gynecologic infections

Funding Agency: Unfunded



Cell Biology and Cytopathology

Category: Basic Sciences

29

Effect of long-term subculturing/passaging on fluorescence emitted by GFP-transfected E2 Cell line using flow cytometry and confocal microscopy

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Introduction:

GFP fluorescence is a reliable and quantitative reporter of underlying differences in gene expression. Cell cultures with immortalized cell lines evolve over months and years in the laboratory, resulting in changes in cell behavior with regard to transfection. Excessive passaging is likely to detrimentally affect GFP expression as well as transfection efficiency. However all cell lines do not behave similarly with increased passage number. The aim of this study was to investigate the long term stability of GFP expression in GFP transfected E2 cell lines using flow cytometry and confocal microscopy techniques.

Methods:

GFP-transfected E2 cells from passage 17 were thawed and cultured for 35 days post thaw. Every 3 days, the cells were trypsinized, washed, and subcultured. Aliquots of the cells from each passage were resuspended in sterile PBS and GFP expression was analyzed using flow cytometry (Beckman Coulter FC 500). E2 cells were also passaged in parallel, in glass bottom petri dishes and the cells were examined periodically for GFP expression by fluorescence microscopy technique using the LSM 510 Meta confocal microscope.

Results:

Flow cytometry analysis revealed that GFP expression was high, as >93% cells fluoresced from all passages tested. The E2 cells when visualized by confocal microscopy, exhibited an intense green fluorescence that also indicated high GFP expression.

Conclusions:

The functionally immortalized E2 cell line retained stable expression of GFP for at least 30 passages following long-term subculturing/passaging.

Key Words: GFP transfection; flow cytometry; confocal microscopy

Funding Agency: Supported by Kuwait University Research Sector Grant SRUL02/13



Community Medicine

Category: Graduate MSc (Basic Science)

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Quality of life and performance of daily life activities among multiple sclerosis adult patients in Kuwait

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Introduction:

Patients with multiple sclerosis (MS) experience disturbance in their life rhythm due to the disease progress. The study aimed to assess the level of quality of life (QOL), performance and satisfaction of daily life activities among adult MS patients in Kuwait and to explore factors associated with their quality of life, level of daily life activities performance, and satisfaction.

Methods:

A cross-sectional study was conducted among a convenience sample of 200 MS patients. The QOL was measured using self-administered MS-specific MSQOL-54 questionnaire with two major outcomes: Physical Health Composite (PHC) and mental health composite (MHC). The performance and satisfaction of daily life activities were measured using face to face interview using the Satisfaction with Daily Occupation (SDO) scale. Non-parametric tests were used since total scores of both scales were not normally distributed.

Results:

The participants' mean age was almost 35.0±9.8 years and 68% were females. The median of PHC score was 48.9/100, MHC score was 53.4/100, SDO performance was 10.0/14.0 and satisfaction scores was 51.0/70.0. Multivariate analysis showed that unemployment was associated with poor: PHC (OR=3.5, CI: 1.36-8.95), performance (OR=3.0, CI: 1.51-5.83), and satisfaction (OR=3.0, CI: 1.44-6.25). For the clinical features, low endurance was significantly associated with poor: PHC (OR=5.0, CI: 1.07-23.34), MHC (OR=11.0, CI: 2.17-55.53), and satisfaction (OR=3.2, CI:1.15-9.01). Sensory, cognitive and visual problems were associated with poor PHC, performance and satisfaction respectively. Level of patient satisfaction was indirectly associated with PHC and MHC.

Conclusions:

MS patients experienced an average level of QOL, however, good levels of performance and satisfaction of daily life activities. A range of psychosocial and clinical features was associated with their QOL and with their level of performance and satisfaction with daily activities.

Key Words: Multiple sclerosis; quality of life; satisfaction, performance of daily life actives.

Funding Agency: NONE



Community Medicine

Category: Undergraduate

31

Exposure to environmental tobacco smoke and allergic conditions among high-school students

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Introduction:

Second hand smoke is global public health problem. This study aimed to i) assess the prevalence of exposure to environmental tobacco smoke (ETS) at home among high-school students, ii) assess the prevalence of asthma and eczema among high-school students and iii) evaluate the association between exposure to ETS and selected allergic conditions.

Methods:

A cross-sectional study was conducted using a self-administered, modified version of the ISAAC questionnaire among students of 6 public and 3 private high-schools in Hawally Governorate, Kuwait during October 2015. Prevalence of exposure to ETS, asthma and eczema were computed. Multivariate logistic regression analyses were used to evaluate association of hypothesized exposure and asthma and eczema.

Results:

Of 800 invited students, 746 (92.2%) participated, of whom 74.8% were Kuwaiti and 50.1% were female with a mean (\pm SD) age of 16.8 (\pm 0.68) years. Prevalence of current smoking was 12.4%, 54% had ETS exposure at home and 52.3% reportedly spent 3 or more hours a week at public areas with ETS exposure. Prevalence of asthma and eczema was 20.5% and 14.8% respectively. Multivariate logistic regression model showed that students had higher odds of asthma if they were smokers (aOR = 2.4; 95% CI: 1.5- 3.9; $p < 0.001$), or if they had one or more smokers at home (aOR = 1.8; 95% CI: 1.2 – 2.6; $p = 0.004$). Additionally, odds of eczema were significantly higher among female students (aOR = 1.5; 95% CI: 1.0 – 2.3; $p = 0.048$) or if the respondents had one or more smokers at home (aOR = 1.6; 95% CI: 1.1 – 2.4; $p = 0.030$).

Conclusions:

This study showed high prevalences of smoking, ETS exposure at home and their significant association with asthma and eczema among high school students. Students' counseling at schools, anti-smoking media campaigns highlighting the detrimental health effects of ETS may alleviate the menace of tobacco consumption and associated morbidity.

Key Words: Environmental tobacco smoke; Asthma, Eczema; High-school

Funding Agency: NONE



Community Medicine

Category: Undergraduate

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Physicians' attitudes towards different types of euthanasia in Kuwait

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Introduction:

Although in recent years the world has witnessed great advances in the medical field, much ambiguity still surrounds the issue of euthanasia [EUS] and physician assisted suicide, with increasingly favorable attitudes amongst physicians towards euthanasia around the world. In our study, we aimed to assess the attitudes of physicians in Kuwait towards different types of EUS, to examine whether physicians' frequent encounters with terminally ill patients were associated with their approval of EUS, and to compare our results with those of a previous study conducted in Kuwait fifteen years ago by Askar et al. (2000).

Methods:

We conducted a cross sectional study among 464 government hospital physicians employed in 6 general and 3 specialty hospitals in Kuwait. A self-administered questionnaire adapted from the previous study was used.

Results:

More than two fifths (43.9%) of physicians in our study reported that the Ministry of Health should legalize EUS under certain restricted conditions, which increased from 19.9 % in the previous study; also, 29 % in our study approved of passive EUS compared with 19.7 %. In addition, 29.1% of our population were willing to perform EUS. After controlling for several characteristics in logistic regression analysis, approval of passive EUS was significantly associated with obtaining basic medical degree from Asia (AOR=4.36), or North America/Europe (AOR=3.24) compared to Kuwait, and frequent treatment of terminally ill patients (AOR=2.45). Male gender was significantly associated with willingness to perform EUS. Religion was the major reason for opposing EUS.

Conclusions:

More physicians approve of EUS now compared to fifteen years ago. This shift suggests that the Ministry of Health should provide some guidelines for physicians dealing with situations where patients or their families request EUS.

Key Words: Euthanasia; Physicians; Kuwait

Funding Agency: NONE



Community Medicine

Category: Undergraduate

33

Cardiovascular risk factors and preventative practices among MOH primary care physicians in Kuwait

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Introduction:

Measuring cardiovascular disease (CVD) risk factors and preventive practices in primary health care (PHC) physicians is important because they play a key role in CVD prevention, health promotion and education. The study objectives were to estimate the prevalence and distribution of the risk factors and personal preventative practices of CVD among PHC physicians in Kuwait.

Methods:

This cross-sectional study enrolled 347 PHC physicians from 36 randomly selected Ministry of Health PHC clinics in Kuwait's six governorates. A self-administered questionnaire was used to collect a self-report regarding cardiovascular risk factors (including hypertension, diabetes, dyslipidemia, smoking and weight and height) and preventive measures (including exercise, aspirin for primary prevention and screening for hypertension, diabetes and dyslipidemia).

Results:

A total of 178 (51.3%) male and 169 (48.7%) female physicians participated in the study. Self-reported prevalence was assessed for hypertension (17.3%), diabetes (4.6%), dyslipidemia (20.2%), overweight/obesity (67.1%) and smoking (26.4% among men; 1.2% among women). More than 50% of the physicians reported not exercising at all, and only 13% exercised according to recommendations. Compliance with screening for hypertension, diabetes and dyslipidemia ranged from 75- 85%. Compliance with aspirin use among 80 eligible physicians was 28.8%. No associations were found between socio-demographic factors and the preventive practice score.

Conclusions:

The prevalence of overweight/obesity was high, and a substantial proportion of male physicians are current smokers. Compliance with screening practices for hypertension, diabetes and dyslipidemia were high, although still could be improved. However, exercise and aspirin use were low, both of which need further improvement. These data can be used to inform policies for healthier clinics, by encouraging physicians to adopt healthier lifestyles as examples to their patients.

Key Words: Cardiovascular Risk Factors; Preventive Practices; Primary Health Care Physicians
Funding Agency: Yes



Community Medicine

Category: Graduate MSc (Basic Science)

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Knowledge, attitude and practices among physicians working in Ministry of Health hospitals towards notifiable diseases surveillance system in Kuwait: a cross-sectional study

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Introduction:

Epidemiological surveillance of infectious diseases through the mandatory reporting system is an essential component of public health sector in Kuwait. The surveillance system is considered very necessary for quick identification and response to outbreaks and provides data about the incidence and prevalence of diseases in the country. Surveillance is required for the assessment, monitoring, control and preventive programs in addition to future planning of public health policies. Objectives were to assess physician's knowledge, compliance and practices of reporting notifiable diseases, correlate them to physician's demographic characteristics and professional status, and to identify barriers and potential solutions to improve disease reporting.

Methods:

A cross-sectional study design was implemented to collect data from 635 physicians working MOH general hospitals using self-administered structured questionnaire.

Results:

The overall knowledge median score was 18±5 out of maximum score of 34. About 70.6% of physicians had the experience of reporting of communicable diseases. The percentages of correct answers were higher among physicians who did report a disease compared to those who did not. Generally, the younger age group with fewer years of practice and non supervisory job title had significantly lower median score of knowledge compared to others. More than one third of the physicians admitted that they were not familiar with the surveillance system. The most common reasons for not reporting were "waiting for the laboratory confirmation" and "don't know how to report". The majority of non-reporting doctors considered that a simplified reporting procedure would increase their willingness to report.

Conclusions:

Our findings suggest that the most effective way to improve reporting rate is to increase physicians' knowledge about the surveillance system and developing a convenient reporting system

Key Words: Surveillance; Notification; Communicable diseases

Funding Agency: NONE



Community Medicine

Category: Undergraduate

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Knowledge of coronary heart disease risk factors and prevention among patients attending Ministry of Health Primary Care Centers in Kuwait

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Introduction:

Coronary heart disease (CHD) is a major cause of death in Kuwait and its incidence is increasing. Therefore, the aim of our study is to assess the knowledge level of CHD, its risk factors, and prevention practices among outpatients attending MOH primary care centers in Kuwait, and to assess factors associated with CHD knowledge.

Methods:

This cross-sectional study enrolled 843 participants from 16 different Ministry of Health primary health care centers. Data were collected through a self-administered questionnaire, including a 28-item section adapted from the CVD Risk Factors Knowledge Questionnaire, scored as percent correct. Multivariate median regression models were used to assess the association between the CHD knowledge score (a skewed variable) and independent variables.

Results:

The mean age was 36.5 years, with equal gender distribution. CHD risk factors were very common, including overweight (35.9%), obesity (33.3%), smoking among men (35%), and physical inactivity (40% reporting no exercise). Consumption of fruits and vegetables was quite low (<2% having 3+ servings/day) while the consumption of red meat was high (42% with 4+ servings/week). Compliance with diabetes, hypertension, and hyperlipidemia screening tests was fairly high (~75% among eligible patients), while only a third of patients eligible for daily aspirin use reported taking it. The median knowledge score [25th, 75th percentile] was 67.8 [57.1, 78.6]. After adjustment, knowledge score was significantly associated with older age, non-Kuwaiti nationality, higher income, current non-smoking, having a diagnosis of diabetes, hypertension, or hypercholesterolemia, and previous screening for diabetes, hypertension or hypercholesterolemia.

Conclusions:

The overall CHD knowledge score of our study participants is relatively high for most CHD knowledge items. However, this knowledge was not adequately translated into their behavioral risk factors and prevention practices.

Key Words: CHD; Prevention; Kuwait

Funding Agency: NONE



Community Medicine

Category: Graduate MSc: Basic Science

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Age at menarche in relation to breastfeeding and academic performance among high school girls in Kuwait

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Introduction:

Early age of menarche has been linked to various adverse health outcomes such as, obesity, type 2 diabetes and breast cancer. It has been suggested that breastfeeding as an early life exposure affects the risk of chronic diseases in adulthood through changing age of menarche but the link between breastfeeding and age of menarche remains debatable. The objectives were to estimate the age of menarche among high school girls in Kuwait, to explore the association between age of menarche and breastfeeding and to investigate the link between age of menarche and students academic performance.

Methods:

A cross-sectional study was conducted on 775 randomly selected female high school students from private and public high schools in all governorates in Kuwait. Data on age of menarche were collected by self-administered questionnaire from the students, while data on breastfeeding were collected by telephone interview with mothers. Data on students academic performance were extracted from students records. Multiple linear regression was used to investigate the association between age of menarche and breastfeeding.

Results:

Out of the 907 students we selected, 800 (88.2%) responded, and out of the 800 mothers we call, 496 (62%) were interviewed. The mean age of menarche was 12.33 (95% CI: 12.18-12.49) years. There was no significant association between age of menarche and the duration of breastfeeding or the type of breastfeeding in the first four months of life before or after adjusting for potential confounders ($p=0.124$ and $p=0.398$ respectively). There was no significant association between age at menarche and students academic performance.

Conclusions:

The estimated age of menarche among contemporary girls in Kuwait is similar to that in industrialized countries. Our findings suggest that the impact of breastfeeding on risk of disease in adulthood is not mediated by age of menarche. Cohort studies are recommended to provide a reliable answer for this research.

Key Words: Menarche; Breastfeeding; Academic

Funding Agency: Yes



Community Medicine

Category: Undergraduate

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Maternal body mass index [BMI] and breastfeeding initiation and practice

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Introduction:

Background: Breastfeeding (BF) has numerous benefits for both mother and child. In recent years, the inverse association between maternal obesity and breastfeeding initiation and duration has become under intense debate. Objectives: The objectives of this study were to estimate the prevalence of maternal obesity before pregnancy and within 6 months of giving birth in Kuwait, to estimate the prevalence of BF among mothers in Kuwait, to investigate the association between maternal pre-pregnancy body mass index (BMI) and BF practices, and to investigate the association between maternal BMI within 6 months of giving birth and BF practices.

Methods:

A cross-sectional study was conducted on 442 mothers visiting vaccination centers within 6 months of giving birth in Kuwait. Data were collected through face-to-face interview using a structured questionnaire. Height and weight of mothers were measured as per standard protocol. Pre-pregnancy BMI was calculated from self-reported pre-pregnancy weight and height. Logistic regression analysis was used to investigate the association between maternal obesity and BF practices while adjusting for potential confounders.

Results:

The prevalence of pre-pregnancy obesity and overweight was 18.9% (95% CI: 14.9-23.8%) and 29.2% (95% CI: 24.4-34.5%), respectively. The prevalence of obesity and overweight within 6 months of giving birth was 34.5% (95% CI: 30.1-39.1%) and (37%; 95% CI: 32.5-41.7%), respectively. Approximately 93% of mothers have breastfed their infant for at least once, but only 58% were currently BF their index child. In univariate and multivariate analysis, both pre-pregnancy obesity and obesity within 6 months of giving birth showed inverse association with BF but this was not statistically significant.

Conclusions:

Maternal obesity before and after pregnancy are extremely high in Kuwait. Efforts should be made to encourage mothers to have ideal body weight before pregnancy and regain the pre-pregnancy weight after birth.

Key Words: Maternal BMI; Breastfeeding; Initiation and practice

Funding Agency: Yes



Community Medicine

Category: Undergraduate

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Prevalence and risk factors of food allergy among children in Kuwait: A cross-sectional study

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Introduction:

Food allergy (FA), an adverse immune response that reoccur on exposure to a given food, can be both life-impacting and life-threatening disorder. Globally, the prevalence of FA has witnessed a rapid increase during the last three decades. Children, in particular, are among the most affected age group. Given the fact that FA is an unexplored issue in Kuwait, the current study sought to estimate the prevalence of and factors associated with FA among children in Kuwait.

Methods:

A population-based cross-sectional study enrolled 707 mothers, whose last born child is aged 5 years old or less, visiting primary healthcare facilities and vaccination centers across Kuwait. Mothers were requested to complete a self-administered questionnaire or a face-to-face interview, which captured information regarding their last born child. FA diagnosis, symptoms, and type of allergenic foods were reported by the mothers. Logistic regression models were evaluated to assess associations.

Results:

A total of 707 children (365 boys and 337 girls) were enrolled in our study. The prevalence of self-reported FA was estimated to be 17.3% (95% CI: 14.5-20.1). While, the prevalence of self-reported doctor-diagnosed FA was estimated to be 8.6% (95% CI: 6.6-10.7). Breastfeeding was associated with reduced risk of self-reported FA (adjusted OR = 0.53, 95% CI: 0.33-0.84, p-value = 0.007) and self-reported doctor-diagnosed FA (adjusted OR = 0.46, 95% CI: 0.25-0.86, p-value = 0.015). In contrast, maternal vitamin D deficiency was associated with increased risk of self-reported FA (adjusted OR = 2.19, 95% CI: 1.19-4.01, p-value = 0.012) and self-reported doctor-diagnosed FA (adjusted OR = 2.01, 95% CI: 0.89-4.56, p-value = 0.095).

Conclusions:

Our findings indicate that FA is prevalent among children in Kuwait and the estimated prevalence is comparable to FA prevalence reported in westernized countries. Future etiological studies are needed to corroborate our findings.

Key Words: Food Allergy; Prevalence; Children

Funding Agency: Yes



Community Medicine

Category: Graduate MSc: Basic Science

39

Obesity and maternal perception among children aged 6 to 8 years in Kuwait

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Introduction:

In Kuwait, there is a marked increase in the prevalence of childhood obesity. There is a longstanding cultural norm among the Kuwaiti population that “a fat baby is a healthy baby”. In our study we postulated that the root problem lies in a mother’s perception of her child’s obesity and her active efforts in changing this obesity. The objective of this study was to determine the prevalence of childhood obesity in those aged six to eight years and to investigate maternal perception on child weight status in Kuwait.

Methods:

A nation-wide cross-sectional study with a multi-stage, gender-stratified randomized cluster-sample was used. Data on height and weight were obtained from nurse’s records and maternal perceptions were assessed through a self-administered questionnaire. Ten public elementary schools from all governorates of Kuwait were chosen in May 2015. A total of 2253 children were included, and 1002 records with complete BMI data on children were linked to their maternal perception data.

Results:

The overall prevalence of obesity and overweight in our study population was over 40%. About 80% of overweight and 45% obese children were perceived by their mothers to have a healthy body weight. 40% of children with normal weight were judged by their mothers to be underweight. Logistic regression models identified that obese or overweight mothers are more likely to underestimate their child’s weight status ([OR] = 1.5, 95% CI 1.05-2.2). Additionally, Kuwaiti nationality and mothers’ weight status were independent predictors of having an overweight/obese child.

Conclusions:

We found an alarmingly high prevalence of childhood obesity among Kuwaiti children who are predominantly pre-pubertal. This coupled with mothers distorted perception of their child’s actual weight status in classifying overweight and obese children to be of a healthy weight, is a serious concern that requires urgent public health intervention.

Key Words: Children; Obesity; Maternal perception

Funding Agency: Yes



Community Medicine

Category: Undergraduate

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Association between sleep hygiene awareness and practice with sleep quality among Kuwait University students

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Introduction:

University students are vulnerable to poor sleep quality, so healthy sleep practices should be promoted among students to enhance sleep quality and eventually improve academic performance. Our aim was to assess students' sleep hygiene awareness and practice, and evaluate their sleep quality. The association of sleep quality with sleep hygiene awareness and practice was also explored.

Methods:

This cross-sectional survey was conducted on 1192 Kuwait University (KU) students from 5 colleges. A self-administered questionnaire was used. The items in the questionnaire were adopted from the validated Sleep Hygiene Awareness and Practice Scale, SHAPS, and Pittsburgh Sleep Quality Index, PSQI. A logistic regression model was used to identify the determinants of sleep quality.

Results:

The median sleep quality score was 7; scores more than 5 indicate poor sleep quality. Hence, a large proportion of KU students experience suboptimal overall sleep quality. Sleep hygiene knowledge among university students was inadequate. Most respondents (60.9%) failed to recognize that taking a nap during daytime might be disruptive to sleep. Sleep quality was strongly correlated with sleep hygiene practice (spearman rank correlation, = 0.267, $p < 0.001$), but not with sleep hygiene knowledge. Medical students showed poorer sleep hygiene awareness and poor sleep quality. Logistic regression analysis showed that gender (adjusted odds ratio, OR= 1.8, $p < 0.001$), college (OR= 2.2, $p < 0.001$), GPA (OR= 2.8, $p = 0.023$), and sleep hygiene practice score were independently associated with sleep quality, after adjusting for confounders.

Conclusions:

A large proportion of KU students experience poor sleep quality, so the development of sleep hygiene education programs as an intervention and prevention strategy is recommended. This will improve students' knowledge on the importance of adopting healthy sleep hygiene practices for better sleep quality and enhanced academic performance.

Key Words: Sleep hygiene; Sleep quality; University students

Funding Agency: NONE



Community Medicine

Category: Graduate MSc: Basic Science

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The association between fast food consumption and obesity of high school students in Kuwait

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Introduction:

Childhood and adolescence obesity continues to be a challenging public health issue. The dramatic rising in the prevalence of obesity affects both developed and developing countries, resulting in adverse health consequences. Obesity can be a result of multiple lifestyle behaviors including fast food consumption and reduced physical activity. The aims of this study were to estimate the prevalence of fast food consumption and prevalence of obesity among adolescents, and to investigate the association between fast food consumption and obesity.

Methods:

A cross-sectional study was conducted in boys and girls in governmental high schools between September to December, 2015. This study was approved by the ethical committee at Faculty of Medicine, Ministry of Health and Ministry of Education. A self-administered questionnaire was distributed to collect the data from 1,279 students. BMI was calculated to determine those who were obese and non-obese.

Results:

The prevalence of fast food consumption among high school students in Kuwait was 91%, and 54.4% were fast food consumers who ate at least twice a week. The prevalence of overweight and obesity among male adolescents were 19.1% and 35.1% respectively, whereas among female students the rates were 26.3% and 19.3% respectively. There was a significant association of overweight and obesity with attempt to lose weight ($p < 0.001$) and number of snacks per day ($p = 0.01$), and frequency of physical activity is marginally significant ($p = 0.06$). This study revealed that there is no significant association between fast food consumption and obesity after adjusting for significant predictors.

Conclusions:

There is no association between fast food consumption and obesity among high school students in Kuwait. However, attempt of weight loss, number of snacks and frequency of physical activity were significantly associated with overweight and obesity.

Key Words: Fast food consumption; Obesity; Adolescents

Funding Agency: No



Community Medicine

Category: Graduate MSc: Basic Science

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Obesity as a risk factor for prediabetes and prehypertension among youth in Kuwait: A cross-sectional study

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Introduction:

Nations around the world have witnessed a rapid increase in the prevalence of overweight and obesity among the general population, and in particular among the youth. Kuwait is no exception, overweight and obesity, major risk factors for prediabetes and prehypertension development, affect a substantial proportion of youth. However, due to the lack of knowledge, this study aimed to estimate the prevalence of prediabetes and prehypertension and assess their association with overweight and obesity among youth in Kuwait.

Methods:

This cross-sectional study enrolled 934 students attending Kuwait University or the Public Authority for Applied Education and Training. In addition to completing a questionnaire, each study participant underwent objective measurement of weight, height, blood pressure, and glycated hemoglobin A1c (HbA1c). Participants with no prior history of diabetes and HbA1c levels between 5.7% and 6.4% were considered to have prediabetes. Prehypertension was defined as systolic blood pressure between 120 and 139 mmHg and/or diastolic blood pressure between 80 and 89 mmHg. Logistic regression models were evaluated to assess associations.

Results:

The estimated prevalence of prediabetes and prehypertension were 7.0% (95% CI: 5.4 - 8.6) and 11.0% (95% CI: 9.0 - 13.1), respectively. Obesity (body mass index [BMI] ≥ 30.0) was found to be statistically significantly associated with increased odds of prediabetes (OR = 1.92, 95% CI: 1.01 - 3.65, P value = 0.045). The odds of prehypertension among overweight ($25.0 \leq \text{BMI} < 30.0$) and obese students was 2.27-fold (95% CI: 1.31 - 3.39) and 5.58-fold (95% CI: 3.34 - 9.33), respectively, higher than those with normal body weight (BMI < 25.0).

Conclusions:

The prevalence of prediabetes in our study is elevated and higher than the global estimate. Obesity is a strong predisposing factor for prediabetes and prehypertension among youth in Kuwait. Future studies are needed to corroborate our finding.

Key Words: Prediabetes; Prehypertension; Obesity

Funding Agency: Yes



Community Medicine

Category: Undergraduate

43

Cosmetic procedures amongst male and female university students in Kuwait: attitudes, motives, and prevalence

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Introduction:

Cosmetic procedures are those procedures and surgeries aimed at enhancing one's appearance. In the past few years, there has been an increase in popularity and prevalence of undergoing these cosmetic procedures. Although this increase in popularity can be observed in the gulf region, there is a limited research that has been done in this field. In our study we planned to: 1) assess the attitude towards cosmetic procedures, their prevalence, and the motives for and against these procedures: 2) Compare the prevalence of cosmetic procedures between males and females, public and private universities, and with a previous study conducted on a similar population in 2005, 3) analyze the association between socio-demographic factors and other characteristics with the practice of cosmetic procedures.

Methods:

A cross sectional study was carried out on 1418 university students. Students were selected on the basis of cluster sampling. Data collection was conducted using an anonymous self-administered questionnaire.

Results:

The prevalence of cosmetic procedures among university students in Kuwait was 28.9% for all reported procedures, and 10.2% when excluding laser hair removal. Prevalence was significantly higher among females than males (44.3 % and 3.4 %). Three out of four students viewed it socially acceptable for females to undergo such procedures, whereas only one out of four viewed it as acceptable for males. Logistic regression on the performance of any cosmetic procedure among female students showed positive significant associations with older age, Kuwaiti nationality, and a higher level of father's education .

Conclusions:

The prevalence of cosmetic procedures among university students in Kuwait increased remarkably from 13.4 % to 28.9 % during the last 10 years. In terms of attitudes, the majority of participants viewed cosmetic procedures as acceptable for females, while only a minority found it acceptable for males.

Key Words: Cosmetic procedures; University students; Attitudes, Motives, Prevalence

Funding Agency: Yes



Community Medicine

Category: Basic Sciences

44

Chicken and meat products preservation by *origanum majorana*

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Introduction:

Herbs are beneficial food preservatives without organoleptic adverse changes and loss of nutrients. We aimed to evaluate the use of *origanum majorana* hydrosol, oil and leaves as an organic preservative for chicken and meat products for different periods of storage.

Methods:

In this prospective controlled study, chicken and meat products were divided into 10 parts; first 3 were mixed with 3 levels of *origanum* oil, second were mixed with 3 levels of hydrosol and third were mixed with 3 levels of ground leaves and the tenth serve as control and all were stored frozen. *Origanum* oil and hydrosol were prepared by hydrodistillation. Food products were assessed monthly for organoleptic properties, pH and microbial profile for 6 months. Dishes with microbial colonies between 5-50 were counted through special equation. K-Wallis test was used for comparing the mean microbial counts.

Results:

Both medium and high concentrations of all *origanum* forms were successful in suppressing aerobic mesophiles in beef burger and chicken samples -but not in minced meat- especially at the last storage period when the count reached below the limit of detection. However, mesophilic counts in all treated samples were significantly lower than that at zero time values and in parallel control ($p < 0.05$). We observed significant continuous reduction in yeast and mold counts in minced meat compared to zero time values; and after one month of storage compared to the control ($P < 0.05$) till it reached below the limit of detection in oil and hydrosol treated samples at the 6th month especially with high oil concentration. We could not detect any mold or yeast at 6th month of storage in all treated chicken and beef burger samples; and the higher the *origanum* concentration the earlier the disappearance of mold and yeast.

Conclusions:

Majorana oil was more effective- microbiologically- and more accepted organoleptically -in medium concentration- bio preservative for chicken and meat

Key Words: Origanum majorana; Meat products; Preservatives

Funding Agency: none



Community Medicine

Category: Basic Sciences

45

Origanum majorana as an organic food preservative for milk products

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Introduction:

Many food products are perishable by nature and require protection from spoilage during their preparation, storage and distribution to give them the desired shelf-life. We aimed to evaluate the use of origanum majorana hydrosol, oil and leaves as an organic preservative in milk products.

Methods:

In this prospective controlled study, ras, white and Kareesh cheeses were divided into 10 parts; first 3 were mixed with 3 levels of origanum oil(.025,, second were mixed with 3 levels of hydrosol and third were mixed with 3 levels of ground leaves and the tenth serve as control and all were stored below 5 5°C. Origanum oil and hydrosol were prepared by hydrodistillation. Food products were assessed monthly for organoleptic properties, pH and microbial profile for 6 months. Dishes with microbial colonies between 5-50 were counted through special equation. K- Wallis test was used for comparing the mean microbial counts.

Results:

Color of milk products treated with oil or hydrosol were similar to the control samples after different storage periods. The lowest accepted score % was in leaves treated samples (medium and high concentrations). Taste, texture and odor of milk products treated with different origanum forms and concentrations showed significantly lower mean score acceptance % compared to the control especially in high concentrations($p<0.001$). High origanum oil concentration was more effective than other forms in suppressing mesophiles below the limit of detection in all cheese samples-except kareesh cheese because of low salt content- compared to basal and control ($p<0.001$). The higher the concentration of origanum used the earlier the disappearance of mould and yeast from white and ras cheeses; and the lower the count compared to that detected at zero time and control samples ($p<0.05$).

Conclusions:

Majorana oil was more effective- microbiologically- and more accepted organoleptically in medium concentration- bio preservative for milk products.

Key Words: Origanum majorana; Milk products; Preservatives

Funding Agency: none



Community Medicine

Category: *Clinical*

46

Impact of structured education on diabetes management during Ramadan

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Introduction:

Fasting during Ramadan is an obligatory duty for all healthy adult Muslims. However, sick people who suffer from chronic diseases are exempted from fasting. Many Muslims with diabetes, despite the religious and medical advice, prefer to fast, exposing themselves to different complications. Aim of the study: We aimed to prevent or minimize the complications associated with fasting in people with diabetes who insist to fast during Ramadan.

Methods:

This study comprised 110 participants in the last 3 Ramadans. All participants were asked to fill a pre and post session's questionnaire. Four educational sessions were conducted with special stress on basic information about current diabetes status and last Ramadan, blood glucose monitoring, life style change, management of hypos and hyperglycemia, how to adjust diabetes medications in addition to healthy diet. MADAR (Measured Approach for Diabetes And Ramadan, structured educational program) was conducted in Dasman Diabetes Institute. To report any possible adverse events during fasting period in Ramadan, a hotline was provided to all participants. Through confidence scale assessment table- with rate from 0 to 100%- was used pre and post education. Patient's data were collected and analyzed.

Results:

During last 3 Ramadans fasting, 76.3% of participants reported at least one hypoglycaemic episode through questionnaire and only 20.9% through hot line. However, no patient needed emergency room visits or hospitalization with average improvement in HbA1c (1.1%) in 71 subjects who provided pre and post Ramadan HbA1c. The average confidence rate to manage diabetes outcomes during fasting period has been improved from 61.5% before education session to 93.6% after education sessions.

Conclusions:

Ramadan-focused structured diabetes education program can empower patients to change their lifestyle, minimize the risk of hypoglycemic events, and improve glycemc control during Ramadan.

Key Words: Diabetes education; Ramadan fasting; Complications

Funding Agency: none



Community Medicine

Category: Undergraduate

47

Prevalence and associated factors of musculoskeletal pain among medical and dental students in Kuwait: a cross-sectional study

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Introduction:

Musculoskeletal (MSK) pain affects the bones, joints, muscles, and/or surrounding structures and soft tissues. Studies have shown that MSK complaints are not limited to the working population, and that the young population may also be susceptible to MSK pain. Health sciences students worldwide, in particular, have a relatively high prevalence of MSK pain. Due to lack of knowledge, this study sought to estimate the prevalence of MSK pain and its associated factors among medical and dental students in Kuwait.

Methods:

This cross-sectional study enrolled 793 medical and dental students from Kuwait University. A self-administered questionnaire was completed by study participants, which captured information on socio-demographics, lifestyle, characteristics of MSK pain, initiatives towards this pain, and its impact on education. Descriptive analysis and logistic regression tests were used.

Results:

A total of 793 students, 651 medical and 142 dental students, were enrolled in our study. The age of study participants ranged between 18 and 32 years. The 12-month and 1-week prevalence of MSK pain were estimated to be 73.1% and 54.1%, respectively. The most affected anatomical sites were the lower back (74%), followed by neck (66.7%) and shoulders (63.5%). The prevalence of MSK pain increased as academic year increased. Statistically significant associations were found between self-reported vitamin D deficiency (odds ratio (OR) = 2.84, 95% confidence interval (CI): 1.84-4.39) and consuming ≥ 2 cups of coffee per day (OR = 2.43, 95% CI: 1.52-3.91) with MSK pain.

Conclusions:

Our findings indicate that MSK pain is highly prevalent among medical and dental students in Kuwait. Self-reported vitamin D deficiency, coffee drinking, and academic year were associated with higher risk of MSK pain. Further studies are needed to corroborate our findings.

Key Words: Musculoskeletal pain; prevalence; medical and dental students

Funding Agency: NONE



Community Medicine

Category: Undergraduate

48

Quality of life comparison between hemodialysis and peritoneal dialysis among end-stage renal disease patients in Kuwait

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Introduction:

Hemodialysis (HD) and peritoneal dialysis (PD) are important renal replacement therapies for end-stage renal disease (ESRD) patients. The comparison of quality of life between the two modalities in Kuwait is lacking. This study aimed to estimate the proportion of HD and PD patients in Kuwait, compare the quality of life between the two groups, and quantify and test the association between satisfaction with the treatment and a set of covariates using a multivariable logistic regression modeling technique

Methods:

A cross-sectional study was conducted using a self-administered structured SF-36 questionnaire on ESRD patients. Data were collected from 407 participants from all dialysis centers in Kuwait. Of the 407 participants used in the study, 336 patients were on HD, 62 were on PD, and 9 underwent both types.

Results:

The proportion of HD patients (84.4%) is 5.4 times more than PD (15.6%), with mean age (\pm SD) of 55.28 (13.42) for HD and 58.44 (15.42) for PD. Among the common causes of ESRD, diabetes mellitus is the most common (about 38%). Although not statistically significant, the mean scores favored PD in all domains except for Mental Health and Role limitation due to Emotional problem, assuming a better quality of life compared to HD. Multivariable logistic regression modeling revealed that the odds of being satisfied with treatment modality in those who live with family/others is 4.5 times the odds of those who live alone.

Conclusions:

The proportion of PD patients is 5.4 times smaller than the HD group, but showed better QoL results overall. Important subgroups found with worse QoL are those with diabetes as their cause of ESRD and those who lived alone. Living status was the only significant socio-demographic characteristic associated with patients' satisfaction with treatment. Therefore, emotional strengthening and morale support need to be established through family or support groups

Key Words: Peritoneal dialysis, End-stage renal disease, QoL; Diabetes mellitus; Multivariate logistic regression

Funding Agency: None



Community Medicine

Category: Graduate MSc (Basic Science)

49

Self-reported ill-health conditions among fuel pump workers in Kuwait: A cross-sectional study

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Introduction:

Workers at gas stations are at high risk of being exposed to hazardous petrochemical substances mainly through inhalation, skin and/or eye contacts. This cross-sectional study aimed to assess the prevalence of self-rated ill-health problems among workers at various gas stations in Kuwait.

Methods:

We enrolled 460 workers from gas stations located in the 6 governorates of Kuwait. Participants were interviewed using a structured and pre-tested questionnaire to collect data on self-rated ill-health conditions, socio-demographic characteristics and potential risk factors including duration of work at gas stations, working hours, wearing protective cloths etc. Prevalence of each of the self-rated ill-health conditions was computed. Multivariable logistic regression analysis was used to model a composite disease dichotomous outcome (i.e. the presence of one or more ill-condition vs. absence of any ill-health) with respect to socio-demographics and potential risk factors. Adjusted odds ratio (aOR) their 95% confidence interval (CI) were used to interpret the model.

Results:

High prevalence of nearly all ill-health conditions including headache (48%), tremors (42%), dizziness (10%), eye complaint in one or both sides (45.2%), skin complaint (30.4%), eczema (13.7%) and asthma/ shortness of breath (7.6%) was recorded. The final multivariable logistic regression model showed that the participants were significantly more likely to report one or more ill-health conditions if they were overweight/obese (aOR = 1.67; 95%CI: 1.07-2.60), married (aOR = 2.4; 95% CI: 1.5-4.0) or have been on current job for more than one year (aOR = 5.1; 95% CI: 2.3-11.2).

Conclusions:

Workers at gas stations have high prevalence of ill-health conditions related to eye, integumentary, respiratory and nervous systems. These workers need to be educated and facilitated for self-protection while on the job. Future studies may focus on evaluating the outcome of such intervention.

Key Words: Fuel pump workers, self-rated ill-health, petrochemical substances; Occupational Health, Epidemiology

Funding Agency: None



Dentistry

Category: Clinical

50

Effect of *Lactobacillus rhamnosus* LGG and *Bifidobacterium lactis* BB-12 on gingival health and dental plaque in healthy adolescents: A randomized controlled clinical trial

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Introduction:

Probiotics are live microorganisms, mainly bacteria, that have been investigated over the past decade for their health-promoting effects in human. Recently, there was an increased interest to explore their effects in the oral health field including dental caries and periodontal disease. Many types of probiotic bacteria are those that belong to the genera *Lactobacillus* and *Bifidobacterium*. The purpose of this study was to determine the effect of a probiotics combination (*Lactobacillus rhamnosus* GG, LGG, and *Bifidobacterium lactis* BB-12, BB-12) on dental plaque accumulation and gingival health in healthy adolescents.

Methods:

108 school children, aged 13-15 yrs, participated in this double-blind, randomized and placebo controlled trial. They were divided into two groups: probiotics (n= 54) and placebo (n=54). Both groups received two lozenges twice a day during a four-week period. Plaque Index (PI) and Gingival Index (GI) were recorded at the baseline and after 4 weeks.

Results:

101 subjects completed the study. There was a significant reduction ($p < 0.001$) in GI among the participants in both groups. However, the reduction was higher in probiotic group as compared to control group ($p = 0.015$). No significant difference was found in PI between the groups ($p = 0.909$). There was a significant positive correlation between decreased PI and GI scores in both groups.

Conclusions:

The short-term daily consumption of LGG and BB-12 probiotic lozenges decreased the gingival inflammation in adolescents; thus, it might be a suitable and simple mean for improving the gingival health

Key Words: Probiotics; Gingival health; Dental plaque; Lactobacillus; Bifidobacterium

Funding Agency: Kuwait University Research Sector grants no. DD04/13, GD01/11, SRUL 02/13



Dentistry

Category: Basic Sciences

51

Microshear bond strength of different restorative materials to teeth with Molar-Incisor-Hypomineralization (MIH)

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Introduction:

The restorative management of molar incisor hypomineralization (MIH) affected teeth poses a challenge in the present day. This is evident in the frequent restorative failures and restoration losses caused by the hypomineralization nature of the tooth substrate. The aim of this study is to compare the microshear bond strength of resin based composite (RBC) and Resin Modified Glass Ionomer Cement (RMGIC) restorations when bonded to teeth with this condition and provide a basis for clinical decision making.

Methods:

Eleven MIH affected teeth obtained from multiple pediatric dental clinics in Kuwait were included in this study. Teeth were sectioned mesiodistally producing a total of 22 surfaces for testing (n=22). Surface preparations were performed for standardization of samples. Each flat surface was bonded to 0.96 mm diameter RBC (Filtek Supreme) and light cured RMGIC (Fuji II) following manufacturer instructions. Microshear bond testing was performed after 24 hour storage in distilled water at 37°C. A Bisco shear tester was used to apply shear stress of 1 mm/min until failure. Wilcoxon signed-rank paired-test was used for comparison of bond strength values.

Results:

Microshear bond strength of RBC (30.80 ± 8.19 MPa) was significantly higher than that of RMGIC (11.13 ± 6.91 MPa) when bonded to hypomineralized permanent first molars ($P < 0.001$).

Conclusions:

The microshear bond strength of RBC is significantly higher than that of RMGIC when bonded to MIH affected teeth. Therefore, RMGIC restorations should only be considered as interim restorations and when placement of resin based composite restorations is not feasible due to sub-optimal clinical situations.

Key Words: MIH; Composite; RMGIC

Funding Agency: Yes



Dentistry

Category: *Clinical*

52

A survey of patients' experience of orthognathic surgery: Health related quality of life and satisfaction

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Introduction:

Orthognathic surgery is performed to correct facial skeletal deformities and associated dental irregularities; to improve chewing, speaking and breathing. Another result of this correction is an enhancement of the facial appearance, due to the restoration of the harmony among facial skeletal bones. Such enhancement in appearance usually raises the patients' self-esteem, and improves social confidence. The aim of this study was 1) identify the reasons for seeking the surgery, 2) estimate their level of satisfaction and 3) whether the orthognathic surgery made improvements in their health related quality of life.

Methods:

The sample included patients who had completed the surgery and removed all orthodontic appliances, or were at least 6 months post surgery. We used a translated Arabic version of the Orthognathic Quality of Life Questionnaire (OQLQ) and two Visual Analogue Scales (VAS); one relating to satisfaction and another to general health. The patients rated themselves along these scales twice: before and after the surgery.

Results:

Among the 67 patients invited, all consented to fill out the survey except one. The main reasons for seeking treatment were to improve appearance of the face (80%), bite (76%), pronunciation (38%), breathing (33%) and joint pain (27%). Pre and post comparisons showed statistically significant improvements along all the domains of OQOL ($p < 0.001$) (social aspects of deformity, facial aesthetic, oral function, awareness of facial deformity) as well as the scores of VAS general health (pre = 73 ± 26 and post = 94 ± 9). On the VAS satisfaction scale, 92% scored 70 or above; and 50% scored 100.

Conclusions:

The study supports the hypothesis that enhancement of facial appearance by orthognathic surgery improves the psychological and general health status of persons with facial skeletal deformities.

Key Words: Quality of Life; Orthognathic surgery; Satisfaction

Funding Agency: None



Dentistry

Category: Clinical

53

The effect of risk factors on the outcomes of non-surgical periodontal therapy

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Introduction:

Periodontal diseases comprise a variety of conditions affecting the health of the periodontium. Although many studies have documented the effect of different risk factors on the development of periodontal diseases, only few studies have evaluated the effect of the presence of risk factors on the response to non-surgical periodontal therapy. The aim of this study was to evaluate the effect of clinical risk factors on the clinical outcomes of non-surgical periodontal therapy.

Methods:

Patients with chronic periodontitis, who attended KU dental clinics during 2010 to 2014 for periodontal therapy were recruited for this study. Clinical data examined were periodontal parameters such as plaque, bleeding on probing, periodontal pocket depth and clinical attachment loss from a total of 800 patients that were considered for the analysis. Inter and intra examiner repeatability was done. The 800 patients were grouped according to severity of periodontal disease; 158 patients with mild chronic periodontitis, 306 patients with moderate chronic periodontitis and 336 patients with severe chronic periodontitis. Exclusion criteria: Pregnancy, orthodontic treatment, and history of antibiotic treatment.

Results:

The criteria for successful completion of therapy was agreed as completion of scaling and attendance of the patient at the reevaluation session. There was no statistical significance between the 3 groups in terms of age, gender and medical history. There was significant improvement in status of periodontal health as well as in all the clinical parameters among all the study groups following initial periodontal therapy ($p < 0.005$). On reevaluation of periodontal status, only 55.9% of this study group were found to have acceptable periodontal health. In Logistic regression analysis low plaque score and bleeding on probing score were the only factors associated with successful completion of non-surgical periodontal therapy.

Conclusions:

Plaque control and inflammation severity are significant factors affecting the success of non-surgical periodontal therapy.

Key Words: Periodontal disease; Risk factors; Clinical attachment

Funding Agency: None



Dentistry

Category: Basic Sciences

54

Detection stability of dental disease-associated bacteria from saliva as determined by PCR and qPCR

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Introduction:

Certain bacterial species belonging to the normal oral microbiota may contribute to the development of dental diseases when their numbers increase. Knowledge of the stability of their detection and quantity over time is important for evaluating their role in microbiologically tested patients. The objective of this pilot study was to determine the presence and quantity of selected dental disease- and health-associated species in saliva twice, one week apart.

Methods:

Paraffin-stimulated whole saliva samples were collected from 3 healthy adult volunteers on day 0 and day 7. Crude DNA and purified DNA (Qiagen) were used for PCR detection and qPCR quantification of *Fusobacterium nucleatum*, *Porphyromonas gingivalis*, *Parvimonas micra*, *Streptococcus mutans*, *Streptococcus sobrinus*, and *Streptococcus salivarius*. Specific PCR primers for each species had been validated in the laboratory.

Results:

S. salivarius, *F. nucleatum* and *P. micra* were found in all subjects at both time points. *S. mutans* was found in 2 of 3 subjects while *P. gingivalis* in 1 of 3 subjects. *S. sobrinus* was not detected in any of the subjects at any time point. qPCR revealed that the median cells/ml were for *P. gingivalis* 8.6×10^4 and 2.3×10^5 at day 0 and day 7, respectively. Similarly, the values for *P. micra* were 1×10^5 and 9.3×10^4 , *F. nucleatum* 2.5×10^5 and 3.6×10^5 , *S. mutans* 2.2×10^5 and 5×10^4 , and for *S. salivarius* 3×10^4 and 5×10^4 . *F. nucleatum* was found in highest median quantities at both time points. The quantities of most species did not differ ($P > 0.05$) between day 0 and day 7. Purified DNA produced more intense bands and showed higher ($P < 0.05$) bacterial quantities than did the crude DNA.

Conclusions:

Detection and quantities of most species tested were stable for the 1-week period. Crude DNA can be used in similar studies, but PCR-negative samples must be cautiously considered.

Key Words: Dental disease; Bacteria; Saliva

Funding Agency: Yes



Dentistry

Category: Clinical

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Dental visits among parents and teachers of disabled schoolchildren

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Introduction:

Regular visits to a dentist are very important for the prevention of oral diseases. The objective of this study was to describe the dental visiting habits among the parents and the teachers of disabled schoolchildren in Kuwait.

Methods:

A total of 308 parents of the disabled children and 112 teachers participated in the study and completed the questionnaire regarding their dental visits. The mean age of the parents was 45 (SD=9.9) years and of the teachers 38 (8.4) years. The chi-square test was used in the analysis.

Results:

Nearly half of the parents (52%) and the teachers (55%) reported that they had visited a dentist during the last twelve months for their own dental care. Majority of parents (91%) and teachers (81%) visited the Ministry of Health dental clinics. Higher proportion of teachers (82%) rated the present dental services as excellent/good compared to a half (52%) of the parents of disabled children. Parents, who perceived their oral health as excellent/good (62%), visited a dentist more often compared to those who seemed their oral health as poor (12%) ($p=0.047$). Teachers who visited a dentist during the last 12 months (59%) brushed their teeth more than once daily as recommended, compared to those who never visited a dentist (5%) ($p=0.008$). Also, parents who visited a dentist during the last 12 months (58%) brushed their teeth more than once a day, compared to those who had no dental visits (6%) ($p=0.049$). Dentists were the most common source of oral health information among parents (36%); than for teachers (26%). Less than a quarter of parents (16%) and teachers (19%) stated that they had received information about the importance of regular dental visits. Age, gender, nationality, area of residence and education level was not associated with the dental visits among parents and teachers.

Conclusions:

Regular dental check-ups and preventive oral health care should be encouraged for the parents and teachers of the disabled children.

Key Words: Dental Visits; Parents; Teachers

Funding Agency: No



Dentistry

Category: Clinical

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Gender variations in dentofacial cephalometric values among Kuwaiti adults with a malocclusion

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Introduction:

The objective of this study was to determine the gender differences in dentofacial cephalometric values among Kuwaiti adults with a malocclusion.

Methods:

Standard lateral cephalometric radiographs for 120 Kuwaiti adults (58 males, 62 females) with age range from 18 to 40 years, regardless of malocclusion were digitally traced by a single examiner using Dolphin® version 11 and then analyzed using the Eastman Analysis. Descriptive statistics including mean and standard deviation were calculated for all the cephalometric measurements. An independent samples t-test was used to compare the cephalometric measurements between males and females. The significance level used was $p < 0.05$.

Results:

Of the skeletal parameters, Kuwaiti females had significantly greater SNA angle than males ($p = 0.022$). Both Kuwaiti males and females had an ANB angle $> 4^\circ$. Kuwaiti males had significantly increased upper anterior face height ($p = 0.001$) and also increased lower anterior face height ($p < 0.001$) than in females. The posterior face height was significantly increased in males than in females ($p < 0.001$). In addition, Kuwaiti males had significantly increased upper posterior face height and lower posterior face height measurements than females ($p = 0.004$). There were no significant gender differences for SNB, ANB, Wits appraisal, Maxillary Mandibular plane angle, ratio of the lower anterior face height to the total anterior face height. Males and females had similar overjet, overbite, interincisal angle, U1-maxillary plane and L1-mandibular plane. Gender had no significant effect in any of the cephalometric dental measurements and in soft tissue parameters.

Conclusions:

An increased ANB angle indicated that both males and females had a tendency for skeletal II base relationship. Kuwaiti males had increased anterior and posterior facial height in relation to Kuwaiti females. It is recommended to use these cephalometric values into orthodontic treatment practice for Kuwaiti adults.

Key Words: Gender Variations; Cephalometric Values; Kuwaiti Adults

Funding Agency: Yes



Dentistry

Category: Clinical

57

A report of the patterns and characteristics of cleft lip and palate hospital-based population in Kuwait

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Introduction:

Cleft lip and/or palate are one of the most common congenital anomalies. Although they are common, their etiology is still obscure. These anomalies present with a considerable variation in forms and severity. Aims: To report the frequency of cleft lip and/or palate in a hospital-based population in Kuwait and to study their association with different factors.

Methods:

Clinical records of 208 patients who attended the cleft clinic at Amiri Dental Centre in Kuwait during the period 2006-2014 were screened. A data collection sheet was designed and used to extract the data. The results were analyzed using SPSS.

Results:

A total of 208 cleft lip and/or palate patients were included in the study. Boys accounted for 55% (N=113) of the population and girls for 45% (N=95). There were 133 Kuwaiti patients, 37 Asians, 35 Arab, and 3 patients were categorized as others. Cleft lip and palate (CLP), cleft palate (CP), and cleft lip (CL) were found in 51.5%, 27.3%, and 21.2% respectively. Boys were more affected with CLP and CL with boys to girls ratios of 1.6:1 and 2.8:1 respectively. On the contrary, girls predominated in CP with boys to girls ratio of 1:2. The left side was more affected in both CLP and CL. It was found that 20% of the patients had a positive family history of cleft. Consanguineous marriage was reported in 36% of the cases. Finally, other syndromes were associated in 24% of the cases.

Conclusions:

The findings of our study revealed that the patterns and characteristics of CLP in Kuwait are similar to those reported in previous studies on Arab populations.

Key Words: Cleft lip and palate; Patterns; Kuwait

Funding Agency: NONE



Dentistry

Category: Basic Sciences

58

Palmitic acid reduces osteoblast mineralization activity and compromises bone health

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Introduction:

Objectives: Obesity and impaired lipid metabolism increase circulating and local fatty acid (FA) levels. Our previous studies showed that obese mice on a high fat saturated PA-enriched diet have a greater reduction in bone mass and structure than mice on a high fat OA-enriched diet- potentially over an increase in bone-resorbing osteoclasts and osteoclastic activity. The aim of this study was to investigate the impact of elevated FA levels on bone-forming osteoblasts and identify potential mediating pathways.

Methods:

4 week old male C57BL/6 mice were randomly divided and subjected to a palmitic (PA)- or oleic (OA)-enriched high fat diet (20% of calories from FA) or a normal (R) caloric diet (10% of calories from FA) for 4 months (n=10 each). We collected serum to determine levels of systemic type 1 procollagen N-terminal (P1NP) and osteocalcin (OC) using ELISA. Further, primary osteoblasts were isolated from 2-3 days old C57BL/6 mice and cultured in the presence of elevated (0.02mM) PA, OA or control (C) medium. Mineralization activity, gene expression and ceramide levels were determined using Alizarin Red Assay, RT-PCR, ceramide analysis, respectively.

Results:

Obese animals in the PA and OA group had significantly lower serum levels of bone formation markers P1NP and OC as compared to normal weight animals (*p<0.001). However, serum levels of obese animals on a high-fat PA enriched diet were much lower levels than animals on an OA-enriched high fat diet (*p<0.001). In line, elevated levels of PA significantly reduced osteoblast mineralization activity in vitro (*p<0.05). In contrast to OA, elevated PA significantly increased saturated ceramide accumulation that was prevented through inhibition of SPT2c, the enzyme responsible for ceramide formation.

Conclusions:

Elevated levels of PA reduce osteoblast function in vitro and bone formation markers in vivo. Our findings suggest that saturated PA can compromise bone health via its impact on osteoblasts.

Key Words: Osteoblast; Palmitic Acid; Mineralization

Funding Agency: none



Dentistry

Category: Basic Sciences

59

Extracellular proteins released by *Granulicatella* and *Abiotrophia* species

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Introduction:

Granulicatella and *Abiotrophia* species are normal oral flora bacteria that can occasionally cause serious infections. Although substantial data exist in the literature, demonstrating occurrence of these species in infective endocarditis, only a few mechanistic studies on their pathogenicity were found. We recently showed coaggregation and biofilm forming abilities of *Granulicatella elegans* and *Granulicatella adiacens* with other oral bacteria. Another study showed that an extracellular arginine deaminase of *G. elegans* inhibited proliferation of human peripheral blood mononuclear cells. Thus, proteins secreted by these species may act as determinants of host-microbe interaction and play a role in virulence. The objective was to investigate the proteome of extracellularly released proteins in *Granulicatella* and *Abiotrophia* species.

Methods:

Bacteria were grown for 24 h in brucella broth supplemented with pyridoxal in 5% CO₂ in air. Extracellular proteins were extracted by acetone precipitation, followed by desalting and concentration using Amicon® Ultra-0.5 ml centrifugal devices. Protein concentration was measured by Quick Start™ Bradford assay. Protein samples (10-15 µg per well) were separated on a 12% SDS-PAGE gel and detected by coomassie blue staining. Protein banding patterns were analyzed by G: Box imaging system.

Results:

Extracellular proteins ranging between 10–100 kDa were detected in all three species with prominent bands of 25 kDa and 70 kDa sizes. *Abiotrophia defectiva* showed a strong band at 30 kDa. Overall fewer bands were seen for *G. elegans* as compared to *G. adiacens* or *A. defectiva*. No bands were detected in control broth samples.

Conclusions:

Detection of proteins in culture supernatants of *Granulicatella* and *Abiotrophia* species confirms the release of extracellular proteins from Gram-positive species. Identification of the released proteins may help understand virulence factors of these species.

Key Words: Granulicatella; Protein secretion; Pathogenicity

Funding Agency: No



Dentistry

Category: Basic Sciences

60

Air-borne microbial contamination in oral microbiology laboratories

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Introduction:

Contamination control is a key laboratory routine to attain reliable results in microbiology laboratories. In Oral Microbiology Laboratory brucella blood agar (BBA) plates have occasionally revealed contamination on bacterial single-colony cultures. Since appropriate meticulous microbiology techniques are being used, we suspect an air-borne route of contamination through the often dusty laboratory air. The objective was to screen the laboratory space for air-borne contaminants and if found, to identify selected isolates.

Methods:

BBA plates (N=20) were kept open above the most used benches in the laboratory for 4 h during the working hours. In addition, swab samples were collected from 2 shelves (n=4) above the workbenches. The plates and samples were cultured on BBA and incubated at 37°C in 5% CO₂ for 2 days. Identification of bacteria was carried out as follows: after 16S rDNA amplification the purified PCR amplicons were sequenced using BigDye™ Terminator kit on ABI 3100 sequencer and identified using NCBI BLAST analysis.

Results:

Heavy fungal growth was found on all plates. Number of fungal colonies varied from 1 to 8 per plate, the highest numbers were detected in the cultures of upper shelf swab samples. On the same BBA plates also bacterial colonies were found, the mean (SD) CFU/ml was 42 (19) for open plates and 24 (12) for swab cultures. Most bacteria were gram-positive cocci and rods. Ten different colonies were selected and subcultured for 16S rDNA-based identification that revealed *Staphylococcus warneri*, *Terribacillus halophilus*, *Acinetobacter indicus*, *Bacillus licheniformis*, *Micrococcus aloeverae*, *Roseomonas mucosa*, *Paenibacillus senegalensis*, and *Staphylococcus hominis*.

Conclusions:

Control of the heavy fungal and bacterial air contamination of the laboratories should be implemented. Several of the air-borne bacterial contaminants identified in this study are opportunistic human pathogens.

Key Words: airborne; microbial contamination; 16S rRNA

Funding Agency: No



Dentistry

Category: Basic Sciences

61

DNA yield and bacterial quantities in different saliva preparations after short-term preservation periods

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Introduction:

Saliva is an attractive source for oral microbial detection and quantification since sampling is non-invasive and rapid. Collecting clinical study material generally takes months, which requires its storage for later analyses. The objective was to determine whether different saliva preparation methods or preservation time periods affect DNA concentration or quantity of bacterial species.

Methods:

Saliva samples from 4 healthy adult volunteers were processed to obtain 3 different preparations: whole saliva, and after centrifugation pellet and supernatant. Purified DNA MasterTM from each sample was divided into 4 aliquots, one for immediate analysis and 3 for later analyses. From the samples preserved for later analyses at -80°C for 1 week and 2 and 6 months, the DNA concentrations were measured using Nanodrop. *Porphyromonas gingivalis*, *Prevotella intermedia*, *Parvimonas micra*, *Fusobacterium nucleatum*, *Filifactor alocis* and *Streptococcus mutans* were quantified by SYBR Green qPCR.

Results:

Concentration of DNA did not decrease ($P>0.05$) during the 6-month storage period in any of the samples. Mean (SE) DNA concentrations (ng/μl) in whole saliva were 152.2 (51.2) and 147.8 (50) at day 0 and 6 months, respectively. Similarly, the values for pellet were 134.9 (42.5) and 133.6 (42.9), and for supernatant, 11 (1.9) and 8.9 (2.3), the difference being significant ($P<0.001$) between supernatant and whole saliva or pellet. As determined by qPCR the quantities of most bacterial species found at day 0 remained stable over the 6-month period in all saliva preparation types. In supernatant, quantities of test species were lower ($P<0.05$) than in whole saliva or pellet.

Conclusions:

DNA concentrations were comparable between whole saliva and pellet, suggesting that either of them can be used for DNA-based analyses. Our results also demonstrated that DNA extracted from saliva can be preserved at -80°C for at least 6 months without decrease in DNA.

Key Words: Saliva; DNA preservation; qPCR

Funding Agency: No



Dentistry

Category: Basic Sciences

62

Protein expression of *Granulicatella* and *Abiotrophia* species in different culture conditions

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Introduction:

Granulicatella and *Abiotrophia* belong to bacterial flora inhabiting the human oral cavity. They can cause systemic infections, e.g. endocarditis, but little is known about their pathogenic mechanisms. Bacterial virulence factors associated with colonization and persistence in the host are regulated by environmental dynamics. The objective was to analyze protein expression of *Granulicatella* and *Abiotrophia* in various culture conditions.

Methods:

G. adiacens, *G. elegans* and *A. defectiva* reference strains were grown for 2 days on chocolate-blood-agar with (P+) or without (P-) pyridoxal in 5% CO₂ and in anaerobiosis (AN). Bacterial cell lysates were prepared by sonication and proteins (50 µg/well) were separated by 12% SDS-PAGE. Protein banding patterns were analyzed using G: Box imaging system. All experiments were performed twice.

Results:

G. adiacens produced more protein bands in AN-P+ than in AN-P-. A distinct 92-kDa band was seen only in AN while a 42-kDa band appeared only in 5% CO₂. Further, a 43-kDa band evident in P+ was absent in P- in both AN and 5% CO₂. For *G. elegans*, an intense band of 45 kDa was detected in all culture settings. The lowest number of bands were found in AN-P+. A 35-kDa band was absent only in AN-P+. A strong 85-kDa band seen in AN-P- was absent in all other culture conditions. *A. defectiva* showed a 100-kDa band in AN-P+ and AN-P-. Further, intense bands of 32, 38, and 47 kDa were seen in all culture settings, while a 59-kDa band was seen only in 5% CO₂-P+. All differentially expressed protein bands are being subjected to mass spectrometry for identification.

Conclusions:

Growth in the presence or absence of pyridoxal, incubated in anaerobiosis or in 5% CO₂ influenced protein expression in all three species tested. Mass spectrometry identification of these differentially expressed proteins might shed light on their growth pre-requisites as members of normal flora or as pathogens.

Key Words: *Granulicatella*; Protein expression; Endocarditis

Funding Agency: No



Dentistry

Category: Undergraduate

63

Possible use of new stabilized silver nanoparticles in the wound treatment

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Introduction:

Silver nanoparticles (NPs) covered by silver oxide can be stabilized with 3-hydroxypyridine (3-HP) derivative and low molecular weight polyvinyl pyrrolidone (PVP). Such NPs are obtained for the first time and have not been studied previously. Research aim is to investigate the possibility to use silver NPs stabilized with 2-ethyl-6-methyl-3-HP succinate (mexidol) and PVP for wound treatment.

Methods:

Wounds of submandibular region were designed in albino rats by subcutaneous administration of 10% solution of calcium chloride with following opening of necrotic center under the general anesthesia. The wounds were irrigated with 1 ml of fluid containing silver NPs stabilized with 2-ethyl-6-methyl-3-HP succinate and PVP, having silver concentration 53.7 mg/L and particles size 17-40 nm. Animals with wounds treated by 0.9% sodium chloride solution served as a control, by 0.05% chlorhexidine solution – as a referent group. On the 1st, 3rd, 7th and 10th day after the start of treatment microbial count of exudate and wound area were determined.

Results:

It was shown that at the start of treatment the wound microbial landscape in all animals had polymorphous character with a predominance of coccal microflora. Quantitative parameters of exudate microbial contamination had no significant differences between the groups. On the 7th and 10th day of the treatment, both stabilized silver NPs and reference preparation reduced microbial count of the wound discharge. For 10 days, this parameter was decreased from baseline by 23.5 times using NPs and 26.6 times using chlorhexidine versus 17.8 times in the control. NPs accelerated the reduction of the wound area and the speed of wound healing as compared to control that was similar to the action of reference preparation.

Conclusions:

Thus, silver NPs stabilized by 2-ethyl-6-methyl-3-HP succinate and PVP, display antiseptic and regenerative activity in the treating of spontaneously infected wound of maxilla-facial area that can be used in the surgical dentistry.

Key Words: nanoparticles; polyvinyl pyrrolidone; mexidol

Funding Agency: Yes



Dentistry

Category: Undergraduate

64

Stiffness characteristics of splints for fixation of traumatized teeth

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Introduction:

Traumatic dental injuries (TDI) are treated by repositioning and splinting. Ideally, injured teeth should possess some mobility for optimal periodontal and pulpal healing. Splints should be easy to apply in emergencies, affordable, and esthetically acceptable. The aims here were to compare some clinically used splints with regard to stiffness (measured in Nm¹), esthetics, cost, and ease of application. Six splints were applied to dental models using an acid-etched bonding technique.

Methods:

One central incisor was adjusted to give 1 mm of horizontal movement at the incisal edge. The mobilized tooth was then connected to adjacent teeth with either twistflex wire (TF), titanium trauma splint (TTS), single (SFG) and double fiber-glass (DFG), nylon (fishing) line (FL), or power chain (PC). A horizontal force was then gradually applied to the incisor in a standardized manner with a spherical probe (1.65 mm radius), monitoring force with a 50N load cell and displacement with a linear variable differential transformer (LVDT).

Results:

Signals were amplified, converted digitally (14-bit analog-to-digital converter), and displayed in real time to show the splint stiffness. Splints were also ranked with regard to esthetics, application time needed, and ease of application cost. FL and PC were the least stiff, averaging 5.7 and 6.3 Nm¹, respectively. TTS averaged 6.9 Nm¹, while SFG and TF averaged 18.5 and 18.4 Nm¹, respectively. DFG was the stiffest, averaging 24.3 Nm¹. PC and SFG were the fastest to apply. FL showed the best esthetic score, followed by TTS and PC. TTS was the most expensive splint, while FL, PC, SFG, DFG, and TF showed similar costs.

Conclusions:

Of these TDI splints, we conclude that DFG should be avoided for flexible splinting because it is too stiff. PC may be an interesting novel alternative, affording sufficient mobility due to its low stiffness.

Key Words: Tooth luxation; avulsion; Splints; Tooth injury

Funding Agency: NONE



Dentistry

Category: Clinical

65

MTA pulpotomy for immature permanent molars: A case series outcome

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Introduction:

Objectives: to prospectively investigate the clinical and radiographic success rates of pulpotomy treatment in immature first permanent molars diagnosed with irreversible pulpitis using mineral trioxide aggregates (MTA) as pulp dressing agents.

Methods:

Nine immature permanent molars in 8 patients with a diagnosis of irreversible pulpitis were included in this study. Pain history, clinical examination and pulpal sensibility tests were used to establish a pulpal diagnosis. Following administration of local anesthesia, molars were isolated with a rubber dam and caries was removed. Pulpal exposures were due to caries. Complete pulpotomy was performed using a sterile round and/or flame shape diamond burs with copious irrigation. The pulp wound was flushed with 5% sodium hypochlorite until bleeding stopped. A mixture of gray or white MTA placed against the wound. A moistened cotton pellet was placed directly over the MTA. Teeth were temporized with a glass ionomer filling. Three to seven days later, the temporary filling was removed and setting of MTA evaluated. The cavity was restored with a resin modified glass ionomer filling and all teeth were provided with a final restoration of a stainless steel crown. Patients were scheduled for follow-up at 3, 6, 12 months and annually thereafter.

Results:

The age of patients at time of pulp therapy ranged between 7.6 to 10.8 years (mean=9.2 ±0.97 years). The follow-up examination period ranged from 24.3- 55.8 months (mean= 45.8±12.0 months). Clinically and radiographically, all pulpotomies were considered successful at the end of the follow up period. Radiographically, all molars showed continued root maturation. A hard tissue barrier was noticed in 5 (55%) molar.

Conclusions:

MTA showed high clinical and radiographic success as a pulpotomy agent in treating immature first permanent molars with a diagnosis of irreversible pulpitis.

Key Words: MTA; Pulpitis; Children

Funding Agency: NONE



Dentistry

Category: Graduate MSc: Basic Science

66

Comparison of the hardness and tensile properties of orthodontic wires

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Introduction:

Measuring mechanical properties of dental materials for use within the oral cavity requires the simplest and most feasible method of testing is adopted to enable reliable clinical outcomes in service. Our aim was to compare the tensile yield stresses with the hardness derived yield stresses of some orthodontic wires, and conclude if hardness test is a suitable for measuring this parameter.

Methods:

Tensile test and Vickers hardness test were performed on Stainless Steel (Permachrome) (0.48 x 0.64mm), Titanium Molybdenum (Beta 3 Titanium) (0.43 x 0.64mm) and Superelastic Nickel Titanium (Superelastic Nitinol) (diameter 0.4mm) orthodontic wires. Tensile tests were conducted with a tensile testing machine (Instron) at an extension rate of 5mm/mm on gauge lengths of 60mm, 30mm and 30mm respectively. Yield stress values were evaluated via the Instron Software (BlueHill). Vickers hardness was also assessed with 100gm load held for 10 seconds using a micro-hardness tester (400DAT/CV Inst) on ground and polished specimens. The latter were analyzed via machine software (Innovator Vector) which calculated Vickers Hardness Number (VHN) based on indentation diagonals. VHNs were converted to MPa and compared with tensile yield stress values. The ratio of these values were then compared. SEM imaging of the fractured wires was also conducted.

Results:

The hardness values for the different materials depended upon whether horizontal or vertical sections were measured with vertical values being higher than horizontal. The stainless steel had lower ratio than the other materials. The stainless steel also failed in a cup and cone manner while the others showed cleavage fracture.

Conclusions:

For all specimens except Superelastic Nitinol the ratio of hardness to yield stress was less than 3, the usual ratio. The highly textured nature of these materials and the different yield mechanisms may have influenced the outcomes.

Key Words: Tensile; Hardness; Orthodontic

Funding Agency: Yes



Dentistry

Category: Undergraduate

67

Nanostructural characterization of the prismless layer of human tooth enamel: pilot study

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Introduction:

The outer surface of enamel plays a critical role for the function and protection of teeth in the abrasive oral cavity environment. This layer, which is typically 5 to 10 microns in thickness for human teeth, has received scant attention compared with the rod and prism structure of bulk enamel. The aim of this study was to use high resolution atomic force microscopy (AFM), nano-indentation and scanning electron microscopy (SEM) to visualize the nanostructure and characterize the nano-mechanical properties.

Methods:

A third molar permanent tooth was collected from Kuwait University Dental Center and stored in normal saline solution. Tooth preparation began with external toothbrush cleaning and rinsing before mounting in epoxy resin. The tooth was then cut axially under running water with a slow speed diamond saw. Grinding and polishing was conducted using silicon carbide abrasive papers under running water before using diamond then colloidal silica suspensions. The enamel surface was observed under optical microscope before etching with a mild acid to remove the “smear layer” and identify the prismless areas. Observations of the surface were made with an AFM in tapping mode to quantify the outer surface features both microstructurally and contact elastic modulus at the nanometer level. Observations have also begun using an SEM and nanoindenter to quantify hardness and elastic modulus of the prismless region.

Results:

The results showed that prism structure started gradually to disappear near the outer surface of enamel and the crystallites in this area were arranged parallel to each other with no prism boundaries between them. Hardness and elastic modulus also rose toward the outer enamel surface.

Conclusions:

Overall, there is significant difference in microstructural features and mechanical properties between prism area and outer enamel surface. These distinct characteristics greatly affect the functional role of outer enamel surface.

Key Words: Enamel; Prismless layer; Nanostructure

Funding Agency: NONE



Dentistry

Category: Clinical

68

Toothbrushing habits among disabled schoolchildren in Kuwait

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Introduction:

The aim of this study was to describe the toothbrushing habits among disabled schoolchildren in Kuwait.

Methods:

A total of 308 parents of children with a physical disability (n=211), Down syndrome (n=97) and 112 parents of normal children, participated in the study and completed the questionnaire about the toothbrushing habits of their children. The chi-square test was used in the analysis.

Results:

In all groups, brushing less than once a day was reported by 10% of Down syndrome children, 12% of physically handicapped and 4% of normal children. More than half of the normal children (53%) and physically handicapped (50%) brushed their teeth once a day compared to Down syndrome children (42%). Less than half (38%) of physically handicapped, (48%) of Down syndrome children and 43% of normal children reported to brush their teeth more than once a day as recommended. More than two-thirds of disabled children (66%) received assistance during brushing; of those, nearly one-thirds (29%) were extensively helped by their parents or caregivers. Fewer disabled children (11%) who had visited a dentist more than two years ago brushed more than once a day compared to those children (45%) who visited a dentist during the last twelve months. Disabled children, whose parents brushed their teeth more than once a day, had more often brushed their teeth more than once compared to others (p<0.001). The children who lived in Jahra and Capital regions (57%) brushed more frequently than children in other governorates (19-42%; p=0.039). Age, gender, nationality and frequency of sugar consumption were not associated with the toothbrushing frequency of disabled children.

Conclusions:

A high number of disabled children required help in toothbrushing and less than half reported to brush their teeth according to recommendation. The disabled children should be targeted for increased preventive dental care by the National School Oral Health Program for the disabled in Kuwait.

Key Words: Toothbrushing Habits; Disabled; Schoolchildren

Funding Agency: No



Diabetes

Category: Clinical

69

The era of change: Dyslipidemia in adolescents with type 1 diabetes

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Introduction:

Objective: Type 1 diabetes mellitus (T1D) and dyslipidemia (DLP) increases the risk of cardiovascular disease (CVD). The objective of this study was to evaluate the progress and perspective of dyslipidemia in young T1D patients.

Methods:

The study was cross-sectional and descriptive design. Medical records of T1D patients were followed at an endocrinology service from 2008-2014. The collected data included gender, age, duration of T1D, body mass index (BMI), glycated hemoglobin (HbA1c), total cholesterol (TC), HDL, LDL and triglycerides (TG).

Results:

126 T1D patients were recruited: 69 male (54.8%) and 57 female (45.2%) with a mean of age 16.4 (± 0.18) and 16.5 (± 0.18), respectively. Diabetes duration and baseline HbA1c were 14.82 (± 2.11) and 8.68 (± 1.21), respectively. The HbA1c increased significantly while following five years by 2.9%. The prevalence of overweight and obese teens was increasing from the 1st year to the following five years later. In contrast, the underweight and healthy subjects were decreasing for the same subsequent years. Means of HbA1c were significantly higher among overweight and obese categories throughout following years. All lipid profile revealed significant increase during five years follow-up study. The prevalence of risk TC/HDL ratio (< 4.1) gradually raised in the last year follow-up by 52.1% comparing to the baseline risk ratio (0.8%). The study of TC/HDL ratio with BMI categories revealed that average T1D patients had an ideal ratio (n=97) in the 1st year measurement. After five years follow-up study, the frequency of ideal ratio declined among all categories in the same rate. Risk TC/HDL ratio in the last year of the study showed that average group had more risk ratio measurements (n=47) in contrast to the 1st year measurement (n=1).

Conclusions:

Attention must be given to control DLP and other comorbidities among T1D adolescents to decrease diabetes macrovascular and microvascular complications.

Key Words: T1D; Dyslipidemia; HbA1c

Funding Agency: none



Genetics

Category: Graduate PhD: Basic Science

70

Williams syndrome in Kuwait

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Introduction:

Williams syndrome (WS), also referred to as Williams-Beuren syndrome (WBS, OMIM-194050), is a relatively rare genetic neurodevelopmental disorder characterized by a set of somatic, psychological, and behavioral abnormalities, such as congenital heart disease, mainly supravalvular aortic stenosis, mental retardation, mild short stature, facial dysmorphisms, and variable abnormalities in different systems. Since the disorder is caused by a 1.55-1.83 Mb micro-deletion at 7q11.23 region including 26-28 genes, it is unsurprising to have very broad manifestations of WS involving most body systems. Rare partial forms of WBS have been recently described and they are both clinically and genetically difficult to diagnose. Unfortunately, Williams syndrome is still little known by health professionals. There are limited population-based data on the occurrence of Williams syndrome. Objectives: To evaluate the WS diagnosis process in Kuwait and revise the working clinical diagnosis criteria in Kuwait.

Methods:

Retrospectively analyze fluorescence in situ hybridization (FISH) data for 140 cases collected from populations living in Kuwait in the period between 1995 and 2014.

Results:

In the study, 43 children were found to be positive for Williams syndrome with a typical chromosome 7q11.23 deletion detected via FISH analysis out of a total of 140 cases referred to the Kuwait medical genetics center to rule out Williams syndrome disorder. The study revealed $43/140 = 31\%$ positive for WS with an average rate of diagnosing 5 cases of WS per year complying with our demographic criteria to diagnose WS.

Conclusions:

Williams syndrome may have been under diagnosed in Kuwait. We propose to implement a set of parallel key solutions including a check list to elevate the rate of WS clinical recognition at an early stage during the medical consultation in addition to utilize microarray testing to better diagnose clinically recognized WS cases which are FISH negative for 7q11.23

Key Words: Williams syndrome; Fluorescence in situ hybridization (FISH); Microdeletion syndromes

Funding Agency: Yes



Genetics

Category: Graduate MSc: Basic Science

71

Discovery of two novel deletions in the CELSR1 gene and CRYAA gene in a Kuwaiti multigenerational family diagnosed with autosomal dominant bilateral congenital cataract

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Introduction:

Cataracts are an eye abnormality. Often known as lens opacities. Congenital cataract is an early onset inherited form of cataracts that is diagnosed at birth, and considered the main reason of reversible blindness in children. Recently many genetic studies were conducted to unravel the molecular genetic background of the disease. Multiple genes were discovered to have a strong causative role in the development of the disorder. In here we are genetically investigating autosomal dominant congenital bilateral cataract (ADCC) in a Kuwaiti multigenerational family.

Methods:

Several members of a multigenerational Kuwaiti family suffering from ADCC were recruited from Al-Bahar Eye Centre. Clinical examination and assessment were completed. DNA was extracted from both affected and unaffected members. Genetic linkage analysis was performed using Affymetrix Gene Chip Human Mapping 250K Arrays. Whole-Exome Sequencing using NextSeq Illumina platform was performed.

Results:

GWLA results of the investigated ADCC-Family revealed two high LOD scores (2.4 and 1.75) for two distinguished loci 22q13.31 and 3q22. WES resulted in the discovery of many novel SNPs and mutations that were predicted to play a role in cataractogenesis. Most prominent mutations were two novel deletions in the CELSR1 gene and CRYAA gene. CRYAA gene encodes for Alpha-crystallin A protein of the lens. Other mutations in this gene have been implicated with cataract. On the other hand, CELSR1 gene encodes a cadherin receptor, and has never been linked to cataract, but we suspect that it played an important role in the manifestation of congenital cataract.

Conclusions:

ADCC is considered a relatively rare disorder. More research in this field is encouraged in order to reach a better understanding of the disease's development. WES proved to be a very successful tool for the discovery of disease-causing mutation, and led us to the discovery of two novel deletions in CELSR1 gene and CRYAA gene.

Key Words: caratacts; Whole-Exome Sequencing; CELSR1 gene and CRYAA gene.

Funding Agency: Yes



Genetics

Category: Basic Sciences

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Association of genetic polymorphisms in the VKORC1 and CYP2C9 genes with warfarin dosage in a group of Kuwaiti individuals

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Introduction:

Warfarin is the most widely prescribed oral anticoagulant worldwide. The narrow therapeutic index and the large variation in the inter-individual dose of warfarin are problematic, since the side effects can be lethal. Single nucleotide polymorphisms (SNP) in CYP2C9 and VKORC1 have been shown to significantly affect warfarin dosage toleration and this effect varies among different populations. We aimed to investigate the effect of these SNPs on warfarin dosage in a sample of Kuwaiti patients.

Methods:

Kuwaiti patients who were taking a maintenance dose of warfarin were genotyped for CYP2C9*1, *2 and *3 and VKORC1 rs9923231, rs9934438, rs7294 and rs2884737. The association of these SNPs with the warfarin dose was evaluated.

Results:

For CYP2C9, carriers of CYP2C9 *1/*1 required the highest dosage (5.5±3.3 mg/day) compared to non-*1/*1 carriers (3.3±1.7 mg/day) (p = 0.003). For VKORC1, the daily warfarin dose was significantly different (p = 0.001) among the three genotypes of rs9923231, rs9934438 and rs2884737, with carriers of the wild type genotype requiring the highest dosage compared to variant allele carriers (p ≤ 0.001-0.002). There was no association found between the daily warfarin dose and the rs7294 polymorphism.

Conclusions:

Our data showed that individuals carrying the wild type allele of CYP2C9 or VKORC1 rs9923231, rs9934438 or rs2884737 are less sensitive than individuals with the variant alleles of these SNPs and therefore required a higher daily maintenance dose of warfarin. Our study confirms the association between SNPs in CYP2C9 and VKORC1 and warfarin dose tolerance in Kuwaiti patients.

Key Words: Pharmacogenomics; Genetic association study; Warfarin

Funding Agency: Kuwait University Research Administration project MM 01/08. The use of the ABI 3130xl Gene Analyzer was under and the General Facility Project grant GS 01/02.



Genetics

Category: Basic Sciences

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Association of bone morphogenic protein 6 (BMP-6) polymorphism with vaso-occlusive crisis in sickle cell disease

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Introduction:

Single gene polymorphisms (SNPs) within and outside the β -globin gene locus influence the sickle cell disease (SCD) phenotype. The bone morphogenic protein 6 (BMP6) gene is involved in inflammatory processes and is important for bone formation. It has been associated with bone complications, especially osteonecrosis, in SCD. We have investigated the association between BMP-6 SNPs and painful, vaso-occlusive crisis (VOC) episodes, which have been shown to be a significant factor in osteonecrosis among Kuwaiti SCD patients.

Methods:

The SCD patients were attending the pediatric hematology clinics of Mubarak and Amiri Hospitals. The frequency of VOC was documented in their charts and patients were divided into mild (0 -1) or severe (≥ 2) phenotype depending on number of hospitalizations for pain episodes per year. Genotyping for the rs3812163 SNP in the BMP-6 gene was by direct allele-specific PCR; the T allele has been associated with adverse outcomes in SCD patients. Statistical analysis comparing between the different groups were conducted using R statistic package "SNPassoc". Analysis was conducted using three genetic models (codominant, dominant and additive).

Results:

There were 133 patients in the study, made up of 86 with mild and 47 with severe phenotypes. An additive effect was observed for rs3812163, increasing risk of VOC with the addition of the T-allele ($p=0.047$). Percentage of carriers of at least one T-allele (Genotypes TA /TT) were higher in the VOC group (≥ 2) compared with VOC (≤ 1), 82.5% and 60.6% respectively (OR 3.02 (1.14 – 8); $p=0.019$) after controlling for age, gender, HbS and HbF.

Conclusions:

BMP-6 rs3812163 is significantly associated with VOC among Kuwaiti SCD patients. Its association with osteonecrosis is being investigated.

Key Words: Sickle cell, SCD, AVN, VOC, SNP, polymorphisms, BMP-6, gene

Funding Agency: KFAS #2012-1302-07



Genetics

Category: Basic Sciences

74

Association of the I allele of the common ACE I/D polymorphism with type 2 diabetes mellitus among Kuwaiti cardiovascular disease patients

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Introduction:

The D allele of the common angiotensin-converting enzyme (ACE) I/D gene polymorphism (rs4646994) predisposes to type 2 diabetes mellitus (T2DM) and cardiovascular disease (CVD). However results on which allele predisposes to disease susceptibility remains controversial in Arab populations. This study was performed to evaluate the association of the common ACE I/D gene polymorphism with both T2DM and CVD susceptibility in a Kuwaiti population.

Methods:

We genotyped the ACE I/D polymorphisms by direct allele specific PCR in 183 healthy controls and 400 CVD patients with diabetes (n=204) and without (n=196). Statistical analysis comparing between the different groups were conducted using R statistic package “SNPassoc”.

Results:

Two genetic models were used; the additive and co-dominant models. The I allele was found to be associated with T2DM (OR = 1.84, P = 0.00009) after adjusting for age, sex and BMI. However there was no association with CVD susceptibility (P > 0.05).

Conclusions:

The ACE I-allele is found to be associated with T2DM however no association was observed with CVD. The inconsistency between studies is suggested to be attributed to genetic diversity due to the existence of sub-populations found in Arab populations.

Key Words: ACE, Polymorphisms, T2DM, Diabetes, CVD, Kuwait, Gene

Funding Agency: Partially funded by Kuwait University #YS 06/09



Genetics

Category: *Clinical*

75

The association of vitamin D receptor polymorphisms with multiple sclerosis risk in a case-control study from Kuwait

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Introduction:

Vitamin D deficiency is associated with several complex disorders including multiple sclerosis (MS). Several factors influence vitamin D levels and its optimal multi-function maintenance. Our objective was to assess quantifiable variables influencing vitamin D level and metabolism in MS patients from Kuwait.

Methods:

This is a case-control study involving 50 Kuwaiti MS patients and 50 healthy control Kuwaiti individuals recruited at Dasman Diabetes Institute's Neurology clinic. Plasma vitamin D levels were determined using enzyme linked immunosorbant assay. Vitamin D receptor (VDR) variants were assessed using Taqman genotyping assays. Skin pigmentation indices were ascertained using a hand-held spectrophotometer. Statistical analyses included Mann-Whitney rank sum test, Chi-square test, and Student t-test. A p-value < 0.05 was considered significant for all tests.

Results:

We found overall vitamin D levels to be deficient in both groups, and supplement use to be common practice. VDR variants Taq-I (rs731236) GG genotype, and Bsm-I (rs1544410) CC genotype associated with MS risk (p = 0.0008, p = 0.003; respectively). VDR SNP Apa-I (rs7975232) AA genotype associated with low disease progression (p = 0.003). VDR variant Fok-I (rs2228570) GG genotype associated with higher constitutive melanin indices in both cohorts (p=0.04).

Conclusions:

Several quantifiable variables related to vitamin D associate with MS risk and clinical course, suggesting a possible clinical immunomodulatory application for vitamin D supplementation in Kuwaiti MS patients as a mode of palliative/ management therapy.

Key Words: Multiple Sclerosis, Genetic polymorphism; Kuwait, vitamin D; Vitamin D receptor
Funding Agency: Kuwait University College of Graduate Studies grant no. 212126150, KFAS grant no. 2012-1302-02



Genetics

Category: Clinical

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PLXNA3 variant rs5945430 is associated with severe clinical course in male multiple sclerosis patients from Kuwait

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Introduction:

Multiple Sclerosis (MS) is an inflammatory autoimmune demyelinating disease affecting the CNS. MS prevalence and clinical course are significantly affected by gender. MS clinical course have been shown to be more aggressive in MS males. Our objective was to identify the genetic factors influencing this phenomenon.

Methods:

Eight male and 19 female Kuwaiti MS patients were recruited at Dasman Diabetes institute's neurology clinic. DNA was extracted from blood using a Qiagen DNA mini kit. Exome sequencing was performed on an Illumina HiSeq2000 platform using TruSeq v3 chemistry with target coverage of 50X. Sequences were analyzed using Oxford Gene Technology (OGT) next generation sequencing software. An additional 62 male MS patients were genotyped to confirm exome analysis findings using Taqman genotyping assay for PLXNA3 variant rs5945430.

Results:

Female MS exomes were compared to male MS exomes and a significant genetic variant was discovered in PLXNA3 gene on chromosome X (rs5945430) ($p=3.6300e-5$). Male MS patients with allele G associated with high MS severity score (MSSS), and increased expanded disability status scale (EDSS) when compared to allele C male MS patients ($p=0.005$, $p=0.02$; respectively).

Conclusions:

A genetic variant in PLXNA3 (p.D863E), a protein involved in axon path-finding; is associated with an aggressive clinical course specifically in male MS patients. We propose PLXNA3 as a novel prognostic marker for male MS patients' clinical course.

Key Words: Multiple sclerosis; Kuwait; Exome sequencing, plexin A3

Funding Agency: Kuwait Foundation for the Advancement of Science grant no. 2012-1302-02



Genetics

Category: Basic Sciences

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The effect of coupling efficiency on the yield and purity of oligonucleotides synthesized by using the DNA Synthesizer Mermade 12

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Introduction:

Coupling efficiency is a way of measuring how efficiently the DNA synthesizer is adding new bases to the growing DNA chain. To measure coupling efficiency, dimethyl trityl (DMT) group is used, which is colorless when attached to DNA base, but gives a characteristic orange color once removed upon addition of the base to the growing chain of DNA. The intensity of this color can be measured by UV spectrometry and it is directly related to the number of DMT molecules released throughout the synthesis. The aim of this study was to determine the effect of coupling efficiency on the yield and purity of the synthesized oligonucleotides by using the DNA synthesizer Mermade 12.

Methods:

Brucella-specific primers, forward (5'CATGCGCTATGTCTGGTTTAC3') and reverse (5'TAATAAGACTCGGCTTTGTGA3'), were arranged in the synthesis chamber with CPG standard columns C and A, respectively, with an estimated activator volume of 3.320 ml, trityl average size 10, trityl area threshold 20000. β -actin primers, forward (5'GGACTTCGAGCAAGAGATGG3') and reverse (5'AGCACTGTGTTGGCGTACAG3'), were arranged in the synthesis chamber with CPG standards columns G and G, respectively, and an estimated activator volume 3.230 ml, trityl average size 10, trityl area threshold 20,000. The purity and quantity of the primers were determined by Epoch microplate spectrophotometer.

Results:

Brucella-specific forward and reverse primers showed average coupling efficiencies of 99.97 and 99.95%, with purities (OD260/280) of 1.85 and 1.84 and yields of 2456ng/ μ l and 2440 ng/ μ l, respectively. The β -actin forward and reverse primers showed average coupling efficiencies of 68% and 42%, with purities of 1.14 and 1.12, and yields of 468 and 365 ng/ μ l, respectively.

Conclusions:

The coupling efficiency correlates with quantity and purity of synthesized oligonucleotides. Hence, oligonucleotides with low coupling efficiency should not be used in downstream experiments.

Key Words: Mermade 12; DNA synthesizer; Coupling efficiency

Funding Agency: Supported by Kuwait University Research Sector grant SRUL02/13



Genetics

Category: Basic Sciences

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Human leukocyte antigens class II DQ and DR haplotypes in Kuwaiti multiple sclerosis patients

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Introduction:

Multiple sclerosis (MS) is considered a T cell-mediated auto-immune disease of CNS, triggered by an unknown environmental event in genetically susceptible individuals. Major genetic risk has been attributed to human leukocyte antigen (HLA) genes. The aim of this study was to investigate the association of HLA-DQ and -DR haplotypes with MS in Kuwait.

Methods:

24 Kuwaiti MS patients who fulfilled McDonald criteria and were followed up at a national MS clinic and 22 healthy controls were recruited. 18 patients had relapsing remitting and 4 had relapsing progressive disease. 17 patients had benign disease (77.3%, EDSS<3). We also clinically evaluated, and retrospectively reviewed medical records of patients to derive clinical information. Overnight fasting blood samples were collected from all subjects. DNA was isolated from blood samples (QIAamp DNAm mini kit) and PCR-amplified (AllSet+™ Gold HLA DQ and DR Low-Resolution SSP Kit). Amplified DNAs were run on 2% agarose gels. DNA bands were visualized and photographed (UVP gel documentation system). The alleles were assigned as per the recommendation of kits manufacturer.

Results:

Some of the HLA class II alleles were more frequently distributed in patients than in controls, i.e. DQ6, DQ7, DRB4*0101. However, these differences failed to reach significance possibly due to small sample size. In both groups, frequencies of DQB1*0601, DQB1*0201 were higher as compared to DQB1*0501, DQB1*0301, DQB1*0602, DQB1*0302 and DQB1*0401 alleles. For HLA-DR haplotypes, the presence of DRB1* allele family was much higher in both control and MS patients as compared to DRB3*, DRB4*, DRB5* allele families. Moreover, the absence of DRB3*0101 was found a risk factor for MS (AOR 4.3, 95% CI 1.2-15.2), p=0.02).

Conclusions:

There were no significant differences among the HLA-DQ and -DR haplotypes among control and MS patients, except for DRB3*0101, which was negatively associated with MS risk.

Key Words: Human leukocyte antigens; Haplotypes; Multiple sclerosis

Funding Agency: Supported by Kuwait university research sector grant SRUL02/13, MM03/09



Genetics

Category: Basic Sciences

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Generation of Induced pluripotent stem cells from human fibroblasts isolated from type 1 diabetic patient by retroviral-mediated genetic reprogramming

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Introduction:

Induced pluripotent stem cells (iPSCs) might provide a potential tool to model complex polygenic diseases like type-1 Diabetes and provide in-vitro model of such disease that can be used for drugs development and toxicology studies.

Methods:

In here we obtained skin fibroblasts from a patient clinically diagnosed with type-1 Diabetes and used retro-viruses loaded with OCT4, SOX2, KLF4 and C-MYC to genetically reprogram the cells into Induced pluripotent stem cells.

Results:

After 30 days of viral transduction, the generated cells transformed their spindle shape morphology into embryonic stem cell like morphology that is round colonies. Fluorescent live imaging revealed alkaline phosphatase activity in the reprogrammed cells which also expressed OCT4, SOX2, TRA1-60 and SSEA4 at the protein and gene levels.

Conclusions:

These results suggest that cells were successfully reprogrammed from their somatic status into Induced pluripotent stem cells. The ability to generate these cells from patients with type-1 diabetes and differentiate them cells into beta cells, the main cell type affected by the disease, would provide a potential research tool that can be used to study the complex molecular pathology of such diseases and can be used as well in drugs development and toxicology studies.

Key Words: Stem cells; iPSC; Pluripotent

Funding Agency: KFAS #03-1302-2012



Genetics

Category: Basic Sciences

80

Identification of novel PKD1 mutation in autosomal dominant polycystic kidney disease patients using whole exome sequencing platform

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Introduction:

Autosomal Dominant Polycystic Kidney Disease (ADPKD) is an inherited renal disease characterized by the accumulation of clusters of fluid-filled cysts in the kidneys with reported incidence ranging between 1:400 and 1:1000 worldwide. ADPKD is caused by mutations in two genes; PKD1, which account for around 85% of all reported ADPKD cases, and PKD2. Genetic analysis and mutation screening of ADPKD cases are more technically challenging compared to other monogenic diseases as PKD1 lies in a segmentally duplicated region, such that the first 32 exons are replicated 6 times in pseudogenes located in regions 13-16 Mb proximal to the original PKD1 (16p.13.1) and share between 97.6% to 97.8% sequence homology to the PKD1 gene [16-18]. As these pseudo-regions are less amenable to selection pressure they tend to have high mutation rates when compared to the parent gene. These duplicated regions represent a diagnostic challenge for ADPKD as conventional sequencing is not effective in specifically targeting the genuine PKD1 regions. The development of next generation sequencing (NGS) platforms allowed facilitated faster sequencing of a higher DNA throughput at lower cost in comparison to traditional Sanger sequencing which encouraged wider utilization of such technologies in the medical field.

Methods:

Whole exome sequencing was performed on DNA samples isolated from 30 polycystic kidney disease patients. Results were analyzed using golden helix software.

Results:

Novel and previously identified PKD1 mutations were identified using whole exome sequencing however the pseudoregions of PKD1 showed reduced coverage which affected the sensitivity of the genetic detection of mutations.

Conclusions:

Whole exome sequencing advantages and limitations in Autosomal dominant polycystic kidney disease genetic diagnosis. These limitations need to be improved to support efficient utilization of WES in clinical applications.

Key Words: NGS; ADPKD; Genetics

Funding Agency: Kuwait University NM01/13



Hematology

Category: Basic Science

81

A one-year hospital-based prospective study of sickle cell disease from one capital area of Kuwait by HPLC

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Introduction:

Objective(s): The aim of the study was to determine the pattern of haemoglobin of patients with sickle cell disease in one capital area in 2015.

Design: This is a retrospective study was carried out for over a period of one year (2015).

Methods:

Setting: The study was conducted at the Hematology Laboratory Department, Amiri Hospital, Kuwait. Subjects: HPLC records of 144 patients with SCD were retrieved from hospital records. Records from 34 control patients were also retrieved. About 178 subjects were included with mean age of 28.2 (SD 20.16) years. 76.3% of patients had an HbAS phenotype, whilst 23.6% were HbSS. Main Outcome Measure(s): Irrespective of their gender or age, differences were observed in HbA, HbS and HbF levels in patients compared to controls. Knowledge of the prevalence of haemoglobin variants underpins screening, diagnosis and treatment strategies within our population.

Results:

There was a significantly lower mean % of HbA in HbAS patients in comparison with the control group, while HbA was not found in any patients in the HbSS group.

Conclusions:

HPLC is a rapid, sensitive and reliable test for determining the presence of Hb variants within a sample.

Key Words: Haemoglobinopathies, HPLC; Sickle cell disease; Haemoglobin pattern

Funding Agency: NONE



Hematology

Category: *Clinical*

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Age and gender effect on osteonecrosis in Sickle Cell Disease

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Introduction:

Sickle cell disease is an inherited hemoglobinopathy characterized by abnormally shaped red blood cells due to its abnormal hemoglobin which tends to polymerize under low oxygen concentrations. It is classified according to genotype into sickle cell thalassemia (SCTh) and sickle cell anemia (SCA). Red blood cells in Sickle cell disease are less pliable and abnormally sticky, so some of them become distorted into a sickle shape, leading to tissue infarctions and progress to avascular bone necrosis. Aim: We studied the effect of age and gender on osteonecrosis in sickle cell disease.

Methods:

In this retrospective study (2008-2015), data was collected from 68 sickle cell disease patients (43 SCA and 25 SCTh). Patient age varied from 4-78 years. All cases had bone scintigraphy or MRI done. SPSS statistical software was used to analyze the significance of age and gender on osteonecrosis.

Results:

Osteonecrosis (OSN) a common complication in both SCA and SCTh, with a prevalence of 65% in SCA (61.5% of children and 66.7% of adults; 55% females and 74% males have OSN) and 56 % in SCTh (63.6% of children and 50% of adults; 27.3% females and 78.6% males have OSN. No significant relation was found between OSN and age in either SCA or SCTh. However, in SCTh a significant relationship was detected between OSN and gender ($p=0.015$) where males had greater tendency to develop OSN than females. Females with SCTh had less tendency to develop OSN than SCA females.

Conclusions:

The main finding of the current study is that SCTH males are more susceptible to develop OSN than females.

Key Words: Sickle Cell Disease; Scintigraphy; Osteonecrosis

Funding Agency: No



Hematology

Category: Clinical

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Comparative study between Kuwait Central Blood Bank and five hospital blood banks in tracing packed red blood cells units

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Introduction:

Transfusion safety is the main concern of blood banks. The blood bank or transfusion service shall ensure that all blood components used in their processing are identified and traceable. The aim of this work is to evaluate the levels of traceability records of packed red blood cells (PRBC) in KCBB and five hospital blood banks.

Methods:

A total of 1080 PRBC units were randomly chosen to be traced to its final deposition, from the year 2008 till 2013. Half of them were traced in the KCBB and the rest were traced in five hospitals. The results were collected and statistically analyzed to identify the deficiency in the traceability system.

Results:

The overall traced units were 949, while no records were found for the rest of units. The tracing percentage was 100% throughout the six years in the KCBB and two of the hospitals. The percentage in the other hospitals were H1 49.1 H3 74.1 and H4 55.6%. Two hospitals H1 & H2 are using the MS (Manual System), H3 used MS till 2012 and ES (Electronic System) on 2013, H4 was on MS till September 2010 then shifted to ES, and H5 introduced the ES on 2011. The KCBB introduced the ES on 2003. Traceability over years was 100% in the KCBB, H2, and H5 all over the six years. The traceability over years in H1 the percentage is variable ups and downs, while in the other two hospitals traceability once increased to 100% maintained at that level.

Conclusions:

The percentage of traceability of PRBC over the 6 years included in this study is satisfactory in the KCBB and 2 of the included hospitals, improved in other 2 HBB after introducing the ES, and not satisfactory in the last HBB. The percentage of traceability is not directly related to the type of the system used. Our recommendations are; Applying ES together with the good management will ensure accurate traceability of blood components. Annual audit to ensure the maintenance of an excellent level of transfusion practice. Promotion of patient blood management program.

Key Words: Blood Transfusion; Traceability; Kuwait Central Blood Bank

Funding Agency: NONE



Herbal Medicine

Category: Basic Sciences

84

Immunomodulatory and NK anti-tumor activities of black pepper (*Piper nigrum*) and cardamom (*Elettaria cardamomum*)

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Introduction:

Immunonutrition represents a dynamic interplay between nutrition and immunity. This study aims at investigating the potential immunomodulatory effects of *Piper nigrum* and *Elettaria cardamomum* in light of splenocyte proliferation, macrophage function, and NK anti-tumor activity.

Methods:

The proliferation of BALB/c primary murine splenocytes was assessed by [3H]-thymidine incorporation. ELISA was performed to assess cytokine secretion, and Griess assay was performed to evaluate NO production by BALB/c primary murine macrophages. Using YAC-1 lymphoma cells, the potential of the indicated extracts to promote the cytotoxic activity of C57/BL6 primary murine NK cells was also examined by JAM assay.

Results:

Both extracts significantly enhance splenocyte proliferation in a dose-dependent, synergistic fashion. *Piper nigrum* and *Elettaria cardamomum* extracts significantly enhance and suppress Th1 cytokine release by splenocytes, respectively. Conversely, Th2 cytokine release by splenocytes is significantly suppressed and enhanced by *Piper nigrum* and *Elettaria cardamomum* extracts, respectively. Based on IL-6 and TNF α release as well as NO production by macrophages, experimental evidence suggests that *Piper nigrum* and *Elettaria cardamomum* extracts exert pro-inflammatory and anti-inflammatory roles, respectively. Experimental evidence indicates that both extracts significantly enhance NK cytotoxic activity against YAC-1 tumor cells, suggesting that the documented anti-tumor effects of *Piper nigrum* and *Elettaria cardamomum* may be attributed to enhanced NK anti-tumor activity.

Conclusions:

Our data present *Piper nigrum* and *Elettaria cardamomum* as traditionally used herbs with potent immunomodulatory, anti-inflammatory, and anti-tumor properties. We anticipate that active ingredients of these herbs may be employed as effective therapeutic agents in the regulation of diverse immune reactions implicated in various diseases including cancer.

Key Words: Immunomodulation; Anti-Tumor; Herbal Medicine

Funding Agency: NONE



Medical Education and Medical Informatics

Category: Undergraduate

85

Practice and opinion of pre-professional year students about disposal of household unwanted medication

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Introduction:

The disposal of unwanted medications has been a concern in many countries. Pharmaceutical waste is considered by UNESCO (2015) as emerging pollutants in water and wastewater causing potentially-serious threats towards human health and ecosystems.

The objective: of this study was to determine the practice and opinion of pre-professional year Health Sciences Centre (HSC) students in regards to disposal of unwanted house medications.

Methods:

The survey was conducted in December 2015; ethical approval was granted. Anonymous questionnaires were distributed to the pre-professional year HSC students in Medicine, Dentistry and Pharmacy (N=194)

Results:

142 (73%) students participated in the study. The mean age of the participants was 18 y and the majority of them were females (93.7%) and Kuwaitis (88.7%). The majority of the students (96%) were disposing their unwanted household medications by throwing them in the trash (94.3%) or flushing them down the toilet (2.8%). Their opinion on the most suitable method of disposal was to place them in special containers in residential areas (44%) and return them to the pharmacy of the hospital or the polyclinic (33%). Half of the participants reported that sewage pollution, mutation to aquatic organisms and deterioration in the fish kingdom were the environmental implications of unsafe disposal of medication, while only 24% stated that the effect can reach to ground water pollution. Reasons for the increase in household pharmaceutical waste from the student's point of view were mainly due to the lack of commitment to the completion of the patient treatment (73.9%) as a result of free medications (43.7%).

Conclusions:

There is need to increase the HSC students' awareness about safe disposal methods and the health, environmental and economic impact of waste medication. The "Let's practice green" events at the HSC should be an ongoing campaign.

Key Words: Students; Safe medicine disposal; Environment

Funding Agency: No



Medical Education and Medical Informatics

Category: Undergraduate

86

Attitudes of second year medical students towards discussing sensitive questions during medical history taking

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Introduction:

Medical history taking collects sensitive information. Some information may be illegal, embarrassing, or taboo in different cultures. This study aims to explore the perception and attitude of second year medical students towards discussing sensitive topics during medical history taking.

Methods:

A survey given to 110 students with 90 responses (15 male, 75 female). Response rate was 82%. Mean age was 19 (± 1.5), 89% were Kuwaiti. Data was collected on 46 questions regarding past medical history, family history, social history, risk factors, and review of systems.

Results:

Of the questions, the majority of students stated that end of life care, cancer, sex, virginity, sexually transmitted diseases, HIV and lesbian/gay/bisexual/transgender were the most uncomfortable to discuss with the patient. Male students were significantly more comfortable to discuss the topic of obesity ($p=0.007$), lesbian/gay/bisexual/transgender ($p=0.003$) with the patient than female students. Parent education affected the students comfort in discussing abortion, contraception, end-of-life care, sex, sexually transmitted diseases and suicide, with students of higher educated parents being more comfortable, (p -values ranges 0.055-0.087).

Conclusions:

This study highlights the comfort levels of medical students who have still not been exposed to classes on ethics and thorough history taking. The cultural and religious barriers in this country may have an effect on the comfort levels of medical students. More research is needed to determine comfort levels of students as they are exposed to more medical courses and handle more patients.

Key Words: medical student attitudes; medical history; sensitive patient questions

Funding Agency: NONE



Medical Education and Medical Informatics

Category: Undergraduate

87

Professional attributes and perceptions of medical students in Kuwait University

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Introduction:

Increasing professionalism amongst physicians improves the delivery and efficacy of healthcare. Although there are many definitions of professionalism in the healthcare setting, there is meager data on the attitudes of medical students towards professional norms. This study investigates the professional attitudes and perceptions of medical students in Kuwait University Faculty of Medicine (KuFoM). It highlights the extent to which students agree with and act consistently with norms of professionalism in the healthcare setting.

Methods:

A survey was provided to a stratified random sample of KuFoM students. A total number of 193 students participated in the survey. Perceptions and behavior regarding professional norms were assessed using indicators for domains of professionalism developed by the American College of Physicians and Board of Internal Medicine. The domains include principles regarding just distribution, honesty with patients, improving access to care, protecting patient confidentiality, fulfilling professional responsibilities, and maintaining appropriate relationships with patients, trust by managing conflicts, and professional competence.

Results:

79% of participants agreed with principles regarding honesty with patients, such as the lack of withholding medical information from a patient. 27% of participants stated it is professional to finance a procedure for a patient who can't afford it, while 20% stated it's appropriate to maintain an emotionally attached relationship to a patient. 17% of participants have revealed confidential information about a patient. 72% of participants believed medical errors should be reported, and 44% of participants are aware of a physician who has been incompetent, but only 10% reported such incidents.

Conclusions:

Many KuFoM students agree with standard professional norms regarding the healthcare setting, although few students actually implement and report behaviors that don't conform to such norms.

Key Words: Medical education; Professionalism; Attitudes, behaviors

Funding Agency: NONE



88

Hidden curriculum factors influencing female students to choose surgery as a career

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Introduction:

Studies demonstrated that there is a decline in applicants to surgical programs worldwide which is thought to be due to the rise of female students in medical schools. Prior to 2012 there were equal seats for both genders at Kuwait Medical School, but a lawsuit won at the Kuwait Constitutional Court abolished the seats per gender policy resulting in a rise in female students. The purpose of this study is to assess hidden curriculum factors that are unique to female students in an Islamic society regarding specializing in surgery.

Methods:

A cross sectional study was performed in the only Medical School in Kuwait. All students from their second year to final year were surveyed using an anonymous self-administered questionnaire and the Zuckerman-Kuhlman personality questionnaire. Analysis was carried out using chi square and one way ANOVA tests.

Results:

Four hundred and sixteen out of 689 participated in this study. It has shown that among Kuwait female medical students, 32.7 % were interested in surgery as a specialty. Being a female surgeon was perceived as unique by 75% of the same gender. While 43% of them viewed that being a surgeon will negatively affect their marriage chances, 34% were neutral. Two thirds of participants do not believe that surgeons face religious and ethical challenges in dealing with the opposite sex. Hijab was not thought to be a negative factor influencing a career in surgery. Out of the 5 personality types (impulsive sensation seeking, neuroticism-anxiety, aggression-hostility, sociability and activity) there was a correlation between activity personality type and choice of surgery ($p \leq 0.003$).

Conclusions:

Multiple factors affect female Arab medical students' choice in pursuing surgery as a career in an Islamic society with no impact of religious duties and social restrictions. The hidden curriculum factors are similar to those reported globally.

Key Words: Hidden Curriculum; Female Students; Choosing Surgery

Funding Agency: Yes



Medical Education and Medical Informatics

Category: Basic Sciences

89

Brightness- and contrast-change resistant algorithm for colocalization in immunofluorescence

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Introduction:

Colocalization analysis in immunofluorescence is often compromised by high background, low contrast and large brightness difference between the two proteins. Currently, widely used methods (Pearson – correlation and Mander's coefficients) cannot deal with these problems. The new algorithm (Henkel-Pearson's, HP-algorithm), presented on this poster, is much less sensitive to these problems and enables a far greater colocalization accuracy in non-perfect immunofluorescence images.

Methods:

The basic idea is to generate scatter plots of both red and green fluorescence images, subtract a spatially randomized scatter plot from the localized scatterplot and subsequently calculate a Pearson's correlation (r) between the resulting images.

Results:

As expected, classical colocalization analysis by means of the Pearson's correlation does not differ from the HP-algorithm in high quality images, where there is no background, both fluorescence signals have the same intensity and contrast is high. However, when the brightness ratio between the signals changes, classical correlation analysis does change accordingly. This change is greatly reduced by the use of the HP algorithm. Digitally simulated brightness-ratio, contrast and background changes on same image prove a 3-4 fold higher robustness of the HP-algorithm, compared to classical correlation analysis.

Conclusions:

Brightness and contrast variation between red and green channels can be largely compensated by use of the HP-algorithm and enable a more reliable colocalization analysis in fluorescence images with compromised quality.

Key Words: Colocalization; Image analysis; Immunofluorescence

Funding Agency: NONE



Medical Education and Medical Informatics

Category: Clinical

90

Are we still learning what drives learning?

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Introduction:

Most medical schools have reformed their curricula to more integrate student-centered and competency-based during the last three decades; these are thought to enhance student learning and performance in clinical settings. While a large number of studies have looked into the impact of new teaching modalities to students performance but little was explored on what drives students learning. In this pilot study, we explored the contribution of teaching formats and assessments to students learning of electrocardiogram (ECG) interpretation skills by 3rd Year Medical students during a cardiovascular module.

Methods:

We looked at two scenarios: I. Role of teaching formats: A total of 142 third-year medical and dental students received a comprehensive teaching on ECG interpretation by lectures and tutorial discussion during their CVS module teaching (October-December 2015). The students were given formative assessment during the clinical skill sessions and a summative assessment at the end of 7-week CVS module teaching. The overall students' performance was compared with the students from previous year that received teaching through didactic lectures only.

II. Influence of 'non-compensatory must-pass' teaching themes/modules.

Results:

The students' performance in ECG interpretation at the end-of-module summative assessment significantly improved >75% compared with <42% among students from previous year [p:0.001], though there was no significant change in the overall performance in the CVS module. A significant improvement in students, performance was observed in clinical skills for a 'non-compensatory must-pass' OSCE assessment (p<0.04).

Conclusions:

Medical educators must be aware of factors that influence a student's drive to learn a subject and align their teaching formats to enhance student learning process by exploring the benefits and limitation of their teaching and assessment formats.

Key Words: Assessment; Small group teaching; Learning strategies

Funding Agency: None



Medicine

Category: *Clinical*

91

Comparison of the associations of circulating total adiponectin and adiponectin multimeric complexes according to metabolic and glycemic status

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Introduction:

Adiponectin, a protective adipokine that increases insulin sensitivity (IS) and regulates glucose metabolism circulates in plasma as high (HMW), medium (MMW) and low molecular weight forms (LMW). Studies show the HMW form as the best indicator of IS. This study compares Total Adiponectin (TA) and the multimeric complexes according to their associations with metabolic and glycemic status.

Methods:

Fasting TA, HMW, MMW, LMW, insulin, glucose, lipid profile and HbA1c were measured in 66 patients with Type 2 diabetes (T2DM) and 59 non-diabetic first degree relatives. Clinical and anthropometric data were recorded. Subjects were classified by adiposity, insulin resistance (IR - homeostasis model assessment) and the number of the criteria of the Metabolic Syndrome (MetS) (International Diabetes Federation).

Results:

TA ($r = -0.21$ & -0.24), HMW ($r = -0.37$ & -0.38) were significantly ($p < 0.05$) inversely correlated with BMI and waist circumference respectively but MMW and LMW were not. TA ($r = 0.23$ & -0.24), HMW ($r = 0.40$ & -0.39) were significantly correlated with IS and IR respectively but MMW and LMW were not. Compared to HMW, Receiver Operating Characteristic (ROC) analysis showed that TA had the higher area under the curve for diagnoses of MetS (0.749 vs 0.712) and T2DM (0.644 vs 0.612) whereas HMW had the higher area under the ROC curve for diagnosis of IR (0.629 vs 0.689)

Conclusions:

Circulating TA and multimeric complexes show variable associations with metabolic indices and glycemic status. HMW is a better predictor of IR but TA is a better predictor of T2DM and MetS. As multimerisation is genetically determined, the predominant form of adiponectin could be the main determinant of the metabolic phenotype and disease associations. Multimeric forms should always be considered in the interpretation of the associations of circulating adiponectin.

Key Words: Adiponectin; Adiponectin multimeric forms; Metabolic syndrome

Funding Agency: KFAS grant 2011-1302-01



Medicine

Category: Clinical

92

Recurrent urinary tract infection among renal transplant recipients: risk factors and long-term outcome

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Introduction:

Urinary tract infection (UTI) is the most common type of bacterial infection contracted by recipients of renal allografts and may have an adverse impact on graft and patient's survival. We aimed to evaluate the risk factors of recurrent UTI in renal transplant recipients, and its impact on patient and graft survival.

Methods:

An eighty six per cent of 1019 patients (who were transplanted between 2000 to 2010 in Hamed Al-Essa Organ Transplant Center of Kuwait) developed at least one episode of UTI however; only 6.2% patients had recurrent UTI. We compared the patients who had recurrent UTI (group 1) and those who had no or non-recurrent UTI (group 2) against their risk factors.

Results:

Patients of group 1 were significantly younger than those of group 2 (34.9 ± 23 vs. 42.8 ± 16 years, $p < 0.001$ respectively), with female preponderance ($p < 0.001$). The percentages of thymoglobulin induction (21.5%) were significantly higher in group 1. Patients with pretransplant urological problems experienced significantly more recurrent UTI ($p < 0.0001$). Hepatitis C patients were significantly more prevalent among group 1 (10.8% vs. 3.8%, $p = 0.008$). Long term graft outcome (functioning, failed and lost follow up) were 78.5%, 21.5 and 0% vs. 84.5, 13.9 and 1.2% respectively ($P = 0.18$). The patient outcome (live, dead and lost follow up) were 73, 1.6 and 25.6% vs. 62.1, 0.3 and 33.6% respectively ($P = 0.187$).

Conclusions:

Adult age, female sex, thymoglobulin induction, pretransplant urological problems and hepatitis C infection were considered risk factors of recurrent UTI among our renal transplant recipients. However, recurrent UTI did not adversely impact graft or patient survival.

Key Words: UTI; Kidney transplant; Outcome

Funding Agency: none



Medicine

Category: Graduate PhD: Basic Science

93

Maternal exposure to dexamethasone during pregnancy activates p73 protein variants in male fetal brains

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Introduction:

Prenatal exposure to dexamethasone (Dex) leads to several long lasting neuropsychological disorders. The mechanisms underlying these negative effects are not yet known. Neural cell death/survival programs are governed, in large part, by p73 gene. Indeed, there are two major p73 protein variants; a pro-neural cell death (TAp73), and a pro-neural cell survival (TRIANGLE Np73) proteins. We have previously shown that fetal exposure to maternally born corticosteroid resulted in increased fetal brain expression of TAp73 protein. We hypothesized that prenatal exposure to Dex would stimulate the protein expression of TAp73 while repressing that of the TRIANGLE Np73.

Methods:

Daily intra-peritoneal injection of either Dex (0.4 mg/kg) or saline was given to the pregnant dams (n=6 in each group) from gestation day (GD)14 until GD21. The expression of p73 protein variants were assessed in the male fetal brains at GD21 using western blot and fluorescent immunohistochemistry.

Results:

Prenatal Dex significantly reduced fetal body and brain weights and increased the expression levels of TAp73 protein. Surprisingly, administration of Dex also led to an increase in TRIANGLE Np73 protein expression. The TA/TRIANGLE Np73 ratio was significantly larger in the Dex exposed group. Furthermore, TAp73 was found in the nucleus whereas TRIANGLE Np73 was found in the perinuclear region.

Conclusions:

Maternal administration of Dex resulted in increased expression levels of both TAp73 and TRIANGLE Np73 proteins in the brains of male fetuses. The fact that Dex induced a more pronounced increase in TAp73 strongly suggests that neural cell death is driven, at least in part, by TAp73 gene variant. This conclusion is supported by the nuclear localization of TAp73 and not that of TRIANGLE Np73.

Key Words: Prenatal stress; Dexamethasone; p73

Funding Agency: Yes



Medicine

Category: Clinical

94

Why patients do not attend their scheduled appointments in the diabetes clinic?

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Introduction:

Diabetes is a chronic complex disease with acute and chronic complications. Effective diabetes care management requires life-long structured approach, including medication management and screening for complications. Non-attendance to the clinic found to be associated with worse glycemic and lipid control, and higher prevalence of diabetes complications. Studies suggest that patients' behavior plays a role in non-attendance, and found that telephone reminders may be helpful in promoting attendance. The aim of this study is to identify the main reasons for non-attendance.

Methods:

The setting was the diabetes outpatient clinic in one of the general hospitals in Kuwait. The register of the clinic attendance was traced from February to December 2015. Patients who missed their appointments and attended the clinic without an appointment were asked about their reasons for missing their scheduled appointment.

Results:

From the 2514 appointments that were scheduled, 1608 (64%) patients attended the clinic according to their schedule, whereas 700 (28%) patients attended the clinic without a scheduled appointment. The main reasons given for missing the scheduled appointment were travel (27.0%), short of medication (12.7%), school schedule (10.8%), work commitment (6.6%), refusing to come for follow up (6.4%), forgetting (6.0%), attending another diabetes clinic (5.7%), add or change medication (4.1%), and patients' sickness (3.9%).

Conclusions:

The findings of this study indicate that there are many factors contributing to the high prevalence of non-attendance in diabetes clinics. Intervention strategies to improve adherence to diabetes clinic appointments should target the main reasons for non-attendance, particularly to the factors that are related to patients' behavior and to those related to organizations' logistic factors in order to facilitate patients' attendance, and ultimately improving diabetes outcomes.

Key Words: Diabetes; Attendance; Appointment

Funding Agency: NONE



Medicine

Category: Undergraduate

95

Risk factors, outcome, and treatment in subtypes of ischaemic stroke in the six general hospitals of Kuwait: Hospital based study

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Introduction:

Cerebrovascular accidents are the 2nd common cause of death and the 3rd common cause of disability-adjusted-life-years worldwide. Our aim here is to identify the trends regarding the risk factors, subtypes, and outcome of ischemic stroke in the six general hospitals of Kuwait between the years 2008-2013, which expectantly will lead to a larger prospective study to aid in making better management plans resulting in better outcomes.

Methods:

This cross-sectional study included 1257 patients presented from 2008 till 2013 in the six general hospitals. Data were collected through hospital records. The survey was divided into five parts. The 1st part was about socio-demographic facts. The 2nd part involved the risk factors. The 3rd part was about the subtypes. The 4th part included the treatment during hospital stay. The last part was assessment of the outcomes.

Results:

A total of 1257 patients (811 males and 446 females; mean age 60.2 ± 13.1) are in the study. Kuwaiti was the largest ethnic group (45.7%), followed by non-Kuwaiti Arab (30.6%), and non-Kuwaiti non-Arab (23.5%). Small-artery stroke was the most common subgroup (69.8%), followed by large artery (LA) (26.3%), and cardioembolism (CE) (3.8%). The most common risk factor is hypertension (80.9%). The previous history of heart disease and atrial fibrillation were most common in the CE subtype, in contrast to diabetes, which was less prevalent in that subtype. One-half of the CE patients had a severe stroke at onset, followed by the LA group (46.2%). Also, a higher duration of hospital stay was needed for CE patients. And, CE was significantly associated with higher mortality.

Conclusions:

Our data can be used as a baseline for future studies to help build stroke units in all the general hospitals, not just in Al-Ameri Hospital; this can aid with planning acute interventions when appropriate. In addition, increasing public awareness campaigns to reduce the prevalence of the modifiable risk factors.

Key Words: Epidemiology; Ischemic stroke; Kuwait

Funding Agency: Yes



Medicine

Category: *Clinical*

96

Puberty does not affect clinical presentation of multiple sclerosis in adolescent

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Introduction:

Multiple sclerosis (MS) is rare before puberty and the data on pre-pubertal patients is scarce. To compare the demographic and clinical characteristics between children of pre-pubertal and post-pubertal onset of MS.

Methods:

Utilizing the national MS registry in Kuwait, a cross-sectional study was conducted to identify children with MS who had their disease onset ≤ 12 or 13-17 years of age (pre-pubertal and post-pubertal cohorts). Clinically isolated Syndrome and primary progressive courses are excluded. Chi Square and student t test were used to compare the demographics and clinical variables between the two cohorts.

Results:

A total of 111 children with MS were identified; of whom 19 (17.12%) had disease onset ≤ 12 years of age. Post-pubertal cohort had higher female to male ratio (2.8:1 versus 1.4:1). Mean disease duration was comparable between both cohorts ($p = 0.64$). Symptoms at onset did not differ between the two cohorts (supratentorial " $p = 0.41$ "; optic neuritis " $p = 0.39$ " brainstem/ cerebellum " $p = 0.55$ " and spinal " $p = 0.29$ "). There was no statistical difference in mean number of relapses ($p = 0.89$) and mean EDSS score (2.02 versus 2.45; $p = 0.33$) between both cohorts. Although the time to develop SPMS was longer in patients with pre-pubertal onset, the difference was non statistically significant (17.70 versus 14.58 years; $p = 0.39$).

Conclusions:

There was an increase in the proportion of female MS children in the post pubertal age. However, puberty did not affect clinical presentation at the onset, number of relapses or disease progression over the observation period.

Key Words: Multiple sclerosis; puberty; Kuwait

Funding Agency: None



Medicine

Category: *Clinical*

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Determinants and role of changes in sclerostin concentration in normal females

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Introduction:

Sclerostin is a glycoprotein secreted by osteocytes and has anti-anabolic effects on bone. Age-related changes of sclerostin are unknown. This study aimed to investigate the changes of sclerostin with advances in age in normal female subjects.

Methods:

A random sample of 140 normal females, aged between 20-69 years, was studied. After taking baseline anthropometry, an overnight fasting blood was collected for the measurement of serum sclerostin (by ELISA). Bone densitometry of L2-L4 spine and neck of left femur were measured by Dual energy X-ray Absorptiometry (DXA-Lunar-Prodigy).

Results:

Subjects were stratified based on age-decades into 5 groups (group 1, n=29, aged 20-29 years; group 2, n=19, aged 30-39; group 3, n=42, aged 40-49; group 4, n=35, aged 50-59; and group 5, n=15, aged 60-69). As age advanced from group 1 to group 5, BMI (P=0.0001) and waist circumference (P=0.0001) demonstrated significant positive trends, whereas height (P=0.0117) and bone mineral content (BMC) (P=0.0001) demonstrated significant negative trends. Sclerostin demonstrated a significant positive trend (P=0.0175) as age advanced (group 1: 74.6±6.3, group 2: 87.2±10.2, group 3: 96.0±5.9, group 4: 113.8±8.5, group 5: 111.6±14.4). In the whole group, sclerostin demonstrated significant positive correlation with age (Rho= 0.29, P=0.003) and significant inverse relation with bone mineral density (BMD) of L2-L4 spine (Rho= - 0.2, P= 0.058). It demonstrated no relation with waist, weight, BMI, BMC, nor with BMD of neck of left femur. In subgroup analysis, however, it demonstrated inverse relation with weight (Rho= -0.36, P= 0.042), waist (Rho= - 0.435, P= 0.013) and BMI (Rho= -0.417, P= 0.018) only in age group 3.

Conclusions:

Sclerostin level increases with advances in age in normal female subjects and is correlated with BMD and components of BMI. It is possible that this age-related increment may contribute partially for the lowered bone mass observed in aging.

Key Words: Sclerostin; Age; Females

Funding Agency: No



Medicine

Category: Clinical

98

Transhepatic venous catheters for hemodialysis

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Introduction:

To describe our experience with the technique of transhepatic venous access for hemodialysis and to evaluate its functionality and complications.

Methods:

From March 2012 till October 2012, 23 patients with age ranging from 12 to 71 years old having end-stage renal disease (ESRD) were included in our study and were subjected to transhepatic venous catheter insertion. In 21 patients there were not any remaining patent peripheral venous accesses. In 2 patients there were only a last one venous access needed to be preserved. Thus, it was decided to make THVA. In all the 23 patients the indication was palliative due to inoperability which was because of inability to insert an arterio-venous graft or making another arterio-venous fistula. Complications were evaluated and calculated in terms of number of procedures, infection, dislodgement and outcome; in terms of disfunctionality of the catheter. Follow-up was performed by monitoring the catheter dialysis rate in each session, abdominal ultrasonography; fluoroscopy or CT. Mean survival time and median survival time from the start of treatment were calculated using Kaplan–Meier method.

Results:

Twenty-three patients required a single transhepatic access procedure. Because of catheter dislodgment, two patients required a second access placement procedure, which resulted in a total of 25 separate transhepatic access sites in 23 patients. Technical success was achieved in 22 procedures. Functionality success was achieved in 20 patients. Functionality failure occurred in 3 patients. The trans-hepatic catheters stayed in place between 90 and 300 days. Complications occurred in 14 patients.

Conclusions:

Based on our findings, transhepatic hemodialysis catheters have proven to achieve good long-term functionality. A high level of maintenance is required to preserve patency, although this approach provides remarkably durable access for patients who have otherwise exhausted access options.

Key Words: Transhepatic catheter; Hemodialysis; venous access

Funding Agency: None



Medicine

Category: Undergraduate

99

Abstinence time and its impact on semen parameters

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Introduction:

According to the WHO, the length of sexual abstinence affects semen quality. Yet, there isn't a specified optimal period of ejaculatory abstinence for achieving maximum semen quality, which is essential to ensure the quantity and quality of sperm needed for successful pregnancy by natural and assisted conception. The study determined the effect of short (24 hours), optimal (2 days), and long (1-2 weeks) abstinence intervals on routine and advanced sperm parameters. Relating abstinence time to functional parameters hasn't been done prior to this study.

Methods:

Semen samples from 10 donors were collected after 1, 2, 5, 7, 9, and 11 days of abstinence. Standard analysis assessed sperm count and motility by MicroCell counting chamber, leukocyte levels by Endtz Test, viability by eosin-nigrosin staining, morphology based on Tygerberg's criteria, hypo-osmotic swelling, semen volume, pH, and viscosity. Advanced analysis determined ROS levels by chemiluminescent assay and sperm DNA damage levels by flow cytometry and terminal deoxynucleotidyl transferase dUTP nick end labeling. Statistically, each subject served as his control.

Results:

Longer durations of abstinence are associated with decreased pH and increased semen viscosity, volume, concentration, and sperm count. Short durations are associated with decreased morphology. Sperm motility significantly decreased after 11 days of abstinence. Sperm viability and HOS levels were insignificant. Significant abnormal DNA damage, more than the acceptable cutoff values of 12%, was exhibited in samples collected after 7 days of abstinence.

Conclusions:

As the length of abstinence increases, routine semen parameters improve, but advanced semen parameters are negatively affected. DNA damage increases, leading to decreased pregnancy rates and infertility. According to our study, the optimal period of sexual abstinence is less than 5 days and a longer period of abstinence has a negative impact on semen quality.

Key Words: Ejaculatory abstinence; Infertility; Semen parameters

Funding Agency: NONE



Medicine

Category: Clinical

100

Pregnancy outcome after renal transplantation: Updated Kuwait experience

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Introduction:

Introduction and aim of work: The influence of pregnancy on graft function in patients after solid organ transplantation is still uncertain. Aim of the work was to evaluate the outcome of pregnancy in our kidney transplanted women.

Methods:

Our study is based on a group of 38 renal transplant recipients with 64 deliveries in the past 12 years and followed up in Hamed Al-Essa Organ Transplant Center of Kuwait. We compared duration of pregnancy, mode of delivery, weight of neonates, and graft function in two groups (tacrolimus based group and cyclosporine based group) of patients.

Results:

The two groups were comparable regarding the viral profile (HBV, HCV and CMV), types of dialysis modalities, type of kidney donors and blood groups. Pregnant ladies maintained on tacrolimus were significantly younger with significant more diabetic patients ($p < .05$). Ladies maintained on cyclosporine experienced more frequent abortions; while the fetal mortality was higher in tacrolimus based group, however this did not rank to significance ($p = .16$). The mean fetal body weight was comparable in both groups (2.5 ± 0.7 vs. 2.57 ± 0.6 , $p = 0.97$). Most ladies who were maintained on tacrolimus delivered more females (63.6% vs. 40% in cyclosporine group) by caesarian section (81.8% vs. 53.8% in cyclosporine group) ($p = 0.16$ and $p = 0.094$ respectively). The two groups were comparable regarding patient and graft outcomes.

Conclusions:

Pregnancy in kidney transplant recipients is high-risk, however by meticulous follow up the outcome might be fruitful without significant maternal or fetal adverse effects regardless the CNI used.

Key Words: Pregnancy; Renal transplant; Outcome

Funding Agency: none



Medicine

Category: Clinical

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Study of the effect of donor source on graft and patient survival in pediatric renal transplant recipients

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Introduction:

Evaluation of the impact of kidney donor sources on the outcome of renal transplantation is not adequately studied. Aim of the study: We aimed to compare the long-term outcome of kidney transplantation from different sources among a pediatric recipient population.

Methods:

This study comprised 105 pediatric recipients who received their kidney grafts between 1994 and 2011 at Hamed Al-Essa Organ Transplant Center of Kuwait. These patients were further subdivided into three groups according to donor source (37 with live related donors); (31 with emotionally related donors) and (35 with cadaveric donors). All patients' data were assessed with special emphasis on graft and patient survival as well as post-transplant medical complications.

Results:

All groups –with mean follow up seven years–were comparable regarding pre-transplant demographic features especially diabetes, anemia, hypertension, tuberculosis, bone disease and viral profile. We found that patient survival at 1, 5, and 10 years was comparable in all groups. In our series, we observed that rejection rate in the 3 groups was comparable ($p>0.05$). However, kidney survival was poor among cadaveric group compared to other groups despite potent induction and maintenance immunosuppression. This could be explained by poor HLA match; high PRA; higher incidence of ATN and NODAT in the same group ($p<0.05$). This was translated as significantly higher mean serum creatinine. The overall incidence of post-transplant complications was comparable among the three groups except significantly higher post-transplant diabetes among emotionally related donors group ($p=0.004$).

Conclusions:

Pediatric renal transplants have good long term patient outcome irrespective of the donor source; with poorer cadaveric grafts and higher risk of NODAT among emotionally related donors.

Key Words: Donor source; Kidney transplant; Outcome

Funding Agency: none



Medicine

Category: Clinical

102

Early vs. late acute antibody mediated rejection among renal transplant recipients in terms of its response to rituximab therapy- single center experience

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Hamed Al-Essa Organ Transplant Center, Kuwait

Introduction:

There are no comparable trials concerning the use of rituximab among renal transplant recipients with acute antibody mediated rejection. Aim of the study: We aimed to compare early and late acute AAMR among renal transplant recipients in terms of its response to rituximab therapy.

Methods:

Out of 1200 kidney transplant recipients performed in Hamed Al-Essa Organ Transplant Center of Kuwait over the last 10 years, 103 developed acute AAMR and were subcategorized into 4 groups according to the onset of rejection and rituximab management. All patients received the standard management of AAMR according to our protocol (PP and IVIG). We added rituximab to the management of cases of group 1 (n=27, early AAMR) and group 2 (n=38, late AAMR) while groups 3 and 4 represented non-rituximab groups (n=20, early AAMR & 18, late AAMR respectively). We compared the 4 groups regarding graft and patient outcome.

Results:

All patients were comparable regarding demographic data (patient age, sex, pre-transplant type of dialysis viral profile, type of induction, donor criteria, and pretransplant co-morbidities). We observed that delayed and slow graft function were significantly higher in groups 1,3 (p=0.016), however we found no significant difference in the 4 groups regarding NODAT, BK viral infection or malignancy. Graft outcome was significantly better in group 1, 2 compared to the other groups (p=0.028). However, patient outcome was comparable in the 4 groups (p>0.05).

Conclusions:

Early AAMR in renal transplant recipients had significantly better outcome when rituximab was added to the standard management.

*Key Words: Antibody mediated rejection; Kidney transplant outcome; Rituximab
Funding Agency: none*



Medicine

Category: Clinical

103

Calcineurin inhibitors elimination with mTORS: comparative analysis between sirolimus and evirolimus

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Organ Transplant Center, Kuwait

Introduction:

The mammalian target of rapamycin inhibitor (mTORi) are used to achieve adequate immunosuppression while decreasing the dose and possible toxicity of primary agents, such as calcineurin inhibitors. Aim of our work to compare which mTOR is better to convert from calcineurin inhibitors (CNI) based regimen among renal transplant recipients.

Methods:

Twenty renal transplant recipients were converted from CNI to evirolimus based immunosuppressive (group 1) were compared with another group of patients who were converted from CNI to sirolimus based regimen (group 2, n=77). All patients were followed up during the period between 2000 till 2015 in Hamed Al-Essa Organ Transplant Center of Kuwait. All patients were adults and received lymphocyte depleting agents as induction. We evaluated the patient and graft outcomes after 1 year of conversion. The primary endpoint was a composite endpoint of graft survival (non-death censored) and biopsy proven acute rejection at 1 year.

Results:

The two groups were comparable regarding demographic data, patient sex, original kidney disease and virology screen were not different in both groups. However, cadaveric donors and overweight patients (BMI>25) were significantly more prevalent among group 2 (p<0.05). Moreover, we observed that despite the higher number of acute rejections (pre and post-conversion) and higher cholesterol (post-conversion) in group 2 (p<0.05), graft and patient outcome were comparable in both groups after 1 year follow up (p>0.05).

Conclusions:

CNI minimization can be successfully contemplated with either sirolimus or evirolimus with equal and similar outcome.

Key Words: mTORS; Renal transplant; Outcome

Funding Agency: none



Medicine

Category: Clinical

104

Successful cost effective prevention of Cytomegalovirus disease in kidney transplant recipients using low dose Valganciclovir

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Organ Transplant Center, Kuwait

Introduction:

Prophylaxis for cytomegalovirus infection is highly recommended for kidney transplants but using valgancyclovir (VGC) in low dose is still under investigation. Our aim was to assess the cost effectiveness of 450 mg VGC prophylaxis compared with 900 mg for kidney transplants.

Methods:

In this prospective trial, 201 kidney transplants were randomized (1:1) to receive 450 mg VGC prophylaxis (group 1, n=100) or 900 mg daily (group2, n=101) for the first 6months post-transplant. Patients were studied for incidence of CMV disease, leucopenia attacks, rejection episodes and graft outcome and associated costs in one year duration. Direct costs associated with acquisition of immunosuppressive medications, rejection management, and hospitalizations were included and measured in US dollars.

Results:

Demographic features of the studied groups were comparable. More patients have received tacrolimus in group 1, while in group 2 more patients were maintained on cyclosporine (p0.001). We found that the cost of CVM prophylaxis in patients of group 1 was significantly lower (by 50% at 6 months, p<0.001) with lower leucopenia attacks (p 0.04) and lower doses of granulocyte colony stimulating factor (by 30 % at 6 months, p 0.03) compared to group 2. Higher doses of mycophenolate mofetil (p 0.04) among group 1 patients were protective therefore they experienced less rejection episodes (p0.01). In group 2; there were more cytomegalovirus infections requiring full treatment (p0.052) and more BK virus nephropathy (p0.03). Graft and patient outcomes were satisfactory in both groups. Mean estimated glomerular filtration rates were above 60 ml/min at baseline, at 6 months and at 12 months post-transplant for both groups.

Conclusions:

Despite higher immunosuppressive regimen in group 1, low dose VGC for CMV prophylaxis after renal transplant was safer, effective without breakthrough infection and less costly than using usual dose.

Key Words: CMV prophylaxis; kidney transplant; survival

Funding Agency: none



Medicine

Category: Undergraduate

105

Quality of life comparison between HD and PD among ESRD patients in Kuwait

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Introduction:

Hemodialysis (HD) and peritoneal dialysis (PD) are important renal replacement therapies for end-stage renal disease (ESRD) patients. The comparison of quality of life between the two modalities in Kuwait is lacking. This study aimed to estimate the proportion of HD and PD patients in Kuwait, compare the quality of life between the two groups, and quantify and test the association between satisfaction with the treatment and a set of covariates using a multivariable logistic regression modeling technique.

Methods:

A cross-sectional study was conducted using a self-administered structured SF-36 questionnaire on ESRD patients. Data were collected using a non-probability sample of size 407 participants from all dialysis centers in Kuwait. Of the 407 participants used in the study, 336 patients were on HD, 62 were on PD, and 9 underwent both types.

Results:

The proportion of HD patients (84.4%) is 5.4 times more than PD (15.6%), with mean age (\pm SD) of 55.28 (13.42) for HD and 58.44 (15.42) for PD. Among the common causes of ESRD, diabetes mellitus is the most common (about 38%). Although not statistically significant, the mean scores favored PD in all domains except for Mental Health and Role limitation due to Emotional problem, assuming a better quality of life compared to HD. Multivariable logistic regression modeling revealed that the odds of being satisfied with treatment modality in those who live with family/others is 4.5 times the odds of those who live alone.

Conclusions:

The proportion of PD patients is 5.4 times smaller than the HD group, but showed better QoL results overall. Important subgroups found with worse QoL are those with diabetes as their cause of ESRD and those who lived alone. Living status was the only significant socio-demographic characteristic associated with patients' satisfaction with treatment. Therefore, emotional strengthening and morale support need to be established through family or support groups.

Key Words: ESRD, Kuwait; Quality of Life,; Hemodialysis, Peritoneal Dialysis

Funding Agency: None



Medicine

Category: *Clinical*

106

Assessment of cardiac safety during first year of fingolimod in multiple sclerosis patients: A single center experience in Kuwait

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Introduction:

Fingolimod is used to reduce the rates of relapse and slow the progression of in relapsing-remitting multiple sclerosis (RRMS). The risks associated with the use of fingolimod include cardiovascular adverse events (AEs). First-dose observation (FDO) is required for all patients for at least 6 hours. We describe FDO data and long-term cardiac tolerability in a cohort of fingolimod-treated MS patients.

Methods:

An observational, retrospective study was conducted on MS patients who received even a single dose of 0.5 mg of oral fingolimod. Prior to administering fingolimod, cardiac function was assessed with 24-hours holter monitor & echocardiogram. After the first dose, all patients were observed for 6 hours with heart rate (HR) & blood pressure (BP) monitoring. The patients were followed up regularly every 3 months. The duration of the treatment was 6 to 36 months (average 14.7), all of the patients were compliant on daily Fingolimod dose of 0.5 mg oral tablets.

Results:

All 34 patients tolerated the first dose well. Average lowest HR was 63/minute (46-102), while average lowest systolic BP was 111mmHg (94-136). None of our patients required extended observation nor hospitalization. Two out of 34 (6%) patients developed arrhythmia that led to discontinuation of fingolimod. The first patient had atrial fibrillation three days after starting on 0.5mg daily dose of fingolimod, Fingolimod was found to be the only explanation and the patient cardiac rhythm reverted to sinus rhythm spontaneously 3 days after discontinuation of Fingolimod. The second patient developed frequent palpitations & hypotension three years after starting fingolimod, and she improved dramatically next day following Fingolimod discontinuation.

Conclusions:

This study shows that fingolimod is well tolerated and that cardiac AEs can occur early or late during the course of treatment.

Key Words: cardiac safety; cardiac safety; fingolimod; multiple sclerosis

Funding Agency: NONE



Medicine

Category: Clinical

107

**Efficacy and tolerability of fingolimod in multiple sclerosis patients:
Experience from an academic MS center in Kuwait**

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Medicine, Faculty of Medicine, Kuwait University, Kuwait

Introduction:

Fingolimod is a first in class oral compound approved for the treatment of relapsing-remitting multiple sclerosis (RR-MS). The aim of this study was to evaluate clinical and neuroradiological responses to fingolimod as well as the safety and tolerability in RR-MS patients in clinical practice.

Methods:

Patients prescribed fingolimod from 2010 to 2016 were identified. Demographics, MS disease history, pre-treatment screening studies, first dose observation experience during shared medical visits and up to three years follow-up data were analyzed.

Results:

A total of 37 patients were included. Fingolimod was most frequently used in relapsing remitting MS (n=33, 91.7%) and was prescribed as a first-line agent in 7 cases (18.4%). The first dose observation was uneventful in 97.2% of patients. The fraction of patients with no evidence of disease activity (no relapse, stable EDSS, no new active lesions in MRI) increased from 26.9% (during the year prior) to 57.7% (at 6 months). Ten (27.7%) patients discontinued fingolimod due to adverse affects with lymphopenia (n=3), increase liver enzymes (1), and cardiac complications (n=2).

Conclusions:

The efficacy in reducing relapses was comparable to that observed in phase III trials and post-marketing studies. Our cohort confirms the tolerability and safety of fingolimod in a real world setting.

Key Words: Tolerability; Fingolimod; Multiple sclerosis

Funding Agency: NONE



Medicine

Category: Clinical

108

Kidney transplantation services in Kuwait in 2015

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Introduction:

Renal transplantation services in Kuwait are provided by Hamed Al-Essa Organ Transplant Center (OTC) since 1979 for Kuwaitis and non-Kuwaiti citizens residing in Kuwait.

Methods:

Data were collected from the different hospital records during the year 2015.

Results:

In 2015, 82 patients had undergone renal transplantation in Kuwait; 24 (29.3%) of them acquired their kidneys from deceased donors, 19 (23.2%) from living unrelated donors, and 39 (47.5%) from living related donors. Males were 46 (56%) and female were 26 (44%) of patients. Thirty-six (43.9%) patients were highly sensitized immunologically and underwent successful desensitization before transplantation local protocol; 13 (36%) of them were males and 23 (64%) were females. Only one patient (1.2%) experienced acute rejection within the first post-transplant week. One diabetic female performed successful simultaneous kidney and pancreas transplantation from a deceased donor. Seventy-nine new patients were added to the follow-up list during 2015 as they were transplanted outside Kuwait; 62 (78%) of them were males and 17 (22%) were females. Thirty-one patients (39%) had their kidneys from living related donors, 45 (57%) from living unrelated donors, 3 (4%) patients from deceased donors. In addition, pre-transplant evaluation for prospective kidney recipients is being performed in OTC. During 2015, Three hundred and three (303) patients were assessed for fitness for kidney transplantation, 204 (67.3%) were males and 99 (32.7%) were females. Only eight (2.6%) patients had been rejected from the waiting list for kidney transplantation for medical reasons.

Conclusions:

In 2015, 82 patients underwent renal transplantation in Kuwait among which only one patient (1.2%) had acute rejection in the first post-transplant week.

Key Words: Kidney transplantation; Acute rejection; Pre-transplant evaluation

Funding Agency: None



Medicine

Category: Clinical

109

Bariatric surgery in obese kidney transplant recipients: Single center experience

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Introduction:

Obesity has been associated with poor graft and patient survival after kidney transplantation, requiring functional increase of anti-rejection drugs. Weight loss surgery may be a good alternative in this clinical scenario. We aimed to assess the outcomes of bariatric procedures among renal transplants compared to conventional group of patients.

Methods:

In this retrospective study, we analyzed the collected data of obese patients (BMI>38) after kidney transplantation who underwent bariatric procedures during the last 5 years (n=25 cases) in comparison to control obese group without this type of surgery (n=41 cases). Roux-en-Y gastric bypass was the most common procedure.

Results:

The two groups of patients were matched regarding their demographic data, type of donor, cases with IHD, type of induction and maintenance immunosuppression. Most of patients in bariatric group were females (60% vs. 84% males in other group, p=0.03). The basal and last follow up mean BMI values were (38.3±8.9 and 33.3±7.3) vs. (44.2±5.6 and 44.2±6.7) with mean weight loss percentage 15.4±5.1% vs. 0.4±0.2% in the control group (p0.05). The 2 groups were matched regarding pre-transplant diabetics but the total number of diabetics in the control group was significantly higher (73.3% vs. 40%, p=0.042). The 2 groups were matched regarding cases with gall bladder stones, sleep apnea and hyperuricemia management. We observed no significant difference between the 2 groups regarding rejection episodes, graft and patient outcomes (p>0.05). There were no postoperative complications except strangulated hernia in one case; and postoperative DVT and pulmonary embolism in another.

Conclusions:

Bariatric surgical techniques may be used safely and effectively-with some precautions- to control obesity among renal transplant recipients. Longer term and larger studies are needed to evaluate metabolic parameters and long term patient and graft outcome.

Key Words: Bariatric surgery; Kidney transplant; Outcome

Funding Agency: none



Medicine

Category: Clinical

110

Impact of systemic lupus erythematosus on the outcome of renal transplant recipients: single center experience.

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Organ Transplant Center, Kuwait

Introduction:

Long term outcome of renal transplantation among systemic lupus erythematosus (SLE) patients remains a debated topic. Aim of the study: We aimed to compare the long-term outcome of kidney transplant recipients with ESRD secondary to lupus nephritis with an age, sex, and donor matched control group of recipients.

Methods:

This study comprised 192 kidney transplant recipients who received their grafts between 1994 and 2011 at Hamed Al-Essa Organ Transplant Center of Kuwait. They were subdivided into two groups according to original kidney disease (36 secondary to SLE) and (156 secondary to non-SLE causes). All patients' data were assessed with special emphasis on graft and patient survival as well as post-transplant medical complications.

Results:

The two groups were comparable regarding pre-transplant patient demographic features, moreover pre-transplant diabetes, anemia, hypertension, tuberculosis, bone disease, type of dialysis, type of immunosuppression and viral profile were also matched. The overall incidence of post-transplant complications was comparable among the two groups especially NODAT, BK nephropathy and coronary heart disease ($p > 0.05$). Lupus patients needed significantly more anti-hypertensives ($p = 0.003$), and had higher prevalence of CMV ($p = 0.001$). On the other hand, we observed higher prevalence of hyperlipidemia in the control group ($p = 0.015$). We observed that the mean number of rejection episodes were significantly higher among lupus patients compared to the control group (0.94 ± 1.1 vs. 0.42 ± 0.66 ; $p = 0.011$). Kidney graft survival was worse among the lupus group compared to the control group ($p < 0.001$); however, patient survival was comparable in both groups at 1, 5, and 10 years ($p < 0.05$).

Conclusions:

SLE as a cause of ESRD in renal transplant recipients is associated with worse allograft survival possibly due to higher prevalence of CMV, hypertension and acute rejection episodes.

Key Words: Lupus; Renal transplant; Outcome

Funding Agency: none



Medicine

Category: Clinical

111

Complications in spinal cord injury: A five-year analysis in a tertiary rehabilitation center

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Introduction:

Spinal cord injury (SCI) is a common event which produces changes in systemic physiology leading to complications which rival the neurologic deficits in their impact on function and quality of life. Data regarding these complications help to minimize these complications. No data is available in Kuwait relating to SCI. The aim of this study was to analyze the incidence of complications in patients with SCI.

Methods:

All patients with SCI admitted in Physical Medicine & Rehabilitation (PM&R) Hospital, Kuwait from 2010 to 2014 were recruited. A retrospective analysis was done on their demographic details, SCI injury level and complications. Exclusion criteria comprised those who could not complete rehabilitation program due to various reasons. A total of 211 patients, mean age 41 ± 16.2 years with F:M ratio 1: 2.83 were assessed.

Results:

68 (32.2%) patients had medical complications. 43 (20.5%) had urinary tract infections (UTI) followed by pressure sores (PrSore) 16 (7.6%), chest infection 6 (2.9%), deep vein thrombosis 3 (1.4%), pulmonary embolism 3 (1.4%), heterotopic ossification 3 (1.4%), depression 3 (1.4%) and neuropathic pain 3 (1.4%). Serial annual incidence of complications from 2010 to 2014 were 14 (28%), 15 (30.6%), 15 (36.6%), 12 (36.4%) and 12 (31.6%). Incidence of UTI was highest in 2014, 10 (26.3%) and lowest in 2011, 8 (16.3%). Incidence of complications were significantly different among SCI injury levels, 21 (42.9%) in low paraplegics, 9 (40.9%) in high paraplegics, 27 (40.9%) in quadriplegics, 11 (15.3%) in cauda equina ($p=0.005$). Prsore was significantly high among Low Paraplegics (T8 – T12) 9 (18.4%) compared to 5 (7.6%) in quadriplegics, 2 (9.1%) in high paraplegics and none in cauda equina, $p=0.001$. Age groups and gender did not show significant association with respect to complications.

Conclusions:

UTI, Prsores and chest infection were the commonest medical complications observed in this preliminary study.

Key Words: Spinal cord injury; Complications; Rehabilitation

Funding Agency: No



Medicine

Category: Clinical

112

Detection of mutations in NOD2/Card15 gene in Arab patients with ulcerative colitis

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Introduction:

Ulcerative colitis is a chronic, immune mediated inflammatory condition which affects the large intestine. NOD2/Card15 mutations have been linked to an increased risk of Crohn's disease and to some of its phenotypes. The association between NOD2 mutations and susceptibility to ulcerative colitis however remains somewhat controversial and potential correlations between these mutations and ulcerative colitis phenotype have not been studied. This study aimed to determine the presence of the above mutations in Arab patients suffering from ulcerative colitis.

Methods:

Blood samples were obtained from 34 Arab patients with ulcerative colitis. The genomic DNA was isolated from the samples using Qiagen DNA Blood mini kit. The isolated DNA were used in Polymerase Chain Reaction (PCR) using three sets of primers specific for each mutation in the NOD2/Card15 (rs2066844, SNP8, Exon4 2104C>T; rs2066847, SNP13, Exon11 3020insC; and, rs2066842, SNP5, Exon4 802C>T). The PCR-amplified DNA were sequenced using ABI 3130xl Genetic analyzer, and specific mutations were detected by using the sequence analysis software.

Results:

The only mutation detected in the NOD2/Card15 sequence of Arab patients with ulcerative colitis was rs2066842 (SNP5, Exon4 802C>T) with the frequency of 13/34 (37%). The other two tested mutations (rs2066844, SNP8, Exon4 2104C>T and rs2066847, SNP13, Exon11 3020insC) were not detected in our patients.

Conclusions:

This study suggests that the rs2066844, SNP8, Exon4 2104C>T mutation in NOD2/Card15 does occur in Arab patients with ulcerative colitis. However, mutation in rs2066844, SNP8, Exon4 2104C>T and rs2066847, SNP13, Exon11 3020insC are not seen in this population.

Key Words: Ulcerative colitis; Inflammatory bowel disease; NOD2/Card15 mutation

Funding Agency: Supported by Kuwait University Research Sector grants MM01/15 and SRUL02/13.



Medicine

Category: *Clinical*

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Detection of mutations in NOD2/Card15 gene in Arab patients with Crohn's disease

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Introduction:

Crohn's disease is a relapsing systemic inflammatory disease, mainly affecting the gastrointestinal tract with extra-intestinal manifestations and associated immune disorders. Studies from other parts of the world have shown the existence of specific mutations in NOD2/Card15, which are associated with increased risk of Crohn's disease. These mutations affect the severity of the disease and response to treatment in respective populations. This study aimed to determine the presence of the above mutations in Arab patients suffering from Crohn's disease.

Methods:

Blood samples were obtained from 39 Arab patients with Crohn's disease. The genomic DNA was isolated from the samples using Qiagen DNA Blood mini kit. The isolated DNA were used in Polymerase Chain Reaction (PCR) using three sets of primers specific for each mutation in the NOD2/Card15 (rs2066844, SNP8, Exon4 2104C>T; rs2066847, SNP13, Exon11 3020insC; and, rs2066842, SNP5, Exon4 802C>T). The PCR-amplified DNA were sequenced using ABI 3130xl Genetic analyzer, and specific mutations were detected by using the sequence analysis software.

Results:

The only mutation detected in the NOD2/Card15 sequence of Arab CD patients was rs2066842 (SNP5, Exon4 802C>T) with the frequency of 13/39 (33%). The other two tested mutations (rs2066844, SNP8, Exon4 2104C>T and rs2066847, SNP13, Exon11 3020insC) were not detected in our patients.

Conclusions:

This study suggests that about one in three Arab patients with Crohn's disease has the rs2066844, SNP8, Exon4 2104C>T mutation. Mutation in rs2066844, SNP8, Exon4 2104C>T and rs2066847, SNP13, Exon11 3020insC is not seen in Arab patients.

Key Words: Crohn's disease; Inflammatory bowel disease; NOD2/Card15 mutation

Funding Agency: Yes



Medicine

Category: Clinical

114

Effect of Omega-3 fatty acids on vascular access patency in chronic hemodialysis patients

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Introduction:

Thrombosis of hemodialysis (HD) vascular access (VA) represents a major medical and economic burden. Omega-3 fatty acids play an important modulatory role in the immune & inflammatory responses & the progression of arteriosclerosis. Fish oils have been demonstrated to have anti-platelet effects, and reduce intimal hyperplasia in autogenous grafts; such effects may improve arteriovenous fistula (AVF) and arteriovenous graft (AVG) patency. This study aimed to determine the effect of fish oil on VA patency in chronic HD patients.

Methods:

Prospective Case control study conducted on 80 chronic HD patients over 6 months. Patients were divided randomly into two groups, group (1) composed of 40 patients receiving four omega-3 fatty acids capsules/day (1-g per capsule) throughout the study duration, & group (2) composed of 40 patients without omega-3 fatty acids. Full clinical examination of vascular access was done in every HD session. Colored Doppler was used to measure vascular access blood flow monthly. In case of changing in access blood flow for more than 20% of its original value, angiography was performed.

Results:

82.5% were having AVF while 17.5% were having AVG. There was significant decrease in serum TG, cholesterol, & LDL levels in group (1) compared to group (2) that was accompanied by a significant increase in HDL & URR in group (1) compared to group (2) over the 6 months. Change in blood flow in the VA was nonsignificant among both groups. 8 patients (20%) underwent angiography, all of them had stenosis <50% of lumen & no interventions were performed with no significant difference between both groups.

Conclusions:

Fish oil administration was associated with improvement in the lipid profile; however, this was not associated with significant change in the VA blood flow.

Key Words: Omega-3; Vascular access; Hemodialysis

Funding Agency: None



Microbiology, Virology and Immunology

Category: Graduate (Resident)

115

Audit of antibiotic prescription compliance with local and published antibiotic prescribing guidelines in a major teaching hospital in Kuwait

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Introduction:

To ensure adherence to a local antibiotic policy, ascertain that antibiotic prescription is accurately documented in the clinical notes with a review after 48 hours, and establish that de-escalation is made after microbiology reports.

Methods:

Patients' antimicrobial prescriptions were reviewed prospectively during the period June 1st to 31st, 2015, in the medical department of Mubarak Al-Kabeer Hospital, Kuwait, and percentage compliance was calculated using the collected data.

Results:

A total of 104 patients were included in the study but four were non-evaluable. Of the 100 patients evaluated, 67% were started on antimicrobials in line with local guidelines. Ninety one percent of patients were started on an appropriate route of antimicrobial administration but only 5% were documented for the duration of therapy on the drug chart. Also 84% of the patients were reviewed at 48 hours and a decision taken whether to continue antimicrobial therapy. Up to a third (33%) of patients were de-escalated to pathogen-directed narrow-spectrum treatment and underwent an intravenous (IV)-oral switch of the antimicrobial.

Conclusions:

There is suboptimal adherence to the local antibiotic policy. Antimicrobial prescription is not being accurately documented in patients' clinical files and percentage compliance for the de-escalation to narrower spectrum antibiotics and IV-oral switching is very low.

Key Words: Audit, antibiotic; policy, compliance; Kuwait

Funding Agency: NONE



Microbiology, Virology and Immunology

Category: Graduate MSc: Basic Science

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Effects of pregnancy-related hormones on maternal cytokine production by lymphocytes from recurrent spontaneous miscarriage

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³Department of Mathematics and Biology, Gulf University for Science and Technology, Kuwait

Introduction:

Recurrent spontaneous miscarriage (RSM) is a serious pregnancy complication that may be caused by pro-inflammatory Th1 cytokines. We have previously shown that normal pregnancy is Th2-biased while unexplained RSM is Th1-dominated. Th17 cells have been shown to contribute to RSM; significantly higher levels of IL-17 are seen in RSM than in normal pregnancy. Hormones have been explored for their ability to down-regulate production of potentially harmful Th1 cytokines. Progesterone enhances T cell differentiation into Th2 cells; we have shown that dydrogesterone, an orally-administrable progestogen, upregulates some anti-inflammatory Th2 cytokines and inhibits some Th1 cytokines. Cytokine-modulating abilities of estrogen have not been studied. This study was aimed at comparing the ability of these three hormones to modulate cytokine production by peripheral blood cells from women with RSM.

Methods:

Peripheral blood mononuclear cells from 22 women with RSM were stimulated with a mitogen, cultured with progesterone or dydrogesterone or estrogen. Levels of the cytokines TNF-alpha, IFN-gamma (Th1), IL-4, IL-10 (Th2) and IL-17 (Th17) in these culture supernatants were estimated using ELISA/MILLIPLEX MAP system.

Results:

Progesterone, dydrogesterone, and estrogen inhibit IFN production while progesterone and dydrogesterone suppress TNF production. Dydrogesterone enhances secretion of Th2 cytokine IL-4. Progesterone and dydrogesterone down-regulate IL-17 production. A significant reduction in Th1:Th2 ratios was seen, indicating a shift from Th1 to Th2 cytokine bias.

Conclusions:

Progesterone and dydrogesterone are effective in down-regulating pro-inflammatory Th1 cytokines that are deleterious to pregnancy, and dydrogesterone upregulates the production of the pregnancy-conducive anti-inflammatory cytokine IL-4. These observations suggest that the orally-administered progestogen dydrogesterone may be considered for immunomodulation of recurrent miscarriage.

Key Words: Hormones; Cytokines; Recurrent spontaneous miscarriage

Funding Agency: Yes



Microbiology, Virology and Immunology

Category: Basic Sciences

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Cloning and expression of *porA* gene from *Campylobacter jejuni* strain

111

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Introduction:

Campylobacter jejuni is a diarrhoeal pathogen with numerous serotypes. It is possible to control campylobacteriosis by vaccination. For broad protection, a vaccine should be based on a protective antigen(s) shared by all serotypes. The major outer membrane protein (MOMP) (PorA) has unique and common epitopes. The objective of the current study was to obtain a recombinant MOMP from a mouse colonising *C. jejuni* strain and use it as a vaccine to demonstrate protection in an adult mouse diarrhoea model in which diarrhoea will be induced by prior intraperitoneal injection with ferric chloride and subsequently with *C. jejuni*. If it works, mouse diarrhoea model will be an ideal model for evaluation of *C. jejuni* vaccines.

Methods:

porA gene from a clinical strain of *C. jejuni* 111 that stably colonises mouse intestine, was amplified using primers of published sequence with attached restriction sites for BamHI and KpnI to facilitate cloning into pQE-30 vector (Qiagen). Competent *Escherichia coli* M15 (Qiagen) was transformed with the recombinant plasmid and transformants recovered on selective agar with antibiotics. A recombinant clone was induced by IPTG and protein analysed by Western blot with primary rabbit polyclonal antibody to biochemically purified *C. jejuni* 111 MOMP. The plasmid insert was sequenced by dideoxynucleotide chain termination method.

Results:

The insert in the recombinant plasmid had a size of 1209 bp. On induction, the recombinant clone expressed a protein of about 45-kDa that was detected on Western blot. This corresponded to mature MOMP. Sequencing of the plasmid insert showed it had 1209 bases potentially encoding a 45-kDa protein with 403 amino acids. The sequence was identical to the published sequence of *porA* gene from another *C. jejuni* (accession number CP010301.1).

Conclusions:

We have successfully cloned *porA* from *C. jejuni* 111 and expressed it. Now the protein can be tested as a vaccine in the mouse model.

Key Words: *C. jejuni*; *PorA*; Vaccine

Funding Agency: No



Microbiology, Virology and Immunology

Category: Clinical

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Evaluation of xTAG gastrointestinal pathogen panel assay for detection of enteric pathogens in Kuwait

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Introduction:

Numerous bacterial, viral and parasitic agents cause diarrhoeal disease. Conventional assays are not optimal for speed and sensitivity in detection of pathogens. Prompt and accurate diagnosis is important for provision of appropriate therapy and containment of outbreaks. Luminex xTAG GPP assay is a rapid (with a turnaround time of 5 hours), multiplexed molecular test that detects 9 bacterial (*Salmonella* spp., *Shigella* spp., *Vibrio cholerae*, *Yersinia enterocolitica*, *Campylobacter* spp., *Clostridium difficile*, *Escherichia coli* O157, shiga toxin-producing *E. coli* [STEC], and enterotoxigenic *E. coli* [ETEC]), 3 viral (rotavirus A, adenovirus 40/41, and norovirus GI/GII), and 3 parasitic (*Cryptosporidium* spp., *Entamoeba histolytica*, and *Giardia lamblia*) diarrhoeal pathogens in a single test. The aim of this study was to evaluate this assay on diarrhoeal stool samples in Kuwait.

Methods:

The assay was evaluated according to manufacturer's instructions on single stool samples from 109 in-patients with diarrhoea treated at the Mubarak Al-Kabeer Hospital, Kuwait, during March 2014 to June 2015. Conventional microbiological assays were done as the gold standard for comparison.

Results:

xTAG GPP assay detected 20 pathogens (18.4%) (3 *Salmonella* spp., 1 *Shigella* sp., 6 *Campylobacter* spp., 3 *C. difficile*, 2 rotavirus, 2 norovirus, 1 *Cryptosporidium* sp., 2 *G. lamblia*) from 19 stool samples, while conventional assays detected 10 pathogens (9.2%)(all the pathogens detected by xTAG GPP assay except *Shigella* sp., *Campylobacter* spp., *Cryptosporidium* sp., and *G. lamblia*) only from the same samples.

Conclusions:

Luminex xTAG GPP assay showed a superior sensitivity compared with conventional assays in detection of enteric pathogens from diarrhoeal stool samples. Therefore, we recommend the introduction of this assay in Kuwait for better diagnosis and treatment of diarrhoeal disease.

Key Words: xTAG GPP assay; Enteric pathogens; Diarrhoea

Funding Agency: No



Microbiology, Virology and Immunology

Category: Graduate MSc (Basic Science)

119

***Haemophilus influenzae* respiratory infections in Farwaniya hospital, one- year study report.**

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Introduction:

Haemophilus influenzae is an important respiratory pathogen. Emergence of resistance to various antibiotics is a major problem in patient management. Knowledge of the sensitivity and resistance pattern of the prevalent strains helps in improving the healthcare systems. Hence the study was undertaken to determine its antibiotics sensitivity pattern.

Methods:

The study was conducted in Microbiology unit of Farwaniya hospital. All the strains of *H. influenzae* isolated from respiratory samples January to December 2015 were included in the study. A total of 54 strains of *H. influenzae* were isolated by standard procedures. Identification was done by manual methods and confirmed by Vitek – 2 biomeuriex or MS vitek. The suspected non - haemolytic colonies that showed gram negative cocco bacilli, oxidase positive were tested for Satellitism on blood agar and for X and V factors requirement on trypticase soy agar. Antibiotic sensitivity and resistance were tested against commonly used antibiotics as per CLSI guidelines.

Results:

Sensitivity to various antibiotics were as follows - ampicillin 57.407 % (31), augmentin 79.629 % (43), cefotaxime 100 % (54), cefuroxime 72.22% (39), cephalothin 51.21% (28), tetracycline 66.666% (36), septrin 50% (27).

Conclusions:

The present study showed variable resistance to antibiotics. It is important for the clinical microbiological laboratory to monitor drug resistance for the best choice of empirical therapy for treating respiratory tract infections.

Key Words: *H. influenzae*; *sensitivity*; *resistance*

Funding Agency: None



Microbiology, Virology and Immunology

Category: Clinical

120

Evaluation of an automated Real-Time PCR for identification of methicillin-susceptible and methicillin-resistant *S. aureus* in clinical specimens

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Introduction:

It is imperative to distinguish between methicillin-susceptible *S. aureus* (MSSA) & methicillin-resistant *S. aureus* (MRSA) isolates from ICU patients to implement infection control precautions. The BD MAX™ Staph SR (MAX) assay (BD Diagnostics, USA) is an automated system that utilizes real time PCR test for rapid detection of MSSA & MRSA directly from nasal swabs reducing the turnaround times. The aim of this study was to evaluate the analytical reactivity & specificity of MAX performance & compare it with GeneXpert, Cepheid (GX) or culture.

Methods:

Screening swabs collected from ICU patients included nasal samples (11), axilla (6) & groin (13). In addition, wound swabs (12) & blood culture vials (68) were also included for testing. Seven control strains provided by BD including mecC-positive strain were tested. The limit of detection (LOD) for MAX assessed by using two known MRSA & MSSA strains at concentrations ranging from 10³-10⁸ cfu/ml. For analytical specificity study, various non-staphylococcal species as well as coagulase-negative staphylococci (CONS) were tested.

Results:

Six control strains were positive by culture, GX & MAX whereas mecC strain tested negative by GX. None of the non-staphylococcal isolates or CONS resulted in misidentification with MAX. The system demonstrated 100% conforming results with GX in identifying MSSA or MRSA in the nasal, groin and axilla swabs. However, there were 91.2% & 98.5% compliant results for blood culture vials positive for MRSA & MSSA, respectively and there was 60% and 86% conformity in detecting MRSA & MSSA, respectively in wound swabs by MAX when compared to culture. In the LOD study, both the strains of MRSA & MSSA tested positive at all concentrations from 10³-10⁸ cfu/ml.

Conclusions:

MAX carries a big promise of testing samples other than screening however, confirmation by culture before reporting results from wound samples is essential.

Key Words: Staphylococcus aureus; BD MAX; GeneXpert

Funding Agency: NONE



Microbiology, Virology and Immunology

Category: Basic Sciences

121

High resolution fingerprinting of clinical *Aspergillus flavus* isolates in Kuwait by calmodulin gene sequencing and multilocus microsatellite typing

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Introduction:

Aspergillus flavus is an important agent of invasive aspergillosis and most common agent of fungal rhinosinusitis and eye infections in tropical countries. Although the incidence of diseases caused by *A. flavus* are increasing, molecular epidemiology of *A. flavus* infections has not been well studied. We performed calmodulin gene (CMD) sequencing and 9 microsatellite markers-based multilocus microsatellite typing (MLMT) for high-resolution genotyping of *A. flavus* isolates in Kuwait.

Methods:

Clinical (n=53) and 2 environmental *A. flavus* isolates were used. Most (73%) were isolated during 2009-2011. *A. flavus* identity was confirmed by rDNA and β -tubulin gene sequencing. Etest was used for susceptibility testing for amphotericin B (AmB), voriconazole, posaconazole, casofungin and anidulafungin. PCR sequencing was performed for CMD haplotypes. Nine microsatellite markers were used in 3 multiplex PCR assays, amplicons were subjected to capillary electrophoresis for fragment profiles and MLMT data were analyzed by BioNumerics v5.1 software for phylogenetic relationships.

Results:

Seven CMD haplotypes were identified. Three isolates were a mixture of different genotypes while 52 isolates yielded 40 MLMT patterns with 33 isolates exhibiting unique patterns and 19 isolates forming 7 clusters. Of the latter 19 isolates, 17 either belonged to a different CMD haplotype or were recovered in different calendar years and were unlikely to be related. There was no association of a given genotype with a particular clinical specimen. Eight isolates were resistant to AmB only and all 8 isolates belonged to different MLMT genotypes.

Conclusions:

Our data show extensive genotypic heterogeneity among clinical *A. flavus* isolates in Kuwait and resistance to AmB was not associated with any particular genotype. Occurrence of more than one genotype in samples indicates that a patient may be colonized by multiple genotypes, any one of which may cause the actual infection.

Key Words: *Aspergillus flavus*; *Calmodulin haplotypes*; *Multilocus microsatellite typing*

Funding Agency: None



Microbiology, Virology and Immunology

Category: Clinical

122

Discordance across phenotypic and molecular methods for drug susceptibility testing of drug-resistant of drug-resistant *Mycobacterium tuberculosis* isolates in a low TB incidence country

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Introduction:

Phenotypic drug susceptibility testing (DST) methods for *Mycobacterium tuberculosis* are considered as the gold standard for identifying drug-resistance, however, resistance linked to specific mutations are missed by some growth-based methods. We evaluated the concordance of susceptibility results across two phenotypic and two molecular methods

Methods:

A total of 70 *M. tuberculosis* isolates were tested by BACTEC 460TB, MGIT 960 SIRE AST (MGIT 960), GenoType MTBDRplus line probe assay and targeted DNA sequencing. Most (84%) of the tested isolates were multidrug-resistant.

Results:

For rifampin (RMP) and isoniazid (INH), streptomycin (STR) and ethambutol (EMB), 96%, 97%, 91% and 76% of isolates, respectively, were susceptible or resistant by all four methods, ($P < 0.05$ for RMP or INH or STR versus EMB). Rare mutations conferring low-level but clinically relevant resistance in three isolates resulted in imperfect agreement for RMP (kappa coefficient (k) range, 0.84 to 0.95). For INH, there was perfect agreement among phenotypic methods and molecular methods (k, 1.00) but lower agreement among phenotypic versus molecular methods. Two isolates were scored as polydrug-resistant by MGIT 960 but as MDR by BACTEC 460TB and both the molecular tests while one isolate was scored as polydrug-resistant by both phenotypic methods but as MDR by both genotypic methods. The agreement was nearly perfect for STR among the two phenotypic methods (k, 0.97) while targeted sequencing, due to its lower sensitivity, resulted in slightly lower agreement (k range, 0.83 to 0.86). The discrepancy for EMB resulted largely due to lower concordance of MGIT 960 results (k range, 0.53 to 0.64).

Conclusions:

The MGIT 960 system is an accurate method for DST of *M. tuberculosis* against INH and STR while the result of RMP susceptibility should be complimented using DNA sequencing. Molecular or other phenotypic methods may be useful in settings where EMB results are clinically important.

Key Words: Phenotypic, molecular; Susceptibility testing; Mycobacterium tuberculosis

Funding Agency: No



Microbiology, Virology and Immunology

Category: Graduate PhD: Basic Science

123

Rectal colonization of *Acinetobacter baumannii* in intensive care unit (ICU) patients

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Introduction:

Acinetobacter baumannii is a nosocomial pathogen that causes serious disease in compromised patients. ICU patients are highly susceptible to *A. baumannii* infection due to multiple medical intervention. The normal colonization sites of *A. baumannii* are respiratory tract and skin surface. Gastrointestinal tract including the rectum may also be colonized. The objective of the study was to determine the long-term rectal colonization of patients in the ICU of a tertiary hospital and assess the genetic relatedness of sequential isolates from the same patients.

Methods:

Patients admitted at the ICU of Mubarak Al-Kabeer Hospital, Kuwait were studied for one year from March 2014. Rectal swabs were taken from each patient on first day of admission and then twice weekly until discharge or death. Isolates from patients were included provided they yielded isolates at least on five sampling times. Rectal swabs were cultured in saline-acetate enrichment medium and then subcultured onto *Acinetobacter* CHROMagar (CHROMagar). Different colony types were picked and confirmed as *A. baumannii* by gyrB PCR. The genetic relatedness of isolates was analyzed by DiversiLab(bioMerieux).

Results:

Of the 493 patients screened, 117 were positive (23.7%) for *A. baumannii*; 35 of 117 patients had positive isolations (29.9%) on at least 5 repeat samplings. A total of 104 isolates from first 14 of these 35 patients were analyzed by DiversiLab. Different patterns of sequential colonization were seen- single type, multiple types, disappearance of an earlier type, appearance of a new type and reappearance of an earlier type. Sequential isolates from the same patients exhibited identity, relatedness or total unrelatedness.

Conclusions:

Our study showed long-term rectal colonization of ICU patients with a mixture of genetic types of *A. baumannii*. The origin of diversity could be probed in future by a high resolution technique like whole genome sequencing of isolates.

Key Words: *A. baumannii*; *DiversiLab*; *Rectal colonization*

Funding Agency: No



Microbiology, Virology and Immunology

Category: Clinical

124

Report from the Kuwait National Primary Immunodeficiency Registry 2004-2015

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Introduction:

Aim: To present an updated report from Kuwait National Primary Immunodeficiency Registry (KNPIDR) for the period of 2004-2015

Methods:

All patients registered in KNPIDR during the study period are presented and were classified according to the 2015 IUIS classification

Results:

A total of 264 patients (142 males and 122 females) were registered during the study period. The distribution of these patients showed the following: immunodeficiencies affecting cellular and humoral immunity (30%), combined immunodeficiencies with associated or syndromic features (22%), predominantly antibody deficiencies (21%), diseases of immune dysregulation (15%), congenital defects of phagocyte number, function or both (7%), defects in intrinsic and innate immunity (0.3%), autoinflammatory disorders (0.7%) and complement deficiencies (4%). The average annual incidence rate for the study period of (S)CID in children was 13.01/100,000, with an estimated occurrence of 1/7500 live births. Parental consanguinity and family history of PID were reported in 77 % and 49% of the patients, respectively. Molecular diagnosis was reached in 53% of the patients and there were 4 novel PID-causing genes identified. IVIG was used in 52% of the patients and there were 69 deaths (26%) during the study period

Conclusions:

PID are prevalent in Kuwait and show a peculiar pattern compared to patients from other geographic areas

Key Words: Primary immunodeficiency; Epidemiology; Registry

Funding Agency: KFAS (2010-1302-05)



Microbiology, Virology and Immunology

Category: Graduate (Resident)

125

Antimicrobial resistance, biofilm formation, arginine catabolic mobile element (ACME) and toxin production in coagulase-negative *Staphylococcus* isolated from neonatal blood cultures at the maternity hospital in Kuwait

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Introduction:

To investigate coagulase-negative *Staphylococcus* (CoNS) isolated from blood cultures of neonates for biofilm production, virulence factors, antibiotic resistance, and their association with inflammatory response.

Methods:

A total of 98 CoNS isolates were collected from blood cultures of neonates at the Maternity hospital in Kuwait in six months between 1 August 2014 and 31 January 2015. Bacterial identification, antibiotic susceptibility were performed using standard methods. Phenotypic detection of biofilm formation was by trypticase soya broth and congo red agar methods. PCR was used to identify genes for antibiotic resistance and virulence factors. Correlation between CRP, antibiotic resistance, and virulence factors was done using Chi-square test, and Mann-Whitney test.

Results:

The CoNS isolates consisted of *S. epidermidis* (76; 81.7%), *S. capitis* (12; 12.9%), *S. hominis* (2; 2.1%), *S. warneri* (2; 2.1%) and *S. haemolyticus* (1; 1.0%). Forty nine (52.7%) of the isolates expressed multidrug resistance. Biofilm formation was detected in 84 (90.3%) isolates with *icaC* as the most common biofilm encoding gene. Ten *S. epidermidis* isolates carried type I ACME; 21 *S. epidermidis*, two *S. capitis* and one *S. haemolyticus* carried type II ACME. Majority of the isolates encoded multiple genes for staphylococcal enterotoxins with staphylococcal enterotoxin b (*seb*) as the dominant SE. Two isolates were positive for toxic shock syndrome toxin (*tst*). There was no association between CRP and antibiotic resistance or virulence factors.

Conclusions:

S. epidermidis was the most common species isolated from neonatal blood culture in the Maternity hospital in Kuwait with 90.3% and 36.6% of the isolates positive to biofilm and ACME production respectively.

Key Words: Coagulase negative staphylococcal neonatal sepsis; ACME, toxin production

Funding Agency: NONE



Microbiology, Virology and Immunology

Category: Graduate MSc (Basic Science)

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Prevention of perinatal HIV transmission at Newham hospital: A retrospective audit

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Introduction:

Mother-to-child transmission of human immunodeficiency virus (HIV) has declined to less than 2% in the United Kingdom. This decline was a result of the development in perinatal care and preventive measures offered to HIV positive pregnant women. In the United Kingdom, management of HIV infected pregnant women is according to the British HIV Association pregnancy guidelines. The aim of this audit was to measure the extent of hospital adherence to British HIV Association 2012 pregnancy guidelines.

Methods:

Records of all HIV positive pregnant women delivering at Newham Hospital from the 1st of May 2012 to the 30th of April 2014 (n=55) were reviewed retrospectively. Data on maternal viral load testing at 36 weeks gestation and delivery, neonatal HIV testing at specific time intervals, post exposure prophylaxis, and pneumocystis pneumonia prophylaxis were collected and analysed using SPSS 22 software.

Results:

Only one (pneumocystis pneumonia prophylaxis) of the seven objectives measured was in accordance to the guidelines in 100% of cases. The adherence to the guidelines in the remaining objectives ranged from 0% to 98.2%.

Conclusions:

In conclusion, practice at Newham hospital lacked adherence to British HIV Association guidelines in most of the objectives. Updates of patients' records and recording dispensed neonatal post exposure prophylaxis from the ward are important recommendations in reflecting the actual practice at the hospital.

Key Words: Mother-to-child transmission (MTCT); Human immunodeficiency virus (HIV);

Pregnancy

Funding Agency: None



Microbiology, Virology and Immunology

Category: Undergraduate

127

Bacterial contamination of computer's frequently touched surfaces: A comparative study

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Introduction:

The aim of this study was to detect and compare the presence of specific pathogenic bacteria *Escherichia coli* and *Staphylococcus aureus* (both methicillin sensitive and resistant) on computers' keyboards and mice used at a university dental clinic, teaching hospital outpatient clinics, and university students' computer laboratories.

Methods:

Moistened sterile swab samples were obtained from 178 computers in the aforementioned locations. Samples were cultured on MacConkey and mannitol salt agars, and then incubated for 48 hours at 37 DEGREE C. Representative colonies on the media were chosen, sub-cultured for purity, then identified to species level using VITEK-2 ID system and confirmed with VITEK MS when necessary. The Chi square test was used to compare the prevalence of bacterial contamination on computers' keyboards and mice in the three locations.

Results:

The differences in the total bacterial contamination of computers' keyboards and mice were statistically significant ($p=0.001$) between students' computer laboratories (72.9%), hospital outpatient clinics (61.5%), and university dental clinics (32.8%). *S. aureus* was detected on two computer keyboards and mice at two places, the university dental clinics and the teaching hospital outpatient clinics. In addition, a sample from the teaching hospital outpatient clinic contained *E. coli*. No methicillin resistant *Staphylococcus aureus* (MRSA) was detected in all three locations.

Conclusions:

Computers' keyboards and mice in various settings are contaminated with bacteria. Dental, medical, and university students laboratory settings have different overall bacterial contamination of computers' frequently touched surfaces, but no detectable differences in *S. aureus* and *E. coli* colonization was evident. Students and health care professionals should be aware of the importance of compliance with infection control protocols as computer surfaces may serve as a mode for cross-transmission of bacteria.

Key Words: Computers; Bacterial contamination; Hospital

Funding Agency: Yes



Microbiology, Virology and Immunology

Category: *Clinical*

128

Perceptions and beliefs about antibiotic use and resistance among clinicians in Amiri hospital

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Introduction:

Antibiotic resistance is an important issue which deserves much attention because it threatens patient safety. It has been shown in several studies that antibiotic misuse is associated with antibiotic resistance. The aim of this study is to examine the perceptions and beliefs on antibiotic use and resistance among clinicians working in Amiri hospital.

Methods:

Survey form was designed using specialized website then distributed to clinicians working in Amiri hospital through social network.

Results:

80 doctors have responded and filled the survey form. Majority of responders were from medical department followed by surgeons then paediatricians. Registrars were the most responders followed by senior registrars and then assistant registrars. Most of responders (>80%) agreed that antibiotic resistance is a national problem, but fewer (60%) agreed that it is a local problem in Amiri hospital. Around 80% of doctors believed that antibiotics are being overused. In addition, the knowledge and expertise on antibiotic prescription was measured. About 30% of responders were uncertain in choosing correct dose in patient with renal impairment. With regard to planning the duration of antibiotic, 18 % of responders were uncertain. Concerning the factors which guide their prescribing decision, most relied on previous knowledge and experience, and fewer (64%) followed the local or national antibiotic policy. A significant number will seek microbiologist advice. Clinicians' culture and behavior were also looked at by asking registrars if they feel afraid or uncomfortable on showing disagreement with seniors decisions and around 40 % of them agreed.

Conclusions:

Antibiotic resistance is a global threat and our society is not an exception. More awareness campaigns are needed for clinicians and also public. Education and training on proper antibiotic prescription is vital to ensure longer efficacy of antibiotics and also for patient safety. Antimicrobial stewardship programs with dedicated MD teams should be well established in each hospital to minimize antibiotic resistance and improve patient safety.

Key Words: Antibiotic resistance; Antibiotic misuse; Antimicrobial stewardship

Funding Agency: None



Microbiology, Virology and Immunology

Category: Graduate (Resident)

129

A comparative evaluation of anti-*Bordetella pertussis* antibodies in sera of pregnant and non-pregnant women and paediatric population

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Introduction:

Background/Objective: Pertussis is a re-emerging infectious disease of global concern. High rates of morbidity and mortality in infants led to development of new protective measures, including maternal vaccination programs. However, baseline knowledge about current status of immunity should be known before planning any new intervention. Towards this end, we conducted this study to determine levels of anti-pertussis antibodies in sera of pregnant and non-pregnant women compared with serum antibody levels of paediatric population.

Methods:

A cross-sectional study with 658 serum samples, collected from 224, 222 and 212 subjects belonging to paediatric subjects, premarital women and antenatal care women, respectively. Sera were tested for anti-*Bordetella pertussis* IgM, IgG and IgA antibodies using enzyme-linked immunosorbent assays.

Results:

The titres for IgM, IgG and IgA were positive in 4.5%, 49.5% and 1% subjects in paediatric group, respectively. In premarital group, IgM, IgG and IgA were positive in 12.7%, 23.1% and 9.4% subjects, respectively. Antenatal screen group had positive IgM, IgG and IgA results in 2.8%, 9.0% and 4.7% subjects, respectively. Odds of having a positive IgG result was 5.36 times higher in children compared to adults (95% CI= 3.642-7.887; $p < 0.001$). Weak inverse correlation between age and IgG level was found (Corr. coefficient = -0.321, sig. level: 0.01). Those with positive IgA results were more likely to have positive IgG than those with negative IgA result (Odds: 42, 95% CI: 9.841-178.762, p -value < 0.001).

Conclusions:

Significant lower positive rate of anti-pertussis IgG antibodies in adults (pregnant and non pregnant women), compared to children, suggests the need for new interventions (e.g. vaccination) in adults.

Key Words: Bordetella pertussis; Antibodies; Pregnant pre-marital pediatrics

Funding Agency: none



Microbiology, Virology and Immunology

Category: Graduate (Resident)

130

Performance of CarbR GeneXpert® assay against culture and PCR for the detection of carbapenemase-producing *Enterobacteriaceae* (CPE) in rectal swabs

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Introduction:

Carbapenemase-producing *Enterobacteriaceae* (CPE) has emerged as a global threat around the world. CPE has the propensity to spread easily between humans (hand carriage, contaminated food and water). These emerging pathogens cause difficult-to-treat infections with high morbidity and mortality. This study was undertaken to evaluate the performance of CarbR GeneXpert assay (CGXA) against culture and PCR in the detection of CRE from rectal swabs.

Methods:

A total of 100 non-repetitive rectal swabs, in duplicates, were collected from patients in the adult ICU, Pediatric ICU and a surgical ward. They were investigated simultaneously by culture and the CGXA. The culture method was by direct inoculation on a MacConkey agar plate on which a 10µg meropenem disk was placed and incubated in air at 37°C for 24 h. After overnight incubation, isolates identified as CPE were confirmed by PCR performed using established primers. CGXA was performed according to manufacturer's protocol. Five isolates with known metallo-β-lactamase genes were included in the assay.

Results:

The sensitivity and specificity were calculated using the PCR assay as the reference test standard. The sensitivity and specificity of the CGXA were 80% and 98.9%, respectively. The prevalence of CPE colonization in our high-risk population was 5% with 80% identified as NDM-1-positive. Recent travel history was significantly associated with CPE colonization ($p < 0.005$). The turn-around-time from specimen to result was 1 h compared with culture and subsequent PCR of 30 h.

Conclusions:

With such performance, the CGXA should readily be incorporated into any busy routine clinical microbiology laboratory. The rapid detection of CRE harboring blaKPC, blaVIM, blaIMP, blaNDM or blaOXA-48 genes directly from rectal swabs within 1 h should assist in timely decision-making on contact-precautions and early detection of outbreaks within the hospital.

Key Words: Assays; Carbapenemase-producing *Enterobacteriaceae*; Rectal swabs

Funding Agency: None



Microbiology, Virology and Immunology

Category: Graduate PhD: Basic Science

131

Molecular characterization and genetic basis of resistance to fluconazole in *Candida parapsilosis* isolates in Kuwait and their rapid detection by multiplex allele-specific PCR

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Introduction:

Fluconazole (FLU) is primary therapy for candidemia caused by *Candida parapsilosis*, a nosocomial pathogen in immunocompromised host. Recent emergence of resistance to FLU is, however, worrisome. This study determined prevalence of *C. parapsilosis* sensu stricto, their susceptibility to FLU and identified resistance-conferring mutations in ERG11. Multilocus microsatellite typing (MLMT) was done to detect cross-transmission of infection.

Methods:

Clinical *C. parapsilosis* sensu lato isolates (n=392) identified by Vitek 2 were used. *C. parapsilosis* sensu stricto were detected by a multiplex PCR, species-specific PCR and/or PCR sequencing of rDNA. Susceptibility to FLU was determined by Etest. ERG11 was amplified and sequenced for detection of mutations. A multiplex allele-specific (MAS)-PCR was developed for rapid screening of FLU-resistant strains. Fingerprinting of isolates was done by MLMT and cross-transmission of infection among candidemia patients was based on association analysis between patients' clinical data and specific genotypes.

Results:

PCR assays identified 373 of 392 isolates as *C. parapsilosis* sensu stricto. Etest identified 361, 3 and 9 isolates as susceptible (FLU-S), susceptible dose-dependent (FLU-SDD) and resistant (FLU-R) to FLU, respectively. Mutations Y132F and M178T were detected in 4 of 9 FLU-R and 3 FLU-SDD strains, respectively, but were absent in 13 FLU-S isolates. MAS-PCR accurately detected Y132F mutation in all 4 strains. MLMT of 93 selected *C. parapsilosis* from 93 candidemia patients and epidemiological data identified 2 possible cases of nosocomial transmission of infection, each involving 2 neonates.

Conclusions:

Resistance to FLU was found in 2.4% *C. parapsilosis* isolates and Y132F in ERG11, accurately detected by MAS-PCR, was dominant mutation in FLU-R strains. Our study also suggests that transmission of *C. parapsilosis* infections occurs among hospitalized patients warranting institution of good clinical practices.

Key Words: Candida parapsilosis; Fluconazole resistance/ERG11 mutation; Multilocus microsatellite typing

Funding Agency: Supported by grants YM 10/11 and SRUL02/13.



Microbiology, Virology and Immunology

Category: *Clinical*

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Cytokine profiles in osteoporosis: A pro-inflammatory bias?

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Introduction:

The immune system is suggested to contribute to the increased incidence of osteoporosis seen in menopause, but these interactions are poorly understood. This study was aimed at measuring osteoclastogenesis stimulator cytokines TNF-alpha, IL-6, IL-17, IL-20 and inhibitor cytokines IFN-gamma, IL-4, IL-10, IL-13 produced by peripheral blood mononuclear cells (PBMC) from postmenopausal women with normal, osteopenic and osteoporotic bone density.

Methods:

The study population included 36 post-menopausal women of whom 12 had normal bone mineral density (BMD), 16 had osteopenia and 8 had osteoporosis. PBMC were stimulated with a mitogen and cultured for 4 days; cytokine levels in culture supernatants were measured using the Multiplex system (Millipore) and read on the Magpex ELISA platform.

Results:

PBMC from osteoporosis women produced significantly lower levels of the osteoclastogenesis inhibitor cytokines IL-4 and IL-13 compared to women with normal BMD ($p=0.013$, 0.008) or with osteopenia ($p=0.049$, 0.006). Women with osteopenia produced lower levels of the anti-inflammatory IL-10 compared to women with normal BMD ($p=0.045$). Osteopenic women produced significantly higher levels of the osteoclastogenesis stimulator cytokines IL-6 and IL-17 compared to women with normal BMD ($p=0.037$, 0.026). Osteoporotic women produced significantly higher levels of the inflammatory TNF-alpha compared to osteopenic women ($p=0.021$). This suggests a decreased anti-inflammatory or increased pro-inflammatory cytokine bias in osteopenic and osteoporotic women compared to those with normal BMD. Ratios of osteoclastogenesis stimulator cytokines to osteoclastogenesis inhibitor cytokines suggest a dominance of osteoclastogenesis stimulator cytokines in postmenopausal women with lower BMD.

Conclusions:

These data provide insights into the possible influence of proinflammatory cytokines on the bone mineral density of postmenopausal women.

Key Words: Cytokines; Osteoporosis; Postmenopause

Funding Agency: KFAS project no. 2013-1302-02.



Microbiology, Virology and Immunology

Category: Clinical

133

Comparison between a new molecular technique and the conventional culture method for the detection of multi-drug resistant genes in gram-negative bacteria in a tertiary care hospital in Kuwait

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Introduction:

Community and healthcare-associated infections caused by multi-drug resistant bacteria represent a major threat worldwide. Early detection of such bacteria using molecular techniques is of utmost importance for prompt and accurate antibiotic therapy. Objectives: This study was done at Ibn Sina Microbiology Laboratory to compare EASYPLEX (Amplex Biosystems) for the rapid detection of carbapenemases and extended-spectrum beta-lactamase (ESBL) producing Enterobacteriaceae with the conventional culture.

Methods:

23 Gram-negative bacteria isolated from different clinical specimens were processed using the Easyplex PCR according to the manufacturer's instructions. The panel consisted of NDM, VIM, KPC, OXA-48, OXA-181, ESBLCTX-M-1 family and CTX-M-9 family. Identification and antimicrobial susceptibility testing for all of those isolates were performed using Vitek II (bioMérieux, France) and E-test (Ab Biodisk). ESBL and MBL (metallo-beta lactamase) detection was done using E-test.

Results:

Out of the 23 isolates tested by Easyplex, 19 produced at least one resistant gene available in the panel. CTX M1 was the most common gene detected in 16 isolates. All of those 16 were ESBL-producing Enterobacteriaceae by the conventional culture method. CTX M1 and NDM gene were detected in 7 isolates and were confirmed by Vitek II/ E-test as ESBL-producing and carbapenem-resistant Enterobacteriaceae. Three *Pseudomonas aeruginosa* isolates produced VIM gene and all 3 showed carbapenem resistance by the Vitek II and E-test. One isolate each of *Acinetobacter baumannii*, *Stenotrophomonas maltophilia*, *Salmonella* spp. and *Escherichia coli* did not produce any resistant marker and all were fully susceptible strains by Vitek II and E-test.

Conclusions:

Easyplex is a rapid and reliable molecular technique to identify ESBL and carbapenemase-producing Gram-negative bacteria.

Key Words: EASYPLEX; Multi-drug resistant bacteria; Conventional culture method

Funding Agency: None



Microbiology, Virology and Immunology

Category: Basic Sciences

134

Emergence and dissemination of ST772-V Methicillin-Resistant *Staphylococcus aureus* (MRSA) in Kuwait hospitals

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Introduction:

The epidemiology of methicillin-resistant *Staphylococcus aureus* (MRSA) is constantly changing. Community-associated MRSA strains belonging to Sequence type (ST) 772 initially reported in Bangladesh has now been reported in many countries including Kuwait. The aim of this study was to characterize ST772 strains obtained in Kuwait hospitals in 2010 to determine their relatedness to similar strains reported in other countries.

Methods:

MRSA strains obtained from clinical samples were characterized using antibiogram, pulsed-field gel electrophoresis (PFGE), SCCmec typing, spa typing, and multilocus sequence typing (MLST). Genes encoding virulence and antibiotic resistance were detected using DNA microarray.

Results:

Eight of 205 MRSA isolates investigated in seven hospitals belonged to ST772. The ST772 isolates harbored SCCmec type V but belonged to three PFGE types and four spa types including t345 (3/8), t657 (3/8), t10795 (1/8), and t12211 (1/8). All isolates carried genes for agrII, cap5, adhesion factors, hemolysins, biofilm genes, immune evasion cluster gene, Panton-Valentine leukocidin, and enterotoxins [sea and egc genes cluster (seg, sei, selm, seln, selu)]. In addition, sec and sel were detected in the t657 and t12211 isolates while sed was detected in the t10795 isolate. The isolates were all resistant to kanamycin, amikacin, and erythromycin and carried aphA3, msrA, and mphC. In addition, the t657 and t12211 isolates were resistant to gentamicin and tobramycin and carried aacA-aphD. The t345 and t10795 isolates carried tetK mediating tetracycline resistance.

Conclusions:

The ST772-V isolates obtained in Kuwait hospitals consisted of four spa types. Although ST772-V-t657 is widely reported in the literature, this is the first report of the t12211 variant. The emergence of different variants of ST772-V MRSA is of concern because of their multiresistance, carriage of multiple virulence factors and capacity to spread extensively.

Key Words: MRSA; MLST; antibiotic resistance

Funding Agency: Research Sector, Kuwait University, Project no. YM 02/12



Microbiology, Virology and Immunology

Category: Basic Sciences

135

Vicissitudes in adhesion to denture acrylic surfaces of oral *Candida dubliniensis* isolates following brief exposure to sub-cidal concentrations of polyenes, echinocandins, azoles and chlorhexidine gluconate

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Introduction:

Adherence of *Candida* to denture acrylic surfaces is implicated as the initial process in the pathogenesis of *Candida*-associated denture stomatitis. This condition can be treated with antimycotic agents belonging to polyene, echinocandin and azole groups of antimycotics. In addition, chlorhexidine is also used in its management. In the niches of the mouth the intraoral concentration of these drugs fluctuates considerably due to the dynamics of the oral environment and *Candida* may undergo only to a brief exposure to therapeutic agents. It has been suggested that *Candida dubliniensis* may play an important role in the establishment and persistence of *C. dubliniensis* induced-denture stomatitis. Hence, the effect of brief exposure to sub-lethal concentrations of nystatin, amphotericin B, caspofungin, ketoconazole, fluconazole and chlorhexidine gluconate on adhesion of these isolates to denture acrylic surfaces was investigated.

Methods:

After determining the minimum inhibitory concentration of the drugs, twenty oral isolates of *C. dubliniensis* were exposed to sub-lethal concentrations of nystatin, amphotericin B, caspofungin, ketoconazole, fluconazole and chlorhexidine gluconate for one hour. Subsequently, the drugs were removed by dilution and the adhesion of these isolates to denture acrylic strips was assessed by an in vitro adhesion assay.

Results:

Compared to controls, exposure to nystatin, amphotericin B, caspofungin, ketoconazole, fluconazole and chlorhexidine gluconate suppressed the ability of *C. dubliniensis* isolates to adhere to denture acrylic surfaces by a percentage reduction of 74.68%, 74.27%, 73.33%, 57.31%, 44.57% and 56.53% ($P < 0.001$ for all drugs), respectively.

Conclusions:

Brief exposure to sub-lethal concentrations of antimycotics seems to exert an antifungal effect by suppressing the adhesion of *C. dubliniensis* oral isolates to denture acrylic surfaces.

Key Words: Adhesion to denture acrylic; Antifungal agents; *Candida dubliniensis*

Funding Agency: Kuwait University Research Grant Numbers: DB 01/11, DB 02/11 and DB 01/13.



Microbiology, Virology and Immunology

Category: Basic Science

136

Eight-year surveillance of sensitivity trends of *Streptococcus pyogenes* from patients with acute tonsillitis

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Introduction:

Monitoring of drug resistance of local isolates of *Streptococcus pyogenes* (*S. pyogenes*) is important, since most streptococcal infections are treated on an empirical basis, with increasing reliance upon second- and third-generations cephalosporines, beta-lactam/beta-lactamase inhibitor combinations and vancomycin. This study was conducted to evaluate the trends in the antimicrobial resistance of *S. pyogenes* responsible for acute tonsillitis among the patients in one hospital in Kuwait and its implications for empiric therapy.

Methods:

A retrospective 8-year study (January 2007-October 2011 and June 2012-July 2014) was managed with 115 strains of *S. pyogenes* isolated from throat cultures of the patients with acute tonsillitis attending the Clinics of London Hospital, Kuwait. Antimicrobial susceptibility of *S. pyogenes* was performed by disc diffusion method and results interpreted using CLSI breakpoint criteria. The results were compared for three study periods.

Results:

The prevalence of resistance for the respective periods were as follow: penicillin 6,75, 5,6%, 4,1%; erythromycin 19,1%, 26,7%, 38,9% and 22,9%; clindamycin 7,2%, 23,1% and 15%. All isolates were sensitive to cefuroxime, ceftriaxone and cefotaxime in the first and the second study periods; and 96,6% were sensitivity rates to cefuroxime and ceftriaxone in the third study period. An interesting exception was the observed decrease in microlide resistance among *S. pyogenes* isolates from 26,7% to 22,9%.

Conclusions:

Continued longitudinal comparisons of worldwide monitored and important pathogen - *S. pyogenes* and changing susceptibility profiles are critical elements in quiding future empiric therapies and epidemiological interventions, for prevention of further complications - suppurative and non-suppurative.

Key Words: monitoring; resistance profiles; suppurative and non-suppurative complications

Funding Agency: None



Microbiology, Virology and Immunology

Category: Basic Science

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***Mycoplasma vaginal* infection in women of reproductive age: a ten-year study of resistance trends**

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Introduction:

Ureaplasma urealyticum (Uu) and *Mycoplasma hominis* (Mh) can cause genital tract infections, intrauterine infections and pathology of pregnancy and newborns. The aim of this study was to investigate the resistance trends of genital mycoplasmas to antimicrobials in our hospital in women of reproductive age with vaginal discharge during a ten-year period.

Methods:

A retrospective 10 year study (January 2006 - July 2015) was managed with 389 women in the age range from 17 to 44 years attending the Obstetrics-Gynecologic Clinics of London Hospital, Kuwait. Vaginal and cervical samples from 81 pregnant and 308 non-pregnant women of reproductive age, presenting with vaginal discharge were studied. For screening, identification and antimicrobial susceptibility testing, the *Mycoplasma* IST 2 (BioMerieux) was used. Isolates were classed as either sensitive or not sensitive to each of 9 antibiotics tested. We compared resistance rates of Uu/Mh and Uu only isolates in two studied periods.

Results:

Uu has been isolated in 39, 3% patients, while Mh has been isolated in 7,9% of them. Uu and Mh have been both isolated in 52,8% of the patients. A total of 195 isolates Uu/Mh and 145 isolates Uu from pregnant and non-pregnant women were compared. In the group of Uu/Mh isolates ciprofloxacin presented the highest resistance rate - in % (82,1 and 100 respectively). In the group of Uu isolates the quinolones presented the highest resistance rates, followed by tetracyclines.

Conclusions:

Ureaplasma urealyticum/Mycoplasma hominis are both the most common pathogens in our patients with vaginal discharge. The isolates studied were highly resistant to quinolones. Knowledge of most frequent genital mycoplasmas and their antimicrobial resistance patterns is essential to provide clinically successful, cost effective antimicrobial therapy for vaginal infections in women of reproductive age, for prevention of further complications, especially for the pregnant women.

Key Words: sensitivity profiles; mycoplasma genital infection; prevention of complications

Funding Agency: None



Microbiology, Virology and Immunology

Category: Clinical

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Viral infections among critically ill patients in Kuwait (2013-2015)

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Introduction:

Viral infections are among the most significant causes of infection among critically ill immunocompetent and immunocompromised patients. This study aims to describe the spectrum, incidence, clinical features of virus-associated infections diagnosed during the hospital stay of immunocompetent and immunocompromised patients admitted to pediatric intensive care unit (PICU) and intensive care unit (ICU) in Kuwait. This is a population-based retrospective cohort study of Virology Unit, Faculty of Medicine, Kuwait University, Kuwait from 2013 to 2015.

Methods:

This analysis was performed using the database of Virology Unit, Mubarak Al-Kabeer Hospital. Data from subjects admitted to ICU and PICU with viral infections were analyzed. Samples were processed by polymerase chain reaction (PCR) for viral detection using three kits from Fast-Track Diagnostics Ltd., Sliema, Malta. Only patients with viral infection but no bacterial infections were included in this study.

Results:

Data from 1510 patients admitted to 5 centers across Kuwait was extracted. The database contained a total of 664 (virally infected ICU (39.6%) and PICU (60.3%) patients (54.2% male and 45.8% females). Single infections were identified in 542 patients (81.6%), double co-infection in 112 patients (16.9%) and triple co-infection in 10 patients (1.5%). Rhinovirus (30.4%), respiratory syncytial virus (26%) and adenovirus (12.6%) were most commonly isolated viral infections in PICU. The most frequent viral agents among ICU patients were cytomegalovirus (23.7%) followed by rhinovirus (12.2%).

Conclusions:

Viral infections play a significant yet unrecognized role in the outcomes of PIUC and ICU patients.

Key Words: Viral infections; Intensive Care Unit; Pediatric Intensive Care Unit

Funding Agency: None



Microbiology, Virology and Immunology

Category: Basic Sciences

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Interpersonal and seasonal diversity of the human nasal bacteriome among the staff of OMICS research unit

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Introduction:

The human nostril is an important bacterial habitat. Millions of bacteria are always present in the nasal cavity and often alter in response to the seasonal variations. A diseased condition may be manifested when the core bacteriome is disturbed under environmental influence. Hence, the characterization of the bacterial population in human nostrils is required to establish healthy baselines and their deviations. The aim of this study was to characterize the bacterial profile of human nostrils and their changes according to the seasonal conditions by analysis of 16S rDNA sequence using next generation sequencing.

Methods:

Nasal swab samples were collected from 10 healthy individuals, working in the OMICS Research Unit, during five different months of summer and winter. DNA was isolated from the samples using QIAamp DNA Mini Kit (Qiagen). The isolated DNA was quantified and checked for purity using a spectrophotometer (Epoch) and a fluorometer (Qubit). The V4-V5 region of the 16S rDNA gene was PCR-amplified using the KAPA HiFi HotStart ReadyMix (Kapa Biosystems). DNA libraries were prepared from the amplified DNA using the Nextera XT DNA Sample Preparation Kit (Illumina) and sequenced on the MiSeq (Illumina) using a 500 cycle kit (2 x 250 bp). The Fastq files were submitted to MG-RAST for quality control, OTU picking and annotation. The statistical analysis was performed using R software.

Results:

The most common bacterial genera present in the samples were *Corynebacterium*, *Pseudomonas*, *Staphylococcus* and *Moraxella*. The relative abundance of these genera varied in different months and also in different individuals.

Conclusions:

The next generation sequencing targeting the 16S rDNA is a useful technique to characterize and determine individual and seasonal variations in the human nasal bacteriome.

Key Words: 16s gene sequencing; Metagenomics; Illumina MiSeq

Funding Agency: SRUL02/13 and RM 01/13



Microbiology, Virology and Immunology

Category: Undergraduate

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Cloning and expression of three major antigenic proteins of pathogenic *Mycobacterium tuberculosis* in non-pathogenic mycobacterium *smegmatis* and *Escherichia coli*

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Introduction:

Mycobacterium tuberculosis is an obligate pathogenic bacterial species in the family *Mycobacteriaceae* and the causative agent of most cases of tuberculosis (TB). Until today, the only approved TB vaccine is BCG which has been used since 1921. While BCG provides fairly effective protection for infants and young children, its efficacy in adults is variable around the world. This could be due to several variables including different strains of the vaccine and exposure of individuals to different environmental bacterial infections. The situation is complicated by the emergence of multi-drug resistant strains of *M. tuberculosis*. This urged the demand to develop new improved vaccines and immunotherapies against TB. *M. smegmatis* is commonly used in work on the mycobacterium species due to its being a relatively 'fast grower' and non-pathogenic. In our work, we are introducing three of *M. tuberculosis* genes (Rv3891, Rv3020, Rv0287) in *M. smegmatis*.

Methods:

ORFs were PCR-amplified from *M. tuberculosis* genomic DNA and visualized on gel electrophoresis at the expected DNA size. Products were then ligated to the plasmid pGEMTeasy and used to transform TOP10 *E. coli*. Transformed colonies were selected on appropriate media. At the second stage, ORFs were sub-cultured in expression vectors PDE22 and pGESTH1; the recombinant plasmids were used to transform *M. smegmatis* and *E. coli*, respectively. Expression of proteins in *E. coli* was confirmed by Western blotting, and in *M. smegmatis* by RT-PCR.

Results:

Amplified genes were successfully cloned and transformed in *E. coli* and *M. smegmatis*. Colonies of recombinant bacteria were detected on appropriate media. Western blotting and RT-PCR also confirmed the expression of our genes proteins in both bacteria.

Conclusions:

Positive results of cloning and expression suggest that the constructed clones are ready tools for further assessment of their immunogenicity, and potential to be included in improved vaccines against TB.

Key Words: Tuberculosis; BCG vaccine; Recombinant proteins

Funding Agency: None



Microbiology, Virology and Immunology

Category: Basic Sciences

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Whole genome SNP-based identification of genotype and possible origin of *Brucella melitensis* prevalent in Kuwait

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Introduction:

Brucellosis, a highly infectious zoonotic disease, is endemic in Kuwait and the Middle East. The primary cause of brucellosis in Kuwait is *Brucella melitensis*. The identification of *Brucella* genotypes is essential for epidemiological studies, including surveillance and contact tracing. However, the limited genetic diversity among *Brucella* genomes has made its genotyping a challenging task by using classical methods. The aim of this study was to genotype human isolates of *B. melitensis* from Kuwait and track their origin using whole genome sequencing.

Methods:

Twenty six clinical isolates of *B. melitensis* were grown on culture plates. DNA was purified from single bacterial colonies by heating at 950C, followed by DNA extraction using the QIAamp DNA Mini Kit (Qiagen). The isolated DNA was checked for quantity and purity using a spectrophotometer (Epoch) and a fluorometer (Qubit). DNA libraries were prepared using the Nextera XT DNA Sample Preparation Kit (Illumina) and sequenced using MiSeq (Illumina). Resequencing of our strains along with all the other strains available in NCBI database was done in BioNumerics 7.5 (Applied Maths) by mapping to *B. melitensis* bv. 1 str. 16M. A phylogenetic tree using neighbor-joining method was constructed based on the presence of genome-wide SNPs.

Results:

The number of SNPs across all isolates ranged from 1641 to 2521. The study identified three different genotypes of *B. melitensis*, i.e. Iib, Iif, and III. The number of samples corresponding to Iib, Iif, and III genotypes were 13, 11 and 2, respectively. A search in the database showed that genotype II is most prevalent in China, Middle of Africa and West Europe.

Conclusions:

The genotype II of *B. melitensis* is the most prevalent genotype in Kuwait, suggesting the possible origin of strains from China, Middle of Africa and West Europe. Interestingly, none of the strain in this study corresponds to the genotype from North and South America.

Key Words: *Brucella melitensis*; SNP; NGS

Funding Agency: Kuwait University Research Sector, MI04/15 and SRUL02/13.



Microbiology, Virology and Immunology

Category: Clinical

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Clinical utility of viral load in the management of cytomegalovirus infection in solid organ transplant patients in Kuwait

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Introduction:

Infection with human cytomegalovirus (CMV) in solid organ transplant patients (SOT) remains an unresolved challenge, despite improvements in immunosuppressive therapy, post-transplantation care, viral prevention, and therapy. The present retrospective study was aimed at demonstrating the clinical utility of viral load monitoring of CMV by means of real-time PCR in SOT patients in Kuwait.

Methods:

We conducted quantitative real-time polymerase chain reaction (PCR) assays of CMV on plasma samples of 1,168 patients in Kuwait who received solid organ transplants from 2012 to 2014 to detect and monitor CMV DNA viral load.

Results:

Of the 1,168 patients, 180 (15.4%) were positive for CMV DNA. Among the CMV DNA-positive patients, 119 (66.1%) remained without symptoms and 61 (33.9%) developed CMV-related symptoms. During the follow-up period, peak viral loads were significantly ($P < 0.05$) higher in symptomatic patients (mean 970 copies/mL; range, 15-625,000 copies/mL) than in asymptomatic patients (<150 copies/mL; range, 67-2,650 copies/mL). Many symptomatic patients ($n = 57$) were successfully treated, and their viral loads declined. However, some symptomatic patients had irregular viral-load kinetics, with prolonged periods of symptoms despite CMV treatment; we excluded the possibility of drug resistance in these patients, because there was no evidence of clinical resistance to treatment.

Conclusions:

Quantitative real-time PCR of CMV DNA is useful in monitoring CMV infection and the effectiveness of CMV treatment in SOT recipients in Kuwait.

Key Words: Viral load; CMV; Solid organ transplant, Kuwait

Funding Agency: None



Microbiology, Virology and Immunology

Category: Graduate PhD (Basic Science)

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Fecal carriage of carbapenem-resistant *Enterobacteriaceae* in food handlers in Kuwait

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Introduction:

The emergence of carbapenem-resistant *Enterobacteriaceae* (CRE) is one of the most significant epidemiologic changes in infectious diseases in the last decade. In this study, the fecal carriage of CRE in food handlers in Kuwait was investigated.

Methods:

A total of 270 food handlers were recruited into this study over a period of one year. Rectal swabs were collected using Copan transport swabs and inoculated onto MacConkey agar on which 10 µg meropenem disc was placed. Representative colonies were identified by Vitek2. Their susceptibility to 21 antibiotics was assessed by determining the minimum inhibitory concentrations (MICs) using E-test. CRE was identified as isolates that showed reduced susceptibility to the carbapenems.

Results:

From the 270 individuals, a total of 403 species of the family *Enterobacteriaceae* were isolated. Of these, 266 (66%) were *Escherichia coli*, 74 (18.4%) *Klebsiella pneumoniae*, 25 (6.2%) *Enterobacter cloacae* and 38 (9.4%) others. Analysis of individual isolates showed that 39 (14.7%) of *E. coli*, 18 (24.3%) of *K. pneumoniae* and 4 (25%) of *E. cloacae* were multidrug-resistant (MDR) showing resistance to at least 3 different classes of antibiotics. Twenty six (9.8%) and 19 (7.1%) of *E. coli*, 2 (2.7%) and 3 (4.1%) of *K. pneumoniae* and 3 (12%) each of *E. cloacae* were resistant to ciprofloxacin and colistin, respectively. All in all, 7 (2.6%), 3 (4.1%) and 1 (4%) of *E. coli*, *K. pneumoniae* and *E. cloacae*, respectively were CRE. MDRE and CRE were isolated from 63 (23%) and 30 (11.1%) of the food handlers, respectively in Kuwait.

Conclusions:

This study identified a high prevalence of MDR *Enterobacteriaceae* (MDRE) with high colonization rates of CRE in the fecal samples of food handlers. These findings suggest that the intestinal tract is an important reservoir for MDRE and CRE, thus creating potential opportunity for dissemination in the community with significant public health implications.

Key Words: Antimicrobial resistant, CRE; Enterobacteriaceae; Food handlers

Funding Agency: Kuwait University Research Grant No. YM07/15



Microbiology, Virology and Immunology

Category: Graduate PhD (Basic Science)

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Sociodemographic profile of food handlers in Kuwait

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Introduction:

Food handlers play an important role in ensuring food safety. Poor personal hygiene and inadequate knowledge of workers in food serving could be a potential source of infections by enteropathogenic bacteria. The objectives of this study were to: (i) investigate the knowledge, attitudes and perceptions of food handlers currently working in community and health care settings and (ii) assess the prevalence and predisposing factors they may be associated with their hygienic practices.

Methods:

246 participants from 6 governorates in Kuwait were studied. Participants were interviewed using a structured questionnaire on: sociodemographic data, work related factors, health related questions and general knowledge of hygienic status.

Results:

Of the 246 participants, 193 (78%) were non-Arabs. The majority (48%) were young adults whose ages ranged from 29-39 years. A total of 41% had 1-5 years' work experience. Also 59% were holders of a high school or university degree certificates and 90% were certified in food preparation and handling. The frequency of cutting their nails was high, once a week in 84%. The majority were healthy with no previous hospitalization. In addition, 93% did a medical checkup prior to employment. A large number of the facilities (99%) had availability of hand washing in the kitchens. They were efficient in dealing with cases of sickness and injury, reporting to their manager if they were sick (94%) and covering their wounds in case of injury in (95%). Food handlers had satisfactory measures in hand washing assessment. Wearing the same gloves when holding raw meat and fresh vegetables and fruit in the kitchen were seen in 55%.

Conclusions:

Food handlers may pose a significant risk on the consumers, therefore, it is essential to implement food handlers training on safety, conduct periodic medical checkup and continuous monitoring of personal hygiene. They should be properly educated to ensure compliance to proper food hygiene guidelines.

Key Words: Food handlers; Sociodemographic, survey; Kuwait

Funding Agency: Kuwait University grant No: YM07/15



Microbiology, Virology and Immunology

Category: Basic Sciences

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Recombinant proteins and synthetic peptides induce delayed-type hypersensitivity skin responses in guinea pigs sensitized with *Mycobacterium tuberculosis*

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Introduction:

The world-wide control of tuberculosis requires affordable and easy to apply test(s), which could diagnose the diseased/infected people and differentiate them from BCG vaccination or exposure to non-tuberculous mycobacteria. Among the tests available, the tuberculin skin test (TST) is the cheapest and easy to perform. However, the currently used antigen in TST is the purified protein derivative (PPD) of *M. tuberculosis*, a crude mixture of >200 proteins, which lacks sensitivity and specificity in the delayed-type hypersensitivity (DTH) skin responses, the readout for TST. The aim of the present study was to identify *M. tuberculosis*-specific antigens/peptides as new tuberculins for diagnostic applications.

Methods:

M. tuberculosis-specific proteins (n=10) were obtained by recombinant DNA cloning and expression technologies. Overlapping synthetic peptides (25-mers overlapping by 10 residues) covering the sequence of each protein were synthesized chemically. The DTH responses to these proteins and peptides were determined in guinea pigs sensitized with *M. tuberculosis*, BCG and non-tuberculous mycobacteria.

Results:

The recombinant proteins were active in inducing DTH responses in guinea pigs. The peptide pools of five of these proteins also induced positive skin test responses in animals sensitized with *M. tuberculosis*, but not in animals sensitized with non-tuberculous mycobacteria. Furthermore, testing of the individual peptides of each protein identified immunodominant peptides. The pools of immunodominant peptides induced stronger skin test responses than the single immunodominant peptides.

Conclusions:

The study identified DTH-inducing proteins and peptides corresponding to antigens belonging to *M. tuberculosis*-specific genomic regions. As compared to PPD, these preparations could easily be standardized for the amount of active ingredients, and thus will not suffer from the shortcomings currently faced by the use of PPD preparations.

Key Words: *M. tuberculosis*; Guinea pigs; DTH

Funding Agency: Kuwait University Research Sector grants MI01/10 and SRUL02/13.



Microbiology, Virology and Immunology

Category: Clinical

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**Prevalence of BK virus among renal transplant recipients in Kuwait:
single center experience**

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Introduction:

BK viremia and nephropathy are increasing problems in renal transplant recipients. The lack of safe and effective antiviral therapy made screening-based prevention a recommended strategy. Aim of the work: Our objective was to determine the prevalence of BK virus (BKV) infection among renal transplant recipients.

Methods:

All renal transplant recipients followed up in Hamed Al-Essa Organ Transplant Center clinics between 2011 and 2015 (n = 1523) were screened. Blood quantitative real-time polymerase chain reaction (PCR) for the BKV was performed in all of the study patients. Patients who showed positive BKV PCR were evaluated by quantitative PCR for viral load. Renal biopsy was performed only in patients with deteriorating renal function associated with positive PCR.

Results:

Among the 1523 kidney transplant recipients studied, 956 (62.8%) were males, 40% were non-Kuwaiti; with mean age 46.6 ± 15.6 years. During the screening period, we found that the prevalence of positive BK virus patients was fluctuating between 2 to 8.3% while those with significant viral load represented 6.1 to 34% of positive cases. Renal biopsy confirmed the diagnosis of BK nephropathy in 31 cases. Cases that were managed by reducing the immunosuppressive treatment showed more stabilization of their graft function compared to those who actively managed by leflonamide, ciprofloxacin, IVIG. Till the end of 2015, diagnosis of BKN was documented in 58 patients with 21 rejection episodes, 21 graft failure and 3 mortalities.

Conclusions:

Our screening program suggested that BKV is not uncommon in our kidney transplant recipients. It could help minimize its detrimental impact on the patient and graft outcome.

Key Words: BK virus; Kidney transplant; Outcome

Funding Agency: none



Microbiology, Virology and Immunology

Category: Clinical

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Detection of *Trichomonas vaginalis* in prostate tissue and serostatus in patients with asymptomatic benign prostatic hyperplasia

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Introduction:

Introduction: Despite a worldwide common and progressive nature of benign prostate hyperplasia (BPH) in older men, no association has been observed between a causative pathogen and other etiology so far.

Methods:

We investigated a causative association of *Trichomonas vaginalis*, a flagellate protozoan parasite, in BPH cases presenting without symptoms of prostatitis at a surgical outpatient clinic in Kuwait by detecting *T. vaginalis* DNA by polymerase chain reaction (PCR) and *T. vaginalis* antigen by immunocytochemistry (ICC) in the prostate tissue of these cases.

Results:

Results: We detected *T. vaginalis* DNA and *T. vaginalis* antigen in 24.6% and 21.9% respectively in the prostate tissue of the BPH cases respectively. Both these assays showed very good agreement and no statistically significant difference in their sensitivities and specificities. A relatively higher seropositivity rate for antibodies to *T. vaginalis* was detected in BPH cases (37 of 114 cases, 32.4%) and control group (33 of 114 people, 28.9%) [p: 0.19] than some of the earlier reports but no significant association was observed between BPH and *T. vaginalis* serostatus. However, a greater proportion of seroreactive BPH cases had high IgG2 antibody absorbance score than in the control group. No significant association was observed between *T. vaginalis* seropositivity and BPH risk (OR= 1.95, 95% CI= 1.08-2.25).

Conclusions:

Further epidemiological and case-controlled studies are needed to focus on local response to chronic asymptomatic retention of *T. vaginalis* in prostate tissue in the development of benign prostate hyperplasia.

Key Words: *T. vaginalis*; Benign prostate hyperplasia; serostatus

Funding Agency: Kuwait University, Kuwait, project # YM 03/12



Microbiology, Virology and Immunology

Category: Undergraduate

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Molecular identification and genotyping of *Brucella* species circulating in Kuwait

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Introduction:

Brucellosis is endemic in Kuwait and other countries of the Middle East. The reappearance of clinical symptoms in treated and cured brucellosis patients is quite common. However, currently, it is not possible to differentiate between relapse and reinfection cases because of the inability to identify *Brucella* species and genotypes by classical microbiological methods. The aim of this study was to identify the species and genotypes of *Brucella* circulating in Kuwait by molecular methods.

Methods:

A total of 76 human *Brucella* isolates were obtained from different hospitals in Kuwait. Genomic DNA were isolated and subjected to real-time PCR (RT-PCR), 16s rRNA gene sequencing and ERIC-PCR analyses. The species were identified by *Brucella*-specific primers in RT-PCR. The MicroSeq® 500 16S rDNA software was used for analysis of 16s rRNA gene sequence data, and MicroSeq® Bacterial Identification Software was used for species confirmation. ERIC-PCR was performed with the primers ERIC1 and ERIC2. The amplification products were visualized on Agilent DNA 7500 gel (Bioanalyzer 2100) and a phylogenetic tree was constructed based on the band-patterns using BioNumerics software.

Results:

The RT-PCR results suggested that all of the 76 isolates were *Brucella mellitensis*. The 16s rRNA gene sequencing confirmed their identity as *B. mellitensis*. The BioNumerics cluster analysis for ERIC-PCR results showed that 75 of the 76 isolates were individual entities on the dendrogram, with an exception of two samples that were 100% identical. The clusters were further classified into 11 classes (A- K), and the maximum numbers (33) of genotypes were present in class C.

Conclusions:

The highly discriminating power of molecular techniques in identifying *Brucella* species and genotypes will be useful in differentiating between relapse and reinfection cases among treated and cured brucellosis patients. This is the first study to genotype *Brucella* in Kuwait.

Key Words: Brucella; Kuwait; Molecular Identification

Funding Agency: MI04/15 SRUL02/13



Microbiology, Virology and Immunology

Category: Clinical

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Contribution of host immunity to effectiveness of drug treatment in Hepatitis C infection

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Introduction:

Hepatitis C virus (HCV) is a life-threatening pathogen due to its high prevalence and serious complications of persistent infection. Treatment with pegylated interferon-alpha plus ribavirin has a sustained viral response rate of 40–80%. In addition to direct antiviral activity, immunomodulation by both drugs seems important, with a possible shift from Th2- to Th1-cytokine bias in responders. We aimed to ascertain whether patients who respond successfully to these drugs are aided by host immunity consisting of a Th1-biased reactivity and whether a poor response to treatment occurs in a Th2-biased state. In other words, do host cytokine profiles either dampen or aid viral response to drug therapy?

Methods:

HCV infection was diagnosed by detecting anti-HCV antibodies and confirmed by a recombinant immunoblot assay. Viral load was estimated by nucleic acid amplification and HCV genotyping was done. Peripheral blood mononuclear cells obtained before and after treatment were stimulated with a mitogen to elicit cytokine production. Levels of IL-2, IL-4, IL-6, IL-10, IL-17A, IL-7F, IFN-gamma and TNF-alpha were estimated using a Multiplex ELISA consisting of dyed microspheres conjugated with anti-cytokine antibodies.

Results:

We compared levels of cytokines in responders and non-responders to drug treatment. While significantly higher levels of IL-17A and IL-17F were produced by non-responders, levels of the pro-inflammatory Th1 cytokine IFN-gamma were higher in responders. Anti-inflammatory cytokines IL-4 and IL-6 were higher in non-responders. IFN/IL-4, IFN/IL-6 and IFN/IL-10 ratios were higher, implying a stronger Th1 reactivity in responders.

Conclusions:

Host immune responses, reflected by cytokine patterns, appear to be associated with drug effectiveness. Our data suggest a pro-inflammatory/Th1 cytokine bias in patients whose viral load decreased with treatment. IFN levels and IFN/IL-4 ratio seem to be predictors of viral responsiveness to drug treatment.

Key Words: Hepatitis C; Cytokines

Funding Agency: Kuwait University Research Sector MI01/12



Microbiology, Virology and Immunology

Category: Basic Sciences

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Synthetic peptides corresponding to *M. tuberculosis*-specific region of difference proteins are immunogenic and induce delayed-type hypersensitivity responses in guinea pigs

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Introduction:

Tuberculosis is a global health problem and new measures are required to control the disease. Two of the major products presently used for tuberculosis control are the *Mycobacterium bovis* BCG vaccine, and the skin test reagent tuberculin (purified protein derivative, PPD). However, the efficacy of BCG vaccine remains a matter of controversy, and the diagnostic value of PPD in delayed type hypersensitivity (DTH) skin responses is suboptimum because the positive responses are also induced by non-tuberculous mycobacteria. Comparative analyses of the *Mycobacterium tuberculosis* genome with the genomes of other mycobacteria have led to the identification of several regions of difference (RD) encoding *M. tuberculosis*-specific proteins. In this study, synthetic peptides covering the sequence of two RD proteins were used to study their immunizing ability by testing DTH skin responses in guinea pigs.

Methods:

Overlapping synthetic peptides (30-mer, 50-mer and 100-mer) covering the sequence of Rv2346 and Rv3619 were synthesized using SymphonyX Peptide Synthesizer. Groups of guinea pigs (5 animals in each group) were immunized with BCG or injected with phosphate buffered saline (PBS). At four weeks intervals, all the animals were tested for DTH skin responses by intradermal injection with PBS (negative control), mixtures of peptides (30-mer, 50-mer), or only one peptide (100-mer) corresponding to the protein sequences of Rv2346 and Rv3619. DTH responses were measured after 24 h and 48 h.

Results:

The animals immunized with BCG or injected with PBS did not induce DTH responses to the peptides of Rv2346 and Rv3619. However, upon retesting after four weeks, the animals injected with peptides showed DTH responses to the peptides of the corresponding proteins.

Conclusions:

The synthetic peptides of RD701 and RD903 are immunogenic and induce DTH responses.

Key Words: Tuberculosis; DTH; Diagnosis

Funding Agency: Supported by Kuwait University Research Sector grant SRUL02/13.



Microbiology, Virology and Immunology

Category: Graduate PhD: Basic Science

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Molecular cloning, expression, purification and immunological characterization of low molecular weight *Mycobacterium tuberculosis* proteins in mice

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Introduction:

Tuberculosis is a major health problem that is responsible for 8-10 million new cases and 1.3 million deaths annually. In order to control the spread of TB, an effective vaccine is needed. ESAT6-like proteins, ESXP, ESXV and ESXW, as well as PE35 protein are among the major antigenic proteins of *M. tuberculosis* with vaccine potentials. The aim of this study was to obtain these proteins in the recombinant form and study the induction of protective (Th1) and pathologic (Th2) immune responses in immunized mice.

Methods:

The esxP, esxV, esxW and pe35 genes were PCR-amplified from the genomic DNA of *M. tuberculosis*, cloned into pGEMT-Easy cloning vector and subcloned into the expression vector pGES-TH1 for high level expression in *Escherichia coli*. The recombinant proteins were purified to homogeneity using affinity chromatography. Groups of 6-8 weeks old female BALB/c mice (5 mice per group) were immunized intraperitoneally with purified recombinant proteins emulsified in incomplete Freund's adjuvant. Mice in each group received boosters with the recombinant proteins only at two weeks intervals. Two weeks after the boosts, mice were euthanized and spleen cells were cultured in vitro in the presence of Concanavalin A and the immunizing proteins. The culture supernatants were collected and the secretion of Th1 (INF-g) and Th2 (IL-10 and IL-5) cytokines was quantified by enzyme-linked immunosorbent assays.

Results:

The esxP, esxV, esxW and pe35 genes were successfully cloned in plasmid vectors and expressed in *E. coli*. The recombinant proteins were purified to homogeneity by the affinity purification strategy. The experiments with spleen cells from the immunized mice showed that ESXV was the only recombinant protein with Th1 bias (high INF-g:IL-10 ratio). Other proteins (ESXP, ESXW and PE35) did not show any Th1 or Th2 bias.

Conclusions:

The Th1-biased response against ESXV protein in mice suggests its potential as a new candidate vaccine against tuberculosis.

Key Words: Tuberculosis; Vaccines; Immunology

Funding Agency: College of Graduate Studies, Research Sector Projects YM06/15 and SRUL02/13.



Microbiology, Virology and Immunology

Category: Clinical

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Surveillance of patients in an organ transplant center after an outbreak with carbapenemase producing *Klebsiella pneumoniae* using a new molecular technique

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Introduction:

The emergence and global spread of carbapenem- resistant *Enterobacteriaceae* (CRE) including carbapenemase producing *Klebsiella pneumoniae* (KPC) is of great concern in health-care settings across the world leaving few treatment options. Objective: To identify inpatients colonized with KPC in the Organ Transplant Center after an outbreak with such organisms using the Xpert® Carba-R from rectal swab specimens.

Methods:

Following an outbreak of four cases of KPC in the Organ Transplant Center, screening of all inpatients including the infected cases in that center was done using the Xpert® Carba-R molecular technique. Rectal swabs were inoculated into the cartridge according to the manufacturer's instructions. Targets included in Xpert® Carba-R PCR assay are blaKPC, blaNDM, blaIMP, blaVIM, and blaOXA-48.

Results:

A total of 20 patients including the four infected cases were screened by Xpert® Carba-R. Of the infected cases, three were positive, of which two had only NDM and one had both NDM and VIM. The fourth infected case was discharged before the surveillance. Out of the other 16 inpatients who were screened, only two were colonized. Of those two, one was VIM positive and one was NDM positive. Proper infection control precautions were undertaken immediately.

Conclusions:

Xpert® Carba-R is a rapid and reliable molecular technique for the surveillance of KPC carriers.

Key Words: Xpert® Carba-R; Surveillance; Outbreak

Funding Agency: None



Microbiology, Virology and Immunology

Category: Clinical

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A comparative study of persistent versus non-persistent candidemia among neonates

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Introduction:

Candidemia is a rising problem in neonatal ICU (NICU). Many risk factors have been identified which render this group of patients more prone to develop invasive candidiasis. However, it remains to be explained why the response and antifungal therapy (AAFT) results in different outcomes in neonates. This retrospective study aimed to evaluate epidemiology and risk factors associated with persistent (PC) vs non-persistent (NPC) candidemia in neonates receiving AAFT.

Methods:

The study was performed by reviewing files of the neonates with diagnosis of candidemia during a period of 3 years (2013-2015). A case was defined as PC if *Candida* was re-isolated from blood after ≥ 5 days of initiation of AAFT. NPC cases were negative for *Candida* on repeat blood cultures done within 5 days of therapy. The demographic features, other risk factors, antifungal therapy used and the outcome were recorded. All *Candida* isolates were characterized.

Results:

A total of 118 neonatal candidemia cases were identified during this study. Of these 74 (62.7%) and 44 (37.3%) had PC and NPC respectively. Analysis of data revealed that the PC was more often diagnosed than NPC in neonates with gestational age (GA) of 24-28 weeks (81.1% vs 38.6%), where as NPC was more often seen than PC in babies with GA of 29-33 weeks (52.3% vs 16.2%). Similar comparison was observed in neonates with birth weight (BW) of ≤ 1000 g having PC (78.4%) and NPC in 29.5% cases. Patients with BW of 10001-1500 g had NPC (43%) more often than PC (12.2%). No difference was seen when risk factors such as CVC, intubation, TPN and bacterial infection were compared. *C. parapsilosis* was the most common species isolated from both PC (51.4%) and NPC (36.4%) groups. Mortality rate was 58.1% as compared to 20.5% in the NPC group.

Conclusions:

Although *C. parapsilosis* was found to be the most frequently isolated species in PC and NPC cases, mortality rate was significantly higher in the former group despite receiving one or multiple AAFT.

Key Words: Persistent candidemia; Neonates; Risk factors

Funding Agency: None



Microbiology, Virology and Immunology

Category: Basic Sciences

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Identification of proteins of *Escherichia coli* BL21 using the Proteome™ Lab PF 2D platform and MALDI–TOF TOF mass spectrometry

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Introduction:

The ProteomeLab™ PF2D protein fractionation system is a fully automated, two-dimensional system that resolves and collects proteins by isoelectric point and hydrophobicity. Mass spectrometry can identify individual proteins isolated by the PF2D System. The aim of this study was to generate a proteome map of *Escherichia coli* using PF2D platform and identify specific proteins using 4800 Plus MALDI TOF/TOF Analyzer.

Methods:

Single colonies of *E. coli* BL21 were cultured in Luria Broth agar at 37°C for 24 hr. The cells were centrifuged and the pellet (0.5 mg/ml) was lysed. The lysate was injected into the PF2D System and the 1st and 2nd dimension runs were carried out as per the optimized ProteomeLab PF2D method. A proteome map was generated using the ProteoVue software package. A fraction from the basic range (pH 6.8-7.10) was selected and injected into the HPRP column. The fractions between the retention time of 5 -20 minutes were collected and concentrated. The proteins were digested with trypsin, and desalted using a C-18 Zip Tip (Millipore). One µl of the digest was spotted on the MALDI plate. The mass spectrometer was used in the MS Reflector mode (800-4000 Da) and the 5X SN 50 Interpretation method using MSMS 1KV positive method. The data were analyzed using the Protein Pilot Software.

Results:

In the first dimension of PF2D analysis, a total of 27 fractions were collected. From these, 24 fractions were separated in the second dimension and 396 peaks were obtained. A ProteoVue pI/hydrophobicity 2D protein expression map was generated. The selected fraction had 27 peaks. The mass spectrometry helped in the identification of few proteins.

Conclusions:

The proteomic analysis of bacterial samples with the ProteomeLab PF2D allows rapid and sensitive resolution of bacterial proteins. Furthermore, mass spectrometry helps in the identification of specific proteins.

Key Words: *Escherichia coli*; *PF 2D Platform*; *Mass Spectrometry*

Funding Agency: *Supported by Kuwait University Research Sector grant SRUL 02/13*



Microbiology, Virology and Immunology

Category: Basic Sciences

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Characterization of Methicillin-Resistant *Staphylococcus aureus* carrying Florfenicol exporter (fexA) -mediated Chloramphenicol resistance in Kuwait

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Introduction:

Chloramphenicol (Cm) resistance in *Staphylococcus aureus* can be due to inactivation by chloramphenicol acetyl transferase (CAT) or efflux by chloramphenicol/florfenicol exporter (fexA). Cm resistance was isolated sporadically in methicillin-resistant *S. aureus* (MRSA) obtained in Kuwait hospitals in the past decade. However, the number of CM-resistant MRSA strains increased from May 2014. This study investigated Cm-resistant MRSA obtained from 1 May to 30 September 2014 to ascertain if they were newly introduced or endemic clones that have acquired Cm resistance, and determine the genetic basis of Cm resistance.

Methods:

Fifty four Cm – resistant MRSA were obtained from nine hospitals and characterized using antibiogram, SCCmec typing, Spa typing, multi locus sequence typing and DNA microarray. Curing, transduction and conjugation were used to determine the genetic location of Cm resistance.

Results:

Most of the isolates were resistant to tetracycline (N=48), trimethoprim (N=45), fusidic acid (N=43) and erythromycin (N=11). Molecular typing classified the isolates into CC5-ST627-VI-t688 (N=42), CC5-ST5-V-t688 (N=7), CC5-ST627-VI-t450 (N=1), CC5-ST627-VI-t951 (N=1), CC8-ST239-III-t037 (N=2) and CC8-ST239-III-t860 (N=1). Whereas all CC5-ST5-V and CC5-ST627-VI isolates (N=51) harbored the florfenicol exporter (fexA) gene, the CC8-ST239-t037/t860 isolates harbored the CAT gene. The CAT gene was located on plasmids similar to pC221 and pSBK203. In contrast, fexA could not be lost or transferred by transduction and conjugation and was presumed to be chromosomal.

Conclusions:

The study revealed two Cm resistance determinants, CAT and fexA, in MRSA circulating in Kuwait hospitals. Whereas CC5-ST5-V and CC5-ST627-VI represented newly introduced clones, the CC8-ST239-III were those isolated previously in Kuwait, highlighting the value of molecular typing in detecting the introduction of new MRSA clones into a healthcare facility.

Key Words: Chloramphenicol resistance, Antibiotic resistance,; MRSA; Molecular typing

Funding Agency: None



Neurology

Category: *Clinical*

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The use of natalizumab in pediatric-onset multiple sclerosis

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Introduction:

Patients with pediatric-onset multiple sclerosis has been increasingly recognized. The efficacy of the available disease modifying therapies (DMTs) used in pediatric cohort is extrapolated from clinical trials conducted in adult-onset MS patients. We aimed to study the effectiveness of natalizumab in pediatric-onset MS patients who presented with aggressive disease or had breakthrough disease.

Methods:

We conducted a retrospective study utilizing the national MS registry to identify patients treated with natalizumab. Patients aged less than 18 years who had been treated with natalizumab for at least one year were included. Data of demographics, clinical and radiological characteristics, and prior use of DMTs was obtained. The primary outcome measure was to determine the annual relapse rate post natalizumab treatment. Secondary outcomes measures were to assess the change in disease progression measured by EDSS scores and the proportion of patients with radiological activity at the end of observational period.

Results:

Twenty-seven pediatric onset MS patients had been treated with natalizumab for at least one year; of whom 70.4% were females. Mean age at onset and disease duration were 15.1 and 5.70 years respectively. 63% patients had breakthrough disease on first line DMTs. Mean number of natalizumab infusions was 35.2 The annual relapse rate was significantly reduced (1.67 versus 0.07; $p = 0.001$) while the mean EDSS score improved (3.39 versus 2.33 ; $p < 0.001$) at the last follow-up visits. The proportion of patients with MRI activity was significantly reduced (96.3% versus 11.1%; $p < 0.001$). No major adverse events were observed.

Conclusions:

In patients with pediatric-onset MS who had aggressive or breakthrough disease, treatment with natalizumab appeared to be effective in reducing clinical and radiological disease activity. This is in keeping with the evidence supporting the use of natalizumab in adult onset MS.

Key Words: Pediatric-onset multiple sclerosis; Natalizumab; Kuwait

Funding Agency: None



Neurology

Category: *Clinical*

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Late onset multiple sclerosis patients tend to have faster disease progression

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Introduction:

The diagnosis of multiple sclerosis (MS) in older patients presents unique challenges and natural history studies on late onset MS (LOMS; > 40 years) are limited. This retrospective cohort study assessed the risk of secondary progression of LOMS and adult-onset MS (AOMS; 18-40 years) patients and examine the prognostic factors associated with time to secondary progression of MS.

Methods:

Utilizing the national MS registry, we identified AOMS and LOMS cohorts of patients who had relapsing onset MS course. The data on age at onset, gender, presentation at onset, disease duration, prior/ ongoing treatments were obtained. Time to secondary progression was measured as the time to reach sustained EDSS 6. Cox proportional-hazards model was used to evaluate the prognostic significance of studied variables.

Results:

For AOMS (n = 804) cohort, the mean (\pm SD) age at onset was 27.1 ± 6.8 years and mean (\pm SD) disease duration was 9.2 ± 5.2 years. The corresponding estimates for LOMS (n = 99) cohort were 45.6 ± 4.2 and 8.0 ± 5.2 years. Spinal presentation at onset was significantly more prevalent among LOMS (46.5% vs. 32.3%; $p = 0.005$). Secondary progressive course was reached in 14.1% and 11.1% of LOMS and AOMS patients respectively. Time (years) to reach secondary progression was significantly ($p = 0.001$) shorter in LOMS (7.1 ± 3.7) than AOMS (12.3 ± 5.4) patients. The variables significantly associated with time to progressive course were LOMS cohort (adjusted hazard ratio (aHR) = 4.0; 95% CI: 2.1-7.3), female gender (aHR = 1.9; 95% CI: 1.2-2.8), and spinal cord presentation at onset (aHR 1.5; 95% CI: 1.0-2.2).

Conclusions:

MS patients with late onset tended to rapidly reach secondary progressive course of the disease. Female gender and spinal symptoms at onset were associated with increased risk of disease progression that warrants aggressive therapeutic approach.

Key Words: Late onset Multiple Sclerosis; Prognosis; Kuwait

Funding Agency: None



Neurology

Category: *Clinical*

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Rate of sero-conversion of anti-JC virus antibody among multiple sclerosis patients in Kuwait

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Introduction:

Anti-JC virus (JCV) antibody testing plays an important role in risk stratification of multiple sclerosis (MS) treatments given the associated risk of progressive multifocal leucoencephalopathy with natalizumab therapy. We aimed to assess the rate of seroconversion of anti-JCV antibody among MS patients in Kuwait.

Methods:

A cross-sectional study examined the data of MS patients who were tested for anti-JCV antibody. Several demographic and disease variable along with anti-JCV titers were collected. Chi-square and independent-t tests were used to determine significance

Results:

Data of 338 MS patients were assessed; of which 61% were females. Mean age and mean disease duration were 34.7 and 8.9 years respectively. The prevalence of JC seropositivity was 44.1%. There was no statistically significant association between risk of seropositivity and gender ($p = 0.80$), age ($p = 0.06$), disease duration ($p = 0.39$), or prior exposure to disease modifying therapies ($p = 0.06$). It was observed that 25.6% of seropositive patients had received > 24 natalizumab infusions. A subset of the cohort ($n=163$) was followed longitudinally for 14.8 ± 6.56 months. The sero-conversion rate was 14.7%. The number of natalizumab infusion was associated with higher rate of sero-conversion ($p = 0.03$). Few patients ($n=4$; 2.4%) reverted to seronegative status and their JC titers were persistently below 0.9.

Conclusions:

The prevalence of anti-JC virus antibody in Kuwait is lower than international figures. However, the rate of JC sero-conversion appeared to be higher than what was previously reported and this was associated the higher number of natalizumab infusions.

Key Words: Multiple sclerosis; Anti-JC virus antibody; Natalizumab

Funding Agency: None



Neurology

Category: Graduate PhD (Basic Science)

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Routine EEG in critically ill patients

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Introduction:

EEG provides functional evaluation of the brain, particularly for patients of epilepsy. It plays a major role in the individual assessment of ICU patients helping in accurate diagnosis and treatment of treatable cases like Non Convulsive Status Epilepticus (NCSE). Aim: to study significance of routine EEG in critically ill patients.

Methods:

We retrospectively identified routine EEGs performed for 100 critically ill patients at neurological or non-neurological ICUs in various hospitals in Kuwait from January 2015 to January 2016. The background EEG was analyzed for slowing and asymmetry, abnormal patterns and epileptiform discharges.

Results:

Among 100 EEG done for critically ill patients, 68 patients show diffuse slowing which could be explained by different types of encephalopathies, 8 patients had focal slowing, 6 patients had NCSE; 6 patients had normal EEG. Burst suppression was detected in 3 patients and interictal epileptiform discharges were noticed in 3 patients. EEG showed electrocerebral silence in 6 cases.

Conclusions:

In spite of advancing technology of imaging procedures for assessment of brain pathology, but is could not replace EEG in cerebral functional assessment. Moreover, EEG is the only tool to diagnose NCSE which is medical emergency and treatable cause. EEG in ICU gives a clue for prognosis according to findings. Thus EEG in ICU is essential in diagnostic work up in coma, confusional states and even sometimes conscious patients.

Key Words: EEG; Critically ill patients; NCSE, epilepsy

Funding Agency: None



Neurology

Category: Basic Science

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Peripheral neuropathies after bariatric surgery: Kuwait experience

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Introduction:

Obesity has reached epidemic proportions in recent decades, Kuwait is reportedly the fourth “fattest” country in the world with prevalence rates up to 45.3%. Bariatric surgery (BS) has proven effective for sustained weight loss. Still, BS is not free from complications caused by malnutrition, micronutrient deficiencies, and loss of the protective fat tissue pad. They may involve any part of the nervous system, including the peripheral division. Aim: to analyze the clinical presentation and electrodiagnostic features of peripheral nerve complications following BS in Kuwaiti patients.

Methods:

Retrospectively evaluation of 48 patients presenting at a tertiary referral center and analyzed patterns and frequency of peripheral nerve involvement, the correlations with nutritional status, possible risk factors and functional impairment.

Results:

Among 48 cases; 21 presented with chronic distal symmetrical sensory-motor neuropathy, 7 with small fiber neuropathy, one got acute severe axonal sensory-motor neuropathy and another one from lumbosacral plexopathy. In 18 patients we observed mononeuropathies (8 carpal tunnel syndrome, 7 fibular compression at the knee, 2 ulnar neuropathies at the elbow and one meralgia paresthetica). Rapid weight loss and protracted postoperative vomiting tended to correlate with generalized neuropathies, while loss of the protective subcutaneous tissue pad was associated with mononeuropathies.

Conclusions:

Peripheral nerve complications after BS may be classified into generalized neuropathies, mononeuropathies and plexus lesion. Prevention by close follow-up, nutritional intervention and patient education to avoid habitual postures such as leg crossing are emphasized

Key Words: Peripheral neuropathy, neuromuscular complication; bariatric surgery; weight loss.

Funding Agency: None



Neurology

Category: Basic Science

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Botulinum toxin for palmar hyperhidrosis: quantifying its response using sympathetic skin responses evoked by train of stimuli

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Introduction:

Botulinum toxin (BTX) treatment of primary hyperhidrosis- although painful- is highly efficient and safe. Objective quantification of the effect of treatment might further help in the choice of optimal treatment. The sympathetic skin responses (SSR) are among the best studied objective tests of autonomic function and of sudomotor activity in particular. Aim: To objectively assess the effect of BTX treatment in primary palmar hyperhidrosis (PH) using sympathetic skin responses evoked by brief train of stimuli (TSSR).

Methods:

Ten patients with PH were examined at baseline, one week and one month after receiving 50 U of BTX in each hand. TSSR were recorded from the palm using a stimulus consisting of train of 3 supramaximal electrical pulses 3 msec apart delivered over the ipsilateral superficial radial sensory nerve at the wrist. The highest peak-to-peak amplitude of the 3 consecutive traces was measured. Results were compared to TSSR of 10 healthy age- and sex-matched controls.

Results:

In controls, the TSSR remained stable, changing no more than 17% from the baseline value. In patients, a decrease of amplitude by a mean of 36% (range 28% to 55%), was observed at one week. The trend continued at one month with a median decrease of amplitude of 54% (range 43% to 68%) compared to the onset. The difference from controls is highly significant (P= 0.026 at one week and P=0.011 at one month).

Conclusions:

This pilot study confirms the stability of TSSR in controls and their possible value in assessment the results of treatment in PH. It also proves the efficacy of BTX in PH as assessed by an objective test of sudomotor function. Studies on larger cohorts over longer periods seem necessary.

Key words: primary palmar hyperhidrosis, botulinum toxin, sympathetic skin response

Key Words: primary palmar hyperhidrosis; botulinum toxin; sympathetic skin response

Funding Agency: None



Nuclear Medicine and Radiology

Category: Clinical

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A comparative study for the measurement of the systolic and diastolic ankle-brachial pressure index in diabetic patients with calcified and non-calcified lower leg arteries

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Introduction:

Ankle-brachial pressure index-systolic (ABI-s) can be falsely elevated in the presence of calcified leg arteries in some diabetic patients and therefore loses its value in this cohort of patients. We aim at investigating the feasibility of using the diastolic instead of the systolic pressure to calculate the ABI in diabetic patients with calcified leg arteries.

Methods:

A total of 51 patients were chosen from the diabetic foot clinic, none had history of claudication or any vascular procedure. 26 of these patients had calcified leg arteries by Duplex scan (Group A) and 25 patients did not have calcifications in their leg arteries (Group B). A 25 (group C) healthy volunteers matching age and sex for comparison were enrolled in the study. ABI measurement was performed using "boso ABI-system 100 machine". Systolic ABI (ABI-s) and diastolic ABI (ABI-d) were calculated based on bilateral brachial and ankle oscillometric pressures. ABI is considered normal when it is ≥ 0.9 and ≤ 1.3 . Independent t-test was used to test the difference between ABI-s and ABI-d. Statistical significance is considered when $P < .05$.

Results:

The mean age of all participants (\pm SD) was 62.71 ± 8.2 years (50-82 years). ABI-s mean \pm SD was 1.3 ± 0.10 (range, 1.18-1.58) in group A patients, 1.07 ± 0.05 (range, 1-1.16) in group B patients, and 1.06 ± 0.05 (range, 1-1.16) in group C volunteers. While ABI-d mean \pm SD was 1.07 ± 0.05 (range, 1.1-1.17) in group A patients, 1.06 ± 0.05 (1-1.14) in group B patients, and 1.05 ± 0.04 (range, 1.01-1.14) in group C volunteers. In group A, independent test showed statistical significance difference between ABI-s with ABI-d ($P < .001$) whereas in group B & C was not ($P > .05$, .198-.532).

Conclusions:

ABI-d can be used as a complementary measure instead of ABI-s in falsely elevated ABI caused by partial incompressibility in diabetic patients with calcified leg arteries for assessment of peripheral arterial disease.

Key Words: Ankle-brachial pressure index; Peripheral arterial disease; Diabetic foot

Funding Agency: None



Nuclear Medicine and Radiology

Category: Graduate PhD (Basic Science)

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Efficacy of motion correction in absolute quantification of PET-CT of the colon [Drug Response Therapy]

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Introduction:

Endoscopy can directly visualise and biopsy diseased bowel, but it is not always possible due to structuring or proximal small bowel disease. A less invasive approach, in assessment of drug response therapy of paediatric IBD is needed. The effect of respiratory and other motion artefacts in the thorax region have been addressed, but little has been done for bowel movement partly due to the complex and non-periodic nature of the movements. The aim was to develop a motion model of the gut using a 3-D non-rigid registration technique.

Methods:

The motion correction technique was developed in-house, using voxel-intensity-based and Multi-Resolution Multi-Optimisation algorithm. A dynamic digitised NCAT which can generate sets of image data was used. The organ to BG activity ratios of 2-6:1 and four lesions of diameters (5, 10, 15 and 20 mm) with activity to BG ratios of 10:1 were generated. The image volumes were convolved with a Gaussian kernel to address the effect of PSF of a PET scanner. Diaphragm movement and the anterior-posterior expansion were set to maximum of 2 and 1.2 cm.

Results:

Characterisation of translation, rotation, scaling and shearing parameters of abdomen and colon motion were consistent with the physiology of respiration and its effect on abdomen movement. For the small, intermediate and large ROIs drawn at the ascending, transverse and descending colon the difference between motion and non-motion corrected activity were; -2%, +35% and +41% accordingly. The fidelity of the images was greatly increased with the maximum improvements of fidelity from 0.830 to 0.940 within the lesion volume of interest.

Conclusions:

The motion correction was effective for motion between 25-100% from the full expiration reference. For lesions ≥ 10 mm the correction was successful in various position in the colon, whereas for lesions < 10 mm needs further investigation. The correction will reduce artefacts and improve the efficiency of quantitative treatment.

Key Words: Motion correction, NCAT, PET-CT

Funding Agency: None



Nuclear Medicine and Radiology

Category: Basic Science

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Efficacy of optimization of intraoperative Gamma Probe in detection of sentinel lymph nodes in breast cancer and melanoma patients.

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Introduction:

Breast cancer patients often have associated metastases, caused by cancerous cells spreading through the lymphatic system to other areas of the body. As a result, it is common to remove and assess the sentinel lymph node (SLN) during the surgical removal of the tumour. To localise the SLN, an injection of Tc99^[m] nanocolloid is administered interstitially that is transported to SLNs via the lymphatic system. A Nuclear Medicine scan is acquired during this process. A gamma probe is used to locate the SLN during the surgery procedure assisted by the Nuclear Medicine scan. The objective was to optimise the performance of an intraoperative gamma probe system (Europrobe) having both scintillation and semiconductor probes in more accurate detection of SLN in melanoma and breast cancer patients.

Methods:

The surgical Europrobe system is equipped with one scintillation CsI(Tl) detector and one semiconductor CdTe detector. Tests were performed against The National Electrical Manufacturers Association (NEMA- USA) guidelines using an in-house developed phantom.

Results:

The CsI(Tl) detector showed superior sensitivity, where sensitivity in scatter medium at 50 mm lateral view was 14.6 cps/MBq vs 3.3 cps/MBq for CdTe and the Side and Back Shielding was 99.98 vs 99.84% for CdTe. However, CdTe showed better spatial and energy resolutions with FWHM of 35mm vs 49 mm and energy resolution of 8.9% vs 26.5% for CsI(Tl).

Conclusions:

It is not possible for a probe to have optimum performance for all parameters, so a compromise must be reached depends on clinical and surgical preference. Where, the scintillation probe with high sensitivity, suitable for detection of low nodal activity, or deep-seated nodes, whereas the semiconductor probe has superior spatial and energy resolutions, which are suitable for accurate localisation and scatter rejection.

Key Words: Intraoperative gamma probe, SLN, NEMA

Funding Agency: None



Nuclear Medicine and Radiology

Category: Basic Sciences

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Effect of long-term treatment with non-steroidal anti-Inflammatory drug (Diclofenac) on kidney scintigraphy

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Introduction:

Non-Steroidal Anti-Inflammatory Drug, Diclofenac, is the most commonly used to relieve kidney pain, The objective of this study is to examine the effect of long-term use of diclofenac on renography which used to evaluate kidney function.

Methods:

24 New Zealand White rabbits divided into two groups: (99mTc MAG3 and 99mTc DTPA) were used for the renography. A baseline study (control) was done by injecting 1.3mCi 99mTc MAG3 and a renography was performed. Two days later an i.v. dose of diclofenac (2mg/kg) (treated animals) was given daily for 8 days. Then 99mTcMAG3 renography was performed. Above procedure was repeated for the 99mTc-DTPA group following administration of 2.6 mCi of the tracer. Studies were acquired using Gamma camera.

Results:

Diclofenac treatment shifted the renogram curves to the right indicating that there was a delayed renal uptake of the two tracers and clearance of radioactivity. The calculated average values of Tmax for control and treated rabbits using 99mTc-MAG3 were (3.1±0.3 and 4.2±0.3 min) respectively, while values were (5.4±0.5 and 12.9±1.5 min) using 99mTc-DTPA. The T_{1/2} for control and treated rabbits were (4.47±0.2 and 5.51±0.1 min) for 99mTc-MAG3 while 99mTc-DTPA values were (13.35±3 and 29.50±4 min) respectively, (n=12; *p<0.05).

Conclusions:

Diclofenac, prostaglandins synthesis inhibitor, delayed both the time to reach peak renal activity (Tmax) and the subsequent renal clearance time (T_{1/2}) for both tracers, and tracer arrival in the bladder was delayed for both of them. However, the effect of NSAID was much greater for DTPA. Therefore, we recommend using 99mTc-MAG3 and not 99mTc-DTPA for performing renography studies with the NSAIDs administration. This misleading result may occur due to the type of the radiopharmaceutical and not due to the real clinical-condition.

Key Words: Chronic use of NSAIDs; Radiopharmaceuticals; Renal scintigraphy

Funding Agency: None



Obstetrics and Gynecology

Category: *Clinical*

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A five-year review of Emergency Peripartum Hysterectomy (EPPH) in Al-Adan Hospital

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Introduction:

In the last 5 years we have noticed alarming rise in cesarean section (CS) rate. 55% of them are done in patients with previous CS. There was a concomitant increase in EPPH (31 cases in 5 years). Maternal mortality of EPPH ranges from 0 to 12.5%. We reviewed the incidence, risk factors, indications and complications of EPPH over the last 5 years.

Methods:

Retrospective observational study for all cases of EPPH carried out in our hospital from January 2011 till the end of December 2015.

Results:

During the study period there were 31 cases of EPPH. Overall incidence of CS was 31.6%. The overall incidence of EPPH during the study period was 0.95/1000 deliveries (0.22/1000 for vaginal deliveries and 2.5/1000 for CS). Thirteen percent of patients were young aged 25 years or less and 16% aged 40 years or more. Nineteen percent of cases were mothers of one child and 39% were mothers of five children or more. The main risk factors were history of previous CS (87%) and delivery by CS (84%). Abnormal placentation (placenta accrete and placenta praevia) accounted to 68% of cases. The other indications were rupture uterus (16.1%) and atonic postpartum haemorrhage (12.9 %). No maternal mortality was reported. The main complications were febrile morbidity, bladder injuries and coagulopathy. Blood transfusion was required in all patients and 22.5% of patients were admitted to ICU.

Conclusions:

National efforts should be made to decrease EPPH as it is associated with significant morbidity/mortality, both maternal and fetal. These efforts should be focused on decreasing CS rates from repeat CS and CS carried for fetal distress. The measures suggested are avoidance of continuous monitoring in low risk obstetric patients, judicious use of fetal blood sampling jointly with fetal monitoring and greater involvement of consultants in counseling of patients with previous CS to encourage them for vaginal birth after cesarean section.

Key Words: Emergency Peripartum Hysterectomy; Incidence; Complications

Funding Agency: None



Obstetrics and Gynecology

Category: *Clinical*

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Trends in induction of labour at maternity hospital, Kuwait

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Introduction:

Induction of labour [IOL] remains one of the most frequently performed procedures in obstetric practice worldwide. The objective of our study was to evaluate the trends in IOL.

Methods:

A one year [January 1st- December 31st, 2014], retrospective study of all the patients admitted to Maternity Hospital, Kuwait, for IOL, was undertaken. Exclusion criteria included breech presentation/multiple pregnancies. The patients were allocated to para 0+0[group A], para1-4[group B] and para ≥ 5 [group C].The indications for and the methods of induction and the related factors and the maternal/fetal outcome extracted from the records. A comparative study of groups A and B was undertaken and the data were compared with a study on IOL in 2001-2002.

Results:

The incidence of IOL in the study, 8.8%, was lower than the incidence of 14.1% reported in the 2001-2002 study: 11,645 total deliveries and 1,026 inductions in 2014 vs. 11,514 deliveries and 1,628 inductions in 2001-2002. In the current study, whereas the mean maternal age, gestational age at delivery and the fetal birth weight were significantly lower in group A than group B, (27.38 \pm 5.07 vs. 30.52 \pm 5.033, $p < 0.0001$) years, [38.54 \pm 2.509 vs. 38.87 \pm 1.995, $p = 0.020$] weeks and {3140.11 \pm 621.264 vs. 3287.08 \pm 569.38, $p = 0.0001$ } grams, the incidence of C/S was significantly higher in group A, 4.1.7% vs. 27.6%, $p < 0.0001$. The overall C/S rate for the current study is significantly higher than the rate recorded in 2001-2002, 34.7% vs. 23.6%. The main indications for IOL in the current study for groups A and B were as follows: postdates, 18.1% vs. 24.1%, $p = 0.023$, diabetes in pregnancy, 13.3% vs. 22.6%, $p = 0.0002$ and PIH/PE, 12.7% vs. 6.6%, $p = 0.0017$ and more neonatal complications in group B, 14.9% vs. 7.7%, $p = 0.012$. The incidence of ruptured uterus of 0.6% in the current study was higher than the 0.3% reported in 2001-2002.

Conclusions:

IOL is associated with high incidence of operative delivery and there has been a drop in IOL.

Key Words: trends; induction labour; outcome

Funding Agency: None



Obstetrics and Gynecology

Category: Basic Sciences

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Effect of hyperglycemia on maternal-fetal transport of arachidonic acid in 'Diabetic Model' placental lobule

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Introduction:

In this study we have investigated effect of hyperglycemia on maternal-fetal transport of an essential fatty acid, arachidonic acid across human placenta in a diabetic model perfusion state.

Methods:

Human placentae were collected post-partum. ¹⁴C labelled Arachidonic Acid (Amersham,UK) along with tritiated water (Amersham,UK) as reference marker were then injected as a single bolus (100ul) into maternal arterial circulation of perfused placental lobules and perfusate samples collected from maternal and fetal circulations over a period of 5 minutes. National Culture and Tissue Collection medium, diluted with Earle's buffered salt solution was used as perfusate. In diabetic model perfusions, glucose concentration in maternal perfusate flow was raised to 200 mg/dl to mimic a moderate hyperglycemia situation than control phase value, to mimic a diabetic state. Concentration of labelled substances in perfusate samples was assessed by scintillation spectrometry (LKB Wallac Scintillation Spectrometer, Denmark). Transport kinetics of substances studied were computed using established permeation parameters.

Results:

Differential transport rates of arachidonic acid and tritiated water in 8 perfusions differed significantly (Student's t-test; $p < 0.05$) for all transport fractions studied in control and diabetes model perfusions. TR50 indices of arachidonic acid compared to reference marker averaged 0.82 and 1.12 in control phase and diabetic model perfusions respectively implying compromised fatty acid transport in hyperglycemic state. Absorption rate index of arachidonic acid compared to tritiated water differed significantly (Student's t-test; $p < 0.05$) in control and diabetic model perfusions.

Conclusions:

Our studies show for the first time that transport behaviour of essential fatty acids like arachidonic acid could be seriously compromised in hyperglycemic diabetic states, with potential harmful effects on fetal and neonatal development in such disease states.

Key Words: Diabetic Model Perfusion; Arachidonic Acid; Maternal-fetal exchange, Diabetic Model Perfusion, Arachidonic Acid

Funding Agency: Kuwait University Research Grant # MO01/00



Obstetrics and Gynecology

Category: *Clinical*

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Neonatal cord blood anti-Mullerian hormone: Clinical significance of gender differences

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Introduction:

Anti-Mullerian hormone is involved in primary sex development through inhibition of differentiation of the mullerian ducts. Objective of Study: To evaluate the differences in cord blood levels after delivery and if there are gender differences.

Methods:

Opportunistic and random selection of women over one year period of 100 women. After vaginal delivery paired cord blood and maternal blood were taken, maternal weight, birth weight, gender and gestation at delivery were documented. Any obstetric prenatal complications were also noted. This was a single blinded study. Karyotype in ambiguous external genitalia.

Results:

of the 100 singleton pregnancies, 55 were male infants and 45 were females, 7 cases of preeclampsia and 6 cases of preterm delivery (24 to <37 weeks) and 3 ambiguous external genitalia. No differences in the AMH levels in mothers of boys and girls (0.51 ± 0.39 ng/ml vs. 0.54 P=0.9). AMH was significantly higher in the cord blood of male neonates than female 38.7 ± 27.6 versus 1.1 ± 0.4 , P<0.001. There was an inverse correlation with gestation and birth weight ($r = -0.472$ and -0.442 respectively). In ambiguous external genitalia, the AMH was significantly higher in 2 with XY compared to XX (26.4 vs. 0.9 ng/ml, AMH levels were also significantly higher in patients with preeclampsia.

Conclusions:

There is obvious gender differences in which AMH was higher in male and it may be used to predict maleness in ambiguous external genitalia and pre-eclampsia.

Key Words: Cord Blood Anti-Mullerian Hormone; Ambiguous External Genitalia; Male gender
Funding Agency: NONE



Obstetrics and Gynecology

Category: *Clinical*

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Trends in management of premature ovarian failure: The role of anti-Mullerian hormone (AMH) and tibolone

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Introduction:

Premature Ovarian Failure (POF) is cessation of ovarian functions before the age of 40 years with consequent cessation of menstruation. Objective of study: This paper aims to resolve two important issues about POF: (1) to adopt a holistic evaluation of the clinical features and aetiology (2) to evaluate the ovarian reserve with AMH and outcome of replacement therapy with Tibolone in women with POF.

Methods:

Forty-two women seen at the outpatient clinic of Maternity Hospital fulfilled the study criteria and had clinical evaluation with history, physical examination and investigations were carried out. Blood samples were taken for determination of, Follicle Stimulating Hormone (FSH), Luteinizing Hormone (LH), prolactin, testosterone and lipid profiles, vitamin D and autoimmune antibodies. Bone density was evaluated with QCT Scan. Ovarian reserve was estimated with serum levels for anti-Mullerian hormone (AMH). Replacement therapy was with Tibolone 2.5 mg daily for at least 6 months.

Results:

Climacteric symptoms were common and patients had high serum levels of FSH, LH and low levels of estradiol and AMH. Aetiological factors included bilateral oophorectomy and ovariectomy, autoimmunity, chemo-radiotherapy and idiopathic. AMH was undetectable in patients with bilateral ablative ovarian surgery and low in the remaining patients compared to controls ($P < 0.01$). Tibolone was well tolerated by patients with significant relief of vasomotor symptoms ($P < 0.001$) but no effect on psychological reaction.

Conclusions:

POF has multifactorial origin and needs a holistic approach with AMH and Tibolone.

Key Words: Premature Ovarian Failure; Ovarian Reserve; Holistic Management

Funding Agency: NONE



Obstetrics and Gynecology

Category: Clinical

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Tobacco-free-campus initiative combined with carbon monoxide monitoring and counseling: Quitting strategy for Kuwait nursing college student smokers

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Introduction:

Smoking cessation involves changing unhealthy smoking habit which accounts for 63% of global deaths. This study was in response to the United Nations General Assembly Global Forum for non-communicable diseases invitation to nurse researchers to evaluate smoking cessation interventions for their students. Objective: To evaluate “Tobacco-free-campus initiative” combined with carbon monoxide monitoring and tobacco cessation interventions as quitting model for student nurses.

Methods:

This was the second part of a multi-phase study which involved a series of ‘no-smoking’ campaigns, enforced tobacco-free-campus initiative, mandatory weekly monitoring of biological health indicators and biochemical feedback using expiratory carbon monoxide (CO) levels for 36 real cigarette and shisha-smokers. The quasi-experiment lasted 10 weeks. Participants’ data on tobacco use, quit attempts and self-efficacy (SE) were collected using a 25-item bi-lingual questionnaire. Counseling and smoking cessation aids of their choice were offered.

Results:

All the participants lived with their families and 70% of the families smoked cigarette and/or shisha. Previous quit attempts were statistically higher in males than females, 47.2% versus 13.9% and (U=76.00, P=0.007). High SE to quit was 36% and the quit rate for the last 4 weeks was 13.9%. Biological health indicators of participants such as pulse rate and systolic blood pressure improved as a result of cessation interventions.

Conclusions:

Tobacco product ban on college campus, CO monitoring followed by counseling were effective smoking cessation interventions.

Key Words: Tobacco free campus; Carbon monoxide monitoring; Counseling, smoking cessation

Funding Agency: None



Obstetrics and Gynecology

Category: *Clinical*

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Effects of smoking on seminal cytokine network

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Introduction:

The seminal cytokine network is involved in priming female reproductive tract reception for embryo implantation and may have a role in infertility, genital tracts infection and pathologic conditions.

Objective of the study: To evaluate the association between smoking and Seminal Cytokine Network.

Methods:

Eighty men who presented with infertility were evaluated. Clinical evaluation including smoking habits were noted and semen analysis was carried out according to WHO guideline. A panel of 6 cytokines TNF- α , IL-12, IL-6, IL-13, IL-10 and IL-4 were estimated in smokers and non-smokers, using Enzyme-linked immune sorbent assay (ELISA). After a program of cessation of smoking, the seminal cytokines were repeated.

Results:

Of the 80 men, Normozoospermia (39), oligozoospermia (25), Azoospermia (16), Asthenozoospermia (21) and leucocytospermia (8) and 29 (36%) and 51 (64%) were non-smokers. The T helper proinflammatory cytokines expression were significantly higher in smokers IL-6; 36 ± 8 versus 26 ± 4 , $p < 0.05$, IL-12, 44 ± 6 versus 27 ± 6 , $p < 0.01$, TNF $\alpha = 12 \pm 3$ versus 7 ± 1.3 , $p < 0.05$. On the other hand, T helper 2 expression was higher in non-smokers than smokers. IL-13; 12 ± 3 versus 6 ± 2 , $p < 0.01$, IL-10 : 9 ± 4 versus 4 ± 1.2 , $p < 0.01$, IL-4: 6 ± 1.2 , versus 3 ± 1.2 , $p < 0.05$. Semen analysis revealed Normozoospermia 39, Oligozoospermia 14, Asthenozoospermia, had higher expression of proinflammatory cytokines IL-12, IL-6 and TNF- α . And after cessation of smoking by 14 men, they had higher expression of T helper2 Cytokines and reduced T helper1 cytokines compared to non-cessation ($p < 0.01$)

Conclusions:

Smoking is associated with proinflammatory cytokine (Thelper 1) expression. This may explain the detrimental effect of smoking on sperm parameters and function.

Key Words: Seminal Cytokine Network; Smoking Effect; Sperm Parameter

Funding Agency: NONE



Obstetrics and Gynecology

Category: *Clinical*

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Emotional impacts of premature ovarian failure in Kuwait

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Introduction:

Premature Ovarian Failure (POF) is cessation of ovarian functions before the age of 40 years with consequent cessation of menstruation. Objective of study: To evaluate the emotional reaction and self-efficacy of women with POF.

Methods:

Forty-two women confirmed to have Premature Ovarian Failure seen at the outpatient clinic of Maternity Hospital fulfilled the study criteria, were enrolled into the study. Another group of 42 healthy women formed the control group. The instrument of data collection included three types of questionnaires to assess the depth of emotional reaction to the diagnosis of POF including the subjects' biodata, modified Health Orientation Scale (HOS) and Stanford Chronic Disease Self-Efficacy Scale.

Results:

The women with POF presented at the clinic with infertility ($P < 0.01$), amenorrhea ($P < 0.01$) and hot flashes ($P < 0.05$). The diagnosis of ovarian insufficiency was a traumatic life event similar to bereavement (grieving of no obvious loss to others), with high level of anxiety, depression, fear of divorce, lower life satisfaction and impaired self-esteem. Fertility was generally of profound concern to all of them, because fertility is a societal landmark of womanhood and youth. The Stanford Chronic Self Efficacy scores were generally low (below 7) in coping with emotion reaction to loss of fertility, loss of menstruation, loss of self-esteem and other significant emotional reactions

Conclusions:

The present study has demonstrated that Premature Ovarian Failure is associated with severe emotional distress and impaired ability to cope with them especially low self-esteem. A multidisciplinary management team is advocated for POF.

Key Words: Premature Ovarian Failure; Emotional Reaction; Self-efficacy

Funding Agency: None



Oncology

Category: Undergraduate

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Lung cancer management through the analysis of volatile organic compounds

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Introduction:

Lung cancer has the highest mortality rate among various types of cancers. A lot of nowadays techniques that used to diagnose lung cancer have harmful effect on the patients. Previous studies have found that both CALU-1 and NL20 release AC in vitro, CALU-1 producing a higher level of AC than NL20. However other studies have provided conflicting results about the release of AC of CALU-1 populations. This study examines the differences in AC level which is released by the cell lines in the presence or absence of L-threonine and pyridoxal. The aim of this study is to further our knowledge about the metabolic processes of cancerous population which can end up with the diagnosis of lung cancer through breath analysis.

Methods:

This study used two different cell lines; CALU-1 and NL20. CALU-1 was cultured in DMEM medium and NL20 was cultured in Ham's F12 medium. We used for culture conditions two media in SIFT-MS bottles. One with PBS, supplemented with glucose and FBS, while the other one with the addition of L-threonine and pyridoxal. Then we incubated them after the bottles were air purged. Also, we prepared a control air bottle and two a-cellular control bottles with media. The volatile organic compounds were analyzed by using a Profile 3 SIFT-MS instrument.

Results:

The results have shown that in control group the addition of L-threonine and Pyridoxal reflect on increase the release of AC. While the addition of L-threonine and pyridoxal to CALU-1 and NL20 did not enhance the release of AC.

Conclusions:

Levels of AC in the headspace of NL20 cells were higher when compared to CALU-1 cells. The addition of threonine and pyridoxal did not increase AC levels in the headspace of either CALU-1 or NL20 cells. Further work is needed to clarify whether the possible extra AC produced by cells is immediately metabolized.

Key Words: Lung cancer, lung cancer cells (Calu-1), non-malignant; Acetaldehyde, L-threonine

Funding Agency: NONE



Oncology

Category: Graduate PhD (Basic Science)

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Developing adhirons as tools to detect prognostic biomarkers in cancer

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Introduction:

Adhirons represent a novel alternative to the antibody technology and the aim of this project is to develop Adhirons to human epidermal growth factor receptors 1, 2, 3 and 4 (HER1-4) and vascular endothelial growth receptor-2 (VEGFR-2) that are important in cancer diagnostics and therapeutics.

Methods:

Adhirons were selected by phage display from a library with a complexity of >10¹⁰ to different target proteins bought commercially. Isolated Adhirons that showed high binding affinity were cloned, expressed in *Escherichia coli*, purified by affinity chromatography, and characterised by site-directed biotinylation using our optimal protocol. Characterised Adhiron binding reagents were then taken forward to be tested by immunofluorescence (IF) and immunohistochemistry (IHC)-like applications.

Results:

Using the optimised protocols for Adhiron expression and characterisation we were able to obtain between 40 to 160 mg of protein per litre and to characterise 80% of the total Adhiron proteins using biotin-maleimide chemistry. Two of the VEGFR-2 Adhiron proteins showed highly specific membrane staining in IHC with a binding affinity of low nanomolar (kd, 41nM and 400nM). The HER binding Adhirons are currently being characterised.

Conclusions:

Such VEGFR-2 Adhiron proteins might be useful for the development of different diagnostic and therapeutic reagents.

Key Words: Adhiron protein; antibody-alternative; Cancer

Funding Agency: Kuwait University scholarship



Oncology

Category: *Clinical*

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Somatic mutations of JAK2/MPL/CALR in patients with myeloproliferative neoplasms

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Introduction:

JAK2/MPL mutations are involved in the pathogenesis of classic myeloproliferative neoplasms (MPNs), which includes polycythemia vera (PV), essential thrombocythemia (ET), and myelofibrosis (MF). Recently somatic mutation of calreticulin (CALR) gene has been found in patients with ET and MF. In this study we investigated the prevalence of JAK2/MPL/CALR mutations in patients with MPN's from January 2007 – December 2015 reported in our center.

Methods:

We analyzed 2000 cases with suspected MPN, for JAK2V617F mutation by ARMS-PCR and their allele burdens were reported by RQ-PCR. We have screened a cohort of 400 MPN patients for JAK2/MPL/CALR mutations by a sequential molecular analysis, which includes PCR, RT-PCR and fragment analysis.

Results:

JAK2V617F mutation is present in 50% of patients with MPN. Among 400 cases submitted for sequential molecular analysis identified 200 cases with JAK2V617F mutation, 48 cases with CALR mutation and 4 cases with JAK2 exon 12 /MPL mutations. Allele burden study on JAK2V617F positive patients revealed that patients with ET has the lowest allele burden, those with PV an intermediate one and those with MF showed the highest burden. CALR mutation is found in ET and MF cases that are mutually exclusive with JAK2 and MPL. In our cohort, none of the patients with CALR mutation had anemia where as 21% had splenomegaly, 43% had megakaryocytes at time of diagnosis. Compared with JAK2 V617F-positive ET and PMF, CALR-mutant ET and PMF are clinically correlated with lower leukocyte and hemoglobin counts, higher platelet counts, and a reduced risk of thrombosis.

Conclusions:

Analysis of JAK2/MPL/CALR genes as molecular marker's for MPN allows the diagnosis of 90% of patients with PV, ET and MF. As a novel mutation, CALR testing also has a prognostic value since it is associated with longer survival and fewer thrombotic events compared to JAK2 mutations.

Key Words: Myeloproliferative Neoplasms; Polycythemia vera, Essential thrombocythemia, Mye; JAK2/MPL/CALR

Funding Agency: Kuwait Foundation for the Advancement of Sciences (KFAS grant number: 2008130204).



Pathology

Category: Graduate (Resident)

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Comparison of urinary cortisol excretion between type 2 diabetics and non-diabetic individuals in Kuwait

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Introduction:

Type 2 diabetes is one of the most common diseases in Kuwait causing morbidity and creates a great burden on the patient and healthcare resources. In 2013 the prevalence of diabetes in Kuwait was 23.09%. Studies were conducted to find an association between type 2 diabetes and the excess secretion of cortisol as a possible explanation for the metabolic syndrome features (obesity, hypertension, hyperlipidemia, coronary heart disease and type 2 diabetes). The aim of the study was to compare urinary cortisol levels between type 2 diabetic individuals and non-diabetic apparently healthy controls.

Methods:

94 study subjects; 65 type 2 diabetic patients and 29 age and sex matched non-diabetic controls were included in the study. Diabetic patients were recruited from diabetes clinic in Mubarak hospital. Anthropometry, demographic details and history of comorbidities were assessed in both groups. Overnight urine cortisol/creatinine ratio was performed for all study subjects.

Results:

There was a significant difference in the median urinary cortisol creatinine ratio between the two groups (P=0.014). The median urinary cortisol creatinine ratio was higher in type 2 diabetics {48.9 nmol/mmol (IQR 39.1)} compared to the control group {29.6 nmol/mmol (IQR 30.6)}.

Conclusions:

Conclusion:

The significant urinary cortisol excretion found in our studied type 2 diabetic patients could have impact on the future therapeutic modalities of type 2 diabetes and its complications.

Key Words: Cortisol; Type 2 diabetes; Metabolic syndrome

Funding Agency: None



Pathology

Category: Clinical

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Metastatic breast carcinoma in pleural fluid: Correlation of receptor and HER-2 status with the primary carcinoma

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Introduction:

Objectives: Documenting the four molecular subtypes of breast carcinoma is significant as they determine response to therapy, disease free interval and survival. The aim of this study is to document the sub types defined by immunocytochemistry (ICC), expression of estrogen receptor (ER) or progesterone receptor (PR) and human epidermal growth factor receptor 2 (HER 2): ER/PR+,HER2+ ; ER/PR+,HER2- ; ER/PR-,HER2+ ; and ER/PR-,HER2- in metastatic breast carcinoma in pleural fluids and compare them with their expression in the primary tumor.

Methods:

Over a period of 18 months, 13 cases of invasive breast carcinoma with metastases to the pleural cavity were studied for the subtypes. ER,PR and HER2 were determined by ICC in the primary breast tumor and the cell blocks of the pleural fluid with metastatic carcinoma.

Results:

Age ranged from 33 – 75 years. The primary tumor ER/PR+,HER2+ ; ER/PR+,HER2- ; ER/PR-,HER2+ ; and ER/PR-,HER2- were 4,7,1 and 1 respectively. In the cell blocks of the metastatic tumor in the pleural fluid the sub types ER/PR+,HER2+ ; ER/PR+,HER2- ; ER/PR-,HER2+ ; and ER/PR-,HER2- were 5,3,3 and 2 respectively. There was complete correlation in 9 of the sub types in the primary and metastatic tumor. However, there were 3 cases where the metastases was positive for HER 2 and one case which became triple negative from ER/PR+,HER 2-.

Conclusions:

Determining the molecular sub type in metastatic breast carcinoma is of importance as it greatly affects the management as 23% of our metastatic tumors became HER2 positive which would thus require anti HER 2 drugs.

Key Words: Breast carcinoma sub types; Metastatic pleural effusion; Estrogen /progesterone receptor, HER 2

Funding Agency: None



Pathology

Category: Clinical

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Use of virtual autopsy in drowning

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Introduction:

Virtual Autopsy (VA) is a new non-invasive form of post-mortem investigation in forensic practice. This technology utilizes post-mortem multislice computed tomography (MSCT) and magnetic resonance imaging (MRI) in order to obtain a detailed insight of a body lesions. Radiographic screening is invaluable in the forensic investigation of drowning. MRI has had a greater impact in demonstrating soft-tissue injuries. The main objective of this study is to evaluate the importance and the effectiveness of CT scanning and MRI as a diagnostic procedures in the forensic evaluation of drowning victims in comparison with conventional autopsy.

Methods:

Data was collected in Detroit Medical Examiner Office, Michigan. Fifty cases of drowning victims were studied. The cases were for males, with age range of 19 to 55 years, with the mean age of 36.75 years. Data were interpreted at a three-dimensional workstation by radiologists using CT scanning and MRI. Radiographic images were evaluated and compared with the autopsy findings.

Results:

The results revealed that all drowning subjects had evidence of fluid in the para-nasal sinuses and hyper-inflated lungs in all 50 cases (100%) in both traditional autopsy and radiological imaging. 25 cases (50%) had fluid in the sub glottic trachea and bronchi detected in CT scanning which are similar to the autopsy results. These preliminary results, based on the concept of virtual autopsy are promising enough to introduce this new technique in forensic medicine.

Conclusions:

In conclusion, MRI and CT have the power to play an important role to aid in drowning cases. It is possible to recommend to the Kuwaiti Government the use and implementation of virtual autopsy in Kuwait. This technique can be combined with conventional autopsy to speed up the process.

Key Words: Virtual Autopsy; Drowning; Post-mortem

Funding Agency: none



Pathology

Category: Graduate PhD: Basic Science

180

Association of uncoupling protein 2 (UCP2) gene variant with leukocyte telomere length (LTL), human telomerase reverse transcriptase [hTERT] and oxidative stress markers in type 2 diabetes mellitus

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Introduction:

Oxidative stress and resulting reactive oxygen species (ROS) have been associated with aging and leukocyte telomere length (LTL) shortening. To explore the hypothesis that functional variant p.A55V (rs660339) in the UCP2 gene is associated with oxidative stress-induced LTL shortening in type 2 diabetes mellitus (T2DM), this study evaluated associations of oxidative stress markers with p.A55V, implicated in the regulation of ROS.

Methods:

Serum human telomerase reverse transcriptase (hTERT), adiponectin, malondialdehyde [MDA], Total oxidative stress status [TOS], insulin, glucose, insulin resistance (homeostasis model assessment [HOMA-IR]), and leukocyte telomere length (LTL) were measured in 225 T2DM patients and 245 age and sex matched controls. Allelic discrimination genotyping was used to determine UCP2 gene variant rs660339.

Results:

Homozygous carriers of the G allele [G/G] of rs660339 had the shortest LTL [4.02±0.8] and the lowest hTERT [25.36±7.9 ng/ml] compared to [A/A]: 4.11±0.80; 28.42±7.98 ng/ml and [A/G]: 4.10±0.72; 28.79±7.98 ng/ml respectively. Carriers of [A/A] genotype had increased odds ratio [OR=1.2, p=0.04] of having longer LTL and higher telomerase levels [OR=1.9, p=0.004] compared to other genotypes. [A/A] genotype was associated with the highest adiponectin levels [6.30±0.90 ng/ml] and lowest HOMA-IR [1.66±1.91]. G/G genotype was associated with higher levels of oxidative stress markers such as MDA [1.6(0.5-1.9), p=0.03] and increased risk of developing T2DM. Genotype [A/A] was found to be associated with lower risk of developing T2DM [OR = 0.81(95% CI = 0.5-0.9), p=0.03]. [AG+AA] haplotypes were significantly associated with higher levels of oxidative stress markers and increased risk of developing T2DM, suggesting that a single G allele could supersede the protection of the A allele.

Conclusions:

We conclude that the A allele carries protective effects in contrast to G allele. Polymorphisms in UCP2 gene influence LTL and hTERT resulting in telomere shortening via oxidative stress pathways in T2DM.

Key Words: Telomere Length; Aging; Oxidative Stress

Funding Agency: Yes



Pathology

Category: Graduate PhD: Basic Science

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Association of glomerular filtration rate (GFR) with leucocyte telomere length (LTL) and human telomerase reverse transcriptase [hTERT] in subjects with type 2 diabetes mellitus (T2DM)

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Introduction:

Telomeres and telomerase are determinants of biological cell clock linked to aging and type 2 diabetes mellitus (T2DM). We explored the hypothesis that differences in intrinsic biological age could determine susceptibility to declining glomerular filtration rate (GFR).

Methods:

Serum human telomerase reverse transcriptase (hTERT) and leucocyte telomere length (LTL) were measured in 225 T2DM patients and 245 age and sex matched controls. Indices of GFR evaluated were serum urea, creatinine, creatinine-derived estimated GFR (eGFR) using CKD-EPI and MDRD equations, serum cystatin C, cystatin C-derived eGFR (eGFRcys).

Results:

T2DM subjects with shorter LTL (<3.5) had significantly ($p < 0.05$) lower median eGFR (shorter LTL 70 ml/min/1.73m²) vs. longer LTL 86 ml/min/1.73m²). Similarly, median eGFRcys was significantly lower in T2DM subjects with shorter LTL compared to subjects with longer LTL (shorter LTL eGFRcys 48 ml/min/1.73m² vs. longer LTL eGFRcys 89 ml/min/1.73m²). Similar trends were observed with eGFR calculated using CKD-EPI and MDRD creatinine formulas. Similar significant trends were observed with eGFR calculated using CKD-EPI and MDRD creatinine formulas. T2DM subjects with lower hTERT levels (< 23.5 ng/mol) had significantly lower eGFR compared to those who had higher hTERT levels. LTL correlated negatively with urea ($r = -.40$), creatinine ($r = -0.21$), and cystatin C ($r = -0.72$). hTERT correlated negatively with urea ($r = -.11$), creatinine ($r = 0-.13$) and cystatin C ($r = -0.14$). LTL and hTERT correlated positively with eGFR calculated using MDRD equation ($r = .29$ and $r = .31$) respectively. LTL correlated positively with eGFRcys ($r = .44$) but not hTERT.

Conclusions:

Our data support earlier observation of age-related telomere shortening in renal cell populations and suggest roles for telomeres and telomerase in age-related decline of GFR. Screening T2DM patients with LTL and telomerase may be useful adjunct for identifying subjects susceptible to decline in GFR

Key Words: Telomere Length; Aging; Oxidative Stress

Funding Agency: College of Graduate Studies and Research Sector (Grant Number: YM06/11)



Pathology

Category: Graduate PhD (Basic Science)

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Expression and role of miRNA in thyroid cancer

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Introduction:

MircoRNAs (miRNA) are endogenous non-coding small RNAs that regulate gene expression by binding to specific mRNA targets. They contribute to cancer pathogenesis by interfering with many biological processes. Worldwide increasing incidence of thyroid cancer, as well as absence of reliable diagnostic methods and unclear etiology, justify the need to search for new biomarkers. miRNAs are good candidates as biomarkers in future cancer management. This study is planned to explore the signature and role of a panel of miRNAs in papillary thyroid cancer (PTC).

Methods:

Fifty eight thyroid tissue samples have been profiled for the expression of 84 different miRNAs using miScript miRNA PCR Array. To test the function of one of the deregulated miRNAs (miR-146b), primary cultured thyroid cells were transfected with miR-146b inhibitor and activity of 10 major signaling pathways were assessed by luciferase assay. The obtained results were confirmed by invasion assay and immunofluorescence staining.

Results:

Profiling revealed a persistent signature of up-regulated miR-222 and miR-146b, and down-regulated miR-148b, miR-138, and miR-7 defining PTC with specific clinicopathological sub-groups. Inhibition of miR-146b in primary cultured thyroid cells resulted in a significant activation of JNK pathway with relative response ratio (RRR%) of 115% and suppression of Wnt, Notch and Hypoxia pathways with RRR% of 67%, 76% and 60% respectively. The results were confirmed by lower invasion ability and at the protein level by immunofluorescence staining.

Conclusions:

The obtained miRNA signature revealed a diagnostic potential to distinguish between different thyroid cancer histotypes and characteristics of aggressiveness. Our results so far demonstrate that miR-146b play an important role in thyroid cancer progression which makes it a potential diagnostic and prognostic biomarker. The assessment of the functional role of the other deregulated miRNAs is in progress.

Key Words: miRNA; Cancer; Thyroid

Funding Agency: YM 08/15



Pathology

Category: Clinical

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Circulating fetuin-A as a biomarker in subjects with acute myocardial infarction

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Introduction:

Fetuin-A (FA), also known as alpha-2-Schmid Heremans glycoprotein (AHSG) is an anti-inflammatory negative acute-phase glycoprotein, synthesized by the liver. It has been found that FA suppresses arterial calcification, promotes insulin resistance, and appears to be a key player in the pathogenesis of cardiovascular diseases (CVD). Prospective research has recognized that low serum FA levels are a valid predictor of CVD risk and mortality. However, the data is still inconsistent. In this study, we aimed to investigate the associations of serum levels of Fetuin-A with acute myocardial infarction (AMI).

Methods:

77 consecutive patients presenting with symptoms suggestive of AMI and who were tested for elevated troponin I levels. Cardiac event was confirmed using the criteria of the National Academy of Clinical Biochemistry (NACB) guidelines. 78 age and gender matched healthy control volunteers were studied. Troponin-I was determined with the Beckman Access automated immunoassay analyser.

Results:

Serum levels of FA was significantly lower in patients with AMI compared to healthy control subjects [31.9±9.5 ng/ml vs 38.5±12.9 ng/ml]. FA showed significant correlations with troponin I (r=0.30, p=0.01). Binary logistic regression showed that FA was associated with AMI, (OR = 0.9, p= 0.001).

Conclusions:

The data indicated that decreased serum FA level is significantly associated with AMI. As studies have shown that FA is inversely associated with mortality after AMI, routine determination of FA may be a useful prognostic indicator in subjects with AMI.

Key Words: Fetuin-A; Cardiovascular diseases; Troponin I

Funding Agency: KFAS (Grant Number: 2012130205)



Pediatrics

Category: *Clinical*

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The influence of BETA-thalassemia mutations on the sickle-beta thalassemia phenotype

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Introduction:

The most common Hb genotype causing sickle cell disease (SCD) is homozygous HbSS, but compound heterozygotes of Hb S with other abnormal beta variants are encountered. The Sbet-thalassemia genotype is common among Gulf Arabs; seen in >30% of SCD patients in Kuwait. The present study documents the phenotype in SBthal patients and investigates the influence of the B-thalassemia mutation on the phenotype in SB⁺ and SB⁰-thalassemia patients.

Methods:

The patients were attending the pediatric hematology clinics of Mubarak and Amiri Hospitals. Hb genotype was confirmed by HPLC and DNA studies. Clinical records were obtained from their charts. The B-thal mutations were identified by allele-specific oligonucleotide hybridization, direct sequencing or the arrayed primer extension (APEX) method.

Results:

There were 30 SB-thal patients, aged 14.3 ± 6.8 years. Twenty one (60.0%) carried B⁰ thal mutations, while 30% had B⁺ mutations. There were 12 mutations in the whole group; B⁰ cd39 (C/T) with 8 (26.7%), followed by B⁰ IVSI-1 (G/A) in 6(20.0%), B⁺ IVSI-110 (G/A) in 5 (16.7%), 2(6.7%) each of B⁺ IVSI-5 (G/C) and B⁰ IVSII-1 (G/A). There was 1 (3.3%) each of B⁰ Cd8 del AA, B⁺ IVSI-6 (T/C), B⁰cds 8/9 ins G, B⁰ cds 36/37 del T, B⁺ -28 A/C, B⁰ IVSI del 25. SBthal patients had a severe phenotype compared to SS patients, but no difference in the pain phenotype between SB⁺ and SB⁰ patients. However, the latter are more likely to be transfused. There was no association between the mutations and the phenotype, probably because of the small numbers of patients.

Conclusions:

There are multiple mutations associated with SBthal in Kuwait. The phenotype is uniformly severe with no significant difference between SB⁰ and SB⁺ patients. There is no significant influence of the mutations with phenotype.

Key Words: Sickle cell disease; BETA-thalassemia; Phenotype

Funding Agency: None



Pediatrics

Category: *Clinical*

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The spectrum of ALPHA-thalassemia alleles associated with HbH disease in Kuwait

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Introduction:

Alpha thalassemia is one of the most widely distributed genetic disorders worldwide. It is quite common in the Arabian Peninsula and the common alleles include deletional and non-deletional mutations. The classical Hb H disease arises from the co-inheritance of the ALPHA⁰ and AL⁺ alleles (--/AL). However, the A⁰ allele is uncommon in the Arabian Peninsula. The present study reports the alleles associated with HbH disease in Kuwait.

Methods:

The patients were referred to the pediatric hematology clinic, over a 20-year period (1994 – 2014), for suspicion of HbH disease based on: microcytic, hypochromic anemia, normal iron status, normal Hb electrophoresis with H inclusion bodies and/or HbH on HPLC. DNA was extracted with phenol and all patients were screened for A-thal alleles by PCR, allele-specific oligonucleotide hybridization and/or reverse-dot blot hybridization.

Results:

There were 117 patients, 69 males, 48 females, aged from 1 day to 75 years with a mean of 8.2 years. There were 14 different genotypes; the commonest being homozygosity for the polyadenylation AATAAA/AATAAG, non-deletional mutation (A^TA/A^TA) in 62 (53.0%). Next was the homozygous -A^{3.7kb} one-gene deletion (-A/-A) in 16 (13.7%). There were 9 (7.7%) compound heterozygotes for A^T and -A^{3.7kb} (-A/A^TA). The other rare alleles found in different combinations included the A⁰ (MED), A⁰ (SEA), Hb Constant Spring, A2 cd 19(-G), and the A2 IVS-1 (-5nt), in a total of 15 patients. The mutations could not be identified in 5 (4.3%) patients. The most severe was the patient with -MED/-A3.7kb, followed by those with A^TA/A^TA.

Conclusions:

Alpha-thalassemia is quite common in Kuwait and the HbH phenotype is frequently encountered. By far the commonest genotype is ATA/ATA, which has a mild phenotype; the severe -MED allele is uncommon.

Key Words: Alpha thalassemia; Hb H disease; Phenotype

Funding Agency: None



Pediatrics

Category: Clinical

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Attitudes toward the use of baby walkers among healthcare personnel

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Introduction:

Objectives: To identify the attitudes of healthcare personnel in Kuwait regarding their perception and personal use of baby walkers (BW), including the associated risks and injuries.

Methods:

Self-administered questionnaires were distributed in hospitals in the State of Kuwait. The participants were surveyed on their attitudes towards BWs including the perceived benefits and associated risks, as well as their use of BWs for participants with children. Subjects: 144 participants completed the questionnaire.

Results:

108 participants had children and 36 did not. Of those who had children, 87 (80.6%) have used a BW. The most common reasons for using a BW were: to promote early walking (60.9%), to give the child freedom (44.8%), and to keep the child safe (43.7%) and entertained (43.7%). Among BW users 83 reported skipping of motor behaviors including sitting unsupported (8.4%), crawling (15.7%), pulling to a stand (26.5%) and cruising (14.5%). 20 participants reported injuries sustained from the BW (23.0%), 8 of whom required medical attention. The majority of participants (52.8%) acknowledged the increased risk of falling attributed to BWs, but most participants also believed that BWs increase a child's motor activity levels (64.6%). Physiotherapists and pediatricians showed the greatest awareness of BW associated risks. 88 participants said that they would recommend BWs to others (58.7%).

Conclusions:

Healthcare personnel commonly use BWs for their own children. A large proportion of healthcare personnel think highly of BWs and believe that it benefits the child. This is a misconception, and many also failed to realize the risks associated with BW use.

Key Words: Baby walker; Parental attitude; Child development

Funding Agency: None



Pediatrics

Category: Basic Sciences

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NADPH oxidase-mediated cellular oxidative stress in idiopathic nephrotic syndrome

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Introduction:

Nephrotic syndrome affects children of all ages worldwide, including Kuwait and majority of the cases are idiopathic. Though most NS cases respond favorably to steroids, yet exact mechanism of pathogenesis is unknown and development of cellular oxidative stress has been suggested as a key pathogenic mediator. We examined the status of NOX activity and antioxidant enzymes in peripheral blood lymphocytes (PBL) of INS patients in relation to cellular oxidative stress.

Methods:

PBL from 15 INS patients during relapse and, 15 age- and gender-matched controls were isolated and cultured in this study. Enzyme activities of NADPH oxidase (NOX), catalase and superoxide dismutase (SOD) were measured in PBL of INS patients and controls, along with determination of malondialdehyde (MDA) levels. Cellular levels of NOX-1 protein were measured using western blot analysis.

Results:

INS patients had significantly ($p < 0.01$) higher enzyme activity of NOX as well as levels of NOX-1 protein in PBL during disease relapse as compared to control cells. Catalase and SOD activities were markedly lower in INS patients with catalase levels being significantly ($p < 0.01$) less than control cells. PBL levels of MDA were significantly ($p < 0.01$) more in INS patients as compared to controls.

Conclusions:

These results show that markedly higher levels of NOX in INS patients accompanied by deficient catalase activity might be a significant contributor to overall oxidative stress and pathogenesis of this renal disease.

Key Words: Nephrotic Syndrome, Catalase; NOX; Oxidative stress

Funding Agency: None



Pediatrics

Category: *Clinical*

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The era of change: Dyslipidemia in adolescents with type 1 diabetes

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Introduction:

Type 1 diabetes mellitus (T1D) and dyslipidemia (DLP) increases the risk of cardiovascular disease (CVD). The objective of this study was to evaluate the progress and perspective of dyslipidemia in young T1D patients.

Methods:

The study was cross-sectional and descriptive design. Medical records of T1D patients were followed at an endocrinology service from 2008-2014. The collected data included gender, age, duration of T1D, body mass index (BMI), glycated hemoglobin (HbA1c), total cholesterol (TC), HDL, LDL and triglycerides (TG).

Results:

126 T1D patients were recruited: 69 male (54.8%) and 57 female (45.2%) with a mean of age 16.4 (± 0.18) and 16.5 (± 0.18), respectively. Diabetes duration and baseline HbA1c were 14.82 (± 2.11) and 8.68 (± 1.21), respectively. The HbA1c increased significantly while following five years by 2.9%. The prevalence of overweight and obese teens was increasing from the 1st year to the following five years later. In contrast, the underweight and healthy subjects were decreasing for the same subsequent years. Means of HbA1c were significantly higher among overweight and obese categories throughout following years. All lipid profile revealed significant increase during five years follow-up study. The prevalence of risk TC/HDL ratio (< 4.1) gradually raised in the last year follow-up by 52.1% comparing to the baseline risk ratio (0.8%). The study of TC/HDL ratio with BMI categories revealed that average T1D patients had an ideal ratio ($n=97$) in the 1st year measurement. After five years follow-up study, the frequency of ideal ratio declined among all categories in the same rate. Risk TC/HDL ratio in the last year of the study showed that average group had more risk ratio measurements ($n=47$) in contrast to the 1st year measurement ($n=1$).

Conclusions:

Attention must be given to control DLP and other comorbidities among T1D adolescents to decrease diabetes macrovascular and microvascular complications.

Key Words: T1D; Dyslipidemia; HbA1c

Funding Agency: None



Pediatrics

Category: Clinical

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An overview of pediatric hemophilia A and B in Kuwait

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Introduction:

Hemophilia A and B are rare inherited bleeding disorders. Haemophilia leads to morbidity and mortality if left untreated. Haemophilia has not been well studied in Kuwait. This study documents the course of the paediatric haemophilia in this region.

Methods:

This study is an overview of all the pediatric hemophilia cases in 3 governmental hospitals in Kuwait, Amiri, Mubarak and Adan. The Data collected is the initial presentation, clinical findings, laboratory data, clinical course, managements, and complications.

Results:

34 hemophilia patients were registered, 23 patients with hemophilia A, 11 patients with hemophilia B. Most of the hemophilia patients (58.8%) presented at an age less than 1 year old (n=20). 29.4% (n=10) presented between the age of 1-5 years old. 4 patients (11.7%) presented after the age of 5 years old. Hemophilia A: 15 patients were severe, 2 were moderate and 6 were mild. Hemophilia B: 7 patients were severe, 3 patients were moderate and one patient was mild. The clinical presentation varies as in hemophilia A 10 patients presented with mucus membrane bleeds, 8 patients presented with cut wound, 2 patients presented with CNS bleeds, 2 patients presented with hemarthrosis and one patient presented with skin bruises. However, for hemophilia B most of the patients presented with mucus membrane bleeds or bruises. Most of the severe patients (n=18) were managed with prophylaxis treatment; no evidence of target joint or severe bleeding, none of the patients had viral infections from the plasma-derived products. Less hospital admissions while being on prophylaxis. However, one of the CNS bleeds patients had hemiplegia that improved with physiotherapy. None of the CNS bleeders had learning difficulties.

Conclusions:

Kuwait pediatric hemophilia patients are serious bleeders usually early management has a good outcome, starting prophylaxis at an early age revealed less mortality and morbidity.

Key Words: Pediatrics; Hemophilia; Kuwait

Funding Agency: None



Pediatrics

Category: *Clinical*

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Does vitamin D deficiency increase the risk of fractures in children?

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Introduction:

Vitamin D deficiency is the most prevalent nutritional deficiency globally. It has been linked with a wide spectrum of conditions and diseases (e.g. rickets in children). Its classic role involves calcium (Ca) regulation and it is known to affect bone quality and health. This study aimed to assess vitamin D levels in children with fractures compared to healthy children.

Methods:

A prospective case control study of children; (boys <14 and girls <12), in Al-Razi Orthopaedic Hospital in Kuwait. Data collected was serum 25 hydroxyvitamin D (25[OH]D) levels and a bone profile (calcium, magnesium, albumin, alkaline phosphatase). The levels used were; insufficiency <75 nmol/L, deficiency <50 nmol/L and severe deficiency <25 nmol/L. A chi-square test was performed to examine the relation between vitamin D levels and fractures. A multivariate and a bivariate logistic regression model was made to compare fractures with age, gender, sport activity, supplementation and daily milk intake.

Results:

It was a convenience sample that included 188 subjects (104 fractures and 84 controls). The chi-square analysis for the relation between these fractures and vitamin D levels was not significant, $\chi^2(2, N = 189) = 14.14, p = .33$. Our null hypothesis (vitamin D does not increase fracture risk) was not rejected. In the logistic regression model we found that children who do not meet RDA for milk will be having a 6.68 times greater chance of getting a fracture compared with those who meet RDA.

Conclusions:

No statistical significant relation was established between vitamin D levels and fractures.

Key Words: Children; Fractures; Vitamin D

Funding Agency: None



Pediatrics

Category: Clinical

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Neonatal sepsis in Arab states in the Gulf region: Two-year prospective study

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Introduction:

Investigate the incidence and the pattern of causative organisms of culture proven Early-Onset Sepsis (EOS) and Late-Onset Sepsis (LOS) in Arab states in the Gulf region.

Methods:

Five neonatal care units participated in this two-year prospective study in Kuwait, United Arab Emirates and Saudi Arabia. Data were collected prospectively using standardized data collection form. EOS was defined as the growth of a single potentially pathogenic organism from blood or cerebrospinal fluid in infants within 72 hours of birth with clinical and laboratory findings consistent with infection. Similarly, LOS was defined among the infants beyond 72 hours.

Results:

During the study period 67474 live births occurred among whom 102 EOS and 785 LOS occurred. The overall incidence of EOS was 1.5 (95% CI: 1.2-1.8) per 1000 live births and ranged from 2.64 per 1000 live births in Kuwait to 0.40 per 1000 live births in King Abdulaziz Hospital in Saudi Arabia. The incidence of LOS was 11.6 (95% CI: 10.8-12.5) per 1000 live births and ranged from 13.5 per 1000 live births in Kuwait to 5.2 per 1000 live births in Tawam hospital in UAE. The most common causative organism for EOS was Group B *Streptococcus* GBS (60.0%) followed by *E. coli* (13%); while coagulase-negative staphylococci (34.6%) followed by *Klebsiella* spp. (22.8%) were the main causative organisms for LOS. Case-fatality was 13.0% and 20.6% among EOS and LOS, respectively.

Conclusions:

The incidence and the pattern of causative organism of EOS in Arab states in the Gulf region resembles that in developed countries. More than half of EOS were due to GBS which highlight the importance of intrapartum antibiotic prophylaxis. On the other hand, the incidence of LOS is higher than that reported from developed countries and resembles that in low-income countries. The later requires institutional policies and more efforts to reduce healthcare associated infection.

Key Words: Neonatal sepsis; Early Onset Sepsis; Late Onset Sepsis

Funding Agency: None



Pediatrics

Category: *Clinical*

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Inattention and hyperactivity symptoms in children with atopic disorders

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Introduction:

Atopic diseases may cause significant problems in everyday life. The rates of stress-related disorders, hyperactivity and attention deficit besides physical and emotional disturbances, school absenteeism and play disabilities. Aim: to assess the symptoms of inattention and hyperactivity in atopic disorder children to detect the relation between these symptoms and the atopic disorders.

Methods:

80 children of the same age (5 to 10 years) and sex were divided into four groups, each included 20 children: control group, bronchial asthma, allergic rhinitis and atopic dermatitis. All children were subjected to full history taking, general examination, and had a questionnaire for the symptoms of inattention and hyperactivity. The data were analyzed using regression analysis.

Results:

The type of the atopic disease and the sleeping disturbance variable were significantly associated with inattention, bronchial asthma $p=0.001$, atopic dermatitis $p<0.000$, while allergic rhinitis was insignificant $p<0.336$. Sleeping disturbance was significantly associated with inattention in bronchial asthma and atopic dermatitis groups. The I.Q, the sleeping disturbance and the itching are the variables significantly associated with hyperactivity.

Conclusions:

There was significant association between inattention symptoms and bronchial asthma ($p<0.00$) and atopic dermatitis ($p<0.001$). But there was no significance with allergic rhinitis. In asthmatic cases there was no significant correlation between bronchial asthma onset, duration, severity, control and/or controller therapy and inattention symptoms. The sleeping disturbance was significantly associated with inattention in bronchial asthma and atopic dermatitis groups. There is statistical significance between hyperactivity symptoms and atopic dermatitis ($p<0.01$).

Key Words: Atopic diseases, Bronchial asthma, Atopic dermatitis; Inattention; Hyperactivity

Funding Agency: None



Pediatrics

Category: *Clinical*

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Association of vitamin D receptor (VDR) gene polymorphisms with type-1 diabetes mellitus in Kuwaiti Arab children

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Introduction:

Type-1 diabetes mellitus (T1DM) is a multifactorial disease in which a complex interplay of genetic and environmental factors modulate the immune system and result in destruction of insulin producing beta cells in pancreas. Recent evidence indicate that production and degradation of vitamin D is a major signaling component in both innate and adaptive immunity. We have determined the prevalence of four VDR gene polymorphisms and measured serum vitamin D levels in Kuwaiti children with T1DM and controls to evaluate their relationship with the disease onset.

Methods:

This study included 210 Kuwaiti children with T1DM and 136 ethnically matched controls. The ISPAD criteria was used for diagnosis of T1DM. The control subjects were healthy and were evaluated by a diabetes specialist. The genotypes of four VDR gene polymorphisms (BsmI, FokI, ApaI and TaqI) were identified by PCR-RFLP. Serum vitamin D levels were determined by enzyme immunoassay method. The study was approved by KIMS-HSC Ethics Committee.

Results:

The genotype frequency of all four VDR gene polymorphisms was found to be significantly different between T1DM patients and controls. The genotype frequencies of all four polymorphisms were correlated with serum vitamin D levels in T1DM patients and controls. Serum vitamin D levels were significantly lower in T1DM patients compared to controls in the case of all genotypes except for bb genotype (minor allele) of the VDR gene BsmI polymorphism.

Conclusions:

Our data demonstrate that four VDR gene polymorphisms (BsmI, FokI, ApaI and TaqI) show strong association with T1DM onset and with lower serum vitamin D levels in T1DM patients. Therefore VDR gene polymorphisms can be considered as important determinants of genetic predisposition of T1DM in Kuwaiti children.

Key Words: Genotype; Vitamin D receptor gene; Type 1 diabetes

Funding Agency: Kuwait University, Research Sector, Project No. MK01/11



Pharmacology and Toxicology

Category: Graduate MSc (Basic Science)

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Investigating amino acid residues that contribute to the constitutive activity of the GIP receptor

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Introduction:

The incretin hormones, glucose-dependent insulinotropic polypeptide (GIP) and glucagon-like peptide-1 (GLP-1), potentiate insulin secretion in a glucose dependent manner. While GLP-1 receptor (GLP-1R) agonists are used clinically to treat type 2 diabetes mellitus (T2DM), there is an almost complete lack of response to GIP in this condition. We have previously demonstrated that the GIP receptor (GIPR) displays higher basal activity than GLP-1R. The aim of this study was to characterize a GIPR single nucleotide polymorphism (E354Q) that results in reduced fasting and post OGTT serum C-peptide concentration and a receptor with lower basal activity, and to investigate other amino acid changes that may contribute to constitutive activity in GIPR.

Methods:

Three modified GIPRs were generated using site directed mutagenesis; the naturally occurring polymorphism E354Q, a proline to phenylalanine mutation at position 359 in the trans membrane helix 6 (as proline residues are known to form kinks in alpha-helices), and a chimeric form where extracellular loop 3 (ECL3) was replaced with that of GLP-1R. These mutated receptors were transiently expressed in HEK-293 cells and basal and ligand-dependent activity was assessed using a cAMP-responsive luciferase assay.

Results:

GIPR E354Q displayed significantly ($P < 0.05$) lower basal activity than wild-type (WT) GIPR (12% of maximum GIP response compared to 20%). Although the P359F and ECL3 mutations increased basal activity compared to WT, the difference did not reach significance. Interestingly, GIP was approximately 10-fold more potent at GIPR E354Q than at the WT receptor.

Conclusions:

The decreased basal activity and increased responsiveness to GIP observed in GIPR E354Q may contribute to the increased risk of developing T2DM seen in individuals who carry this polymorphism.

Key Words: Type 2 Diabetes Mellitus; G Protein-Coupled Receptor; Single Nucleotide Polymorphism

Funding Agency: The College of Graduate Studies, Kuwait University, and the Research Sector, Kuwait University, grant No. YP02/15



Pharmacology and Toxicology

Category: Graduate MSc (Basic Science)

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Anticontractile effect of cooling in the rat aorta: Influence of gender and Perivascular Adipose Tissue (PVAT)

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Introduction:

In addition to providing mechanical support for blood vessels, the PVAT secretes a number of vasoactive substances and exerts an anti-contractile effect. The main objective of this study was to find out whether the anti-contractile effect of cooling is affected by PVAT and gender.

Methods:

Aorta segments, with or without PVAT from male and female SD rats were used in this investigation. Cumulative concentration-response curves were established for phenylephrine at 37°C or 24°C.

Results:

Phenylephrine (10-9M – 10-5M) induced concentration-dependent contractions of aorta segments in all groups. The maximum response was reduced in aorta segments from female rats without PVAT but with no significant difference in pD₂ values (7.5±0.2 and 7.3±0.1 in male and female rats). PVAT reduced phenylephrine-induced contractions in aorta segments from male and female rats. The reduction, based on pD₂ values was significantly greater in aorta segments from female rats (concentration ratios of approximately 4.3 in female v 1.2 in male rats). Cooling the tissues to 24 °C resulted in a significant reduction in the maximum response in aorta segments without PVAT with no change in pD₂ values. However, the anti-contractile effect of cooling was attenuated in the presence of PVAT. There was no significant reduction in the maximum response. However, there was a rightward shift of PE concentration-response curve in both groups. The concentration ratios were approximately 3.0 (male) and 1.5 (female) aorta suggesting greater attenuation of the anti-contractile effect of cooling in female aorta segments.

Conclusions:

Cooling exerted an anti-contractile effect against phenylephrine in aorta segments from male and female rats and this effect was attenuated by PVAT

Key Words: Perivascular adipose tissue; anticontractile effect; cooling

Funding Agency: College of Graduate Studies; YM05/15



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Angiotensin-(1-7) corrects diabetes-induced activation of phosphodiesterase in rat corpus cavernosum

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Introduction:

Angiotensin-(1-7) may have beneficial effects in erectile dysfunction (ED) associated with diabetes mellitus but its molecular actions in the corpus cavernosum of diabetic subjects are not known. The objective of this study was to investigate the effects of diabetes and/or chronic in vivo administration of Ang-(1-7) on phosphodiesterase (PDE) levels in the rat corpus cavernosum.

Methods:

Male Wistar rats were divided into: Group 1: Control (non-diabetic), Group 2: Diabetic (Streptozotocin, STZ, 55 mg/kg, body weight) 3: Control +576 µg/kg/day of Ang-(1-7) for 3 weeks and Group 4: STZ+ Ang-(1-7). At the end of treatment, rats were sacrificed and penile cavernosal tissue was removed to be cut into longitudinal strips of 2x15 mm. Vasoreactivity of the isolated cavernosal strips was measured in response to Ang-(1-7) after pre-incubation of the tissues with phenylephrine or carbachol. A part of the isolated penile tissue was used for total RNA isolation and measurement of PDE activity and levels of nitrites and cyclic GMP.

Results:

The relaxant response to Ang-(1-7) was significantly impaired in diabetic corpus cavernosum strips as compared to control rats with maximal percentage relaxation induced by Ang-(1-7) being 91±2% and 51±4% in the control and diabetic tissues, respectively. Ang-(1-7) (10⁻⁶ M) resulted in significant ($p < 0.01$) enhancement in carbachol-induced relaxant responses. PDE activity was significantly more in penile tissue of diabetic rats (295.9 ± 29.9 mU) than controls (74.9 ± 20.0 mU). Chronic treatment with Ang-(1-7) significantly attenuated PDE activity (160.2 ± 10.3 mU) in diabetic rats and had no effect on controls.

Conclusions:

Ang-(1-7) –mediated attenuation of the markedly increased penile PDE activity in STZ-treated rats, provides a new mechanism of the vasoactive action of Ang-(1-7) and possibly a new therapeutic tool to correct erectile dysfunction.

Key Words: Diabetes; Erectile Dysfunction; Relaxation

Funding Agency: Kuwait University, Research Administration, Project No. MR04/09.



Pharmacy

Category: Graduate MSc: Basic Science

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**Health related quality of life in type 2 diabetic patients at the Dasman
Diabetes Institute**

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Introduction:

Diabetes is emerging as a major public health concern. Quality of life (QOL), a subjective measure of the person's view of own wellbeing and functioning, is considered an optimal target of all health interventions. The literature lacks reports on QOL within the diabetes population of Kuwait. Aim: To measure the QOL of adults with type 2 diabetes using a validated general health related quality of life (Hr-QOL) questionnaire. The study explored also the association of Hr-QOL with demographics and disease parameters.

Methods:

A survey was conducted with a sample of patients with type 2 diabetes recruited from the Dasman Diabetes Institution. A validated Arabic version of the 36-Item Health Survey 1.0 (SF-36) was used to measure Hr-QOL. Additional items collected information on demographics and clinical parameters; including length of time since diagnosis, current treatments, existing diabetic complications and other co-morbidities.

Results:

The sample consisted of 72 patients with type 2 diabetes with an average age of 55 years and a 54% females. A 43% had been diagnosed with diabetes for more than 10 years, 96% were on oral medications, 29% of all were on five or more and 55% were on insulin. Diabetes complications such as kidney or foot problems were reported by 65%, while 69% reported additional co-morbidities such as hypertension. The eight domains of SF-36 showed a moderate effect of diabetes on Hr-QOL. Physical functioning and general health were the most affected domains, while social functioning and role limitation due to emotional problems were the least affected. In general, Hr-QOL was negatively affected by age, the female gender, duration of diabetes, number of oral medications, and the presence of co-morbidities and complications.

Conclusions:

The study showed a moderate effect of type 2 diabetes on Hr-QOL. Specific correlates with the eight domains of the SF-36 questionnaire are noteworthy and deserve further investigation.

Key Words: Type 2 Diabetes; Health related quality of life

Funding Agency: None



Pharmacy

Category: Basic Sciences

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Bioavailability assessment of metformin hydrochloride rectal dosage forms in human volunteers

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Introduction:

Metformin hydrochloride (MtHcl) is widely used as a first-line treatment for type 2 diabetes. However, it has poor bioavailability, GIT intolerance and high liver metabolism. Children and elderly patients may face difficulty to swallow the oral tablets. The rectal administration may solve some of these problems.

Methods:

Suppository fatty bases (Witepsol®, Suppocire® and Massa®; different grades) and PEG bases 1000, 4000 and 6000 (different ratios), were used to prepare rectal suppositories each containing 500 mg MtHcl. The formulations were characterized for mechanical strength, melting time, penetration time, content uniformity, and in-vitro drug release. Based on the results, three formulations containing Witepsol H12 (F1), Suppocire AP (F2) and Massa Estranium B (F3) were chosen for bioavailability testing in human volunteers using the commercial oral tablets as a reference (Ref).

Results:

The preparation method applied produced suppositories with satisfactory characteristics. The fatty bases were superior compared with PEG bases. The average melting time for F1-F3 was 8 min, the drug content uniformity ranged between 95-105%, the mechanical strength ranged between 7-8 kg/cm, the penetration time ranged between 6-8 min and the in-vitro drug release was more than 90% in the first hour of dissolution time. The in-vivo results for F1, F2, F3 and Ref. were: T_{max} 0.25, 0.5, 0.25, 3 hr; C_{max} 7254.11, 8319.19, 8423.36, 1125.01 ug/ml, respectively. The % relative bioavailability for F1, F2, F3 against the Ref. were 76.65, 100.95 and 99.01 respectively.

Conclusions:

The results indicated that MtHcl rectal suppositories were successfully prepared and characterized and the fatty bases showed better characteristics compared with the PEG bases. F2 and F3 showed comparable bioavailability with the commercial tablets. MtHcl formulated in fatty bases could be a potential alternative to the commercial tablets particularly for pediatric and geriatric patients.

Key Words: Diabetes; Metformin Hydrochloride; Rectal Dosage Forms and Bioavailability

Funding Agency: None



Pharmacy

Category: Graduate MSc (Basic Science)

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A systematic review of a clinical intervention in the treatment of acute myocardial infarction in the Gulf region

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Introduction:

Myocardial infarction (MI) is a coronary artery disease that results from partial or complete occlusion of the coronary by thrombus, which leads to myocardium necrosis. The Gulf populations have increased risk of cardiovascular diseases (CVD) and deaths due to high prevalence of risk factors. This is the first systematic review conducted on clinical intervention of acute MI (AMI) in the Gulf region. The aims of this study are to identify all studies in the Gulf region focusing on the clinical intervention of AMI, compare the results with international studies, develop recommendations for future practice and identify gaps in knowledge.

Methods:

A systematic literature review was undertaken between January and May 2015 involving searches of the Web of Science, PubMed, Scopus and Google Scholar databases for studies published in any language.

Results:

926 hits were returned and 177 duplicated articles were removed. After reviewing the title and abstract, fifteen studies met the inclusion and exclusion criteria. Seven studies were local or multicenter prospective observational registries, two studies were retrospective cohort studies and six studies were based on data derived from the main two Gulf registries. Studies showed high adherence to evidence based medicine in the management of AMI. Fibrinolysis is the main reperfusion therapy for patients with ST-segment elevation MI, while door-to-needle delay time is longer than recommended by 8 to 15 min. The use of fibrinolytic agents ranged from high fibrin-specificity to non-fibrin specificity agents.

Conclusions:

This systematic literature review suggests guidelines for improving future practice based on the UK NICE. The recommendation listed in this study focused on emergency medical services utilization, pre-hospital ECG, pre-hospital fibrinolysis and inter-hospital transfer. Further studies are required to address the gaps in knowledge.

Key Words: Pharmacy; Myocardial infarction; Gulf region

Funding Agency: None



Pharmacy

Category: Clinical

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National survey of aminoglycosides dosing and monitoring in Kuwait general hospital

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Introduction:

Dosing and administration of aminoglycosides changed from the tradition multiple dosing to extend interval dosing. The extended interval dosing has been found to reduce risk of nephrotoxicity and with equivalent efficacy compared with multiple dosing. The aim of the current study is to determine the practice trends, dosing strategies, therapeutic drug monitoring practices, and adverse drug reaction monitoring of aminoglycoside in Kuwait general hospitals.

Methods:

A 19 self-administered questionnaire was distributed to a sample of 230 physicians in Kuwait general hospitals between March to April 2015.

Results:

Out of 84% response rate, about 20% only reported using aminoglycosides once daily dosing. Local hospital guidelines (31%) and BNF (28%) were the most followed guidelines. Amikacin was used by 76%, gentamicin 66%, streptomycin 14%, and tobramycin 2%. The responders demonstrated that they were using peak and trough concentration to monitor aminoglycosides serum levels. However, majority failed to document in the target levels. Aminoglycosides were administered via short infusion over 15 or 30 minutes in 56%. Most of participants (49%) do not use any nomogram to adjust aminoglycosides doses. Nephrotoxicity was commonly monitored through serum creatinine measurements, while ototoxicity was monitored by asking the patient.

Conclusions:

The evaluation of the current practice in Kuwait indicated that aminoglycosides multiple dosing is the mostly used regimen, and aminoglycosides serum concentrations are being monitored as a routine practice. The once daily dosing is used in some conditions such as in chronic kidney disease, pediatrics, elderly, and febrile neutropenia. Education program is indicated to familiarize physicians with the current updates in aminoglycoside dosage regimen.

Key Words: Once daily; Extended interval; Nephrotoxicity

Funding Agency: None



Pharmacy

Category: Clinical

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Attitude of healthcare providers with regard to clinical pharmacy service in Amiri Hospital

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Introduction:

Pharmacists in Kuwait are seeking more proactive interaction with healthcare professionals through direct intervention in patient centered care. In November 2014, Clinical pharmacy services were first introduced in Amiri; a secondary care governmental hospital in Kuwait. Three clinical pharmacists provided the service at three specialties; surgical, pediatric and intensive care units. Objective: To evaluate the attitudes and beliefs of healthcare professionals regarding clinical pharmacy services in Amiri Hospital.

Methods:

A cross sectional questionnaire was used. A total of 197 participants (77 physicians and 120 nurses) were randomly selected in three wards: surgical, pediatric and intensive care units. Participants were asked to complete a validated self-administered questionnaire during the period November to December 2015.

Results:

The majority of physicians and nurses believed that clinical pharmacists are an important integral part of the clinical ward team. Most of the respondents believed that clinical pharmacist play an important role in minimizing medication related errors and eventually improving patient treatment outcomes. More than 90% believed clinical pharmacists can improve the quality of patient care in a hospital setting. Clinical pharmacist participation in clinical rounds was desirable among respondents. In general, results showed a more favorable attitude towards clinical pharmacy services from physicians rather than nurses.

Conclusions:

There is a transition in the profession of pharmacy in Kuwait. Pharmacy services are evolving and there is a lot of ambiguity and uncertainty towards its status as a health care profession. This study showed that the attitude and perception of healthcare professionals towards the expanding role of the pharmacist in Kuwait is positive and this favorable response indicates a more patient-centered, clinical role for pharmacist in Kuwait in the future.

Key Words: Clinical pharmacy; Pharmacy practice; Attitude

Funding Agency: None



Pharmacy

Category: *Clinical*

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Impact of age on presentation, management, and outcomes of acute coronary syndromes in Kuwait

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Introduction:

Evidence-based cardiac therapies are underutilized in older adult patients. We assessed differences in presentation, management, and outcomes by age.

Methods:

We retrospectively collected data from 128 patients' files, who were admitted to CCU Mubarak from Jan 2013 to Jan 2014. The patients were divided into two groups according to their ages: middle aged adults (40-64) and older adults (>65).

Results:

The mean age was 60. The majority were males (77%) and non-Kuwaitis (68%). Almost 66% of the patient were diagnosed with non-ST elevation myocardial infarction (NSTEMI). Older adults had hypertension more than the middle-aged adults ($p=0.001$), while middle aged adults were smoking more than older adults ($p=0.001$). The mean length of hospital stay for all patients were 4 days. Clinical presentations of patients with acute coronary syndromes (ACS) did not vary with age, however; older adults had additional specific symptoms such as nausea, vomiting, dizziness, and diarrhea. Despite being a higher-risk group, older adults were undertreated with evidence-based therapies such as ACE-inhibitors and aspirin at the time of admission, $X^2(1, N = 128) = 9.6, p=0.02$, $X^2(1, N = 128) = 6.2, p=0.012$ respectively. Moreover, there was low rate of beta-blocker use, ACE-inhibitors, and aspirin among older adults compared to middle-aged adults at discharge $X^2(1, N = 128) = 4.1, p=0.043$, $X^2(1, N = 128) = 9.6, p=0.002$, $X^2(1, N = 128) = 4.1, p=0.042$ respectively. Regarding patient outcomes, there was no difference in both age groups.

Conclusions:

The results of this study is consistent with the literature of ACS and it confirms that older adults with ACS are often undertreated with evidence based therapies compared to middle-aged adults both at admission and at discharge

Key Words: Acute coronary syndrome; Kuwait; Elderly

Funding Agency: None



Pharmacy

Category: Basic Sciences

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Preparation and in-vitro evaluation of meloxicam co-ground mixtures

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Introduction:

Meloxicam (MLX) is a non-steroidal anti-inflammatory drug of the oxicam class. It is practically insoluble in water and suffers from poor dissolution and bioavailability.

Methods:

MLX was formulated into co-ground mixtures by ball/vibrational milling in presence of hydrophilic carriers.

Results:

Percent of drug dissolved from MLX-PEG co-ground mixture prepared by ball mill or vibrational mill > MLX-PEG-PVP co-ground ternary mixture > MLX - PVP co-ground binary mixture > MLX-polymer physical mixture > MLX alone. Co-ground mixtures prepared with ball mill has a relatively higher dissolution rate than those prepared with vibrational mill. An increase in the concentration of carrier resulted in an increase in the dissolution rate of MLX. Co-ground mixture of MLX-PEG in 1:4 ratio by ball mill showed the best results in terms of extent and rate of dissolution in water and phosphate buffer. DSC and PXRD studies indicated that crystalline nature of drug was reduced after co-grinding with PEG and / or PVP as compared to their corresponding physical mixtures. SEM images showed that particle size of MLX was reduced after co-grinding with hydrophilic polymers.

Conclusions:

DSC and PXRD studies indicated that crystalline nature of drug was reduced after co-grinding with PEG and / or PVP as compared to their corresponding physical mixtures. The co-ground mixture consisting of MLX: PEG (1: 4) using ball mill was found to have superior dissolution compared to all other co-ground mixtures.

Key Words: Meloxicam; Co-ground mixture; Dissolution, Meloxicam, Co-ground mixture

Funding Agency: None



Pharmacy

Category: Graduate (Resident)

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Prevalence of polypharmacy and inappropriately prescribed medications in Beaumont Hospital by comparison with the STOPP criteria

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Introduction:

Previous studies have demonstrated that inappropriate prescribing is highly prevalent in Ireland and is associated with adverse drug reactions. This study aims to determine the prevalence of potentially inappropriate medications (PIMs) in Beaumont Hospital by applying STOPP (Screening Tools of Older Persons' potentially inappropriate Prescriptions) criteria, which have been developed to help identify inappropriate prescribing in older patients.

Methods:

Concurrent data were collected from 142 patients aged 65 years or older who were admitted to Beaumont Hospital over a 2-week period. Patients' paper medical records were reviewed and relevant information regarding medical history, co-morbidities and current medications were recorded. STOPP criteria were applied to identify PIMs.

Results:

A total of 56 STOPP criteria PIMs were identified in 42 (31%) patients. The mean age of patients was 77.9 years (\pm 6.9). The total number of medicines prescribed was 1250 (range 0-22, median 9). The most common inappropriate medicines were NSAIDs (19.6%), drug duplicates (10.7 %), warfarin (10.7 %) and benzodiazepines (8.9%). There was a positive association between number of prescribed medications and PIMs ($r_s = 0.47$, $P < 0.001$)

Conclusions:

Potentially inappropriate prescriptions are prevalent in older patients admitted to Beaumont hospital. This necessitates the development of strategies to reduce the rate of PIMs. This would require further research to determine prevalence of STOPP criteria adverse drug effects and to investigate the best interventions to reduce them.

Key Words: STOPP criteria; adverse drug effects; medical error

Funding Agency: None



Pharmacy

Category: Clinical

205

Evaluation of clinical pharmacy services in intensive care unit in a local government hospital in Kuwait

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Introduction:

A clinical pharmacist has been shown to play an integral part in patient care through optimisation of therapy, prevention of adverse drug events and reduction in unnecessary costs especially in critically ill patients. However, few if any published studies analyzed clinical pharmacy services in local government hospitals. The aim of this study is to analyze and evaluate clinical interventions performed by a clinical pharmacist in an adult intensive care unit in a government hospital in Kuwait.

Methods:

All clinical interventions were recorded including optimisation of therapy, prevention of adverse drug reactions and medication errors in an adult ICU with a capacity of 26 beds. The study period was between March 2013 and December 2014. The interventions were categorized and reviewed by an independent clinical pharmacist with expertise in critical care.

Results:

A total of 325 successful interventions were made during the study period. The interventions can be categorized as follows: 105 (32%) dose optimisation and adjustment, 44 (13.4%) prevention of adverse drug events and drug-drug interactions, 63 (19.2%) medication selection, 35 (10.7%) drug frequency modification, 25 (7.6%) provision of drug information and educational sessions for healthcare professionals, 15 (4.5%) therapeutic drug monitoring, 10 (3%) medication history and counseling, and 28 (8.5%) interventions involved unnecessary route or duration of therapy. The most common drug therapy issues involved antimicrobial agents with 125 interventions (109 related to antibiotics, 16 linked with antifungal agents).

Conclusions:

Clinical pharmacy services have a positive impact on rationalizing drug therapy, preventing adverse drug events and detecting medication errors. Clinical pharmacy can also reduce healthcare costs through rationalization of durations and routes of therapy especially in costly care of critically ill patients.

Key Words: Intraoperative gamma probe, SLN, NEMA.

Funding Agency: None



Pharmacy

Category: Basic Sciences

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Comparative pharmacokinetic study of three antibacterial oxazolidinone derivatives

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Introduction:

Linezolid (Lnz) is an oxazolidinone derivative which is currently marketed to treat Gram-positive infections. PH27 and PH51 are novel triazolyl oxazolidinone derivatives with a comparable in vitro antibacterial activity to Lnz, but of a significant lower in vivo activity to Lnz when given orally to mice. This study was carried out to determine whether the discrepancy between the in vitro and in vivo activities for Lnz, PH27 and PH51 is due to pharmacokinetic factors.

Methods:

Lnz, PH27 and PH51 were synthesized in our lab. Six groups of rabbits (n=4, each), 3 groups received 5 mg/kg IV, and 3 received 20 mg/kg orally of each compound. Serial plasma and urine samples were collected, and analyzed using LC-MS/MS. The PK parameters for Lnz, PH27 and PH51 following IV and oral dosing were calculated and compared.

Results:

The IV plasma concentration-time profiles showed a distribution phase, followed by an elimination phase with an average t_{1/2} of 52.4, 68.7, and 175 min for Lnz, PH27, and PH51, respectively. The average AUC values were 4.04, 5.67, and 1.95 mg-hr/L and the calculated CLT were 1.24, 0.891, and 2.564 L/hr/Kg, respectively. The percentage of dose excreted unchanged in urine were, 5.7% and 0.4% for Lnz and PH27 and much lower for PH51. Oral dosing of substances showed C_{max} for Lnz and PH27 at 60 min, while for PH51, the C_{max} could not be defined. The average AUC values were 6.25, 5.01, and 0.369 mg-hr/L which correspond to a bioavailability of 38.7%, 22.2%, and 4.73%, respectively.

Conclusions:

Compared to Lnz, PH27 and PH51 are more lipophilic, have longer half-life, lower renal clearance, and significantly lower oral bioavailability. The low rate of absorption of these derivatives most probably results from their low water solubility which will reflect on poor bioavailability.

Key Words: Oxazolidinone Antibiotic; Pharmacokinetics; Linezolid

Funding Agency: Kuwait University Research Sector (PP01/13), animals were supplied by the Animal Resources Center, HSC, Kuwait university. Science Analytical Facilities (SAF) Instrument Grants GS01/01, GS01/03 and GS01/05.



Pharmacy

Category: *Clinical*

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Pharmaceutical care education in Kuwait: Pharmacy students' perspectives

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Introduction:

Pharmaceutical care is the responsible provision of medication therapy to achieve definite outcomes that improve patients' quality of life. Pharmacy education should equip students with the knowledge, skills and attitudes they need to practice pharmaceutical care competently. This study investigated pharmacy students' attitudes towards pharmaceutical care, perceptions of their preparedness to perform pharmaceutical care competencies and opinions about the barriers to its implementation in Kuwait.

Methods:

A descriptive, cross-sectional survey of pharmacy students (n=126) was conducted at Faculty of Pharmacy, Kuwait University. Data were collected via a pre-tested self-administered questionnaire. Descriptive statistics including percentages, medians and means Likert scale rating (SD) were calculated and compared using SPSS. Statistical significance was accepted at a p value of 0.05 or lower.

Results:

The response rate was 99.2%. Pharmacy students expressed overall positive attitudes towards pharmaceutical care. They felt prepared to implement the various aspects of pharmaceutical care, with the least preparedness in the administrative/management aspects. The students agreed/strongly agreed that the major barriers to the integration of pharmaceutical care into practice were lack of private counseling areas or inappropriate pharmacy layout (95.2%), lack of pharmacist time (83.3%), organizational obstacles (82.6%), and pharmacists' physical separation from patient care areas (82.6%).

Conclusions:

Pharmacy students' attitudes and perceived preparedness can serve as needs assessment tools to guide curricular improvement. Student pharmacists at Kuwait University advocate implementation of pharmaceutical care while recognizing the barriers to its widespread adoption. The education provided at Kuwait University Faculty of Pharmacy is designed to develop students to be the change agents who can advance pharmacist-provided direct patient care.

Key Words: pharmaceutical care; education; pharmacy students

Funding Agency: None



Physiology

Category: Basic Sciences

208

New insight: the use of intravenous immunoglobulin as a treatment for ischemic heart disease

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Introduction:

The role of intravenous immunoglobulin (IVIG) in ischemia/reperfusion (I/R) is not yet known. In this study we investigated the potential effects of IVIG on the heart protection and proinflammatory cytokines levels.

Methods:

Hearts isolated from adult male rat (6 weeks of age) were perfused in Langendorff system and subjected to regional ischemia and reperfusion. Controls were subjected to only ischemia and reperfusion. The effects of IVIG pre- and post-treatment on left ventricular (LV) and coronary dynamics were assessed. Pretreatment was done by IVIG infusion either in the puffer or intravenously before scarifying the rats. IVIG was given both in low (0.6 g/kg) or high (1 g/kg) doses. Hemodynamics data were digitally computed using a software developed by Hugo-Sachs (Hugo-Sachs Elektronik, Germany) specifically for this purpose. Proinflammatory cytokines including TNF- α , IL-1 and IL-6 and cardiac enzymes levels were determined by ELISA. Data were analyzed using one-way analysis of variance (ANOVA).

Results:

Low (0.6 g/kg) and high (1 g/kg) doses of IVIG normalized LV and coronary vascular dynamics ($P < 0.05$) and significantly ($P < 0.05$) reduced cardiac enzymes levels compared to untreated controls. Similar effects were achieved when IVIG was infused 2h before animal sacrifice or before onset of ischemia. Surprisingly, combined pre- and post-treatment IVIG infusions showed no cardio-protective effects. Interestingly levels of TNF- α , IL-1 and IL-6 were significantly increased by IVIG infusion.

Conclusions:

Infusion of low and high doses of IVIG before or after the ischemic insult exerted a pronounced protection to the heart against I/R injury. In contrast, combined pre- and post-treatment protocols completely abrogated the protection afforded by each of the treatments when given alone. All IVIG treatments resulted in increased proinflammatory cytokines levels.

Key Words: Ischemic disease; Intravenous immunoglobulin; Cytokines

Funding Agency: Research Administration, Kuwait University, grant #MK01/13



Physiology

Category: Graduate MSc: Basic Science

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Dexamethasone-induced intrauterine growth restriction is associated with altered expressions of metastasis tumor antigens, p21, p53 and beta-catenin in rat placentas

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Introduction:

Molecular mechanisms responsible for disruptions of placental growth and function in intrauterine growth restriction (IUGR) are not entirely understood. Since metastasis tumor antigens 1 and 2 (MTA1&2) promote cell proliferation while MTA3 suppresses proliferation, we hypothesized that during normal placental development there would be an increase in MTA1 and MTA2 and a decrease in MTA3 expression, which might be reversed with IUGR.

Methods:

Pregnant Sprague-Dawley rats received daily i.p. injections of either dexamethasone (0.4 mg/kg; IUGR) or saline (control) starting from day 14 of gestation (14 dg) up to 21 dg. Gene and protein expression of MTA1, MTA2 and MTA3 in basal (BZ) and labyrinth (LZ) placental zones were investigated by RT-PCR, Western blotting and immunohistochemistry. The proliferating cell nuclear antigen (PCNA), caspase-3, p21, p53 and bet-catenin were investigated.

Results:

Gene expression of MTA1 decreased only in BZ (p<0.05). Its protein level decreased in the nuclear fraction of BZ and increased in the homogenate and cytosolic fractions of LZ (p<0.05). Gene expression of MTA2 decreased only in LZ (p<0.05) but its protein level did not change. Gene expression of MTA3 decreased in both BZ and LZ (p<0.05). Its protein level increased in the cytosolic fraction but decreased in nuclear fraction of BZ; the protein level also increased in the homogenate fraction of LZ (p<0.05). Protein levels of p21 increased in both BZ and LZ whereas that of p53 increased only in LZ (p<0.05). B-catenin protein decreased only in LZ (p<0.05). The increased expression of caspase-3 and the decreased expression of PCNA indicate enhanced apoptosis and inhibited cell proliferation.

Conclusions:

Near or at term, the placentas of IUGR rats showed increased apoptosis associated with alterations in expressions of MTAs. Taken together, the observed changes in MTA levels could form the basis of induction of restricted fetal and placental growth in rats.

Key Words: Metastasis tumor antigen; IUGR; Apoptosis

Funding Agency: YM07/13



Physiology

Category: Basic Sciences

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The interplay between the renin angiotensin system and pacing postconditioning induced cardiac protection

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Introduction:

Accumulating evidence suggests a cardioprotective role of pacing postconditioning (PPC). The interaction between RAS and PPC induced cardiac protection is however not clearly understood. The role of angiotensin converting enzyme (ACE), Angiotensin II (Ang II) and angiotensin receptor 1 (AT1) remains to be identified. Objective: The objective of this study was therefore to investigate the role of ACE-Ang II-AT1 axes of RAS in the protective effects of PPC.

Methods:

The role of RAS was tested by infusion of Ang II, chymostatin (inhibitor of locally produced Ang II), ACE blocker (captopril) and AT1 antagonist (irbesartan). Hemodynamics data was computed digitally and infarct size was determined using 2,3,5-Triphenyltetrazolium chloride (TTC) staining and by measuring creatine kinase (CK) and lactate dehydrogenase (LDH) levels.

Results:

In comparison to hearts subjected to I/R injury or untreated control hearts, PPC significantly ($P < 0.001$) improved cardiac hemodynamics and reduced infarct size and cardiac enzymes. Systemic infusions of Ang II did not affect I/R injury or PPC mediated protection. Nonetheless inhibition of endogenously synthesized Ang II protected against I/R induced cardiac damage and did not block or augment the protective effects of PPC. The administration of AT1 antagonist did not alleviate I/R induced damage. Interestingly it abrogated PPC induced cardiac protection. Finally, PPC induced protection and blockade of locally produced Ang II involved enhanced activation of ERK1/2 and Akt.

Conclusions:

This study demonstrates a novel interaction between PPC mediated cardiac protection and ACE-Ang II-AT1 axes of the RAS in which locally produced Ang II appears to play a significant role in PPC mediated protection while systemically produced Ang II appears to be dispensable. Moreover this interactions appears to involve alterations in the activation state of downstream kinases including ERK1/2 and Akt.

Key Words: Angiotensin II; AT1 receptor; ischemic heart

Funding Agency: Grant number MY 02/10 from Research Administration, Kuwait University



Physiology

Category: Graduate MSc (Basic Science)

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Involvement of gum arabic and daflon in the protection of heart against ischemia reperfusion injury

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Introduction:

Ischemic heart disease (CHD) is a major cause of morbidity and mortality in the world, in general, and in the Middle East, in particular. Natural products such as flavonoids (Daflon (DAF)) and Gum Arabic (GA) have rarely been investigated for treatment of ischemia reperfusion (I/R) injury. Gum Arabic has been proven to be a potent antioxidant and used as an emulsifier for suspension of many drugs. DAF is a well-known anti-inflammatory medicine. In this study, we investigated protective effects of GA and DAF against I/R injury in hearts.

Methods:

Adult male rats (6 weeks of age) were used in this study, which were segregated into control, I/R injury, 50 g/L GA, 1 g/L DAF. The GA and DAF were given in drinking water for 2 or 4 weeks. Other subgroups of rats were given 400 mg/kg GA or 200 mg/kg DAF (infusion), 2 h before sacrifice or 2 g/L GA or 1 g/L DAF, infused at reperfusion. Hearts isolated from these rats were perfused in Langendorff machine (n=6) and subjected to 30 min coronary occlusion and 30 min reperfusion. Control hearts were only subjected to I/R. Hemodynamics data were digitally computed using a software developed by Hugo-Sachs (Hugo-Sachs Elektronik, Germany) specifically for this purpose. Data were analyzed using One-way analysis of variance (ANOVA).

Results:

In comparison to hearts subjected to I/R injury or untreated control hearts, chronic infusion of GA or DAF for 2 or 4 weeks normalized ($P<0.01$) cardiac hemodynamics and reduced infarct size. Interestingly, acute infusion of GA or DAF 2 h before ischemia or immediately at the beginning of reperfusion normalized cardiac hemodynamics and reduced infarct size ($P<0.01$).

Conclusions:

These data demonstrate a significant protection to the heart by GA and DAF when infused chronically before ischemia, acutely few hours before ischemia or immediately at reperfusion.

Key Words: Ischemia; Gum Arabic; Daflon

Funding Agency: This study is supported by College of Graduate Studies, Kuwait University



Physiology

Category: Basic Sciences

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Absence of hypertensive effect of chronic ouabain application is associated with down-regulation of Na/K-ATPase alpha-2 isoform

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Introduction:

Endogenous ouabain may have a crucial role in the development of essential hypertension. We previously showed that chronic application of exogenous ouabain did not elevate arterial pressure. In this study, we hypothesized that absence of ouabain hypertensive effect could be explained by changes in gene expression coding proteins involved in calcium fluxes in the vascular smooth muscle cells, and/or sodium transport in the kidneys.

Methods:

Telemetric transmitters were implanted in control (n=9) and ouabain treated (n=10) 3-month-old Wistar male rats to monitor arterial blood pressure non-invasively. Ouabain treated rats were subcutaneously implanted with pellets that released 63 mcg/kg/day ouabain during the first 40 days and 324 mcg/kg/day during the next 40 days. Probe-based qPCR (Taqman) was used to quantify changes in mRNA expression (Na/K-ATPase alpha-1,2 & 3 isoforms, Na/Ca-1 exchanger, Na/H-1 antiporter, Na/K/Cl 1 & 2 transporters). Null hypothesis was tested with the pair-wise fixed reallocation randomization and standard deviation was estimated with the bootstrapping technique.

Results:

The reported increase in Na/K-ATPase alpha-2 isoform which was causally related to ouabain-induced hypertension was absent in our ouabain treated rats. Instead, Na/K-ATPase alpha-2 mRNA was reduced in mesenteric arteries by 47% (p = 0.047) and in aortas by 66% (p = 0.008). Na/Ca-exchanger gene expression was not modified in mesenteric arteries, but was increased by 2.7 fold in the conductance vessels (p < 0.001). In the kidneys, Na/H-1 antiporter gene expression was not changed. Ouabain reduced the expression of both Na/K/Cl transporter genes in the renal cortex but not in the renal medulla.

Conclusions:

Ouabain-induced changes in the gene expression of Na/K-ATPase isoforms and Na/Ca-exchanger in the vasculature, as well as Na/H antiporter and Na/K/Cl transporters in the kidney are consistent with the absent hypertensive effect of ouabain application.

Key Words: Ouabain; Na/K-ATPase; Hypertension

Funding Agency: Kuwait University graduate student research grant YM 02/09



Physiology

Category: Basic Sciences

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Mode of exocytosis in individual synapses is altered by fluoxetine and staurosporine

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Introduction:

Neural transmission and information processing requires not only quantitative modulation of transmitter release but also temporal coordination of the information flow. Here we describe that the onset of synaptic release of FM1-43 in individual synapses can be delayed by several hundreds of msec.

Methods:

Hippocampal neurons from newborn rats were cultured in vitro until they obtained functionally mature synapses. Synaptic vesicles were fluorescently labeled with FM1-43 and destained in two consecutive stimulation cycles, where the first served as internal control. Neurons were either treated with drugs or control solution during the second cycle and kinetic parameters from both cycles were compared.

Results:

Mean exocytosis of FM followed roughly a single exponential decay curve during the stimulation period. Detailed analysis, revealed that the synaptic population was composed of 4 kinetically distinguished subtypes. FM-exocytosis kinetics were significantly altered by short term application of fluoxetine during the second stimulation cycle, which decreased the number of delayed synapses by more than 50 % and increased the speed of synaptic exocytosis significantly by rising the percentage of fast two-component synapses. Staurosporine application produced an opposite effect. Exocytosis of synapses, expressing synaptophysin, was never delayed after start of stimulation.

Conclusions:

Our results suggest that the mode of exocytosis is switched between full vesicle fusion and “kiss-and-run” within the same synapse and the delay of FM release could be explained by “kiss-and-run” type of exocytosis. Both, H⁺ ions and neurotransmitter molecules, however, can leave the vesicle lumen through a pore.

Key Words: Exocytosis; Antidepressants; Synaptic transmission

Funding Agency: Research Administration Kuwait University Grant MY1/11



Physiology

Category: Undergraduate

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Are bax and JNKs involved in inhibition of placental growth in dexamethasone-induced intrauterine growth restriction in rats?

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Introduction:

Molecular mechanisms involved in the onset and progression of intrauterine growth restriction (IUGR) are not clear, although enhanced apoptosis seems to play a primary role. It is also not clear whether or not both basal (BZ) and labyrinth (LZ) zones of the placenta experience the apoptosis. The present study, investigated two key proteins, Bax (B-cell lymphoma associated X protein) and JNK (c-Jun N-terminal kinase), in the two zones of Dexamethasone (Dex)-induced IUGR placenta.

Methods:

Pregnant Sprague-Dawley rats received daily intra-peritoneal injections of either Dex (0.4 mg/kg; IUGR group) or saline (control group) starting from 14 days of gestation (dg) to 21 dg. Gene and protein expressions of Bax and JNK in the BZ and LZ were investigated by RT-PCR, Western blotting and immunohistochemistry.

Results:

In the BZ, Bax mRNA decreased, but in the LZ, it increased in the IUGR group on 21 dg ($p < 0.05$). However, there were no significant changes in Bax protein levels. On the other hand, in conjunction with the effects on Bax mRNA levels, JNK mRNA levels decreased in the BZ in the IUGR group on 21 dg ($p < 0.05$), but without any effects on protein level. In the LZ, JNK mRNA increased in the IUGR group ($p < 0.05$) without any effects on its protein levels on 21dg.

Conclusions:

Placentas in DEX-induced IUGR rats show reduced cell death in the BZ and enhanced cell death in the LZ. These results indicate that both intrinsic and JNK-mediated cell death may partly contribute to the inhibited growth of placentas near-term in rats.

Key Words: IUGR; BAX; JNK

Funding Agency: KU



Plant Biotechnology

Category: Basic Sciences

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Induction of somatic embryogenesis from leaf tissues of alfalfa

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Introduction:

Plant tissue culture is an excellent tool for producing genetically identical clonal plants. Recent technological developments in the field of plant genetic engineering have enabled scientists to introduce various beneficial traits to improve commercially important plant species. However, genetic engineering of a plant species requires a robust tissue culture based regeneration system. Alfalfa is grown in Kuwait and many parts of the world as an important source of animal feed. Objective of this work was to establish a plant regeneration method through induction of somatic embryogenesis from callus tissues of alfalfa initiated from the leaf tissues.

Methods:

Alfalfa genotype Regen SY was obtained from the United States Department of Agriculture and seeds were germinated in a growth chamber. The trifoliates were surface sterilized and cultured on medium supplemented with nutrients, growth regulators and vitamins. Rapid growth of undifferentiated cell mass was obtained from the trifoliates of alfalfa cultured on Murashige and Skoog (MS) basal medium supplemented with vitamins, sucrose, 2,4-dichlorophenoxyacetic acid (2,4-D), 6-benzylaminopurine (6-BAP) and agar. Following callus induction step, the cultures were transferred to a medium comprising MS basal salts and vitamins, sucrose, kinetin, 6-BAP and agar for somatic embryogenesis.

Results:

The total time required for the induction of somatic embryos varied between 2-3 months. The embryos were cultured on a medium for the elongation of the shoots and rooting of the plantlets. The rooted plantlets were successfully transferred to pots and acclimatized in a growth chamber with high level of humidity prior to transfer of the plants to the field. The entire process of regeneration requires approximately 6-8 months.

Conclusions:

The developed embryogenesis method is highly useful for the mass propagation of alfalfa through tissue culture and routinely used for genetic engineering.

Key Words: Plant biotechnology; Clonal propagation; Genetic engineering

Funding Agency: KFAS; Grant No. 2013-4401-01



Plant Biotechnology

Category: Basic Sciences

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Determination of heavy metal uptake efficiency of plant species for remediation of contaminated soil

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Introduction:

Plants can be used to clean up contaminated environment in a cost-effective manner. Kuwait has witnessed a major environmental disaster during the Gulf war due to the release of a large amount of crude oil into the environment. The objective of this study was to screen selected plant species for determining their heavy metal uptake efficiency and ability to tolerate oil contaminated soil.

Methods:

Germination assay was conducted to determine the tolerance of selected plants to oil contaminated soil. In a long term experiment, alfalfa, Indian mustard, Atriplex and barley seedlings were cultured on control clean soil and oil contaminated soil for 50 days. At the end of the experiment, shoot and root biomass was measured. Heavy metals in the soil and plant tissues were measured by ICP-AES, and petroleum hydrocarbons were measured by GC-MS and FT-IR.

Results:

In a germination test, barley seeds showed efficient germination and vigorous growth compared to alfalfa and Indian mustard. Indian mustard was the most sensitive in terms of percentage inhibition in germination and root growth. Barley tolerated the toxicity of oil-contaminated soil more effectively compared to the rest two species. In terms of remediation efficiency, Indian mustard and alfalfa plants performed better in comparison to barley. The reduction in the level of heavy metals, nickel, lead, and vanadium in soil was significantly higher in soil where Indian mustard plants were grown. Barley roots accumulated significantly high accumulation of Cd. However, Cd translocation to shoot was more efficient in Indian mustard in the presence of EDTA. Accumulation of Pb in shoot and roots enhanced in presence of EDTA in the growth medium. Atriplex roots are highly efficient in accumulating all the tested heavy metals with enhanced accumulation in presence of EDTA.

Conclusions:

The selected plants can be effectively used to remediate soil contaminated with crude oil and associated heavy metals.

Key Words: Phytoremediation; Oil contamination; Environment

Funding Agency: KFAS; Grant No. 2013-4401-01



Psychiatry

Category: Clinical

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Prevalence of psychiatric morbidity in the primary health clinic attendees in Kuwait

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Introduction:

A substantial proportion of primary clinic attendees suffer from psychiatric disorders and many of them are neither recognized nor adequately treated by primary clinic physicians. Objectives: To determine the point prevalence of, and identify risk factors for, depression, anxiety, and somatisation disorder in the primary health clinics in the country.

Methods:

The Physical Health Questionnaires (PHQ-SADs), were administered to a randomized sample of 1046 primary clinic attendees in all the five governorates of the country over a 5-month period. The descriptive data were computed with chi-square tests while the association of demographic characteristics with psychiatric disorders was determined with the logistic regression test.

Results:

42.7% of the patients suffered from psychiatric disorders including depressive (22.9%), anxiety (17.7%), and somatisation (33.4%) disorder. Comorbidity between the three disorders was found in 20.4% of the sample; 11% had two and 10.4% had all three disorders. The Kuwaiti nationals, female gender, older age group subjects and those with lower level of education were more likely to suffer from psychiatric disorder.

Conclusions:

In order to ensure timely provision of appropriate treatment, the primary care physicians need adequate information on different forms of presentation, and basic front line treatment, of the common mental disorders at the primary care level.

Key Words: Mental health; Primary clinics; Kuwait; Anxiety

Funding Agency: None



Psychiatry

Category: Graduate MSc (Basic Science)

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The association between suicide ideation, depression, and hopelessness

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Introduction:

The association between suicide ideation, depression, and hopelessness is relatively ignored in the literature of the Arab World, particularly using suicide ideation, Beck Depression, and hopelessness inventories. Objectives: The specific research questions related to this model are as follows: Does the relationship between suicide ideation, depression, and hopelessness, postulate the latent factor?

Methods:

The participants were 200 girls, first year Kuwait University students. The mean age (18.18 ± 0.38) and BMI (23.50 ± 4.85). The Arabic versions of the Beck Scale for Suicide Ideation (BSI), Beck Depression Inventory-II (BDI-II), the Beck Hopelessness Scale (BHS), and demographic surveys were administered to participants in the class. All participants read and signed a consent form before test administration. The correlation matrices, exploratory factor analysis, and reliability analysis are used in this study.

Results:

Internal consistency of scores were satisfactory for the BSI, BDI-II, & BHS inventories respectively (Cronbach's alpha = .91, .89, .85). A correlation of ($r=.53$) between the BSI and BDI-II and ($r=.43$) with BHS. Meanwhile a correlation of ($r=.58$) between BDI-II & BHS. A principal-axis factor analysis with oblique rotation suggested one factor accounting for 67.73% of the common variance.

Conclusions:

This trend indicates there is a strong relationship of suicide ideation with depression and hopelessness. The results of the present study suggest that targeting depression may be as important in adolescents as in adults to reduce suicidal ideation and prevent suicidal attempts.

Key Words: Suicide ideation; Depression; Hopelessness

Funding Agency: NONE



Psychiatry

Category: Basic Sciences

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Gender differences in working memory among Kuwaiti children

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Introduction:

The ability to maintain relevant information mentally while performing complex cognitive tasks, e.g. decision making, reading comprehension, and problem solving, memorizing a poem or even driving a car is conceptualized as Working Memory (WM), which became a workspace to general mental functioning. Nevertheless, as to yet, this topic is relatively ignored in literature in the Arab World. The aim of the current investigation was to explore gender related differences in WM performance among Kuwaiti children.

Methods:

The participants were 2165 Kuwaiti pupils. The participants aged 105.94 ± 29.9 months (1088 girls aged 105.52 ± 28.86 months and 1077 boys aged 106.36 ± 29.33 months with no significant age differences ($t=0.67, p>.05$). Moreover, the participants were identical in age, economic level and school grade. All participants in the two groups were compared on how they performed in the Automated Working Memory Assessment (AWMA), a computerized instrument developed by Alloway (2007). Independent Sample t Test was used to examine gender differences in WM performance.

Results:

The verbal WM were internally consistent (Alpha = 0.94, and 0.85) for boys and girls respectively, while for the visuospatial WM the internal consistency was (Alpha = 0.93, and 0.92) for boys and girls respectively. The mean score for verbal WM boys and girls samples (11.47 ± 6.04) and (9.83 ± 5.50) respectively. It was significantly lower in girls ($t=6.58, p<.001$). Also, the mean score for visuospatial WM boys and girls samples (10.23 ± 6.18) and (8.17 ± 5.12) respectively. It was significantly lower in girls ($t=8.75, p<.001$).

Conclusions:

Gender differences in working memory capacity exist. Results showed that gender contributed to the variations in WM resources, which were efficient among the Kuwaiti children. This warrants further investigation.

Key Words: Working Memory; Gender differences; Kuwaiti children

Funding Agency: NONE



Psychology

Category: *Basic Sciences*

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Individual differences in social desirability ratings of personality items

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Introduction:

Socially desirable responding refers to the tendency to endorse items in response to social or normative pressures instead of providing veridical self-reports. The purpose of the study was to explore the effect of social desirability responding on some personality scales: Consciousness and Religion.

Methods:

The participants were 468 Kuwait University students selected from a pool of 760 individuals based upon EPQ lay scale as a social desirability scale, and they were divided into two groups: the lowest social desirability group mean (6.22 ± 1.68) consisting of 265 individuals (76 males and 180 females), and the highest social desirability group mean (14.60 ± 1.51) consisting of 212 individuals (98 males and 114 females). The mean age for the lowest social desirability group (21.37 ± 2.55) while the mean age for the highest social desirability group (22.10 ± 4.21) with a significant age difference ($t=2.33$, $p<.02$). All participants completed the lay scale of Eysenck personality questionnaire EPQ, Conscientiousness of the Big Five Inventory BFI, the Consciousness of International Personality Item Pool IPIP, and Religious Scale. Independent Sample t Test was used to examine group differences in personality scales as well as Cronbach's Alpha.

Results:

Internal consistency was satisfactory for the EPQ lay, BFI Consciousness IPIP Consciousness, Religious subscales respectively (Cronbach's $\alpha = .70, .76, .70, .91$). The results revealed significant group differences where the highest social desirability group obtained a higher score than the lower social desirability group on BFI Consciousness ($t=5.04$, $p<.000$), IPIP Consciousness ($t=6.64$, $p<.000$), and Religion ($t=9.95$, $p<.000$).

Conclusions:

The highest social desirability group obtained a higher score on consciousness and religion. It can be suggested that self-report measure of consciousness and religion contain large amounts of variance due to social desirability response style.

Key Words: Social Desirability; Consciousness; Religion

Funding Agency: Research Rector of Kuwait University grant number OP04/15.



Psychology

Category: Graduate MSc (Basic Science)

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Gender differences in hofstede's cultural dimensions among a Kuwaiti sample

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Introduction:

Hofstede's model of cultural dimensions has become the most widely accepted and most frequently cited model for cross-cultural research. His cultural dimensions included power distance index (PDI), individualism vs. collectivism (IDV), masculinity vs. femininity (MAS), uncertainty avoidance index (UAI), and long-term vs. short-term orientation (LTO). The objective of this study is to explore gender related differences in the Hofstede's five dimensions of national culture for work-related values among a sample from Kuwait.

Methods:

The participants were 540 first year secondary school Kuwaiti teachers (270 males mean age = 28.95±2.47 and 270 females; mean age = 28.20±2.04). The Arabic version of the Values Survey Module, VSM 08 was administered to participants. Data analysis include independent Sample t-test was used to examine gender differences in Hofstede's five dimensions of national culture.

Results:

Internal consistency was satisfactory for the Power Distance, Individualism vs. Collectivism, Masculinity vs. Femininity, Uncertainty Avoidance, and Long-term vs. Short-term Orientation subscales respectively (Cronbach's alpha = 0.82, 0.84, 0.90, 0.74, .87) for males and (Cronbach's alpha = 0.77, 0.90, 0.83, 0.80, .88) for females. The results revealed significant gender differences where the males obtained a higher score than females on individualism ($t=2.95$, $p<0.002$), and masculinity ($t=2.77$, $p<0.005$), while females obtained a higher score than males on power distance ($t=4.48$, $p<0.000$), and long-term orientation ($t=4.13$, $p<0.000$).

Conclusions:

These findings suggest that the gender differences exist for cultural dimensions, and provide insight on leadership characteristics.

Key Words: Gender Differences; Cultural Dimensions; Kuwaiti Sample

Funding Agency: None



Psychology

Category: *Basic Sciences*

222

Gender differences in the five personality factors model

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Introduction:

The Five Personality Factors Model received tremendous empirical attention in the conceptualization of personality structure in the current literature. This model is comprised of five factors: Neuroticism, Extraversion, and Openness to Experience, Agreeableness, and Conscientiousness. The goal of the study is to examine gender differences on the Five Personality Factors Model among university students.

Methods:

The participants were 685 first year undergraduate Kuwaitis: 305 males mean age = 22.77±4.57 and 380 females; mean age = 19.61±2.59). The Arabic version of BFI (John & Srivastava, 1999) was administered to participants. Internal consistency and one-way ANOVA analysis was used in this study.

Results:

Internal consistency was satisfactory for the Neuroticism, Extraversion, and Openness to Experience, Agreeableness, and Conscientiousness subscales respectively (Cronbach's alpha = .83, .82, .79, .82, .90) for males and (Cronbach's alpha = .74, .83, .85, .81, .92) for females. The results revealed significant gender differences where the males obtained a higher score than females on Extraversion ($f=20.05$, $p<.000$), and Conscientiousness ($f=27.81$, $p<.000$), while females obtained a higher score than males on neuroticism ($f=41.96$, $p<.000$). However, no significant gender differences were found on Openness ($f=0.49$, $p>.05$), and Agreeableness ($f=1.51$, $p>.05$).

Conclusions:

This study provides evidence for the association between gender and personality factors. Replication of these findings using longitudinal designs may facilitate a better understanding of the association between gender and personality factors Model.

Key Words: Gender Differences; Five personality factors; University students

Funding Agency: Research Rector of Kuwait University grant number OP03/15.



Psychology

Category: Basic Sciences

223

Psychometric properties of the Arabic version of adult hope scale

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Introduction:

Defining hope as a cognitive set comprising agency (belief in one's capacity to initiate and sustain actions) and pathways (belief in one's capacity to generate routes) to reach goals, the Adult Hope Scale (AHS) was developed and validated previously as a dispositional self-report measure of hope (Snyder et al., 1991). This study focuses on the AHS adaptation of the scale in Kuwait and its psychometric characteristics.

Methods:

The AHS consisted of (8) items with 4 responses. The AHS has been applied to a random sample of Kuwait University undergraduates including (288) males and (472) females. The mean age of the males was 23.31 ± 4.53 years, while the mean age of the females 21.03 ± 2.71 with a significant age difference ($t=8.73$, $p<.000$).

Results:

The AHS positively correlated with Oxford Happiness Inventory OHI ($r=0.40$), Satisfaction with Life Scales SWLS ($r=0.46$), and Consciousness ($r=0.28$). The AHS was negatively correlated with Beck Depression Inventory-II BDI-II ($r=-0.55$), Hopelessness ($r=-0.66$), and the Beck Anxiety Inventory -BAI ($r=-0.33$). The Factorial validity of the AHS revealed one explanatory factor solution explains 42.91% of the total variance for males and 47.45% for females. Moreover, the mean of the corrected item total score were ranged (0.55 to 0.68) for males and (0.56 to 0.71) for females respectively. Cronbach's Alpha (0.81 & 0.84) for males and females respectively. The results revealed significant gender differences ($t=4.78$, $p<.000$) in which females (28.47 ± 7.95) scored higher than males (25.82 ± 7.05) in hope AHS.

Conclusions:

This study provided evidence for the reliability and validity of the Arabic AHS for Kuwaiti undergraduates. The strengths of the 8 core items of the AHS include their brevity and ease of scoring, which make them practical to use in both counselling and research. We do hope that AHS will be widely used as a proper measure of positive emotionality in Kuwait.

Key Words: Adult Hope Scale; Psychometric properties; Kuwait

Funding Agency: None



Psychology

Category: Graduate MSc (Basic Science)

224

Factor structure subjective well-being among Kuwait University students

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Introduction:

Progress has been made in the field of positive psychology recently, one major area is subjective well being SWB people's cognitive and affective evaluations of their lives. Many efficient instruments have been used in this study measuring positive and negative variables in addition to factor analysis in order to examine the components of subjective well being. Oxford Happiness Questionnaire OHQ was translated into Arabic in this study and has been used for the first time in this study.

Methods:

The sample consisted of 380 students at Kuwait University of which 180 are males, and 200 are females, with a mean age of 22.1, SD=2.9. Measures: The OHQ was translated into Arabic and administered to participants, in addition to the Arabic version of Life Orientation Test Revised LOT R, The Satisfaction with Life Scale SWLS, The Adult Hope Scale AHS, Beck Depression Inventory BDI II and Beck Anxiety Inventory BAI. Statistical analysis: Exploratory factor analysis was used in this study.

Results:

Significant correlations were found between the OHQ, AHS, LOT R, and SWLS positive, whereas the correlations between these scales and BAI and BDI II were negative as expected. A principle components analysis with Varimax rotation, eigenvalue greater than 1.0, revealed two factors of subjective well being in the whole sample, both males and females, since there were no significant gender differences in OHQ in the two samples males and females, the two factors accounted for 73.03% of the total variance. The first factor comprised positive variables: Happiness, hope, optimism and satisfaction with life, with the eigenvalues: 0.861, 0.842, 0.802, 0.775 respectively, and the second factor comprised negatives ones: Anxiety and depression, with the eigenvalues: 0.908 and 0.673.

Conclusions:

It was concluded that subjective well being is a general bipolar factor that consists of positive and negative correlations. Implications and suggestions for future research are discussed.

Key Words: Subjective well being; Exploratory factor analysis; University Students

Funding Agency: None



Surgery and Transplantation

Category: Clinical

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Correlation of serum creatinine- based equations with radionuclide GFR in candidates for liver transplantation

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Introduction:

Renal dysfunction is common pre-liver transplantation (LTx); however, the best way to determine the glomerular filtration rate (GFR) pre-LTx remains unclear. We evaluated the performance of two commonly used serum creatinine- (Scr) based GFR estimating equations, compared to the radionuclide GFR (rGFR). We also studied if pre-LTx GFR was associated with incident chronic kidney disease (CKD) or death post-LTx.

Methods:

We studied 426 consecutive adult LTx recipients from 1990-2014. We analyzed the performance of the CKD-Epi and MDRD equations compared to rGFR, and examined their association with a composite outcome of CKD stage 4, initiation of chronic dialysis, and patient death.

Results:

The correlation coefficient of rGFR with CKD-Epi and MDRD was 0.61 and 0.58, respectively. The MDRD showed less bias than CKD-Epi (-4.7 vs. -11.1 mL/min), whereas CKD-Epi was more precise (28.1 vs. 32.9 mL/min). Although all GFR measurements were significantly associated with the composite outcome in univariate analysis, only the CKD-Epi equation remained significantly associated with the composite outcome in multivariate analysis.

Conclusions:

Commonly used Scr-based GFR estimating equations correlate poorly with rGFR. The CKD-Epi was the only measure to provide independent prognostic information regarding long-term outcomes post-LTx. New GFR estimating equations need to be developed in LTx recipients.

Key Words:

Funding Agency: None



Surgery and Transplantation

Category: Clinical

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Pre-operative transthoracic echocardiography findings in asymptomatic morbidly obese patients eligible for bariatric surgery

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Introduction:

Obesity has become a worldwide epidemic and has been linked to cardiac diseases. Kuwait is one of the most obese countries worldwide with elevated numbers of cardiac and metabolic diseases appearing at a very young age. Cardiac abnormalities are not uncommon in asymptomatic morbidly obese patients and can influence operative and postoperative care in those particular patients. Bariatric surgery although a very beneficial surgery to treat obesity, like any other surgery, has its operative risks and postoperative complications, particularly in those who are morbidly obese. Our study aims to identify asymptomatic morbidly obese patients with cardiovascular abnormalities prior to surgery. In addition, we aim to assess whether those cardiac abnormalities influence bariatric surgery and whether a preoperative echocardiography is necessary.

Methods:

A retrospective study was designed to look at cardiac functions of all patients who were eligible for bariatric surgery in Al-Amiri Hospital between 2012 and 2016 with a BMI of 50 kg/m² and above. Those with BMI lower than 50 and with no transthoracic echocardiography record prior to surgery were excluded from the study. Operative complications, if any, and postoperative findings were also reported. Patients were followed up for 18 months after surgery.

Results:

A total of 92 patients with an echocardiography report prior to surgery were included in the study. The majority of patients (91%) were younger than fifty years of age. 9.7% of patients (9/92) were found to have abnormal cardiac findings prior to surgery (LV dysfunction, hypertrophy, etc.). No complications were observed in all patients.

Conclusions:

Preoperative transthoracic echocardiography has revealed a wide range of cardiac finding but does not seem to add significant information to the pre-operative workup of patients undergoing the procedure and should be reserved for indicated patients. Although no complications were observed among all patients.

Key Words: Morbid Obesity; Cardiac abnormalities; Bariatric Surgery

Funding Agency: None



Surgery and Transplantation

Category: Basic Sciences

227

Blood concentration of prilocaine and lidocaine after the use of topical anesthesia (Oraqix®) in lacerated wounds

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Introduction:

Soft tissue injuries are increasingly often treated in clinical trauma praxis using only topical anesthesia applied in the laceration. However, little is known how topical anesthesia applied inside lacerations is absorbed in the blood. The objective of this study was to assess the pharmacokinetic profile of components of Oraqix® (2.5% prilocaine and 2.5% lidocaine) when applied in a laceration as compared to intact skin application in the mouse.

Methods:

A total of 200 BALB-c male mice were used in this study. The mice were divided into three groups: group A: shaved and laceration group (80 mice), B: shaved and intact skin group (80 mice) and C: control group (shaved, no treatment; 40 mice) which underwent the same procedures but without application of Oraqix®. Blood samples were collected over 90 minutes. Plasma sample analysis employing liquid chromatography coupled with tandem mass spectrometric (LC-MS/MS) method was used to determine plasma concentrations of lidocaine and prilocaine. Pharmacokinetic analysis of mouse plasma concentrations was done by standard non-compartmental methods.

Results:

Absorption of both lidocaine and prilocaine was rapid. C_{max} and AUC values of lidocaine were significantly increased by 4-fold and 2-fold, respectively in lacerated mouse skin compared to intact skin. Similarly, prilocaine's C_{max} and AUC values were also increased by 2.5-fold and 4-fold, respectively in lacerated skin compared to intact skin.

Conclusions:

Lidocaine and prilocaine are significantly absorbed in lacerated tissue in contrast to intact mouse skin, following application of a thermosetting gel formulation, Oraqix®. More studies are warranted before this preparation can be clinically recommended for use in lacerations in very young children.

Key Words: Anesthesia; Topica; Oraqix®

Funding Agency: Research grant# DS 01/13 from Kuwait University Research Sector.



Surgery and Transplantation

Category: Graduate (Resident)

228

Laparoscopic sleeve gastrectomy experience in Adan hospital: A pilot study

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Introduction:

To our knowledge, there is no data exploring Adan's Hospital experience in laparoscopic sleeve gastrectomy (LSG). This study aims to explore its experience and outcomes.

Methods:

After contacting 176 participants who underwent LSG in our institution from 2012-2015, we administered a phone call questionnaire that inquired about patient's demographics, weight and height, post-operative status and hospital stay. We calculated BMI, percent total weight loss %TWL, and percent excess weight loss (%EWL).

Results:

34 participants responded to our questionnaire. Among them 61.8% were females (n=21), average age was 38.8 (SD-12.9). About 14.7% had diabetes, 17.7% had hypertension, 2.9% had bronchial asthma. The average BMI among the population prior to the surgery was 46.6 (SD: 8.4) while the average BMI after surgery was 34.4 (SD: 7.9). The average percent of total weight loss (%TWL) was 25.4% (SD: 14.4%) while the average percent of excess weight loss (%EWL) was 57.8% (SD: 30.2%). Approximately 5% of the participants developed gallstones after surgery. Overall, 91.2% (n=31) scored a satisfaction of 4 or 5 on a 5 scale satisfaction scale (5 being very satisfied), 2 reported 3 and one scored 1 (very unsatisfied). Fifty six percent (n=19) reported staying less than 4 days post-operatively and the rest reported 4 days or more. The samples size was too small to show any statistical significance of any of these findings or comparisons.

Conclusions:

A large proportion of the patients lost significant amount of weight but on average their weight loss was half of the target weight loss by %EWL. There were no reported immediate complications after surgery with almost half staying less than 4 days. While there were no immediate complications, 5% reported gallstones. Our experience shows promising results but a larger sample size is needed to corroborate our results.

Key Words: Surgery; Laparoscopic Sleeve Gastrectomy; Adan Kuwait

Funding Agency: None



Surgery and Transplantation

Category: Basic Sciences

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Analysis of the effect of the Arabian Gum on arterial myointimal hyperplasia

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Introduction:

We studied the effect of drinking Arabian Gum prior to inducing experimental myointimal hyperplasia (MIH) in the rat carotid artery. A techniques developed by our group, that uses dental floss cachet, was used to induce MIH in rats.

Methods:

Six male Wistar rats were used. Experimental group (n = 3): Their drinking water was replaced by Arabian Gum solution 1.5% w/v for one weeks. Control group (n = 3): Were allowed to drink the usual tap water. Both groups were supplied with the same rat chao diet and kept in the same room in the HSC Animal house facility. After one weeks, MIH was induced in the left carotid arteries in both groups. Two weeks after inducing MIH, animals from both groups were brought back, anaesthetized and the left carotid arteries (Common, External and Internal carotids) were harvested. In the experimental group, contralateral carotid was harvested as a positive control. Specimens were preserved and stained for histopathological studies.

Results:

Administration of Arabian Gum solution significantly reduced the area of induced MIH in the carotids compared with those of control rats at 14 days after the injury. The contralateral carotid of the experimental group did not show any abnormality.

Conclusions:

Drinking Arabian Gum solution one week prior to inducing MIH, significantly suppressed the development of myointimal hyperplasia. Further studies are underway to study the mechanisms involved in this protective effect.

Key Words: Myointimal hyperplasia; carotid stenosis; Arabian Gum

Funding Agency: None



Surgery and Transplantation

Category: Clinical

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Efficacy and safety of low dose versus high dose valganciclovir for prevention of cytomegalovirus disease in intermediate risk kidney transplant recipients

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Introduction:

Prophylaxis for cytomegalovirus infection is highly recommended for kidney transplant recipients. Using 900 mg valganciclovir daily is the usual prophylactic dose while using 450 mg daily is under investigation. We aimed to evaluate the outcome of using two different doses of valganciclovir prophylaxis for CMV infection after kidney transplant.

Methods:

We randomized kidney transplant recipients (1:1) to receive 450 mg daily valganciclovir (group 1) or 900 mg daily (group 2) for the first 6months post-kidney transplant. Serologically, all subjects were at moderate risk for CMV infection. Patients were studied for incidence of CMV disease, leukopenia attacks, rejection episodes and graft outcome for one year.

Results:

Demographic features of group 1 (n=98) and group 2 (n=98) were comparable. More than 50% of patients received thymoglobulin induction therapy without difference between the groups. There were more leukopenia attacks in group 2 (p=0.03) requiring higher doses of granulocyte-colony stimulating factor (p=0.03). Group 2 patients have received lower doses of mycophenolate mofetil (p=0.04), reduced doses of valganciclovir (p=0.045). Compared with group1, the high dose group have developed numerically more rejection episodes (p=0.057) and more CMV infections requiring full treatment (p=0.17). Graft and patient outcomes were satisfactory in both groups.

Conclusions:

Six months of low dose valganciclovir prophylaxis for intermediate risk kidney transplant recipients was as effective as high dose with a better safety profile.

Key Words: Renal transplant; CMV infection; Graft outcome

Funding Agency: None



Surgery and Transplantation

Category: Clinical

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Predictors and outcome of influenza A/H1N1 infection in kidney transplant recipients in Kuwait

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Introduction:

Following the pandemic of Influenza A/H1N1 in 2009, reports describing the epidemiological and clinical data in solid organ transplantation from different centers were variable. The correlation between patient's transplant characteristics, medical co-morbidities and presentation are crucial to predict the overall outcome.

Methods:

We collected the data of 241 kidney transplant recipients (KTR) who presented with symptoms of probable H1N1 infection. We compared patient's characteristics between the positive and negative cases.

Results:

There was no significant difference between the demographic characteristics of the positive (n=69) and negative (n=172) groups. Although the type of induction immunosuppression and the use of both mycophenolate and tacrolimus did not increase the incidence of the infection, the use of steroids (p=0.001) and cyclosporine (p=0.003) did increase and sirolimus reduce incidence (p=0.053). Calcineurin inhibitor (CNI) free regimens were associated with less incidence of infection (p=0.001). Among the medical co-morbidities, diabetes was found to be less likely associated with infection (p=0.013). Presenting symptoms of significance were cough (p=0.0001), headache (p=0.0001) and malaise (p=0.0001). Out of the positive group, 24 patients required hospitalization. Fever was a presenting symptom in this group (p=0.001). Four of them developed complications in the form of pneumonia in three and urinary tract infection in fourth. One of the pneumonia patients required endotracheal intubation and ventilator support, and two patients developed renal graft rejections. All complications were treated adequately without any graft or patient loss.

Conclusions:

Influenza A/H1N1 is highly predictable in KTR receiving cyclosporine or steroid and less likely in patients on sirolimus. Cough, headache and malaise are more likely presenting symptoms in H1N1 positive patients. Morbidity and mortality did not increase with the infection.

Key Words: Influenza A/H1N1; Kidney Transplantation; Immunosuppression

Funding Agency: None



Surgery and Transplantation

Category: Clinical

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Post Transplant Diabetes Mellitus (PTDM) in Kuwait

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Introduction:

Diabetes mellitus (DM) is considered the second leading cause for chronic kidney disease (CKD) in Kuwait (24%). Kidney transplantation is the treatment of choice for patients with CKD. PTDM is a known entity that can affect both graft and patient survival.

Methods:

We conducted a survey on kidney transplant recipients (KTR) who are following up in our Center. A questionnaire was attached to all active patients' records in OPD and filled up by the attending physician. The data were collected in Excel sheet and analyzed by SPSS statistics software.

Results:

We reviewed 1392 KTR over 6 months. There were 48 (3.45%), 301 (21.6%) and 356 (25.6%) patients labeled as type I, type II and PTDM respectively and remaining 684 (49.1%) patients were non-diabetics (ND). The mean BMI was 27.8, 31, 29.8 and 28.3 for type I, type II, PTDM and ND respectively. Risk factors for DM in PTDM compared to ND group were significantly higher for physical inactivity (40.7 vs. 33.3%), first degree relative (63.4 vs. 46%), hypertension (88.7 vs. 73.8%), dyslipidemia (64.9 vs. 42.8%), peri-operative hyperglycemia (38.5 vs. 9.9%) and cardiovascular disease (12 vs. 4.2%) respectively. Type of immunosuppression was not significantly different between the two groups.

Conclusions:

PTDM has a major contribution to the diabetic pool in our center. Risk factors for PTDM are similar to those in general population.

Key Words: Post Transplant Diabetes Mellitus; Kidney Transplantation; Risk Factors

Funding Agency: NONE



Surgery and Transplantation

Category: Clinical

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Recurrent nephrotic syndrome after renal transplantation in Syrian children: Does it compare with the international experience?

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Introduction:

Recurrent disease occurs in around 30% of children transplanted for steroid-resistant nephrotic syndrome (SRNS). Its precipitating risk factors have never been studied in the Middle East. The aim of the study was to determine what characterize the post-transplant recurrence of nephrotic syndrome in Syrian children.

Methods:

A retrospective analysis of 12 nephrotic children who received one renal allograft at Kidney Hospital in Damascus (2002 - 2013)

Results:

The mean age at transplant was 11.3 years; focal and segmental glomerulosclerosis (FSGS) has been shown in 9 out of 10 patients; 4 patients were having affected relatives and the remainder were considered as sporadic cases; genetic screening for NPHS2, NPHS1, and WT1 mutations were done for 6 patients, one novel homozygous NPHS2 mutation has been identified in one patient; all cases were transplanted from living donors. 4 patients recurred the disease after transplantation, hence the overall recurrence rate was 33% (4/12); none of these 4 patients has initially responded to plasmapheresis therapy, however, one patient did show a complete and spontaneous remission 20 months after transplant; As expected, the patient with NPSH2 mutation didn't recur. Sporadic cases showed a risk of recurrence that is 5 times higher compared to familial cases ($P = 0.24$). Interestingly enough, all recurrent cases had received a kidney from related donor and were initially classified as sporadic cases. Though not statistically significant, the risk of recurrence from related donors is 6.75 times higher compared to that from unrelated donors ($P=0.16$); This observation, the 1st of its kind, has never been investigated or pointed out in the literature. However, this observation needs to be validated by a properly designed prospective multicenter studies.

Conclusions:

This data suggests that living related donor grafts should be used with constraint because of the increased incidence of recurrence.

Key Words: FSGS; SRNS; Recurrence Risk

Funding Agency: None



Surgery and Transplantation

Category: Clinical

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Oral antibiotics in trans-rectal prostate biopsy, and its efficacy to reduce infectious complications: systematic review

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Introduction:

For the diagnosis of prostate cancer trans-rectal prostate biopsy (TRPB) is used commonly, the procedure is associated with infective complications. There is evidence that antibiotics (ABx) decrease infective events after TRPB, but different regimens are used. Aim: To systematically review different regimens of prophylactic oral ABx in TRPB. MEDLINE, EMBASE, clinical trials site, and Cochrane library were searched, experts were consulted for relevant studies.

Methods:

Randomized clinical trials conducted in the last 20 years, which investigated the different oral antibiotic regimens in TRPB, and compared their efficacy to reduce infectious complications were analyzed. Primary outcomes were bacteriuria, urinary tract infection (UTI), fever, bacteremia, and sepsis. Secondary outcomes were the hospitalization rate and the prevalence of ABx-resistant bacteria. Nine trials were eligible with 3012 patients.

Results:

ABx prevented bacteriuria (3.5% vs. 9.88%), UTI (4.46% vs. 9.75%), and hospitalization (0.21% vs. 2.13%) significantly in comparison with placebo or no treatment. No significant difference was found in all the outcomes of the review between the single dose regimen and the 3 days. The single dose regimen was as effective as the multiple doses except in bacteriuria (6.75% vs. 3.25%), and the prevalence of ABx-resistant bacteria (1.57% vs. 0.27%). Quinolones reduced only UTI significantly in comparison with other ABx (chloramphenicol, trimethoprim-sulfamethoxazol). It is essential to prescribe prophylactic ABx in TRPB.

Conclusions:

No conclusive evidence could be claimed about the superiority of the multiple or the 3 days regimens to the single dose regimen. Unexpectedly, ABx-resistant bacteria were identified more often in the single dose cohorts.

Key Words: Antibiotics; fever, urinary tract infection; trans-rectal prostate biopsy

Funding Agency: None



Case Reports by Subject Area



Dentistry

Category: Clinical

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An unusual case of oral traumatic ulcerative granuloma

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CASE REPORT

Background:

Traumatic ulcerative granuloma with stromal eosinophilia (TUGSE) is an uncommon condition considered to be a benign, reactive lesion that usually affects the tongue. The exact pathogenesis implicated in the development of this lesion is not clear. However, trauma has been found to be a contributing factor in a majority of the cases. Here, we present an unusual case of TUGSE in an adult patient.

Case summary:

A 26-year-old male patient was referred to the Oral Medicine Clinic of Kuwait University Dental Center with a painful lesion on the dorsal surface of the tongue since 7 months. On intraoral examination, a diffuse ulcerative proliferative lesion with erythematous borders was seen on the dorsal surface of the tongue. On palpation, the lesion was very tender and clefting was also observed within the lesion. A differential diagnosis of severe erosive lichen planus and TUGSE was made. After a week of prednisolone mouthwash, the patient felt that his pain had reduced and was able to eat. Incisional biopsies showed partially ulcerated stratified squamous epithelium covered by fibrin entrapping viable and necrotic polymorphonuclear leucocytes. The underlying stroma was edematous, highly vascular with dense inflammatory infiltrate, the majority of which were eosinophils followed by histiocytes and plasma cells. The inflammatory infiltrate extended into the underlying skeletal muscle which exhibited degenerative changes secondary to inflammation. These features were suggestive of TUGSE. On follow up, the patient reported slight improvement but was concerned that the lesion has not subsided completely.

Conclusion:

Recognition of the lesion is important because it often mimics oral malignancy. However, traumatic granuloma is a self-limiting lesion and tends to resolve spontaneously.

Key Words: Traumatic ulcerative granuloma; Diagnosis; Treatment



Dentistry

Category: Clinical

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Oral focal mucinosis: A rare case report

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CASE REPORT

Background:

Oral focal mucinosis (OFM) is a rare soft tissue lesion that is commonly found on the gingiva and it clinically presents as a painless sessile or pediculate mass. It has no risk of recurrence according to previously reported cases.

Case summary:

A 55-year-old Kuwait male reported a chief complaint of slowly-growing asymptomatic enlargement on buccal gingiva in second premolar and first molar area over the past 7 months. His medical history was not contributory.

The mass was 2.0 x 1.0 cm and covered with normal oral mucosa. It was firm on palpation. In addition, there was severe periodontitis with generalized mobility of the whole dentition. Radiologic investigations, including panoramic x-ray and CBCT, showed generalized advanced bone loss and the mass does not seem to be impinging on the alveolar bone.

An excisional biopsy was performed to reveal the nature of the tumor. The histological analysis revealed well-circumscribed myxomatous connective tissue with scattered plasma cell infiltrate on haematoxylin and eosin sections. Alcian blue-PAS pH 2.5 showed strong blue staining in keeping with the presence of hyaluronic acid. The lesion was incompletely excised.

Conclusion:

This case presented in this report bring OFM to the attention of anatomical pathologists while considering the differential diagnosis of myxoid lesions of the oral cavity. Because of rarity of this lesion, almost all clinicians in previously reported cases request full excision of the lesion. In our case report, despite incomplete excision of the mass, there was no recurrence on the follow up. This refers to the benign course of this lesion.

Key Words: Oral focal mucinosis; Gingival mass; Myxoid lesion



Ethics

Category: Undergraduate

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Hands-on ethics education: Students' observational audit of the Ministry of Health policy on control of concentrated electrolytes in Kuwait

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CASE REPORT

Background:

Reports of mortality and morbidity related to the inappropriate administration of concentrated electrolytes (CE) in healthcare facilities have been dramatic and on going worldwide. There are many opportunities during medical education to emphasise the ethical obligations of healthcare professionals to provide a safe care and to “First Do No Harm” when using these agents in clinical practice.

Case summary:

During the 2015 elective Ethics course “Patient Safety: Better Knowledge for Safer Care” in Phase III of the curriculum, students led an observational audit as part of their hospital rotation. The students observed adherence to the Ministry of Health (MOH) policy in 16 wards relevant to the availability, access, prescribing, ordering, preparation, distribution, labelling, verification, administration, storing and monitoring. There were at least 10 Knowledge-based and 5 practice-based items in the MOH policy audit form to be verified with the ward head nurse. The verification of the knowledge-based items revealed the following areas “NOT BEEN FULFILLED”: 1) Information needed for double checking 100%, 2) Discarding of unused/empty vials 100%, 3) Labelling of prepared solutions 88%, 4) Documentation 81%, 5) Labelling of items before preparation 81%, 6) Stocking 81%, 7) Prescribing 73%, 8) Considering CE as controlled substances 40%, 9) Ordering 6%, and finally 10) Knowledge about preparation of CE was the only knowledge-based item that was fulfilled completely. The verification of the practice-based items of the policy revealed the following areas “NOT BEEN FULFILLED”: 1) Storage of CE in “Crash Carts” 87%, 2) Checking of CE in storage areas 40%, 3) Double checking before, during, and after preparation 31%, 4) Infusion pumps guidelines use 6%, and finally 5) Monitoring 6%.

Conclusion:

Engaging students in auditing hospitals' adherence with national healthcare policies proved to be an effective reflective approach to medical ethics education in Kuwait.

Key Words: Concentrated Electrolytes; Safety; Ethics Education



Ethics

Category: Undergraduate

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Students-observed adherence to the 'WHO surgical safety checklist' during an elective ethics and patient safety course

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CASE REPORT

Background:

The surgical safety checklist is a key component of patient safety recognized by the World Alliance for patient safety as part of the World Health Organization (WHO) efforts to reduce the number of surgical deaths across the world. The Ministry of Health in Kuwait has issued a ministerial decree (No.6/2013) requiring the implementation of the checklist at all hospitals in the country. Furthermore, the National Accreditation Standards for Hospitals have identified the protocol for safe surgery based on the WHO surgical safety checklist as a patient safety required area. One of the objectives of the ethics and professionalism course on patient safety is to engage the students in hospital based activities allowing them to observe any gaps in current healthcare practices in view of national healthcare policies aiming to increase their moral sensitivity and sense of self-regulation.

Case summary:

A total of nine surgical operations were observed for the adherence to current checklist policy. The checklist identifies three phases of an operation, each corresponding to a specific period in the normal flow of work: 12 observed points (OPs) before the induction of anaesthesia “sign in”, 8 (Ops) before the incision of the skin “time out” and 5 (Ops) before the patient leaves the operating room “sign out”. In each phase, the students should observe if the team has completed the listed tasks before it proceeds with the operation. Only 2 in a total of 25 points (presence of medical record and functioning pulse oximeter on the patient) were fully fulfilled in all the nine cases. The remaining observed points were not fulfilled within a range between 11% (1/9 procedures) to 89% (8/9 procedures).

Conclusion:

The observed low adherence to the surgical checklist can possibly desensitize medical students and send the wrong message that knowledge and skills attained during their educational journey in ethics and patient safety courses are not applicable.

Key Words: Surgical checklist; Patient safety; Ethics



Genetics

Category: Clinical

239

Chromosome 1p fragmentation/duplication: Case report of a very rare syndrome and even a rarer and 'unusual' cytogenetic finding

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CASE REPORT

Background:

An unbalanced structural chromosome aberration is not an uncommon cytogenetic finding. Depending on the size of chromosome rearrangement, either by gain or loss, it can be commonly associated with lethality, severe multiple congenital anomaly (MCA), global developmental delay, dysmorphic facial features, and/or growth retardation. Amongst all structural chromosome aberrations, chromosome 1p duplication is considered to be the rarest form.

Case summary:

We are presenting a case of chromosome 1 fragmentation with an overall of 1p duplication, which is to our knowledge, has not been published before. Cytogenetic and molecular cytogenetics fluorescence in situ hybridization (FISH) analysis have been utilised to obtain these findings. Further investigation is required using a higher resolution protocol such as array-CGH.

Conclusion:

High resolution array-CGH is recommended in this category of cases and has been requested (in process) as it would be invaluable in establishing the origins and exact locus of these duplications and establishing the copy-number variation (CNV) within this category of cases.

Key Words: Fluorescence In Situ Hybridization; Cytogenetics; Chromosome 1p fragmentation



Medical Education and Medical Informatics

Category: Clinical

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Mega OSCE revision course: A case of collaborative social responsibility in medical education

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CASE REPORT

Background:

The popular African proverb “It Takes a Village to Raise a Child” conveys a sentiment that ‘regardless of a child's biological parent(s) its upbringing belongs to the whole community’. Similarly the whole community should take part in ‘raising’ medical students and shaping them as future doctors. This case study presents the first Mega Mock Objective Structured Clinical Examination (OSCE) revision course accomplished by volunteering healthcare professionals, students, and the private sector “Kuwait Life Sciences Academy” (KLSA) in Kuwait.

Case summary:

In any educational system, examination goes hand-in-hand with increased levels of stress and anxiety amongst the learners. There is evidence that revision courses alleviate some of the stress associated with exams and enhance students’ learning. An intensive one-day revision course was specifically designed and conducted to examine final year students. The exam consisted of an orientation lecture followed by 24 clinical stations. Twenty-two Instructors participated in the exam and were not affiliated to the medical school to ensure impartiality. A total of 55 students attended the course and participated in the revision exam. The 24 OSCE stations provided series of history taking, physical examination of simulated patients, advanced life support scenarios, data interpretation, writing consent and medical prescription. The pass rate of the “Real” final year OSCE was prospectively observed in that academic year. None of the students who attended the revision course failed their final year OSCE exam. Unfortunately, we couldn’t repeat this revision course and since then 13 and 10 medical students failed their final year exams in 2014 and 2015 respectively.

Conclusion:

The MEGA OSCE revision course was a collaborative community initiative demonstrating social accountability in a constructive way to alleviate the students’ anxiety and to help them achieving a successful performance in their final year exam.

Key Words: OSCE; Extra Curricular; Social Responsibility



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Proper diabetes education program can help in diabetes stigma in young Kuwaiti girl with LADA

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CASE REPORT

Background:

Twenty two year-old- single highly educated Kuwaiti girl, who was maintained on L-thyroxin since 2012 because of hypothyroidism. Her body mass index was 36 but no family history of diabetes. She was not adhered to self-management blood glucose (SMBG) or exercise. She was anxious to get diabetes so she started reading a lot about diabetes, and she decided to reduce her weight and followed with a dietitian who advised strict low calorie diet for 18 months with a reduction of her weight (BMI of 24). Later on, she was diagnosed as type 2 diabetes (HbA1c 10.3%) and started oral agents for 2 years without improvement. After 6 months, anti-GAD was 98.72 IU/ml supporting diagnosis of LADA, so her management program was shifted to insulin. She has stigma of being diabetic and did not want to inform any member rather than her family. She was trying to maintain her weight by low carbohydrates diet. The diabetes educator discussed with her the high prevalence of diabetes worldwide, and the importance of telling her co-workers of being diabetic as she might need their help if complications happen. Patient was encouraged to start doing enjoyable exercise and was convinced to monitor BG more frequently to control BG. After 3 education sessions, she was monitoring BG before and after meals, able to manage her diabetes with improved glucose readings, use correction doses of insulin and to manage diabetes during sick days. Her HbA1c reduced from 10.3 % to 8.2% within 9 months.

Conclusion:

Proper diabetes education program is recommended to help young diabetic patients with stigma.

Key Words: Diabetes education; Diabetes stigma; Outcome



Medicine

Category: Graduate (Resident)

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Septic sacroiliitis post intramuscular gluteal injection

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CASE REPORT

Background:

We report an unusual case of septic sacroiliitis resulting as a complication of a previous intramuscular gluteal injection.

Case summary:

A previously healthy young Jordanian man presented with fever and severe pain in the right hip, with swelling and reduced range of movement. Imaging showed inflammatory changes suggestive of septic sacroiliitis. After intravenous antibiotics the symptoms completely resolved and a follow-up computed tomography confirmed the complete resolution of the sacroiliitis. We identified that the patient took an intramuscular injection on his right gluteal area a week before his symptoms.

Conclusion:

This case highlights the possible association between septic sacroiliitis and the intramuscular injection and the importance of aseptic technique.

Key Words: complication; injection; MRSA



Medicine

Category: *Clinical*

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Gastroenteritis can precede an underlying serious disease

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CASE REPORT

Background:

A 28-year-old female patient, with no past history of any illness, admitted with fever, diffuse colicky abdominal pain, watery diarrhea, recurrent vomiting of 6 days duration.

Case summary:

On examination the patient was irritable, anxious and febrile 37.6 °C. The pulse was 110 beats per minute, regular, respiratory rate was 20/minute. She has diffuse goitre, but no bruit, no compression signs and no retrosternal extension. Heart examination showed ejection systolic murmur over the base and radiated to the precordium. The abdomen was tender in the epigastric and right hypochondrial areas. No eye signs and no pretibial myxoedema.

Laboratory investigations showed TSH = 0.02 mU/l (normal 0.3 - 4) and the free T4 = 45 pmol/l (normal 7.5 - 21.1).

Thyroid ultrasound showed huge thyroid swelling consistent with multinodular goitre. Thyroid scan was done and showed thyroid uptake on the scan 61.4% and thyroid antibodies were positive.

Abdominal ultrasound showed enlarged coarse liver and mild ascites. Accidental finding of liver cirrhosis is not related to thyrotoxicosis and work up is ongoing. The patient started on neomercazol tablet 20 mg three times daily and propranolol tablet 40 mg TDS and dramatically improved.

Conclusion:

Patients with hyperthyroidism may have symptoms that include anxiety, emotional lability, weakness, tremor, palpitations, heat intolerance, increased perspiration, and weight loss. Thyrotoxicosis can be presented with gastrointestinal symptoms and full examination of the thyroid gland is necessary so that not to miss the case which can go into thyroid storm later.

Key Words: vomiting; goitre; antibodies



Medicine

Category: Undergraduate

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Catamenial neuromyelitis optica: A case report

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CASE REPORT

Background:

Neuromyelitis optica (NMO) is an autoimmune demyelinating disease of the central nervous system (CNS). It is typically severe, relapsing and results in early and permanent neurological disability. It is associated with a highly specific serum autoantibody marker, NMO-IgG, which targets the water channel aquaporin-4. NMO mainly affects women of childbearing age. It is known that the fluctuations in the levels of progesterone and estrogens are correlated with a shift from Th1 to Th2-mediated immune responses that potentially might exacerbate the NMO course. Unlike NMO and other immunological disorders, some neurological disorders have been linked to cyclical changes in sex hormones, namely catamenial epilepsies and catamenial migraine.

Case summary:

A 32-year-old woman presented with recurrent episodes of optic neuritis (ON) and one episode of transverse myelitis (TM) between 2010 and 2016. She had an annualized relapse rate of 2. Her attacks were mild and responsive to short courses of methyl-prednisolone. Neurological examination was unremarkable during remissions. Complete blood counts, renal and liver function tests were normal. MRI of her brain, spine (cervical & thoracic) and orbits revealed no abnormalities. Her NMO IgG was positive on 2 occasions confirming the diagnosis of NMO. Ocular coherent tomography (OCT) showed mild thinning of the retinal fiber layers. Her husband reported that her relapses were always preceded by heavy menses. During her pregnancy, she had no relapses. However, immediately postpartum she had a relapse. She was started on immunosuppressive therapy, mycophenolate mofetil, for relapse prevention.

Conclusion:

To our knowledge, this is the first description of catamenial NMO that has clear association with the menstrual cycle. Recognition of this case can have important impact on management.

Key Words: Neuromyelitis Optica; Menstrual cycle; Catamenial



Medicine

Category: Clinical

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Rare aetiology of status epilepticus

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CASE REPORT

Background:

Patients with epilepsy have a higher than expected risk of mortality (including sudden death), injury, and motor vehicle accidents. Seizure frequency is a major risk factor for these complications. The term status epilepticus generally refers to the occurrence of a single unremitting seizure with a duration longer than 5 to 10 minutes or frequent clinical seizures without an interictal return to the baseline clinical state.

Case summary:

33-year-old lady, in Kuwait since two years, house maid, with no past history of any illness, admitted with generalized tonic clonic seizure about three times for which she was given valium intravenous and epanutin one gram infusion without improvement. So she was intubated and shifted to intensive care unit. Her blood pressure was 170/110, afebrile, oxygen saturation 98%, random blood sugar was 4.8 mmol/l. Chest and heart examination were unremarkable. CT brain was done and showed bilateral parieto-occipital vasogenic oedema, with no infarction or haemorrhage seen. Abdominal ultrasound showed single foetus, dead, at 28 weeks. Serum human chorionic gonadotrophin was 50000 units. Uric acid was 549 umol/l (normal 150-400), serum electrolytes were normal. Magnesium sulfate and labetalol were prescribed and the patient was sent to the operating theatre and Caesarian section was done. The patient improved and was extubated.

Conclusion:

The patient was pregnant and unfortunately she did not follow up in the clinic till she developed eclampsia. Early rise of blood pressure and uric acid are clue before the development of complete picture of eclampsia. The incidence of eclampsia is 4 to 5 cases per 10,000 live births in developed countries. The goals of management are to stabilize the mother, prevent recurrent convulsions, treat severe hypertension to prevent cerebral hemorrhage, and initiate delivery of the fetus which is the only curative treatment. The risk of recurrent eclampsia in a future pregnancy is 2 percent.

Key Words: seizure; eclampsia; pregnancy



Medicine

Category: Clinical

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Pregnancy outcome in a renal transplant recipient with resistant acute rejection

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CASE REPORT

Background:

To avoid graft rejection during pregnancy, frequent monitoring of serum drug levels is recommended. Pregnancy induces hyper-filtration in transplanted kidneys, as in native kidneys, therefore detection of rejection can be very difficult when monitoring by serum creatinine. If rejection is suspected, ultrasound guided graft biopsy can be done and once proven it can be treated with pulse steroid but data are scarce regarding other agents. We aimed to present pregnant lady with resistant acute rejection with fruitful pregnancy outcome.

Case summary:

Mrs. X. is a 28-year-old Kuwaiti lady who was suffering end stage kidney disease secondary to lupus nephropathy and underwent live renal transplantation on May 2013 after hemodialysis support for 1 year. She received thymoglobulin as an induction and was maintained on prednisolone, MMF and Tacrolimus. She had normal renal graft function without proteinuria and after counseling, she got pregnant on Feb, 2015. She presented with acute graft dysfunction on Jun 2015 with S creatinine 365 umol/L. Her abdominal ultrasound showed mild hydronephrosis and viable fetus. She received empirical pulse steroids with partial response and her graft biopsy showed acute T-cell mediated rejection and negative C4d. Intravenous immunoglobulins and mini pulse steroids were tried without response. After gynecological counseling and informed consent, she received 5 doses of thymoglobulin. She was dialysis dependent till premature vaginal labor was carried on with viable 2-kg boy.

Conclusion:

Fruitful outcome of pregnancy might be expected with close monitoring, daily dialysis in kidney transplant lady with resistant rejection.

Key Words: Pregnancy; Kidney transplant; Survival



Medicine

Category: Clinical

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Case report of rhombencephalosynapsis

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CASE REPORT

Background:

Rhombencephalosynapsis (RS) is a rare cerebellar malformation. It is characterized by dorsal fusion of the cerebellar hemispheres, agenesis or hypogenesis of the vermis, and fusion of the dentate nuclei.

Case summary:

A 28-year-old male patient presented for first time with disturbed level of consciousness for two weeks, the clinical examination revealed no ataxia, no facial dysmorphism, no abnormal eye movement and no alopecia. CT brain revealed moderate supratentorial ventriculomegaly, absence of the septum pellucidum and cerebellar dysmorphism. Cranial MRI revealed agenesis of the cerebellar vermis with fusion of the cerebellar hemispheres and transverse orientation of cerebellar folia with convergence of the dentate nuclei forming a horseshoe shaped arc across the midline posterior to the fourth ventricle giving a diamond shape appearance. The sagittal T2WI confirm the previous finding with better soft tissue contrast resolution which confirm the presence of aqueductal stenosis, supratentorial hydrocephalus and mild tonsillar herniation, yet normal sized posterior fossa. Absent septum pellucidum, retrocerebellar cyst and dysgenesis of the corpus callosum posteriorly is also noted.

Summary:

RS is a congenital abnormality of the cerebellum characterised by the vermis absence and continuity of the cerebellar hemispheres, dentate nuclei, and superior cerebellar peduncles. MRI is definitely better to delineate abnormality at the posterior fossa and should be the imaging of choice.

Conclusion:

Rhombencephalosynapsis (RS) is a rare cerebellar malformation and MRI is the modality of choice for its diagnosis.

Key Words: Cerebellum; Rhombencephalosynapsis; Vermis



Medicine

Category: Clinical

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Hypercalcemia and acute kidney injury complicating unauthorized supplementation

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CASE REPORT

Background:

Performance enhancing substances have been used by athletes without medical supervision. We report a case on a gentleman, 22 years old, previously healthy, presenting to the emergency department with severe hypercalcemia and AKI with a potential diagnosis of vitamin D intoxication, primary hyperparathyroidism, malignancy and granulomatous disorder.

Case summary:

A 22-year-old gentleman, with no past history of any illness, body builder since 3 years, admitted with abdominal pain, constipation, loss of weight about 10 kg in one month. Chest, heart and abdominal examination were unremarkable. Laboratory investigation revealed normal blood count, high serum calcium level up to 3 mmol/l (normal 2.1-2.6) with normal phosphorus of 1.32 mmol/l (normal 0.8 – 1.6), other electrolytes were normal. Vitamin D level was 175.8 (normal 51.5 - 117.5). Parathyroid hormone was normal. Myeloma screen was negative. Immunoglobulin A, G and M were normal. Liver function test was normal, but the renal function was impaired with raised creatinine 235 micromol/l that decreased to 122 with intravenous fluid. ECG showed normal PR and QT intervals. Abdominal ultrasound showed bilateral medical nephropathy grade II. Renal biopsy was done and showed interstitial nephritis. The patient received intravenous fluids, pamidronate 60 mg and hydrocortisone. The patient showed satisfactory improvement and was advised to avoid taking drugs without medical supervision.

Conclusion:

Unsupervised use of anabolic steroids, growth hormones and multivitamins is widespread in the athletic community. A coordinated team approach (with representatives from sports, medicine, advertising, and the pharmaceutical industry) is needed to determine the real risks of anabolic steroids to athletes who are considering their use.

Key Words: Anabolic steroids; athletes; hypervitaminosis D



Medicine

Category: Clinical

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Gastrointestinal stromal tumour (GIST) masquerading as lesser sac cyst

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CASE REPORT

Background:

GISTs originate from the intestinal pace-maker cells of Cajal. They arise as a result of oncogenic mutation in the KIT tyrosine kinase. These tumours account for 1% of all intestinal neoplasms, the age-adjusted incidence in Europe and the U.S. is 7 cases per million. 2 GISTs can arise anywhere in the GI tract, most commonly in the stomach and small intestine. They are usually solid tumors, they rarely present as cystic lesions, and there are only handful of such cases reported in the literature.

Case summary:

A 74-year-old lady referred to the HPB Unit, with three-month history of upper abdominal pain and discomfort, dull aching in nature and radiating to the back and left upper quadrant. Abdominal ultrasound showed a large cystic lesion in the epigastric region with turbid fluid content, suggestive of a pancreatic pseudocyst. Abdominal CT-scan showed a 6.6 x 6 x 6.3 cm cyst related to the pancreas and extending to the hepato-gastric omentum "lesser omentum". Endoscopic ultrasound (EUS) was suggestive of pancreatic pseudocyst. Cyst fluid was aspirated via EUS which showed benign cytology with normal amylase and lipase and normal tumour marker (CEA, CA-19.9, CA-125) levels. She was referred to us as a case of pancreatic pseudocyst. After surgical excision, the histopathology confirmed the presence GIST in the wall of the cystic lesion.

Conclusion: The possibility of GIST should be kept in mind in the presence of unusual features of a cyst on abdominal imaging.

Key Words: Gastrointestinal Stromal Tumour; Mesenteric Cyst; Pancreatic Pseudocyst



Medicine

Category: Clinical

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Isolated sixth cranial nerve palsy secondary to sphenoid sinusitis: A case report

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CASE REPORT

Background:

Dysfunction of the sixth cranial (abducens) nerve can result from lesions occurring anywhere along its course between the sixth nerve nucleus in the dorsal pons and the lateral rectus muscle within the orbit. Inflammation of the paranasal sinuses can cause multiple neurological complications. Sphenoid sinusitis can spread to nearby structures including cranial nerves. We present a case of isolated sixth nerve palsy due to sphenoid sinusitis.

Case summary:

A 42-year-old female who presented with binocular horizontal diplopia on looking to the right side associated with right temporal pain with history of fever and rhinitis five days before the onset of diplopia. Examination showed fever associated with isolated right sixth nerve palsy with tender right temporal region. Magnetic resonance imaging of the brain, orbits, and sinuses demonstrated no intracranial pathology and no evidence of orbital pathology or inflammation. The right sphenoid sinus demonstrated peripheral hyperintense mucosal thickening.

Conclusions:

Abducens nerve palsy (ANP) is the most common isolated palsy due to the long peripheral course of the nerve. Infection in the paranasal sinuses can potentially spread to any surrounding structures, including the orbital and intracranial cavity. Imaging studies, such as CT and MR, are valuable tools to confirm the presence of disease and evaluate its extent. Treatment includes the use of antibiotics with hospital admission for cases with intracranial or ophthalmologic symptoms.

Key Words: Abducens; Sinusitis; Cranial Nerves



Medicine

Category: Clinical

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Case report: Hereditary neuropathy with liability to pressure palsy (HNPP) manifesting after military physical training

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CASE REPORT

Background:

Hereditary neuropathy with liability to pressure palsy (HNPP) is one form of compressive neuropathies. It results from the deletion of the PMP22 gene in chromosome 17p11.2. Clinically, it presents with recurrent painless pressure palsies, typically in the 2nd and 3rd decades of life.

Case summary:

We report a case of a 17-year-old boy who presented with recurrent painless motor and sensory neuropathies. He had bilateral upper limb numbness and weakness directly following military exercises then he developed acute wrist drop following chiropractic therapy. Our patient had some atypical features including lack of family history, presentation with brachial plexopathy and persistence of weakness after 6 months of treatment and rehabilitation. His diagnosis was confirmed by genetic testing that showed deletion in the 17p 11.2-12 region in PMP22 gene.

Conclusion:

HNPP is an important clinical entity that should be kept in mind in cases of recurrent neuropathies. Genetic testing is essential and can replace nerve biopsy in diagnosing such cases.

Key Words: Hereditary; Neuropathy; Pressure Palsy



Medicine

Category: Graduate (Resident)

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Eye swelling in a young asthmatic patient

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CASE REPORT

Background:

IgG4-related disease is a recently recognized infiltrative disorder that can affect a variety of organs. It is characterized by diffuse swelling of the involved organ, marked infiltration of IgG4-positive plasmacytes, storiform fibrosis, and elevated serum IgG4 levels.

Case summary:

A 32-year-old man with underlying asthma, nasal polyps and rhino sinusitis presented with bilateral painless peri-orbital swelling. Despite having this problem for 3 years, no specific diagnosis was made. Examination when he presented to us showed palpable lacrimal glands, submandibular and parotid glands. He had elevated serum IgG4 levels and lacrimal gland biopsy showed plasma cell infiltration, with positive IgG4 staining, and fibrosis. Our patient was diagnosed with IgG4-related dacryoadenitis and sialoadenitis, which carry the old term Mikulicz disease. A history of atopy, asthma and peripheral eosinophilia has been associated with IgG4-related disease. He was treated initially with steroids and later with Rituximab and responded well to therapy.

Conclusion:

Our case report highlights challenges faced with the diagnosis of patients with IgG4-related Orbital disease. Clinicians need to be aware of the different manifestations of IgG4-related disease and rule out other causes of orbital inflammation and lymph proliferative disorders.

Key Words: IgG4-related disease; Dacryoadenitis; Sialadenitis



Medicine

Category: *Clinical*

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Stevens-Johnson syndrome complicating chicken pox

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CASE REPORT

Background:

Stevens-Johnson syndrome is an immune-complex-mediated hypersensitivity complex that typically involves the skin and the mucous membranes. Diagnosis is mainly clinical where there is triad of skin disorders, mucosa and eye lesions. The differential diagnosis are staphylococcal scalded skin syndrome and toxic epidermal necrolysis. The prognosis is good with healing occurs within 2-3 weeks. Mortality ranges from 5-15% in severe cases due to disorders of fluid and electrolyte imbalance and sepsis.

Case summary:

A 12-year-old female patient presented with vesiculopapular rash for 5 days which was itchy and involved both upper and lower limbs and the trunk. She gave history of flue-like illness few days ago. There was no history of drug intake, recent travel, joint pain or history of previous similar attack. She was diagnosed clinically as chicken pox and was prescribed acyclovir and antihistaminic. However, the patient did not improve and the rash increased in size with associated fever, itching, crust formation of some vesicles, mouth ulcers and soreness of the eyes. Laboratory investigations showed WBC 18000, eosinophiles 3.9%, normal electrolytes, normal renal and liver functions. Virology screen for herpes and varicella were negative. She was started on prednisolone, broad spectrum antibiotics, local fucidine, bepanthene cream, mouth wash, antiseptic eye drops and antihistaminic. She showed marked improvement.

Conclusion:

Stevens-Johnson syndrome usually begins with a nonspecific upper respiratory tract infection and could be misdiagnosed as chicken pox. Therefore virology study is important to rule out chicken pox. Mucocutaneous lesions in Stevens-Johnson syndrome involving the oral mucous membranes, may be severe enough that the patient may not be able to eat or drink. So early diagnosis and treatment is important to prevent complications.

Key Words: vesicle; itching; ulcer



Microbiology, Virology and Immunology

Category: Clinical

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***Streptococcus gallolyticus* subsp. *pasteurianus* septicemia in a case of hepatocellular carcinoma in Kuwait Cancer Control Center**

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CASE REPORT

Background:

Streptococcus gallolyticus subsp. *pasteurianus* is part of the normal flora of intestine of humans and animals. It is a known cause of bacteremia, sepsis and endocarditis. We report here a case of hepatocellular carcinoma who had fatal septicemia with *Streptococcus gallolyticus* subsp. *pasteurianus*.

Case summary:

A 57-year-old Indian male, a case of hepatocellular carcinoma with partial hepatectomy, admitted to the Kuwait Cancer Control Center with fever, difficulty in breathing, cough and vomiting. On examination, he was febrile (38.4°C), tachypnoeic and jaundiced. Computerized Tomography of chest and abdomen revealed a right sided pleural effusion, fluid collection in the lesser sac, portal vein thrombosis, extensive parenchymal disease in the remaining liver and common bile duct dilatation. His WBC count was $14.7 \times 10^9/l$, platelets $474 \times 10^9/l$, procalcitonin 2.9 ng/l, total and direct bilirubin were 28 $\mu\text{mol/l}$ and 16.7 $\mu\text{mol/l}$, respectively. Blood from both central and arterial line sent to the microbiology lab, Ibn Sina Hospital for culture grew Gram-positive cocci in chains. He was started accordingly on IV vancomycin 1 g bd. The isolate was identified by Vitek 2 as *Streptococcus gallolyticus* subsp. *pasteurianus*, susceptible to penicillin, amoxicillin/clavulanic acid, erythromycin, teicoplanin and vancomycin. Unfortunately before the therapy could be changed to penicillin, the patient expired due to multi-organ failure and septic shock.

Conclusion:

Streptococcus gallolyticus subsp. *pasteurianus* is a common cause of septicemia and meningitis. It is the first case, however in the Kuwait Cancer Control Center in a patient with underlying malignancy.

Key Words: *Streptococcus gallolyticus* subsp. *pasteurianus*; septicemia; hepatocellular carcinoma



Microbiology, Virology and Immunology

Category: Clinical

255

Clinical course of meningitis due to *Listeria monocytogenes* in an immunocompetent and an immunocompromised patient: a study of two cases.

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CASE REPORT

Background:

Human listeriosis caused by *Listeria monocytogenes* (LM) is a rare disease. In humans, LM infections are mainly food-borne and cause fatal disease in pregnant women, elderly and immunocompromised (ICP) individuals. In immunocompetent (IC) persons, infection produces self-limiting flu-like symptoms or serious infections. We present two clinical cases, one of LM meningitis in a systemic lupus erythematosus (SLE) patient and in an IC patient.

Case summary:

Case 1: A 36-year-old Kuwaiti female presented with a history of high grade fever, nausea and transient loss of consciousness followed by fits for one day. She had SLE for the past 20 years and was on corticosteroids. On physical exam, she was febrile, conscious with neck rigidity. Laboratory data showed raised septic markers (WBC= 23.3×10^9 /L, PCT = 20.6 ng/ml, CRP=199 mg/L). Biochemical markers and cytology of CSF indicated pyogenic meningitis. While CSF culture grew LM, blood culture were negative. Patient was treated with ampicillin plus meropenem with full recovery.

Case 2: A 35-year-old female, a known case of bronchial asthma and gastritis, was admitted with a history of severe recurrent episodes of headache and vomiting for one week. Physical examination revealed a conscious and afebrile patient. Laboratory data showed that the septic markers were within normal limits; however, CSF culture yielded growth of LM even when the cytology and biochemical results were normal. Blood culture proved negative for LM. Patient was treated with ampicillin plus gentamicin with immediate recovery and was discharged after one week on oral trimethoprim/sulfamethoxazole to complete 3 weeks of therapy.

Conclusion:

LM should be included in the differential diagnosis of SLE patients with neurological manifestations and in patients on gastric acid inhibitors. Identification of risk factors for sporadic cases can help direct public health actions to prevent listeriosis.

Key Words: *Listeria monocytogenes; immunocompromised patient; meningitis*



Microbiology, Virology and Immunology

Category: Graduate (Resident)

256

Recurrent meningitis and brain abscess due to infected fibrin glue sealant following functional endoscopic sinus surgery

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CASE REPORT

Background:

The most frequently affected sites of cranial complications of functional endoscopic sinus surgery (FESS) are the boundaries between the anterior and posterior ethmoid roof, the frontal recess and the cribriform plate. Serious complications post FESS are rare, one of them being cerebrospinal fluid (CSF) leak while other less often reported are frontal lobe injury, subarachnoid hemorrhage, pneumocephalus and meningitis. We report a case of recurrent meningitis with brain abscess in a patient who underwent FESS for chronic sinusitis two years ago.

Case summary:

A 22-year-old Kuwaiti male patient underwent FESS in 2013 for chronic sinusitis, nasal polyp and deviated nasal septum. During surgery CSF leak occurred, which was repaired with fibrin glue sealant. In late 2015 he was admitted with fever, headache and photophobia. Biochemical tests and cytology of CSF sample indicated pyogenic meningitis. However, culture of CSF did not yield growth of any microorganism. Patient was discharged a week later after being successfully treated with ceftriaxone, vancomycin and dexamethasone although MRI of brain showed ethmoidal fungal sinusitis extending to left cribriform plate and floor of anterior cranial fossa reaching left frontal lobe. Ten days later he was re-admitted with similar presentation and this time CSF culture grew *Pseudomonas aeruginosa*. He received therapy with piperacillin/tazobactam to which he responded. Repeat MRI of brain revealed a brain abscess, which was empirically treated by adding gentamicin and metronidazole to the regimen. Revised ESS revealed infected fibrin glue.

Conclusion:

Despite the huge development in surgical instrumentation and surgical abilities, serious post-ESS complications can still occur. To the best of our knowledge, our patient represents a unique case who developed delayed complication of recurrent meningitis and brain abscess, not reported earlier in the literature.

Key Words: Brain abscess; Recurrent Meningitis; Functional Endoscopic Sinus Surgery



Microbiology, Virology and Immunology

Category: Clinical

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***Moraxella osloensis* causes bacteraemia in an immunocompetent child**

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CASE REPORT

Background:

Moraxella osloensis is a rare cause of sepsis, central nervous system infection, chest infection and endophthalmitis. It is an environmental inhabitant, causing infection mostly among the immunocompromised persons. It is difficult to be identified in the Clinical Microbiology laboratory using the usual phenotypic tests.

Case summary:

An eight year-old previously healthy non-Kuwaiti boy presented to the Paediatric Casualty of Sabah Hospital with frontal headache and fever. A Gram-negative coccobacillus was isolated in blood culture but VITEK-2 could not identify it. API-NE identified it as *Weeksella virosa*/*Empedobacter brevis* (Confidence level 80.3%) or *Moraxella lacunata* (10.4%). Bacterial antigen test (latex-based) performed on the bacterial colonies was positive for *Neisseria meningitidis* A/Y. It was identified as *Moraxella osloensis* using Matrix Associated Laser Desorption/Ionisation-Time of Flight mass spectrometry (MALDITOF) (Confidence level 99.9%), and further confirmed by 16S rRNA gene sequencing. The child responded well to ampicillin and was discharged home after four days on oral amoxicillin-clavulanic acid for the next seven days.

Conclusion:

M. osloensis is a rare cause of bacteraemia. It may masquerade as *N. meningitidis* in the routine tests performed in the routine microbiology laboratories. It is imperative to confirm the identification with a molecular method to remove the false alarm. To our knowledge, it is the first report from Kuwait. 16S rRNA gene sequencing was supported by Kuwait University grant SRUL02/13

Key Words: *Moraxella osloensis*; Gene sequencing; Bacteraemia



Neurology

Category: *Clinical*

258

A case of anti-GAD65 seropositive limbic encephalitis presented by sudden seizures and cognitive deterioration: a case report

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CASE REPORT

Background:

Limbic encephalitis is a rare disorder that affects the mesial structures of the temporal lobes. Most common non paraneoplastic antibodies associated with limbic encephalitis are Voltage gated potassium channel antibodies and GAD receptor antibodies.

Case summary:

A 22-year-old right handed female, previously healthy, married with one child, referred for difficult to treat seizures and short term memory loss. History started 6 months ago with a focal seizure involving the right side of the body. Then, she had brief spells of inability to understand people talking and behavioural arrest. 2 months later, she had a GTC with severe post ictal psychosis after which Levetiracetam started. Then she complained of multiple daily Déjà vu spells reaching 20 per day and severe short term memory affection. Her EEG showed frequent Frontal Intermittent Rhythmic Delta Activity. She also had independent bitemporal seizures. Initial MRI showed abnormal signal involving both mesial temporal structures. Brain PET showed reduction of FDG isotope uptake over the both mesial temporal structures. A full paraneoplastic, autoimmune, vasculitic workup showed high anti-GAD65 blood IgG titer of 1: 1000. The patient was started on a 5-day course of IVIG (0.4 g/kg/day) and received 6 courses. The patient improved after the 4th course, she stopped having partial complex seizures and Déjà vu spells. The family noticed a 70 % improvement in memory.

Conclusion:

Autoimmune encephalitis is an often underdiagnosed entity that should be suspected in patients with atypical clinical presentation often presenting with difficult to treat seizures, psychiatric manifestations, bilateral mesial temporal involvement and a relatively short disease duration.

Key Words: Anti-GAD65 limbic encephalitis, limbic encephalitis; Non-paraneoplastic syndrome, seizures; Cognitive deterioration



Neurology

Category: *Clinical*

259

Acute abnormal movements and psychiatric manifestations started in a 5 ½ years old girl due to anti-NMDAr encephalitis: a case report

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CASE REPORT

Background:

Anti-N-methyl-D-aspartate receptor (anti-NMDA-R) encephalitis is an immune-mediated syndrome that remains under-recognized despite a growing body of literature. This syndrome has been predominantly described in young females with a constellation of symptoms, including personality changes, autonomic dysfunction and neurological decompensation. It is commonly associated with mature ovarian teratomas.

Case summary:

A case of 16-year-old girl which first presented at age of 5 ½ years by abnormal movements in her lower limbs, severe aggressive behavior, seizures and severe cognition and speech deterioration with slow intermittent progressive course. She was treated by pediatricians by antiepileptic and antipsychotic drugs but no response was achieved. She was diagnosed in the epilepsy monitoring unit at age of 13 years by her vEEG abnormality pattern, positive titres of anti-NMDA antibodies in blood and CSF, and the abnormal brain PET scan study.

Conclusion:

She was successfully treated by regular courses of IV immunoglobulins and steroid sparing agents like Mycophenolate with full recovery of her neuropsychiatric symptoms.

Key Words: anti-NMDAr encephalitis; psychosis, seizures; immune-mediated encephalitis, ovarian teratoma



Nuclear Medicine and Radiology

Category: *Clinical*

260

Acute pelvic compartment syndrome

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CASE REPORT

Background:

Pelvic compartment syndrome is rarely described and is most commonly associated with pelvic trauma and anticoagulation. Hessmann first described it in 1998. Only about 10 cases have been reported in a search of medical literature. Bilateral ureteral obstruction due to traumatic pelvic hematoma and increased pressure in the retroperitoneal space constitute an acute pelvic syndrome. By here we present a rare case of acute pelvic compartment syndrome with review of the existence literature.

Case summary:

An 88 years old female patient known case of IHD, CKD, DM and MVR was admitted as a case of syncopal attack with history of trauma associated with lacerated scalp and facial hematoma. CT brain was negative and carotid Doppler showed left ICA 71-79% stenosis. She was on warfarin for MVR and was started on enoxaparin. Patient developed frank hematuria and there was drop in hemoglobin. Full blood count showed evidence of thrombocytopenia. In addition there was severe deterioration in her renal function, which required renal dialysis. CT abdomen was requested for evaluation of the patient. The findings of the CT abdomen were consistent with acute pelvic compartment syndrome.

Conclusion:

Pelvic compartment syndromes are rare but just as serious as the more common compartment syndromes requiring high vigilance for diagnosis and surgical decompression for treatment. Radiological imaging plays essential role in the diagnosis of pelvic compartment syndrome as is emphasized in this case report. Good clinical judgment and early radiological evaluation are valuable for successful management of the patient.

Key Words: Acute pelvic compartment syndrome; Trauma; Anticoagulation



Nuclear Medicine and Radiology

Category: *Clinical*

261

An unusual presentation of primary hyperparathyroidism: Sphenoidal brown tumor associated with epistaxis

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CASE REPORT

Background:

Primary hyperparathyroidism is the most common cause of hypercalcemia in the ambulatory setting. Due to improvement in the laboratory diagnosis it is nowadays, often discovered accidentally while the patient is still asymptomatic. Brown tumors are osteolytic bone lesions that occur as a result of persistent hyperparathyroidism. They usually appear late in the natural history of the disease and are currently very rare due to an earlier diagnosis of primary hyperparathyroidism. Most common affected sites are mandible, maxilla, clavicle, ribs, and pelvic bones. Sphenoidal sinus is an extremely rare location of brown tumors and only less than 5 cases are reported in the medical literature. In addition epistaxis is uncommon presentation of the primary hyperparathyroidism

Case summary:

A 24 years old man known case of hyperparathyroidism due to parathyroid adenoma was admitted with pathological fracture of the RT humerus and second day of admission the patient developed epistaxis and was referred to our department for CT facial bones and sinuses. The CT revealed a mass lesion located in the left sphenoid sinus with the appearance compatible with brown tumor. As mentioned above sphenoid sinus is a very rare location for brown tumor which was discovered due to unusual presentation of epistaxis.

Conclusion:

Brown tumor is a benign clinical entity appearing as a skeletal manifestation of hyperparathyroidism. It is rarely located in the sphenoid sinus, and it is an extremely uncommon cause of epistaxis.

Key Words: Sphenoidal brown tumor; Hyperparathyroidism; Epistaxis



Nuclear Medicine and Radiology

Category: *Clinical*

262

Coronary CT angiography: Extra-cardiac findings

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CASE REPORT

Background:

Coronary CT angiography is a widely accepted non-invasive or minimally invasive diagnostic imaging modality to investigate chest pain in low risk patients for ischemic heart disease. Special patient's preparation and imaging protocols are applied. Pre IV contrast images are obtained for calcium scoring and post IV contrast images are obtained applying retro- or prospective ECG gating. Dedicated cardiac CT soft wares are available for analysis and post imaging processing. The main indications for coronary CTA include chest pain in low risk patients for IHD, assessing grafts after CABG, and checking for coronary arteries anomalies. Extra cardiac findings are commonly encountered as incidental findings in some cases and as the main cause of clinical presentation in other patients. These findings should be reported for further management.

Case summary:

In this case report we present some of the cases who underwent coronary CTA in the department of clinical radiology in Mubarak Al-Kabeer Hospital as part of investigations for chest pain. Extra-cardiac findings include lung findings (interstitial lung disease, pneumonia, mass, nodules, pleural thickening, and pleural effusion), hiatus hernia, liver mass lesions, and bones lesions. The degree of atherosclerotic disease in coronary arteries in these cases varies from completely normal to significant disease warranting intervention. A literature review of such reported cases is presented also.

Conclusion:

Radiologists practicing coronary CTA should be keen about reporting extra-cardiac findings. Dedicated paragraph should be included in radiology reports for proper management.

Key Words: CT (Computed Tomography); Cardiac CT, Coronary CTA; Coronary arteries, extra-cardiac findings



Nuclear Medicine and Radiology

Category: Clinical

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CO Poisoning: Brain radiology findings and literature review

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CASE REPORT

Background:

Carbon monoxide (CO) is colorless and odorless, but highly toxic. It can cause anoxic ischemic encephalopathy. The neurotoxicity can lead to acute as well as delayed effects. Binding with hemoglobin and production of carboxy-hemoglobin explains the acute symptoms. CO interferes with mitochondrial oxidative phosphorylation which can lead to delayed effects of CO poisoning. Symptoms of CO poisoning include headache, nausea, vomiting, dizziness, fatigue, and a feeling of weakness. Neurological signs include confusion, disorientation, visual disturbance, syncope (fainting), and seizures. Radiology plays a major role in initial diagnosis and follow-up of CNS-related effects of CO poisoning. Certain findings can be seen on CT and MRI of brain that should raise the possibility of CO poisoning in the proper clinical setting. Typical findings on NCCT of brain are bilateral symmetrical hypodense globus pallidus and diffuse hypo-attenuation in cerebral white matter. On brain MRI, affected areas elicit low signal intensity (SI) on T1 WI, high SI on T2/T2 FLAIR WI, and restricted diffusion on DWI and ADC mapping. Intra-axial hemorrhage may develop as a sequel of anoxic brain injury.

Case summary:

Young male patient presented to ER in Mubarak Al-Kabeer Hospital unconscious with GCS of 6/15. Urgent NCCT brain revealed typical findings of bilateral symmetrical hypodense globus pallidus and diffuse brain edema. These findings were the key to diagnosis of CO poisoning with evidence of hypoxic ischemic encephalopathy which was confirmed later by history and lab work up. Follow up brain MRI and CT revealed progression of the findings and development of multiple intra-axial hemorrhagic foci. Literature review of typical findings related to CO poisoning in brain CT and MRI is discussed also.

Conclusion:

CO poisoning is a critical diagnosis to be made. Radiologists should be familiar with typical imaging findings to help in proper clinical management.

Key Words: Carbon Monoxide (CO); CT (Computed Tomography), MRI (Magnetic Resonance; Brain Toxicity



Nuclear Medicine and Radiology

Category: Clinical

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Hypertrophied anterior commissure in a case of obsessive compulsive disorder, newly described radiological finding

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CASE REPORT

Background:

Obsessive compulsive disorder (OCD) is a chronic and disabling neuropsychiatric disease characterized by recurrent intrusive thoughts and ritualized, repetitive behaviors. The anterior commissure (AC) is a white matter connecting the two cerebral hemispheres. It consists of anterior (olfactory) and posterior (temporal) limbs. The anterior limb is a much smaller and connects the olfactory bulbs and the inferior posterior orbital gyri. Fibers of the posterior limb, which forms the major neocortical portion of the AC, projects to the amygdala, temporal pole, parahippocampal, inferior temporal and fusiform gyri. The anterior limb forms an open U- and the posterior limb makes an opposed flattened M-shape when viewed in the MRI axial plane.

Case summary:

We present a case of a 13-year-old boy with OCD, who was referred for an MRI brain investigation. On reviewing the images, a hypertrophied AC with preserved signal intensity was noted. No abnormal enhancement or diffusion restriction could be detected. Similarly, no abnormal enlargement of the corpus callosum (CC) or amygdala. The images were further compared with MRI images of healthy subjects of the same age and gender.

Conclusion:

This case is consistent with our understanding of OCD as a complex disease involving the cerebral white matter (WM). Compared with healthy controls, OCD patients typically show lower WM volume in the left dorsolateral and cingulate regions involving the superior and middle frontal gyri and the anterior cingulate gyrus. Although, previous studies did not reveal any significant correlation between WM and the severity of OCD symptomatology. To our knowledge, this is the first report of hypertrophied AC in a child with OCD. Also it is the first case of hypertrophied AC with normal sized CC. This case report points to the possible role of the enlarged AC in OCD with normal CC. It also highlights the importance of the emerging new radiological imaging in the psychiatric diseases examination.

Key Words: Anterior commissure; Obsessive compulsive disorder; MRI



Nuclear Medicine and Radiology

Category: Clinical

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Diffuse idiopathic skeletal hyperostosis as a cause of progressive dysphagia, a case report

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CASE REPORT

Background:

Diffuse idiopathic skeletal hyperostosis (DISH) also known as Forestier's disease, is an idiopathic rheumatological abnormality in which exuberant ossification occurs throughout the body, but most notably the anterior longitudinal ligament of the spine and usually diagnosed by plain radiography. It is usually asymptomatic, however, rarely, may cause dysphagia, hoarseness, dyspnea, and stridor. We report a case of DISH as a cause of progressive dysphagia.

Case summary:

A 66-year-old woman was referred to a surgical outpatient clinic for difficulty swallowing solid foods. The dysphagia had worsened gradually over the last 3 months. She had no history of smoking or alcohol intake. An upper gastrointestinal tract showed calcification along the anterior aspect of cervical vertebra compressing the posterior wall of the hypopharynx. Computed tomography (CT) showed anterior ossification anterior to vertebral body cortex extending from C3 to C7 and impinging on the hypopharyngeal region. A space was clearly visible between the ossification and the spine, establishing that the extrinsic compression was due to ossification of the anterior longitudinal ligament (ALL). Endoscopy showed the posterior bulge in hypopharyngeal region consistent with extrinsic compression. There was relative preservation of disc spaces. Facet joints and sacroiliac joints were normal. Imaging features were diagnostic of DISH.

Conclusion:

Diffuse idiopathic skeletal hyperostosis (Forestier's disease) should be considered as a rare cause of progressive dysphagia. The diagnosis can be reliably made by imaging. The decision regarding surgical versus conservative treatment depends on severity of symptoms and degree of compression on esophagus.

Key Words: Diffuse Idiopathic Skeletal Hyperostosis (DISH); Forestier's disease; Dysphagia



Nuclear Medicine and Radiology

Category: *Clinical*

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Tracheobronchial injury due to road traffic accident: A case report.

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CASE REPORT

Background:

Most traumatic tracheobronchial injuries (TBI) are fatal and cause increased morbidity and mortality in the cases of road traffic accidents. TBI represent less than 2% of trauma related injuries and are difficult to diagnose in severe multiple trauma patients. The availability of emergency CT has facilitated the diagnosis and proper detection of tracheobronchial injury which is extremely important for prompt patient management.

Case summary:

A 17-year-old teenager sustained multiple injuries after road traffic accident as a front wheel driver in car collision. Chest x-ray revealed bilateral pneumothorax and bilateral intercostal drains were inserted. He underwent emergency CT, which revealed bilateral pneumothorax, pneumo-mediastinum with surgical emphysema extending from the neck to the scrotal region. Reformatted CT images in sagittal and coronal planes revealed a defect in the right anterior wall of the trachea and in the right main bronchus. Initial bronchoscopy done twice could not detect the defect in trachea. However, after CT findings were demonstrated to the thoracic surgeons, repeat bronchoscopy evaluation performed in view of CT findings confirmed TBI. Patient underwent right thoracotomy and TBI was repaired. After surgical repair of TBI, patient improved clinically and after 6 months went back to army job and is currently doing well.

Conclusion:

Tracheobronchial injuries are rare. Early and careful diagnosis of these injuries by CT followed by prompt surgical management plays a crucial role in reducing morbidity and mortality in patients with these types of injuries.

Key Words: Tracheobronchial injury; Road traffic accident; CT scan



Nuclear Medicine and Radiology

Category: *Clinical*

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Omental torsion and infarction with left sided inguinal hernia

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CASE REPORT

Background:

Torsion of the greater omentum is a rare cause of acute abdomen, the cause of which is not well known. The majority of cases have right-sided torsion and left-sided torsion is rare. A concentric or spiral pattern of omental fat and the vascular pedicle has been described in the diagnosis of this lesion. We present a case of torsion and infarction of the omentum with left- sided hernia.

Case summary:

A 65-year-old man presented to the emergency unit with persistent and increasing left lower quadrant pain and palpable mass of 4 days duration. A non-enhanced abdominal CT scan demonstrated the fatty mass consistent with the omentum within left inguinal hernia including streaks in a whirling pattern. Surgical exploration confirmed the infarction of the omentum. We report a case of infarction and torsion of left sided inguinal omental hernia with typical whirling pattern on CT which proven surgically and pathologically.

Conclusion:

We reported the specific computed tomography signs for the infarcted twisted omental hernias.

Key Words: Omentum; acute abdomen; spiral computed tomography



Obstetrics and Gynecology

Category: *Clinical*

268

Unusual case of pelvic hydatid cyst of broad ligament mimicking an ovarian tumor

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CASE REPORT

Background:

The diagnosis of hydatid cyst in female genital tract is rare and difficult. Of the 51 cases of hydatid disease reported in Kuwait between 1956-1960, only one was located in the pelvis. In that study the majority of patients were immigrants from other countries such as Iraq, Iran, Saudi Arabia and Jordan; only 5 (2.6%) patients were Kuwaitis. The pelvic organs in females are rarely the primary site of cyst formation. Bickers et al, after reviewing 532 cases of hydatid disease from an endemic area over a 20-year period, recorded 12 instances where hydatid cysts were present in the pelvis, only 2 of which were in the broad ligament. The objective of this presentation is to highlight a pelvic hydatid cyst mimicking ovarian tumor.

Case summary:

A 22-year-old female, presented with constipation and hematuria with acute urinary retention from the pressure effect of a cystic mass in the lower part of the abdomen. On abdominal examination, a mass measuring 15x13 cm was palpable in the left iliac region reaching to the umbilicus which had smooth surface, was movable and non-tender. A provisional diagnosis of ovarian teratoma was made pre-operatively. During laparotomy it was found to be a cystic mass. Histopathology report of frozen section macroscopic diagnosis revealed a left broad ligament cystectomy. Gross features were consistent with hydatid cyst; the cystic wall was white and there were multiple small thin wall daughter cysts. Microscopic diagnosis with paraffin sections showed cystic lesions with laminated wall and scolices in the daughter cyst. Serology test using indirect haemagglutination test was positive with a reading of 128 IU. The patient responded well to surgical excision followed by albendazole administration.

Conclusion:

This case highlights the fact that a pelvic hydatid disease may resemble neoplastic ovarian cyst, clinically and radiologically. The possibility of pelvic hydatid disease should be included in endemic areas where differential diagnosis of cystic ovarian lesions is needed so that the patient can be managed accordingly.

Key Words: Hydatid cyst; broad ligament; ovarian tumor



Pathology

Category: Graduate (Resident)

269

Congenital pulmonary lymphangiectasia

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CASE REPORT

Background:

Congenital pulmonary lymphangiectasia (CPL) is a rare disorder of unknown etiology characterized by dilatation of pulmonary lymphatics. It is associated with a high perinatal mortality rate and was considered in the past as invariably fatal. Primary and secondary variants of the disease exist. The former is confined to the lungs or as part of a generalized lymphatic malformation. Secondary CPL is a complication of a variety of heart abnormalities, and/or lymphatic obstruction. The objective of this report is documentary. A case of primary CPL which was recently diagnosed in a Kuwaiti individual is presented. Although the condition was not clinically suspected, the aggressive management is considered an important contributory factor to the survival of the baby.

Case summary:

This preterm male neonate developed respiratory distress soon after birth. His management included continuous positive airway pressure within three hours after birth. His clinical course was complicated by bilateral sequential pneumothorax, pneumomediastinum and hypotension. On each occasion, the pneumothorax was successfully managed with chest tube. Chest x-ray showed cystic changes in the right upper lung lobe. A diagnosis of congenital pulmonary airway malformation (CPAM) was made and a lobectomy was carried out. Pathological examination of the resected lung lobe showed dilatation, without proliferation, of the lymphatics in the sub-pleural, interlobular septal, perivascular and peribronchial areas. A diagnosis of CPL was made.

Conclusion:

The report confirms the assertion that aggressive management has resulted in improved survival of a condition which was once considered invariably fatal. Lack of awareness of the condition might have contributed to the clinical diagnosis of CPAM – a relatively more common disorder. Pneumothorax was a red herring and was most likely secondary to the CPAM.

Key Words: Congenital; Pulmonary; Lymphangiectasia



Pathology

Category: Graduate (Resident)

270

Unusual myoepithelial carcinoma of soft tissue

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CASE REPORT

Background:

Myoepithelial neoplasms are usually encountered in salivary glands, sweat glands and breast and are composed of cells with a dual epithelial and smooth muscle phenotype. In recent years, primary soft tissue neoplasms with morphologic, immunohistochemical, and ultrastructural features of myoepithelial differentiation have been increasingly recognized. They affect all age groups and commonly arise in the soft tissues of limbs. Similar to their salivary gland counterparts, the primary soft tissue neoplasms range from benign to overtly malignant myoepithelial carcinoma which demonstrates an aggressive biological behavior. Immunohistochemically, these tumors express myoepithelial markers and may show loss of INI1 expression. Around 50% of cases show EWSR1 gene rearrangement. Here is a report of a rare case of myoepithelial carcinoma diagnosed at Kuwait Cancer Control Center.

Case summary:

A 36-year-old female was found to have a para-spinal soft tissue mass in the muscular compartment. Pathological examination revealed a cellular tumor composed of small round to epithelioid cells arranged in islands, trabeculae and pseudopapillae with hemangiopericytoma-like vascular pattern. The cells are relatively uniform showing scant amphophilic cytoplasm, vesicular nuclei and easily identifiable mitotic figures. Immunohistochemical testing showed positivity for GFAP, S100, and EMA, compatible with myoepithelial differentiation. However, INI1 expression was intact and FISH studies were negative for EWSR1 gene rearrangement. The patient is lost to follow-up.

Conclusion:

We report an unusual soft tissue tumor that did not conform to any of the well-characterized sarcomas of soft tissue. This tumor was best regarded as a myoepithelial carcinoma, based on the histological features and immunohistochemical phenotype. The lack of EWSR1 gene rearrangement does not exclude this diagnosis as the molecular mechanisms underlying these intriguing neoplasms remain to be established.

Key Words: Myoepithelial neoplasms; Soft tissue; Carcinoma



Pathology

Category: Graduate (Resident)

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Uterine leiomyosarcoma with osteosarcomatous dedifferentiation

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CASE REPORT

Background:

Leiomyosarcoma is the most common sarcoma of the uterine corpus, however, uterine dedifferentiated leiomyosarcoma remains a poorly characterized entity. It can be defined as the occurrence of a high-grade undifferentiated sarcoma in association with a lower-grade sarcoma that demonstrates morphologic and immunophenotypic evidence of myogenic differentiation. Occasionally, the high-grade area shows extensive heterologous elements that can be problematic. Previous reports indicate aggressive biological behavior and poor prognosis. Herein, we report a case of uterine leiomyosarcoma with features of dedifferentiation in the form of osteosarcomatous heterologous elements.

Case summary:

A 35-year-old lady who presented with menorrhagia was found to have a large uterine mass on imaging studies. The patient underwent total abdominal hysterectomy with bilateral salpingo-oophorectomy. Histological examination showed malignant-looking spindle to epithelioid cells growing in sheets and vague fascicular pattern admixed with numerous multinucleated osteoclast-like giant cells. Osteoid matrix was identified deposited in a lacy trabecular pattern with focal calcification compatible with osteosarcomatous differentiation. Focally, an abrupt transition into a lower grade spindle cell sarcoma was seen, composed of interlacing fascicles of cigar-shaped nuclei in keeping with conventional leiomyosarcoma. The low-grade area was diffusely positive for smooth muscle actin and h-caldesmon and focally positive for desmin. The high-grade component showed focal equivocal positivity for all three myogenic markers. The patient had metastatic peri-appendiceal and omental tumor deposits.

Conclusion:

Uterine dedifferentiated leiomyosarcoma is a rare and controversial entity characterized by aggressive clinical course. Thorough examination of the resected specimen and extensive sampling are important as the low-grade component may be minute and easily overlooked.

Key Words: Dedifferentiated; leiomyosarcoma; Heterologous; osteosarcomatous differentiation; Uterus



Pathology

Category: Clinical

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Mesenteric tumour - not always GIST

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CASE REPORT

Background:

Mesenteric fibromatoses (MF) are defined by the World Health Organization as clonal fibroblastic proliferations that arise in deep soft tissue and may mimic a gastrointestinal stromal tumor (GIST). Differentiating between these two entities is important clinically because intraabdominal fibromatoses are characterized by infiltrative growth pattern and tendency towards local recurrence but do not metastasize (Fletcher et al. 2002), whereas GIST does metastasize.

Case summary:

A 55-year-old male presented with 5 days history of increasing abdominal pain in the right upper quadrant, and abdominal distention associated with nausea, vomiting and constipation. Computed tomography (CT) showed two large lobulated exophytic solid heterogeneous soft tissue masses with necrotic areas adjacent to each other which seemed to arise from the ascending colon with compression of adjacent vessels. Mass resection and right hemicolectomy was performed. Histopathological examination of the tumor showed sweeping fascicles of spindle cells, with smooth nuclear membranes and delicate nucleoli and, occasional cells with stellate cytoplasmic contours. There was uniform distribution of collagen with focal colloid-like collagen and prominent vascular pattern. The overlying colonic mucosa was uninvolved. The tumor cells were positive for B-catenin and negative for CD117, DOG-1, CD34, SMA and S-100. Ki67 showed a low proliferation index.

Conclusion:

Mesenteric fibromatosis (MF) is a very rare tumour, which is often mistaken for GIST, a more common and more malignant tumour. Immunohistochemistry (IHC) is essential in differentiating between them as both (GIST 95%; MF 70%) express CD117 that is most often associated with GIST. A wider panel of antibodies including B-catenin as utilized in this case is essential for the distinction between the two.

Key Words: Fibromatoses; Mesenteric; GIST



Pathology

Category: Clinical

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Pediatric nasopharyngeal carcinoma: cervical lymph node metastasis diagnosed by FNA cytology

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CASE REPORT

Background:

Pediatric nasopharyngeal carcinoma (NPC) is a relatively rare entity which represents a locally advanced undifferentiated tumor with a great propensity to metastasize to regional nodes, unilateral cervical lymphadenopathy being the most common mode of presentation. Fine-needle aspiration (FNA) cytology has been utilized in case of metastatic NPC as evident from a few reports. We describe the FNA cytologic diagnosis of a pediatric NPC case metastasizing to cervical lymph node and the histopathological features of the primary lesion, which included a spectrum of progressive precancerous changes leading to invasive carcinoma.

Case summary:

An 11-year-old girl presented with cervical lymphadenopathy. Fine needle aspiration smears from a left cervical lymph node showed an undifferentiated malignant tumor with sprinkling of lymphocytes. A thorough nasopharyngeal examination was advised to rule out a primary lesion which was subsequently confirmed on endoscopy and CT scan. Histopathological examination of the nasopharyngeal growth showed a spectrum of epithelial abnormalities ranging from reserve cell hyperplasia and dysplasia to invasive undifferentiated carcinoma, which took origin from carcinoma in situ. The tumor cells were positive for pan-cytokeratin (pan-CK), epithelial membrane antigen (EMA) and p53. The KI67 index was high, staining >75% of tumor cells. There was negative reaction for Epstein-Barr virus nuclear antigen (EBNA), vimentin and leukocyte common antigen (LCA). Following chemo-radiation therapy the patient is free from local recurrence even after 11 years of follow-up.

Conclusion:

FNA cytology is a useful tool for the diagnosis of metastatic nasopharyngeal carcinoma. Histopathology demonstrated a rare finding of origin of invasive carcinoma from carcinoma-in-situ. The good prognostic outcome of this case may be attributed to young age at diagnosis and good loco-regional disease control.

Key Words: nasopharyngeal carcinoma; cervical lymph node metastasis; fine needle aspiration cytology



Pathology

Category: Graduate (Resident)

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Low-grade fibromyxoid sarcoma with hemangiopericytomatous vascular pattern

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CASE REPORT

Background:

Low-grade fibromyxoid sarcoma (LGFMS) is a rare but distinctive type of soft tissue sarcoma that, despite its deceptively bland morphology, is characterized by malignant behavior. LGFMS harbors a chimeric FUS/CREB3L2 gene resulting from a balanced translocation t(7;16)(q32-34;p11). Classical LGFMS is readily recognized on routine H&E sections but when the tumor displays unusual morphological features it may pose a diagnostic challenge. Herein, we report an unusual case of LGFMS with prominent hemangiopericytoma (HPC)-like vascular pattern.

Case summary:

An 18-year-old man was noted to have a swelling in the left forearm of 3 months duration. Imaging studies revealed a soft tissue mass measuring 5.5 x 4 x 4.5cm. A core biopsy was performed revealing a uniform low-grade spindle cell lesion with dilated and branching blood vessels imparting an HPC-like pattern, but no definite diagnosis was reached. Upon surgical resection the tumor was found to be relatively circumscribed and generally bland, comprised of alternating hyper- and hypo-cellular areas, & lacking significant cytological atypia, mitosis & necrosis. Metaplastic bone formation noted. The prominent HPC-like vasculature identified on the biopsy was also present and together with the alternating cellularity raised the suspicion of solitary fibrous tumor. An extensive panel of immunostains was performed and the tumor was found to be negative for CD34 and STAT6 excluding solitary fibrous tumor. MUC4 immunostain was positive and FUS gene rearrangement was detected by fluorescence in-situ hybridization (FISH), confirming the diagnosis of LGFMS.

Conclusion:

Prominent HPC-like vasculature is rarely seen as part of the histological spectrum of LGFMS confusing it with other entities such as solitary fibrous tumor; therefore pathologists should be aware of this pitfall. In this setting, MUC4 expression and FISH studies for FUS and CREB3L2 gene rearrangement are useful tools for confirming the diagnosis of LGFMS.

Key Words: Low-grade fibromyxoid sarcoma; Solitary fibrous tumor; Hemangiopericytomatous vascular pattern



Pathology

Category: Graduate (Resident)

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Unusual case of osteosarcoma: A case report

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CASE REPORT

Background:

Classic osteosarcomas are aggressive tumors of bone that commonly metastasize to the lung early in the course of the disease. Here we report a challenging osteosarcoma case that showed unusual metastatic pattern, slow clinical progression and unusual histopathological features.

Case summary:

In 2010, a 28-year-old female was found to have a large mass arising from the lower metaphysis of right fibula. Radiologically, the mass involved the surface of the bone and measured 12 x 5.8 x 4.7 cm. Parosteal osteosarcoma was suspected. On histology, classic features of parosteal osteosarcoma were lacking. Instead the tumor showed epithelioid cells with mild to moderate nuclear atypia but numerous mitoses along with lace-like osteoid deposition. The diagnosis of high-grade juxtacortical osteosarcoma was rendered & the patient underwent a below-knee amputation & chemotherapy. Then in 2013 the patient came back with a well-circumscribed hard mass in the soft tissues of left thigh. The excision specimen revealed peculiar mature ossification and low-grade bland spindle cells that did not match those seen in the fibular tumor. Subsequently in 2015 the patient presented again, this time with new masses developing in the soft tissues of the back and scalp. Similarly, these were well-circumscribed and showed low-grade morphology and mature ossification. Simultaneously, a solitary lung lesion was discovered on imaging and confirmed to be a metastatic deposit histologically.

Conclusion:

This osteosarcoma demonstrated 3 unusual features: (1) a relatively indolent clinical course compared to conventional osteosarcoma, (2) unusual metastatic sites including soft tissues of the thigh, back and scalp, and (3) a discrepancy between the histopathological features of the primary tumor and that of the metastatic deposits which is probably chemotherapy-induced. This relatively indolent osteosarcoma may represent a rare variant known as osteoblastoma-like osteosarcoma.

Key Words: Osteoblastoma; Osteosarcoma; Unusual



Pathology

Category: Graduate (Resident)

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Idiopathic pleuroparenchymal fibroelastosis: An under-recognized or misdiagnosed entity

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CASE REPORT

Background:

Idiopathic pleuroparenchymal fibroelastosis (IPPFE) is a rare interstitial lung disease of unknown etiology with a progressive clinical course. Histologically it is characterized by a predominantly upper lung lobe peripheral fibroelastosis. Till date no case has been reported from the Middle East. The objective of this report is to document the first case of IPPFE diagnosed in Kuwait. The patient is an Arab male ex-smoker whose symptoms lasted for more than 15 years prior to diagnosis.

Case summary:

A 54-year-old Kuwaiti man, an ex-smoker, presented at the respiratory service in 1998 with a complaint of prolonged episodes of bothersome, unproductive cough and heart burn of many years duration. His chest x-ray (CXR) was normal. The heart burn was controlled with anti-reflux measures. Despite use of antibiotics and steroid spray, the cough increased in frequency and intensity with time. In 2002, lung function tests and computerized tomography (CT) scan revealed restrictive impairment and apical and lateral pleural thickenings with minimal parenchymal lung disease respectively. Further deterioration of his clinical condition necessitated video assisted thorascopic biopsies in 2013 on a presumptive pre-surgical diagnosis of non-specific interstitial lung disease (NSIP). Pathological examination of the biopsies showed peripheral fibroelastosis consistent with IPPFE. About 1 month after surgery the patient was readmitted because of left sided pneumothorax which was successfully managed. No specific treatment was given for his lung condition. Till date, the patient remains symptomatic.

Conclusion:

This is the first case of IPPFE diagnosed in Kuwait and probably in the Middle-East. The curious association with GERD may have been a contributory factor to the delay in diagnosis.

Key Words: Interstitial Lung Disease; Idiopathic Pleuroparenchymal Fibroelastosis; Kuwait



Pathology

Category: Graduate (Resident)

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Ameloblastic fibro-odontoma: A case report

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CASE REPORT

Background:

Ameloblastic fibro-odontoma (AFO) is an odontogenic tumor most commonly affecting children and adolescents. It constitutes only 1.7% of all jaw tumors and has slight male to female predilection. According to the World Health Organization, AFO is classified as a benign tumor of odontogenic epithelium and ectomesenchyme with hard tissue formation. The nature of AFO is fraught with debate as some pathologists consider it hamartomatous while others argue it is neoplastic. The aggressive and destructive behavior reported in some cases and the fact that a malignant counterpart, ameloblastic fibro-odontosarcoma, was documented support the latter theory.

Case summary:

A 12-year-old boy suffered from a painless swelling of the right side of the mandible progressing over three months. Orthopantomograph and cone beam computed tomography revealed a large radio-opaque lesion surrounded by unilocular radiolucent zone with a well-defined sclerotic margin without any cortical perforation. The patient was operated under general anesthesia; the calcified mass itself was removed in several pieces to avoid excessive bone loss and the soft tissue envelope was curetted then the involved teeth were extracted. The lesion measured four centimeters in diameter and consisted of boney hard center with soft tissue fragments attached onto the periphery. The histological examination revealed islands of peripheral palisading columnar cells surrounding loose spindle cell epithelium. These were scattered in primitive looking stroma composed of stellate-shaped fibroblasts. Areas of well-formed dentin and enamel were also seen.

Conclusion:

AFO is an indolent benign tumor. Although rare, it is important to consider this entity when the sufferer is under the age of 20. The diagnosis of AFO is confirmed by histological examination after complete surgical enucleation of the tumor. Long-term follow-up of the patients is advised as recurrence and malignant transformation were reported.

Key Words: Ameloblastic; Odontogenic; Fibroodontoma



Pediatrics

Category: Clinical

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Toxic shock syndrome as pediatric emergency

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CASE REPORT

Background:

Toxic Shock Syndrome (TSS) is an acute, toxin-mediated illness that results in shock and multi-organ failure early in its clinical course. Causes include toxin-producing strains of *Staphylococcus aureus* and Invasive Group A *Streptococcus*. The diagnosis of Toxic Shock Syndrome is mainly clinical. Criteria for a confirmed case include: a patient with fever $>38.9^{\circ}\text{C}$, hypotension, diffuse erythroderm and skin desquamation plus involvement of at least three organ systems.

Case summary:

We had a case of TSS due to an MRSA strain. He was a 9 years old boy, admitted to Adan Hospital, Kuwait, with 2 days history of high grade fever, lethargy and persistent vomiting. He had a post traumatic left ankle sprain managed with splint. On physical examination, the patient was confused, tachypneic, pale with sweating. His temperature was 39.8°C , HR 130/minute and BP 80/50 mm Hg. He had bilateral conjunctivitis. There was a diffuse hyperemic rash all over his body with a big bulla 4×6 cm over his left heel. Other systemic examination was unremarkable. Laboratory results showed: leucocytic count $40.6 \times 10^9/\text{L}$ with 94% neutrophils, Hb 10.9 gm/dl, platelets $322 \times 10^9/\text{L}$, CRP 220 mg/L, ESR 39 mm/hr. Creatinine 75 $\mu\text{mol}/\text{L}$, BUN 9.9 mmol/L, sodium 131 mmol/L, bicarbonate 13 mEq/L, LFT was normal, CK 242 U/L. Urine showed WBCs 8-12/hpf and RBCs 10-15/hpf. Cultures of blood, stool, and urine samples were negative. Puncture of the bulla released 12 ml pus; culture of the pus showed MRSA strain. Treatment included aggressive IV fluid resuscitation and antimicrobial therapy (Cefotaxime and Vancomycin). The outcome was favorable. On the seventh day, the patient showed extensive peeling on both patient's hands. Our patient met the criteria of TSS in the form of: fever, disturbed level of consciousness, rash, desquamation, hypotension, vomiting, mucus membrane involvement and impaired renal function.

Conclusion:

The diagnosis of TSS is mainly clinical. The treatment must not be delayed till laboratory confirmation.

Key Words: Toxic; Shock; Criteria



Pediatrics

Category: Clinical

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Role of EEG in follow up patients with West syndrome

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CASE REPORT

Background:

West syndrome is an age-related specific epileptic encephalopathy due to diverse causes. It is characterized by a unique type of seizure called epileptic spasms and gross EEG abnormalities. The most characteristic EEG finding is hypsarrhythmia. Hypsarrhythmia is not found in all cases, nor is it found throughout the clinical course. Effective treatment for West syndrome should produce both cessation of epileptic spasms and resolution of hypsarrhythmia on EEG. It is called primary electroclinical outcome.

Case summary:

We are presenting two patients with West syndrome with different clinical and EEG courses of encephalopathy. Those subsequent recordings illustrates EEG patterns changes throughout epilepsy course and their correlation with clinical presentation.

1st case is boy with first at age of 3 month with clusters of tonic spasms, abnormal EEG evolving from focal to presentation hypsarrhythmia and showed predictors of poor outcome-early seizures, anterior predominance in hypsarrhythmia and persistence of epileptiform discharges after disappearing of hypsarrhythmia with variable drug and ACTH trial. He continuous with seizures.

2nd case had previous history of symptomatic focal seizures and development of spasms at age of 8 month with focal EEG pattern which latter on evolve into hypsarrhythmia. He was treated with Vigabatrin and ACTH which resulted with primary electroclinical outcome even it was symptomatic cause. His EEG showed predictors of good outcome during follow up- late onset of spasms, hypsarrhythmia with posterior predominance followed by EEG normalization. He is seizure free.

Conclusion:

EEG has very important role in follow up patients with West syndrome. Frequent EEG recording could help in predicting initial developing of spasms, response on treatment and seizure outcomes. Also it could be the basis for early specific treatment intervention what should be subject of further investigation.

Key Words: EEG; West syndrome; Epilepsy



Pediatrics

Category: *Clinical*

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Ketogenic diet in management of a child with FIRES: Beyond epilepsy control

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CASE REPORT

Background:

Febriile infection-related epilepsy syndrome (FIRES) is a catastrophic epileptic encephalopathy with a yet undefined etiology. The chronic phase of FIRES consists of drug-resistant epilepsy and neuropsychological impairment but there are reports of therapeutic success with ketogenic diet.

Case summary:

The patient was a totally normal child till the age of 5 years when he had an attack of high grade fever with status epilepticus. His seizures were refractory to the initial treatment measures and necessitated medically induced coma. He was diagnosed as fever induced epileptogenic encephalopathy (FIRES) with frequent convulsions despite adequate use of 3 antiepileptic drugs. The patient was thus started on classic ketogenic diet (KD) 3:1 by gastrostomy tube (GT) and over a short period his seizure frequency decreased dramatically. It was an easy task when he was on GT feeding since liquid formula provided our classic KD and his caloric needs were estimated relative to his growth rate. Few months later he suffered complications that necessitated removal of his GT but fortunately he was receiving physiotherapy and swallowing exercises. The patient was started on gradual increasing amounts of oral ketogenic formula. To keep his ketones at the desired level he was shifted to the ketogenic formula 4:1 and we successfully added ketogenic soup and pancakes to plan a daily menu. Two years follow up revealed proper seizure control regarding both severity and frequency and the patient didn't suffer any side effects from the KD. In addition, cognitive enhancement was noticed especially social interaction and bowel control. Decision to gradually withdraw the anti-epilepticus is the next step but with the cognitive improvement taking the patient off the KD will be a hard call.

Conclusion:

KD benefits for FIRES are well demonstrated in this young boy and the cognitive improvement noticed poses a novel reason to continue this management protocol beyond epilepsy control.

Key Words: Cognition; Epilepsy; Ketogenic diet



Physical Therapy
Category: Clinical

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Misdiagnosed vestibular dysfunction: Falling for life

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CASE REPORT

Background:

A 59-year-old female, retired university professor with a major complain of recurrent loss of balance and falling, and severe left knee pain. She has no diabetes or hypertension and leads a sedentary lifestyle.

Case summary:

The patient has a history of left breast cancer, underwent surgical and medical interventions on 2003. She has a history of multiple surgical repairs due to sustained injuries from falling in the past 20 years. Recently, she had a lumbosacral internal fixation for spondylolisthesis. Patient's major concern is pain and numbness in the left side of her body affecting her sleep and quality of life. She received several sessions of physical therapy with negative results. On examination, she has intact deep and superficial sensations, reduced muscle strength. She walks significantly slower than normative values. The score on the modified fall efficacy scale indicated that the patient has fear of falling. Also, the scores on the Balance Quest were indicative of vestibular dysfunction. When the patient was asked if she has a hearing impairment, she confirmed that she was prescribed a hearing aid that she does not use. The patient is on pain control medications. Our intervention focused on vestibular rehabilitation including strengthening exercises, gait and balance retraining, and fall prevention education. The patient was referred to an audiologist to manage her hearing impairment.

Conclusion:

There are significant improvements in patient's functional status, pain level, endurance, and overall quality of life. In addition, the patient stopped all pain medications and is leading a more active lifestyle. Fall-related injuries and complications for the past twenty years could have been prevented, if vestibular dysfunction was diagnosed earlier. More light should be shed on this issue to avoid misdiagnoses.

Key Words: Falling; vestibular dysfunction; pain



Surgery and Transplantation

Category: Clinical

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Intra-gastric balloon as a bridge for sleeve gastrectomy in a morbidly obese patient with liver steatosis

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CASE REPORT

Background:

It is common to have an enlarged liver in morbidly obese patients. One of the steps of sleeve gastrectomy is elevation of the liver to fully expose the stomach. However, an enlarged and fatty liver is prone for lacerations and puts the patient at a great operative risk.

Case summary:

A 67-year-old female who's morbidly obese (BMI above 60) with coronary heart disease, hypertension, diabetes and obstructive sleep apnea presented to our unit for sleeve gastrectomy. During attempt of surgery, the liver was fatty and enlarged and would have put the patient at severe risk if the surgery had continued. A decision was made to insert an intra-gastric balloon endoscopically instead after consent of the patient. After 6 months, the patient had lost 38 kilograms. The second attempt of surgery was successful as the liver had shrunken in size and the amount of fatty tissue in the area has majorly decreased.

Conclusion:

Intra-gastric balloon is an effective way for weight loss prior to sleeve gastrectomy, reducing both liver size and operative and postoperative complications

Key Words: Morbid Obesity; Sleeve Gastrectomy; Liver Steatosis



Surgery and Transplantation

Category: Clinical

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Renal fungal ball in immunocompromized patient

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CASE REPORT

Background:

Renal fungal ball is uncommon fungal disease among adult patients. It is difficult to treat and can lead to significant morbidity especially in immunocompromized patients.

Case summary:

A 37-year-old gentleman presented with loin pain, anuria, and uremic manifestation. Further workup showed evidence of obstructive uropathy complicated with bilateral hydronephrosis. Percutaneous nephrostomy was done to relieve the obstruction and patient improved gradually. The patient's obstructive uropathy was due to retroperitoneal fibrosis, which is an autoimmune disease that caused strictures in the ureters. The patient was subsequently started on systemic steroids and Rituximab which is genetically engineered monoclonal antibody. Few weeks later, he had another episode of obstructive uropathy, but this time imaging studies showed a filling defect in pelvi-calyceal system. Percutaneous nephrostomy was done and fluid sample collected from nephrostomy grew *Candida albicans* susceptible to fluconazole, and amphotericin B. The diagnosis of renal fungal ball was made and multidisciplinary team was initiated which involved urologist, interventional radiologist and medical microbiologist. The patient was treated with systemic fluconazole combined with Amphotericin B irrigation through nephrostomy tube and ureter stent was replaced. The patient made successful recovery and was discharged. After few months, he had a relapse of urinary tract *Candida* infection with subsequent ureter obstruction. Currently, patient is on long-term fluconazole and being followed by MD team.

Conclusion:

Fungal infections are generally regarded as opportunistic and primarily affects patients whose immune system is compromised. This case illustrates how fungal pathogens aggressively invade human body when his immunity is affected by steroids or new biological treatments. Managing such cases is really challenging but is certainly possible with the help of close and direct communication within a multidisc

Key Words: candida; urinary tract infection; fungal ball



Biochemistry

Category: Graduate MSc: Basic Science

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Novel aldosterone autocrine/paracrine mechanism in the adrenal cortex

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Introduction:

Adrenocortical tissues are organized into zona glomerulosa (ZG), zona fasciculata (ZF), and zona reticularis (ZR). ZG synthesizes aldosterone to regulate mineral homeostasis primarily through mineralocorticoid receptor (MCR)-mediated genomic effects on target cells. These cells express 11beta-hydroxysteroid dehydrogenase-2 (11betaHSD-2) to guard MCR from corticosterone interference. Rat adrenal reportedly expresses 11betaHSD-2 in ZF/ZR. ACTH-stimulation of adrenal corticosterone synthesis is accompanied by sustained aldosterone synthase protein level, up-regulated aldosterone production and MCR protein level. Thus, aldosterone may play an autocrine/paracrine role in regulating corticosterone synthesis. This study investigated adrenal MCR tissue expression and subcellular distribution.

Methods:

Wistar rats were injected with ACTH (30 microg/100g BW) or saline (control) for four consecutive days. Adrenals were harvested to prepare homogenates and subcellular fractions. MCR and 11betaHSD-2 proteins were studied by western blots. MCR tissue expression was investigated by immunohistochemistry. Statistical significance was determined by Student t-test.

Results:

MCR principally resided in ZG. Upon ACTH-stimulation, expression of MCR became intensified in the ZF/ZR. Both MCR and 11betaHSD-2 were primarily localized in microsomes. ACTH-stimulation did not alter 11betaHSD-2 protein level, neither induced a subcellular translocation of MCR into the nucleus.

Conclusions:

Adrenal MCR chiefly resides in ZG a different region from the ZF/ZR for 11betaHSD-2. Thus, the ZG-MCR is not protected by 11betaHSD-2, and can therefore be activated by both aldosterone and corticosterone. Only upon ACTH-stimulation, MCR and 11betaHSD-2 are able to 'meet' with each other in ZF/ZR. This permits aldosterone to influence corticosterone synthesis via MCR, perhaps predominantly through non-genomic mechanisms.

Key Words: Mineralocorticoid receptor; 11beta-hydroxysteroid dehydrogenase type-2; Autocrine/paracrine

Funding Agency: Supported by the College of Graduate studies and YM10/15



Community Medicine

Category: Undergraduate

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**Prevalence, Associated Factors, and Low Back Pain Disability
Assessment among Government Employees in Kuwait**

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Introduction:

Low back pain (LBP) can be defined as the pain, muscle tension, or stiffness localized below the costal margin and above the inferior gluteal folds, which is a common public health problem that may cause a lot of disability among people.

Methods:

In this cross-sectional study, 894 government employees were randomly selected from 6 ministries in Kuwait. A self-administered questionnaire was used to collect the socio-demographic data, and factors associated with pain. The Oswestry Disability Index was employed to assess the level of disability due to LBP.

Results:

The lifetime prevalence of LBP was 64.1%. Multivariate analysis revealed that compared to young aged (21-30) employees, older age group (31-40) were 1.9 [95% CI: 1.42-2.70] times at higher risk to suffer from LBP. Female and ever married employees were 1.64 & 1.87 more odds to develop LBP compared to men and to singles respectively. Sitting at work for >4 hours/day was a significant correlate to LBP compared to sitting for <2 hours/day (OR: 1.78, 95% CI: 1.12-2.84). Suffering from ≥ 2 chronic medical conditions placed participants at a higher risk for developing LBP (OR: 7.59, 95% CI: 4.28-13.47) compared with those who didn't suffer. Regarding the level of disability, majority of LBP sufferers (73.7%) showed minimal level. Older age, suffering from ≥ 2 chronic medical conditions, diagnosed with osteoporosis, and had a back surgery were significant correlates of severity of the disability. Among LBP sufferers, an average of 3 days of absenteeism/last 6 months, was reported.

Conclusions:

The lifetime prevalence of LBP among government employees in Kuwait was alarmingly high. Although, the level of disability due to LBP was mostly minimal, it could impair their productivity and increased absenteeism rates. These findings will provide policy makers with some information they need to plan policies and programs aiming to promote healthy working conditions to decrease related LBP.

Key Words: Low Back Pain; Prevalence; Government Employees

Funding Agency: Yes



Microbiology, Virology and Immunology

Category: Graduate PhD: Basic Science

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In vitro anticandidal activity of Amentoflavone

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Introduction:

The majority of commonly used antifungals and oral antimicrobial irrigant solutions have serious drawbacks in terms of toxicity to the host tissue, and their continuous use has led to the emergence of drug-resistant strains. Considering the drug resistance and safety concerns of synthetic drugs, the use of plant derived molecules to cure oral fungal infections might prove to be advantageous.

Methods:

Samples were collected from the patients through oral rinse technique. The samples were then inoculated on SDA plates containing chloramphenicol. Gram staining was used for general identification of *Candida*. The colonies were seeded on the surface of CHROMagar plates for presumptive identification of species. Species identification was also done through VITEK 2 system. Initial antifungal screening was done by determining the minimum inhibitory concentration of amentoflavone (plant-derived molecule) against different *Candida* species.

Results:

In gram staining the cells appeared round to oval. The cells retain the crystal-violet stain and appeared purple. CHROMagar medium better differentiated the color of colonies after 48 h of incubation. A typical green color was observed for *C. albicans*, metallic blue for *C. tropicalis*, and pink for *C. krusei* colonies. Out of the eleven clinical samples the VITEK yeast identification system identified four *C. albicans*, three *C. tropicalis*, one *C. krusei*, two *C. glabrata*, and one *C. dubliniensis* species. The MIC of amentoflavone against one reference strain (*C. albicans* ATCC 65881), and 11 different *Candida* isolates (clinical) ranged 31.25-125 µg/ml. Respective inhibition by fluconazole was in the range of 1.56-25 µg/ml.

Conclusions:

The MICs obtained gave a good evidence of the overall antifungal potential of amentoflavone. To conclude this study will form the basis for future research in the use of naturally occurring plant derived principles to eliminate the fungi involved in oral infections.

Key Words: Amentoflavone; Candida; Oral infection

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العلمي للتقدم الكويت مؤسسة عامة وخلفية مقدمة

تمتلك مؤسسة الكويت للتقدم العلمي سجلاً تاريخياً حافلاً يمتد نحو 37 عاماً من دعم وتعزيز التقدم العلمي والتكنولوجي في دولة الكويت. وفي عام 1976، تلقى قادة القطاعات الاقتصادية في البلاد توجيهاً سامياً من المغفور له بإذن الله الشيخ جابر الأحمد الجابر الصباح (ولي العهد ورئيس مجلس الوزراء آنذاك) يتعلق بإنشاء مؤسسة الكويت للتقدم العلمي. وبناء عليه، تم نشر مرسوم أميري في الجريدة الرسمية «الكويت اليوم» في 12 ديسمبر 1976، بإنشاء المؤسسة وتحديد شروطها المرجعية، كمؤسسة خاصة غير ربحية، تهدف في المقام الأول إلى دعم البحث العلمي على أعلى المستويات، وتشجيع الباحثين.

ويأتي إنشاء المؤسسة من الشعور العميق بالتقدير والعرفان نحو الوطن، ويعد إنشاء المؤسسة دليلاً على روح الخير المتأصلة في الشعب الكويتي ودعمهم للتقدم العلمي وتشجيعهم للعلماء.

ويدير المؤسسة مجلس إدارة، يترأسه صاحب السمو أمير البلاد، الشيخ صباح الأحمد الجابر الصباح، حفظه الله ورعاه. وتتلقى المؤسسة الدعم المالي من الشركات المساهمة الكويتية، التي تقدم كل منها مساهمة سنوية للمؤسسة بواقع 1% من صافي ربحها.

ويتمثل أحد أهم أهداف المؤسسة في ترويج وتعزيز تطوير العلوم في دولة الكويت من خلال دعم المشروعات العلمية، والمجتمع العلمي والبنية التحتية العلمية في البلاد.

وعلى الرغم من أن مؤسسة الكويت للتقدم العلمي، والمؤسسات العلمية المرتبطة بها في الكويت، قد حققت الكثير من الإنجازات، فإنه لا يزال هناك الكثير الذي يجب القيام به. فقد شهدت دولة الكويت نمواً متسارعاً نتيجة لإيراداتها النفطية المتزايدة على نحو ثابت، واليوم، يزيد نصيب القطاع العام عن 70% من الناتج المحلي الإجمالي، وتشكل الكوادر الوطنية أكثر من 85% من القوى العاملة في هذا القطاع. وهناك إجماع بين الجهات المساهمة في المؤسسة على أن هذا النمو



غير مستدام على المدى الطويل، وأن هناك حاجة الى وضع استراتيجيات وطنية بديلة للتنمية تركز على بناء اقتصاد تكميلي من القطاع الخاص يتسم بالكفاءة والمنافسة.

وإدراكاً لهذه الضرورة، تفضل حضرة صاحب السمو، أمير البلاد، الشيخ صباح الأحمد الجابر الصباح، حفظه الله ورعاه، بتكليف لجنة منتقاة من نخبة من الخبراء، تسمى «اللجنة العليا لتطوير البحث العلمي في دولة الكويت» في عام 2007 لمراجعة تنظيم وأداء عمليات البحث والتطوير، ورفع التوصيات فيما يتعلق بإعادة هيكلة مجالات العلوم والتكنولوجيا والإبداع، وتقديمها في دولة الكويت.

وقامت اللجنة بإصدار عدد من التوصيات لتعزيز وتقوية المنظومة والثقافة الشاملة للعلوم والتكنولوجيا والإبداع في كل أرجاء الكويت، متضمنةً الارتقاء بالقرارات، وفي بعض الحالات إعادة توجيه مسار أنشطة عدة مؤسسات تعمل في مجالات العلوم والتكنولوجيا والإبداع، بما فيها مؤسسة الكويت للتقدم العلمي، وجامعة الكويت، ومعهد الكويت للأبحاث العلمية، والهيئة العامة للتعليم التطبيقي والتدريب، والشركة الوطنية لمشاريع التكنولوجيا، والنادي العلمي الكويتي.

وإدراكاً لدور مؤسسة الكويت للتقدم العلمي المتفرد في نطاق المنظومة الوطنية للعلوم والتكنولوجيا والإبداع في الكويت، واستجابةً للتوصيات الواردة في تقرير اللجنة العليا لتطوير البحث العلمي في دولة الكويت، والتقييم والنتائج التي توصل إليها الخبراء العالميون والمحليون، قامت إدارة المؤسسة في عام 2009 بعملية إعداد الخطة الاستراتيجية الجديدة. وتمت دراسة وتصميم آليات وخطوات الإعداد بعناية. وتمثلت أولى الخطوات في عملية الإعداد في تقييم الوضع الراهن، تلتها خطوات أخرى تضمنت وضع الشروط والمتطلبات الأساسية، وتحديد القطاعات المستهدفة، وتعديل الرؤية والرسالة، وتحديد الأهداف الرئيسية للاستراتيجية والنتائج المتوقعة، وتم إلقاء نظرة فاحصة على البرامج والأنشطة القائمة والمقترحة، وتم تحديد المشكلات وتحليلها ووضع الحلول لكل برنامج بعناية، بالإضافة إلى تحديد المتطلبات والترتيبات المؤسسية اللازمة لتحقيق أهداف الخطة الاستراتيجية. وتضمنت آخر خطوة للتوصل إلى مجموعة من مؤشرات الأداء الرئيسية لقياس درجة النجاح بمرور الوقت وعلى كل المستويات.

العلمي للتقدم الكويت لمؤسسة الاستراتيجية (2016 – 2012)

لقد جاءت الاستراتيجية للمؤسسة نتيجةً للاجتماعات واللقاءات المكثفة والمداخلات من جانب فريق الإدارة لدى المؤسسة ومراكزها، وهي تعكس أحدث نتاج فكري حول احتياجات العلوم والتكنولوجيا والإبداع في الكويت، والدور المناسب للمؤسسة ومراكزها في تلبية جزء من تلك الاحتياجات، إضافة إلى تحديد أسلوب أكثر انتظاماً لاستحداث البرامج الممولة بما يسهم في استيفاء احتياجات المستقبل لمنظومة العلوم والتكنولوجيا والإبداع في الكويت. وكذلك دعم قدرات البحث والتطوير في المجالات ذات الأولوية الوطنية مثل المياه، والطاقة البديلة والبيئة ونشر الثقافة العلمية والتقنية والإبداع في دولة الكويت.



الرؤية:

**والإبداع، والتكنولوجيا للعلم فاعلة وطنية وثقافة منظومة،
”مستدامة لتنمية دعامةً تشكل تطويرها، في المؤسسة ساهمت**

ويعكس هذا النص الجديد لرؤية المؤسسة عدة مفاهيم على درجة كبيرة من الأهمية ويرتكز على الخبرة السابقة لمؤسسة الكويت للتقدم العلمي وفكرها الراهن. ويمتد النص ليغطي سائر النطاق الوطني، مع توجيه كل الموارد نحو تعزيز الوضع التنافسي في الاقتصاد العالمي المرتكز على المعرفة في المستقبل.

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**مبادرات وفي البشرية القدرات تنمية في والاستثمار ودعم تحفيز
وتعزيز والإبداع والتكنولوجيا للعلم صلبة قاعدة بناء في تساهم
لذلك الممكنة الثقافية البيئة**

**قدرات وتقوية العلمية، الثقافة ونشر تطوير المبادرات تلك تشمل
ودعم لذلك، الممكنة الثقافية البيئة وتعزيز والإبداع، البحث
وتشجيع ابتكارات، إلى المعرفة وترجمة والتميزين، الموهوبين
الخاص القطاع لدى التكنولوجية القدرات تطوير.**

تعرف الرسالة الجديدة المعدلة بشكل أفضل دور مؤسسة الكويت للتقدم العلمي وطموحاتها التي شكلت القوة المحركة للاستراتيجية التي ورد عرض لها أدناه. تعرف الرسالة الجديدة بشكل أفضل دور مؤسسة الكويت للتقدم العلمي وطموحاتها، التي شكلت القوة المحركة للاستراتيجية التي سيرد عرضها أدناه. فهي تعيد تعريف المؤسسة كجهة تمويل في الدرجة الأولى. ونظراً إلى مواردها المحدودة مقارنةً بالتمويل الكلي للعلوم والتكنولوجيا والإبداع على المستوى الوطني، فإنه بمقدور المؤسسة رصد موارد استثماراتها من خلال الجهات المساهمة والمتبرعة وأداء دورها بكفاءة أكبر كمحفز لتحقيق أهدافها.



المحاور الاستراتيجية للخطة

تشمل الخطة على أربعة محاور استراتيجية تعالج التنمية واحتياجات الموارد البشرية لمنظومة العلوم والتكنولوجيا والابداع في توزيع الموارد المتاحة من المؤسسة والجهات المعنية. كما تم التركيز على توزيع الموارد المتوفرة من المؤسسة سنويا لتحقيق افضل النتائج.

المحور الاستراتيجي الأول - نشر الثقافة العلمية
الإسهام في تطوير ونشر وتعلم العلوم، ودعم الموهوبين والتميزين والمساعدة في تطوير الثقافة العلمية والبيئة الممكنة لذلك في دولة الكويت

المحور الاستراتيجي الثاني - دعم البحوث العلمية
دعم قدرات البحث العلمي في المؤسسات العلمية الوطنية وتعزيز التعاون والتكامل فيما بينها

المحور الاستراتيجي الثالث - الإبداع و الابتكار
دعم الإبداع والمساعدة على تطوير الروابط اللازمة للتطبيقات التجارية في إطار منظومة للعلم والتكنولوجيا

المحور الاستراتيجي الرابع - الشركات و الإبداع
تحفيز تطوير القدرات العلمية والتكنولوجية للقطاع الخاص والمشاركة في بناء اقتصاد المعرفة



Introduction and Background

Kuwait Foundation for the Advancement of Sciences (KFAS) has a 37 year history of supporting the advancement of science and technology in Kuwait. In 1976, a visionary call by the late Amir of Kuwait, Sheikh Jaber Al- Ahmad Al-Jaber Al-Sabah, then Crown Prince and Prime Minister of Kuwait, was favourably embraced by the Chamber of Commerce and leaders of the economic sector in the country. It resulted in the establishment of the Kuwait Foundation for the Advancement of Sciences by an Amiri Decree on 12th December 1976; stating its mandate as a private non-profit organization devoted to supporting scientific research today. The Foundation's work is overseen by a Board of Directors, chaired by H.H. the Amir, Sheikh Sabah Al-Ahmad Al-Jaber Al-Sabah. It is financially supported by Kuwaiti private sector companies who have made generous contributions throughout the years, the contribution is currently set at 1% of their net annual profit.

One of the foremost goals of KFAS is to promote scientific development in the State of Kuwait by supporting scientific projects, the scientific community, and the country's scientific infrastructure.

While much has been accomplished by KFAS and related scientific institutions in Kuwait, there is much still to be sought after. The State of Kuwait has grown rapidly in terms of population and economy, the latter as a result of steadily increasing oil revenues. Today, the public sector accounts for more than 70% of the GDP and employs more than 85% of the national workforce. The consensus among the majority of stakeholders is that this growth is not structurally sustainable in the long run and that alternative national development strategies, based on building a complimentary, efficient and competitive private sector economy, are urgently needed.

Recognizing this need, H.H. the Amir of Kuwait, Sheikh Sabah Al-Ahmad Al Jaber Al-Sabah, commissioned in 2007 a "blue-ribbon panel"; the Kuwait Research Review Panel (KRRP), which was tasked to review the organization and the performance of Research and Development and make recommendations for restructuring and advancing Science, Technology and Innovation (STI) in Kuwait.



The panel presented a number of recommendations aimed at strengthening the overall STI system and culture throughout Kuwait, i.e. improving the capabilities and in some cases redirecting the activities of several STI institutions including KFAS, Kuwait University (KU), Kuwait Institute for Scientific Research (KISR), Public Authority for Applied Education and Training (PAAET), National Technology Enterprises Company (NTEC), and the Kuwait Science Club (KSC).

Recognizing its unique role within the national STI system in Kuwait and responding to the recommendations in the panel's report, KFAS conducted an extensive assessment of its historical performance by benchmarking itself against similar institutions in the region and on a global level. KFAS consulted with representatives from its key stakeholders and worked closely with recognized leading international and domestic experts in Research and Development (R&D), policy, and STI evaluation to support this assessment.

Based on the KRRP's recommendations and external assessment and findings in 2009, KFAS management embarked on developing a new strategic plan that would help meet the future needs of Kuwait's STI system. The preparatory steps were carefully designed.

The first step was the evaluation of current situation (status quo), followed by numerous steps like the determination of the basic requisites, identification of the targeted sectors, revision of vision and mission, defining the primary goals of the strategy and the expected results. An examination of the on-going and proposed programs and activities were then made.

Problem and solution trees for each program were carefully prepared and analysed, and the institutional requirements and arrangements to achieve the goals of the strategic plan were identified. The last step was to come up with a set of key performance indicators to measure the degree of success over the years at all levels.



KFAS Strategy (2012 – 2016)

The strategy is a result of intensive consultation through numerous meetings lead by the management team at KFAS and its centers. It reflects the latest thinking on the STI needs of Kuwait, the proper role of KFAS and its centers in meeting part of those needs, and a more systematic approach to formulating and selecting programs for KFAS funding.

KFAS programs in the strategy are directed towards contributing tangibly to the development of an effective STI system and culture in Kuwait.

In addition to supporting R&D capacity and activities in priority fields, such as water, energy, the environment, and the development and the dissemination of STI culture, the plan puts further emphasis on STI capacity building of the private sector and strengthening of innovation system.

Vision:

“An Effective Science, Technology and Innovation System and Culture, to which KFAS has contributed, that underpins the sustainable development of the State of Kuwait”

This vision statement reflects several important concepts based on the Foundation’s past experience and current philosophy. It is nationally-focused and draws on valuable resources to successfully position Kuwait to compete in a knowledge-based economy in the future.

Mission:

Stimulate, support, and invest in initiatives and human resources that contribute to the building of a strong STI system and culture and fostering an enabling environment. The initiatives include improving public understanding of science; strengthening innovation and research capacity and enhancing the enabling cultural environment; supporting the gifted and talented; translating knowledge into innovation; and encouraging private technology capabilities.

This mission statement defines KFAS’ role and ambitions driving the strategy outlined below. It primarily redefines KFAS as a funding institution. Given its modest annual resources, when compared to the overall STI funding by public institutions at the national level; KFAS will need to effectively leverage its targeted investments and efficiently execute its role as a catalyst to achieve its goals.



Strategic Thrust Areas

In developing the strategy, four thrust areas were identified. They address the development and human resource needs of the Science, Technology and Innovation System by leveraging the resources of KFAS and other stakeholders. Distribution of KFAS' available resources was given great consideration to ensure maximum impact.

Strategic Thrust 1 – Advocacy of Scientific Culture:

Contribute to the development of a strong advocacy for science including science education, support the gifted and talented, and to help advance scientific culture and the enabling environment in Kuwait

Strategic Thrust 2 – Scientific Research:

Enhance and integrate Research and Development capacity in and among Kuwaiti Scientific Institutions to address national development priorities

Strategic Thrust 3 – Innovation in Science and Technology:

Support innovation and assist in developing the required links to commercialization within a framework of an integrated Science, Technology and Innovation (STI) system

Strategic Thrust 4 – Innovation and Enterprise:

Supporting the development of the Private Sector's scientific and technological capacities and participate in building a knowledge economy

