المؤتمر الدولي الخامس للكيمياء السريرية والمختبرات الطبية

5TH INTERNATIONAL MEETING ON CLINICAL CHEMISTRY AND LABORATORY MEDICINE

الجمعية تحت إشراف
الهيئة السعودية للتخصصات الصحية
Saudi Commission for Health Specialties

المؤتمر السنوي التاسع
للجمعية السعودية
للكيمياء السريرية

9TH ANNUAL CONFERENCE
SAUDI SOCIETY FOR CLINICAL CHEMISTRY

19 CME EVENTS

5~7 DEC, 2023

HOTEL GALLERIA, JEDDAH

ABSTRACT BOOK

IFCC WORLDLAB DUBAI 2024 MAY 26-30

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INTRODUCTION AND WELCOME

Dear Colleagues,

We are pleased to host the 5th International Meeting in Clinical Chemistry & Laboratory Medicine and 9th Annual Meeting Saudi Society for Clinical Chemistry with an education and scientific programs paired with industry workshops from 5th – 7th December 2023.

The meeting is designed to meet the needs of laboratory Physicians, Supervisors, Directors, and Managers, as well as pathologists and other laboratory professionals overseeing or carrying out Clinical Chemistry, Toxicology, Laboratory Leadership and Clinical Chemistry Board Programs.

The scientific program features experts from International Federation of Clinical Chemistry and Laboratory Medicine, Canada, Australia, the Middle East and Saudi Arabia, sharing recent advances and innovations. Scientific conference attendees will listen and network with experts in the field and engage with their peers for a unique learning experience. Furthermore, the scientific program will feature the latest updates of clinical testing including:

- Pre-conference workshop on Clinical Laboratory Leadership and Management, Low Carb Society Session, Clinical Chemistry Board Programs, and Toxicology.
- Keynote presentation on the impact of laboratory medicine in public health, biomarkers of diseases, clinical research, laboratory management, quality and general chemistry, and special sessions dedicated to low carbs and its impact on health.
- Dedicated session for young scientist and poster presentation
- Industry workshops

The meeting is a learning and sharing platform for all laboratory workers to advance professionally and develop solution for daily practice in the laboratory. We would like to take this opportunity to extend our gratitude to the Saudi Commission for Health Specialties, our speakers, and moderators for their support to Saudi Society for Clinical Chemistry. We also like to offer special thanks to our sponsors for their participation and support for the conference.

On behalf of Saudi Society for Clinical Chemistry, we wish you a successful meeting and look forward seeing you again in 2024.

Dr. Samia H. Sobki
SSCC President

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2018 -2024

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DR. OLA ALGADAR, Al Borg Diagnostics, UAE
MR. MOHAMMAD ALFAYED, Ministry of Health, Jeddah, KSA
MR. KAMAL ALBLWEI, Security Forces Hospital Program, Riyadh, KSA
MS. NESREEN ABO ALGADAYEL, Sultan Bin Abdulaziz Humanitarian City, Riyadh, KSA
DR. DALAL NEMENQANI, Taif University, Taif, KSA
DR. NAFILA ALRIYAMI, Senior Consultant in Clinical Biochemistry Department, Sultan Qaboos University Hospital, Oman
PROF. AYMAN ELSAMANOUDY, King Abdulaziz University, Jeddah, KSA
MR. RAYYAN AL-SULAIMANI, Laboratory Technologist King Abdullah Medical City, Makkah Al-Mokarramah
DR. SALAM SAADEDDIN, , MSc, PhD, MT (ASCP), SSCC Chairperson Scientific Committee and Board Member, Riyadh, KSA
DR. KHALID SUMAILY, King Saud University, Riyadh, KSA
DR. OSAMAH KHOJAH, King Saud University, Riyadh, KSA
DR. BASMA ALHARTHY, King Abdulaziz University, Jeddah, KSA
DR MANSOUR AL-ZAHRANI, Regional Lab, Makkah, KSA
DR. HAMZA AL-ZAHRANI, King Fahad Armed Forces Hospital, Jeddah, KSA
DR AHMED AL-ASMARI, King Faisal Specialist Hospital and Research Centre, Riyadh, KSA

SCIENTIFIC SPEAKERS DAY #2

PROF. KHOSROW ADELI, IFCC President, The Hospital for Sick Children, Toronto, Canada
DR. MOHAMMED HABBAB, Council of Health Insurance, Riyadh, KSA
DR. MOTASIM JAWI, University of Jeddah, Jeddah, KSA
PROF. ZUHIER AWAN, KAU., Jeddah, KSA
PROF PETER BRUKNER, La Trobe University, Melbourne, Australia
DR. MALAK AL GHAMDI, King Saud University, Riyadh, KSA
DR. AHMAD AL-ODAIB, King Faisal Specialist Hospital and Research Centre, Riyadh, KSA
DR. NAIF ALMONTASHIRI, Taibah University, Almadinah, KSA

SCIENTIFIC SPEAKERS DAY #3

DR. ANWAR BORAI, Clinical Scientist and Associate Professor, King Abdulaziz Medical City, Jeddah
PROF. KHOSROW ADELI, IFCC President, Head of Clin. Biochem., Dept. of Paed. Lab. Med., The Hospital for Sick Children, Toronto, Canada
DR. HADY ELKHODARY, American Hospital, Dubai, UAE
DR. GHASSAN SHANNAN, Al Raheed Private University, Damascus, Syria
DR AHMAD ABOAMER, Alnoor Hospital Makkah, KSA
MR. RAFIQ KHAN, National Guard Health Affair, Riyadh, KSA
DR. HADY ELKHODARY, American Hospital, Dubai, UAE
DR. LAILA ABDEL-WARETH, Acting Executive Director, National Reference Lab/Cleveland Clinic, Abu Dhabi, UAE
MR. JAFFAR KHIARIY, King Faisal Specialist Hospital and Research Centre, Jeddah, KSA
MR. ABDULAZIZ ALJOHANI, NGH, Medina, KSA
DR. NASHAT NAFOURI, Chair of Healthcare Interest Group & Executive Officer (SQC) / Medical & Quality Director Futurelab

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DR. ANWAR BORAI, Clinical Scientist and Associate Professor, King Abdulaziz Medical City, Jeddah, KSA

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DR. ALI M AL-SHANGITI, Immunology Consultant / SSCC Board Member

DR. ALI AL OTHAIM, SSCC Vice President

INDUSTRY WORKSHOP SPEAKERS

DR. HISHAM ABD EL-AZIZ, Head of Lab in Mouwasat Hospital

MR. ALAA SALAMA, Regional Marketing Manager – Core Lab, Roche Diagnostics Saudi Arabia

MESHAAL HAMED AL MALKI, Technical Solution Design Manager, Abbott Saudi Arabia

MS. CECILIA SCARPONI, Commercial Marketing, QuidelOrtho

MS. MILICA MIJATOVIC, PhD, Assays and Clinical Marketing Manager, MEA Region, Siemens Healthineers

MR. AHMED SHEHATA, Product Manager MEA, Beckman Coulter

MR. MOHANNAD YACOUB, Medical Scientific Liaison, Binding Site

MR. ERIC A. BUTTON, Founder & CEO, Precision Diabetes, Inc., USA

MR. MESHARI ALABDULLATIF, Medical Affairs Manager – Saudi Region, Becton, Dickinson and Company (BD)

SCIENTIFIC PROGRAM

Schedule PRE-CONFERENCE WORKSHOP

Tuesday, 5th December 2023

TIME	TOPICS	SPEAKER
08:00 am	Registration	
SESSION #1 1st SSLM CERTIFICATE PROGRAM: "Clinical Laboratory Leadership and Management" Moderators: Prof. Zuhier Awan and Prof. Ghada Ali Ajabnoor		
08:00 am – 08:20 am	Strategic Planning and Leadership in the Clinical Laboratory	Dr Ayman Johargy Umm-Alqura Univ., Makkah
08:20 am – 08:40 am	Enhancing Laboratory Leadership through Financial Management Skills	Dr Ola Elgaddar Al Borg Diagnostics, UAE
08:40 am – 09:00 am	Determining Education Needs and Professionalism	Ms. Nesreen Abo Algadayel SBAHC, Riyadh, KSA
09:00 am – 09:10 am	Questions and Answers	
09:10 am – 09:25 am	Coffee Break	
09:25 am – 09:45 am	Personnel Self-Discipline and Motivation	Mr Kamal Alblwei SFHP, Riyadh, KSA
09:45 am – 10:05 am	The ART of clinical laboratory, Leadership and Management	Mr Mohammad Alfayed MOH, Jeddah, KSA
10:05 am – 10:25 am	The role of the laboratories in 2030 vision and health transformation	Dr Dalal Nemenqani Taif Univ., Taif, KSA
10:25 am – 10:40 am	Questions and Answers	
10:40 am – 10:50 am	Coffee Break	
SESSION #2 - Low Carb Society Session Moderator: Dr. Abdulhadi Bima and Dr. Amani Gusti		
10:50 am – 11:10 am	HBA1c as a diagnostic tool for diabetes and beyond : advantages, disadvantages and methods of analysis	Dr. Nafila Bazdawi Al Riyami SQUH, Oman
11:10 am – 11:30 am	Modulation of Dyslipidemia Markers Apo B/Apo A and Triglycerides/HDL-Cholesterol Ratios by Low-Carbohydrate High-Fat Diet in a Rat Model of Metabolic Syndrome.	Prof. Ayman Elsamanoudy KAU, Jeddah, KSA
11:30 am – 11:50 am	LDL-C Measurements: A Comparative Analysis of Techniques and Clinical Implications	Mr. Rayyan Ali Al-Sulaimani KAMC, Makkah, KSA
11:50 am – 12:05 pm	Questions and Answers	
12:05 pm – 01:30 pm	Lunch and Prayers	
SESSION #3 - Clinical Chemistry Board Programs in Saudi Arabia Moderator: Dr. Anwar Borai and Dr. Salam Saadeddin		
01:30 pm – 01:50 pm	Saudi Board in Clinical Biochemistry (SBCB)	Dr. Salam Saadeddin SCFHS Lab. Scientific Council, KSA
01:50 pm – 02:10 pm	KSU Board in Medical Biochemistry: An Overview: History, Disciplines, Importance, and Future	Dr. Khalid Sumaily KSU, Riyadh, KSA
02:10 pm – 02:30 pm	KSU Clinical Pathology Residency Program: An Overview: History, Disciplines, Importance, and Future	Dr. Osamah Khojah KSU, Riyadh, KSA
02:30 pm – 02:40 pm	Questions and Answers	
02:40 pm – 02:50 pm	Coffee Break	
SESSION #4 - Toxicology Moderator: Dr. Ahmed Al-Asmari and Dr Mansour Al-Zahrani		
02:50 pm – 03:10 pm	Addiction and Mental Health Related to Methamphetamine	Dr. Basma Alharthy KAU, Jeddah, KSA
03:10 pm – 03:30 pm	Up to Date for Detection of Methamphetamine	Dr Mansour Al-Zahrani MRL, Makkah, KSA
03:30 pm – 03:50 pm	Fatalities Related to Methamphetamine	Dr. Hamza Al-Zahrani KFAFH, Jeddah, KSA
03:50 pm – 04:10 pm	Epidemiological of methamphetamine abuse and deaths in Jeddah: Forensic Toxicology Overview	Dr. Ahmed Al-Asmari KFSHRC, Riyadh, KSA
04:10 pm – 04:20 pm	Questions and Answers	

SCIENTIFIC PROGRAM

DAY 1 Schedule CONFERENCE
Wednesday, 6th December 2023

TIME	TOPICS	SPEAKER
8:00 am	Registration	
	SESSION #5 **Conference Opening** **Moderators: Dr. Samia Sobki and Dr. Anwar Borai**	
08:00 am - 08:15 am	Introductory Remarks	Dr. Samia H. Sobki President, SSCC
08:15 am – 09:00 am	Innovative technological advancements in laboratory medicine: Predicting the lab of the future	PROF. KHOSROW ADELI President, International Federation of Clinical Chemistry and Laboratory Medicine (IFCC)
	SESSION #6 **Cardiometabolic Markers** **Moderators: Dr. Mohammed Habbab and Prof. Zuhier Awan**	
09:00 am – 09:25 am	Atherogenic Markers for Residual Cardiovascular Disease Risk	Dr. Mohammed Habbab CHI, Riyadh, KSA
09:25 am – 09:50 am	Role of Lipoprotein (a) in Coronary Disease: An Emerging Novel Target	Dr. Motasim Jawi Univ. of Jeddah, Jeddah, KSA
09:50 am – 10:15 am	Dyslipidaemia Saudi Guidelines	Prof. Zuhier Awan KAU, Jeddah, KSA
10:15 am – 10:40 am	Chronic disease. Does what we eat make any difference?	Prof Peter Brukner La Trobe Univ, Melbourne, AU
10:40 am – 10:50 am	Questions and Answers	
10:50 am – 11:05 am	C o f f e e B r e a k	
	SESSION #7 **Young Investigator Presentations** **Moderator: Prof. Suhad Bahijri and Dr. Aliaa Alamoudi**	
11:05 am – 11:25pm	Method Verification of Serum & Urine Osmolality by OsmoPRO Micro-osmometer Analyzer Using Freezing Point Method	Eman Almalki, PSMMC Riyadh, KSA
11:25 am – 11:45pm	False Positive Urine Amphetamine: Comparison between Two Common Immunoassay Techniques	Ali AlGhamdi. KAMC, Jeddah, KSA
11:45 am – 12:05pm	Establishing The Initial Cut-Off Values Of Free Carnitine Level By Tandem Mass Spectrometry For Newborn Screening	Mohammed Alyousif, KFMC, Riyadh, KSA
12:05 pm – 02:00 pm	L u n c h a n d P r a y e r s	
	SESSION #8 **Biochemical Genetics** **Moderator: Dr. Naif Almontashiri and Prof. Khalid Al Harbi**	
02:00 pm – 02:25pm	Utilizing Targeted Metabolomics for Streamlined Diagnosis and Management of Inborn Errors of Metabolisms (IEMs)	Dr. Malak Al Ghamdi KSU, Riyadh, KSA
02:25 pm – 02:50 pm	Biochemical Approach for the Diagnosis and Monitoring Patients with Inborn Errors of Metabolism	Dr. Ahmad Al-Odaib KFSHRC, Riyadh, KSA
02:50 pm – 03:15pm	The Molecular and Biochemical Landscapes of Mitochondrial Diseases: The Known and Unknown	Dr. Naif Almontashiri Taibah Univ., Almadinah, KSA
03:15 pm – 03:25pm	Questions and Answers	
	INDUSTRY WORKSHOP #1 **Moderator: Dr. Naif Sannan and Dr. Abdullah Al Meshari**	
03:25 pm – 03:45 pm	Diagnosis of Neonatal Sepsis Using Different Sepsis Markers	Dr. Hisham Abd El-Aziz, Head of Lab in Mouwasat Hospital
03:45 pm – 04:00 pm	Revolutionizing Laboratory Efficiency and Diagnostic Accuracy	Mr. Ahmed Shehata, Product Manager MEA, Beckman Coulter
04:00 pm – 04:15 pm	Monoclonal Gammopathies, Diagnosis and Monitoring	Dr. Mohannad Yacoub, Medical Scientific Liaison, Binding Site
04:15 pm – 04:30 pm	GlycoMark - A New Test for Prediabetes and Diabetes (Clinical and Technical Overview)	Mr. Eric Button, Founder & CEO, Precision Diabetes, Inc., NC, USA
04:30 pm – 04:45 pm	Detection and improvement of Preanalytical issues in clinical laboratory	Dr. Meshari Abdullatif, Medical Affairs Manager, BD

SCIENTIFIC PROGRAM

DAY 2 Schedule CONFERENCE
Thursday, 7th December 2023

TIME	TOPICS	SPEAKER
8:00 am	Registration	
	SESSION #9 **Reference Intervals** **Moderator: Dr. Anwar Borai and Dr. Waleed Al Omaim**	
08:00 am – 08:20 am	Reference Intervals of Common Laboratory Tests for Saudi Population: Overview and Summary	Dr. Anwar Borai, NGH, Jeddah, KSA
08:20 am – 08:40 am	Harnessing the power of big data analytics to harmonize reference intervals across populations and analytical platforms	Prof. Khosrow Adeli, President, IFCC
08:40 am – 09:00 am	Refine R for Indirect Estimation of Reference Intervals	Dr. Hady Elkhodary, American Hospital, Dubai, UAE
09:00 am – 09:20 am	Reference Intervals: Importance and Suitability for Diagnosis of Diseases	Dr. Ghassan Shannan, Damascus, Syria
09:20 am – 09:30 am	Questions and Answers	
09:30 am – 09:50 am	Coffee Break	
	SESSION #10 **Integration Between Quality and Good Laboratory Practice** **Moderator: Dr. Waleed Al Tamimi and Ms. Maha Gassas**	
09:50 am – 10:10 am	Auto-Validation Rules Testing to Ensure Continuous Quality and Reliability	Dr Ahmad Aboamer, Alnoor Hospital Makkah, KSA
10:10 am – 10:30 am	Method Validation/Verification Protocol	Mr. Rafiq Khan, NGHA, Riyadh, KSA
10:30 am – 10:50 am	Moving Averages for Quality Control in Medical Labs	Dr. Hady Elkhodary, American Hospital, Dubai, UAE
10:50 am – 11:10 am	The influence of Delta Check in Auto-verification as laboratory Quality Control	Dr. Laila Abdel-Wareth, NRL, Dubai, KSA
11:10 am – 11:15 am	Questions and Answers	
11:15 am – 11:30 am	Coffee Break	
	SESSION #11 **Quality Between Excellence and Costs** **Moderator: Dr. Nashat Nafouri and Mr. Ali Bawazeer**	
11:30 am – 11:50 am	Breaking Barriers: A 360-Degree Dive into Operational Challenges in Diagnostic Laboratories	Mr. Jaffar Khiariy, KFSHRC, Jeddah, KSA
11:50 am – 12:10 pm	Quality Costs Between the Truth and Denial	Mr. Abdulaziz AlJohani, NGH, Medina, KSA
12:10 pm – 12:30 pm	Are Laboratories Ready for Operational Excellence and Awards	Dr. Nashat Nafouri, Saudi Council, Riyadh
12:30 pm – 12:40 pm	Questions and Answers	
12:40 pm – 02:00 pm	Lunch and Prayers	
	INDUSTRY WORKSHOP #2 **Moderator: Dr. Baraa Al Hajj-Husain and Dr. Ali Shangiti**	
02:00 pm – 02:20 pm	The Future of the Clinical Laboratory	Mr. Alaa Salama, Regional Marketing Mngr. Roche Diagnostics
02:20 pm – 02:40 pm	Innovation Beyond the Laboratories: Transformative Advances and Future Frontiers	Mr. Meshaal Hamed Al Malki Design Manager, Abbott SA
02:40 pm – 03:00 pm	A novel approach using Big Data to measure Sigma metrics in Clinical Laboratories	Ms. Cecilia Scarponi, Commercial Marketing, QuidelOrtho
03:00 pm – 03:20 pm	Analytical Interferences in High Sensitivity Cardiac Troponins: A challenge that can be solved	Dr. Milica Mijatovic, Assay & Clinical Marketing Manager MEA, Siemens
03:20 pm – 03:30 pm	Questions and Answers	
03:30 pm – 03:45 pm	Coffee Break and Prayer	

SCIENTIFIC PROGRAM

DAY 2 Schedule CONFERENCE
Thursday, 7th December 2023

SESSION #12 General Events Moderator: Dr Salam Saadeddin and Dr. Ali Al Othaim		
03:45 pm – 03:55 pm	General Assembly	Dr. Samia Sobki, President, SSCC
03:55 pm – 04:05 pm	IFCC World Lab Dubai 2024	Dr. Anwar Borai, NGH, Jeddah, KSA
04:05 pm – 04:15 pm	Awards Presentation	Dr. Salam Saadeddin Chairman, Scientific Committee, SSCC
04:15 pm – 04:25pm	Sponsors Appreciation	Panel members
04:25 pm – 04:30 pm	Closing	Dr. Samia Sobki, President, SSCC

SCIENTIFIC ORAL PRESENTATION ABSTRACT

STRATEGIC PLANNING AND LEADERSHIP IN THE CLINICAL LABORATORY

DR AYMAN KHALID JOHARGY
Professor of Medical Microbiology
Umm Al-Qura University, Makkah, KSA

In this presentation we will discuss the definition of strategic planning and leadership and identify the importance of having a strategic leader to lead a strategic plane in clinical laboratory. Then we will discuss the main roles of strategic leader.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

ENHANCING LABORATORY LEADERSHIP THROUGH FINANCIAL MANAGEMENT SKILLS

DR. OLA HUSSEIN ELGADDAR
General Manager, Al Borg Diagnostics
United Arab Emirates

This presentation dives into the integral fusion of financial management skills with the leadership dynamics in clinical laboratories. Clinical laboratory leaders, as stewards of diagnostic excellence, are confronted with the challenge of harmonizing scientific innovation with fiscal responsibility. This abstract outlines the pivotal role of financial acumen, budgetary planning, regulatory compliance, resource optimization, and strategic decision making, in enhancing the success and sustainability of clinical laboratories. Through real-world case studies and implementation, the presentation emphasizes the symbiotic relationship between sound financial management and the capacity to navigate the evolving clinical laboratory landscape. Light will be shed on the necessity for targeted professional development, aiming to equip laboratory leaders with actionable strategies for financial mastery. By providing a roadmap for seamlessly integrating financial expertise into the fabric of clinical laboratory leadership, this presentation aims to empower attendees with practical insights, fostering a culture of financial resilience and innovation within their institutions. Join us in exploring how the strategic infusion of financial management skills would enhance clinical laboratory leadership, where scientific advancement and fiscal stewardship converge.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

DETERMINING EDUCATION NEEDS AND PROFESSIONALISM

MS. NESREEN FAHAD ABO AL GADAYEL
Medical Technologist – PMS & Education Coordinator
Riyadh, KSA

In the diagnosis, treatment, and prevention of diseases, the medical laboratory discipline is crucial. Determining the educational requirements and level of professionalism needed in medical laboratories is essential for ensuring the provision of high-quality healthcare services. The different factors that go into deciding the level of expertise and educational requirements for medical laboratories are explored in this abstract.

Firstly, a comprehensive understanding of current and emerging medical laboratory technologies, methodologies, and practices is essential. This involves continuous evaluation and assessment of advancements in medical laboratory science, including techniques for disease detection, laboratory automation, and quality assurance measures. Identifying educational gaps and formulating strategies to address these gaps is crucial to equip laboratory professionals with updated knowledge and skills.

Secondly, professionalism within the medical laboratory field extends beyond technical competence. It includes moral conduct, effective communication, teamwork, and adherence to legal and ethical requirements. Medical laboratories must cultivate a commitment to ethical behavior and patient-centered care in addition to technical skill development in order to establish a professional culture.

Determining the education needs and professionalism in medical laboratories also involves recognizing the importance of specialized credentials and certifications. Additionally, ongoing professional development opportunities should be made available to laboratory personnel to ensure they stay up-to-date with the latest advancements and best practices.

Furthermore, collaboration between universities and Colleges and healthcare facilities plays a crucial role in determining education needs and professionalism in medical laboratories. These stakeholders should work together to develop standardized competency frameworks and establish guidelines for laboratory professionals, fostering a sense of accountability and continuous improvement.

In conclusion, maintaining high-quality healthcare services depends on identifying the professional development needs and educational requirements in medical laboratories. It necessitates cooperation amongst stakeholders, a deep awareness of technology developments, and a dedication to professionalism. Medical laboratories can be better prepared to offer accurate, dependable, and patient-centred laboratory results by routinely evaluating and upgrading education programmes, aligning them with professional standards, and fostering a culture of professionalism.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

PERSONNEL SELF-DISCIPLINE AND MOTIVATION

MR. KAMAL FARAG ALBLWEI
Senior Laboratory Quality Management
Security Forces Hospital Program, Riyadh, KSA

In today's dynamic and competitive professional landscape, the significance of personnel self-discipline and motivation cannot be overstated. Health organizations such as the Laboratories are continually striving to maximize employee potential and drive towards optimal performance. This presentation delves into the pivotal role that self-discipline and motivation play in the success of individuals and the organisations they are a part of. The presentation begins by dissecting the fundamental concepts of self-discipline and motivation, highlighting their interdependence and impact on personal and collective achievement. It explores the psychological factors that underlie these traits and how they influence an individual's behaviour, choices, and overall work ethic.

Recognizing that cultivating self-discipline and motivation is not a one-size-fits-all approach, the presentation delves into diverse strategies and techniques that organizations can adopt to foster these qualities among their personnel. These strategies encompass creating a conducive work environment, setting clear goals, providing constructive feedback, and promoting a culture of continuous learning.

Furthermore, the presentation underscores the critical link between self-discipline, motivation, and resilience. In the face of challenges and setbacks, individuals with a high level of self-discipline and motivation are better equipped to adapt, persevere, and excel. Real-world examples and case studies will be shared to illustrate how these attributes have driven remarkable achievements in various industries.

Lastly, the presentation underscores the role of leadership in cultivating a culture of self-discipline and motivation. It highlights the responsibility of leaders in setting an inspiring example, nurturing a sense of purpose, and empowering their teams to take ownership of their professional development.

In conclusion, the presentation emphasizes that self-discipline and motivation are not mere personality traits, but skills that can be developed and refined over time. By incorporating effective strategies into organizational practices and leadership approaches, personnel can be empowered to unleash their full potential, leading to sustainable success both for individuals and the organizations they serve.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

THE ART OF CLINICAL LABORATORY, LEADERSHIP AND MANAGEMENT

MR. MOHAMMAD MORDI H ALFAYED
Safety Officer – Laboratories and Blood Banks Administration and JRL

Firstly, Accreditation plays a crucial role in ensuring the reliability and accuracy of laboratory test results. It involves a comprehensive evaluation of the lab's processes, equipment, and personnel by an independent accrediting body. By meeting specific standards and criteria, labs can earn accreditation, which signifies their commitment to quality and precision. This accreditation process helps instil confidence in the accuracy of test results and ensures that patients and healthcare providers can rely on the information provided by the lab. It's like a seal of approval that assures everyone that the lab is up to par and can be trusted.

In terms of time management, it is like a superhero cape when it comes to reducing stress and boosting productivity! By organizing our time effectively, we can prioritize tasks, set realistic goals, and avoid feeling overwhelmed. With better time management, we can tackle our to-do lists with ease, leaving us more time for relaxation.

Secondly, Building and maintaining effective communication within a team is like creating a harmonious symphony. It involves open and honest dialogue, active listening, and clear sharing of ideas and information. By fostering a supportive and collaborative environment, team members can feel valued and understood, leading to better teamwork and productivity. Regular check-ins, clear expectations, and respectful feedback are key to keeping the communication flowing smoothly.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

THE ROLE OF THE LABORATORIES IN 2030 VISION AND HEALTH TRANSFORMATION

PROF. DR. DALAL M. NEMENQANI
Professor of Pathology, College of Medicine
Taif University, Taif, KSA

Identify the Saudi vision 2030 areas of applicability through the clinical laboratories.

Engage in brainstorming sessions for the role of the clinical laboratories in executing the Saudi vision and health transformation projects.

Explore areas that need to be re-visited during day to day clinical laboratory operation that serve the vision and transformation.

Appreciate the importance of laboratory workers and their role and powerful insights toward the progress of healthcare in Saudi Arabia.

Emphasize on the important role of clinical laboratories in implementation of sustainability.

Incorporate the objectives of digital transformation in the clinical laboratory operation.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

HBA1C AS A DIAGNOSTIC TOOL FOR DIABETES AND BEYOND: ADVANTAGES, DISADVANTAGES AND METHODS OF ANALYSIS

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The incidence of diabetes and prediabetes is rising worldwide. According to the International federation of diabetes (IDF), if the current trend continues, it is estimated that there will be 700 million people living with diabetes by the year 2045. Timely diagnosis and management of both diabetes and pre-diabetes are crucial to prevent complications and for better patient outcomes. This talk explores the significance of hemoglobin A1c (HbA1c) along with other diagnostic tools for the diagnosis of diabetes and prediabetes. Other diagnostic tools include fasting blood glucose (FBG), oral glucose tolerance test (OGTT), glycated albumin and continuous glucose monitoring. Hemoglobin A1c has been designated as a pivotal tool to look at average blood glucosewithin patients retrospectively in the past 2-3 months. In this talk we talk a closer look at the advantages, disadvantages, and methods of analysis. The results of a study we conducted at Sultan Qaboos University Hospital, Oman, regarding HBA1c diagnostic utility is also discussed.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

MODULATION OF DYSLIPIDEMIA MARKERS APO B/APO A AND TRIGLYCERIDES/HDL-CHOLESTEROL RATIOS BY LOW-CARBOHYDRATE HIGH-FAT DIET IN A RAT MODEL OF METABOLIC SYNDROME

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Background: Metabolic syndrome (MetS) is associated with an increased risk of cardiovascular diseases due to Dyslipidemia. The low-carbohydrate, high-fat (LCHF) diet is proposed to influence MetS and reverse insulin resistance positively.

Objectives: This study aimed to investigate the protective effect of the LCHF diet on MetS-associated Dyslipidemia in an experimental animal model.

Methods: Forty male Sprague-Dawley rats were divided into four groups (10/group): control, dexamethasone-induced MetS (DEX) (250 µg/kg/day), LCHF-fed MetS group (DEX + LCHF), and High-Carbohydrate-Low-Fat-fed MetS group (DEX + HCLF). After four weeks, fasting glucose, insulin, lipid profile (LDL-C, HDL-C, Triglyceride), oxidizedLDL, and small denseLDL were estimated using the ELISA technique. HOMA-IR, Apo B/Apo A1 ratio, and TG/HDL were calculated. Additionally, a histological examination of the liver using H & E and Sudan III stain was conducted.

Main Outcomes: The DEX group exhibited a significant increase in HOMA-IR and atherogenic parameters such as s-LDL, OX-LDL, Apo B/Apo A1 ratio, and TG/HDL. The LCHF diet significantly improved Dyslipidemia parameters by decreasing the Apo B/Apo A1 and TG/HDL-C ratios. A notable decrease in steatosis was observed in LCHF-fed rats compared to the HCLF group.
Conclusion: The LCHF diet effectively ameliorates MetS-associated Dyslipidemia, as evident from both biochemical results and histological examination.

Clinical Implication: Adopting an LCHF diet could be beneficial in managing Dyslipidemia related to MetS, potentially reducing the risk of cardiovascular diseases.

Keywords: metabolic syndrome; dyslipidemia; HFLC; ketogenic diet; HOMA-IR; Apo B/Apo A ratio; TG/HDL ratio

SCIENTIFIC ORAL PRESENTATION ABSTRACT

LDL-C MEASUREMENTS: A COMPARATIVE ANALYSIS OF TECHNIQUES AND CLINICAL IMPLICATIONS

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Background: Low-density lipoprotein cholesterol (LDL-C) is a pivotal biomarker for cardiovascular disease risk. Standard techniques to quantify LDL-C have evolved over the years, leading to the introduction of more advanced and direct methods.

Objectives: This talk aims to compare the various methodologies in LDL-C determination, namely standard lipid testing, direct lipid testing, the distinction between LDL-C and LDL particle number (LDL-P), and advanced lipids testing.

Main Outcomes: Standard lipid testing calculates LDL-C using the Friedewald formula but can be inaccurate in certain conditions like hypertriglyceridemia. Direct lipid testing, as the name suggests, directly measures LDL-C, offering a potentially more accurate result. The differentiation between LDL-C and LDL-P provides added insight, as the number of LDL particles (LDL-P) can be a better indicator of atherosclerotic risk than the cholesterol content (LDL-C) alone. Advanced lipids testing goes beyond just measuring cholesterol content, delving into the size, density, and other characteristics of lipoproteins which can provide further risk stratification.

Conclusions: While standard testing remains widely used due to its accessibility and cost-effectiveness, direct and advanced testing can provide a more comprehensive understanding of an individual's cardiovascular risk. The choice of technique should consider the patient's clinical scenario and the potential benefits of the additional information.

Clinical Implications: Understanding the nuances and limitations of each LDL-C measurement technique is crucial for clinicians to guide therapeutic decisions and assess cardiovascular risk more holistically

SCIENTIFIC ORAL PRESENTATION ABSTRACT

SAUDI BOARD OF CLINICAL BIOCHEMISTRY (SBCB)

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and of the Examination Committee of the Saudi Board of Clinical Biochemistry.
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The growth in the population and the expansion in the provision of quality healthcare accompanied by an increase in the number of hospitals meant an expansion in the various laboratory facilities and services, including those serving for the Clinical Biochemistry services. Clinical biochemistry is considered one of the major laboratory services within any healthcare providing facility. Accordingly, such an increase in laboratory services requires an equivalent growth in the number of highly qualified staff members specialized in clinical biochemistry.

Therefore, a training program in clinical biochemistry was developed. The overall objective of this program is to enroll residents in a well-structured comprehensive residency training program certified by the SCFHS in Clinical Biochemistry. By providing an adequate theoretical knowledge & practical training that is required for practicing clinical biochemistry laboratory specialty. The major components of this program include theoretical basis of physiology and clinical biochemistry in health and disease, laboratory component, quality control, and laboratory management together with dissertation writing. The total duration of the training program is four academic years during which, the resident will acquire competencies and is expected to function effectively as per CanMEDS roles framework competencies. The objective is to gain experience over a wide field of clinical laboratory practice.

The program recruits clinical laboratory graduates or equivalent. Applicants to this residency training should have a graduate degree from appropriate and recognized college of clinical laboratory sciences and MSc degree in clinical chemistry or equivalent (e.g., American Board in clinical chemistry, etc.), classification as specialist by SCFHS, an evidence of English exam satisfaction, completion of four years of work experience in clinical biochemistry and a letter from sponsoring organization approving and pledging support for the candidate's total period of training. Candidates for the residency program are selected based on a written examination and an interview conducted by the National and/or Regional Committee.

Upon completion of this training program and passing the final certification exam, the graduate will be granted certification from the Saudi Board in Clinical Biochemistry (SBCB), will have a degree of competency and experience considered adequate to practice Clinical Biochemistry independently, and will become eligible for the position of scientist and consultant after the requisite years of experience. They will be consultants to clinicians regarding test selection and interpretation, educators of residents and staff, researchers in developing methods and discovering biomarkers, and leaders implementing quality patient care.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

KSU BOARD IN MEDICAL BIOCHEMISTRY: AN OVERVIEW: HISTORY, DISCIPLINES, IMPORTANCE, AND FUTURE

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History and Definition: Medical Biochemistry is a division of laboratory medicine that is generally concerned with analysis of body fluids, which are useful for diagnostic and therapeutic purposes. Many clinical decisions are made based on laboratory test results, the majority of which are Biochemistry. In 1971, King Saud University (KSU) established the Medical Biochemistry Unit at the College of Medicine, which belongs to Pathology Department and Laboratory Medicine, offering an excellent diagnostic service for the patients at King Saud University Medical City (KSUMC) Hospitals.

Disciplines: Medical Biochemistry is a broad field typically lasting four years of training that encompasses many different disciplines in clinical biochemistry. The Clinical Biochemistry Unit laboratories at KSUMC analyzes close to 4.2 million tests per year making about 70% of the pathology laboratory's total workload employing advanced laboratory automation. However, the major disciplines include: Routine Biochemistry Laboratory; Special Biochemistry Laboratory; and the Inherited Metabolic Disease Laboratory.

Why is this program important? The KSU Board in Medical Biochemistry is the only Board currently offered in the Kingdom for medical graduates, which graduates highly qualified medical biochemists/chemical pathologists who are skilled for laboratory services and management. Medical Biochemists/Chemical Pathologists play a critical role in diagnosing diseases and providing information to clinicians to help them make informed decisions about patient care. They are also involved in research to develop new diagnostic tests and treatments. Moreover, they play an important role in healthcare leadership and public health involving developing strategies to prevent disease.

The future of the Graduates: Graduates of the KSU Board in Medical Biochemistry have a bright future ahead of them. They can pursue a variety of career paths, including:

- Medical Biochemist/ Chemical Pathologist in a hospital or laboratory
- Researcher/Administrator in a university
- Healthcare Leader
- Governmental Official

Saudi Arabia's need for Medical Biochemists/Clinical Pathologist: Saudi Arabia is a rapidly developing country with a growing population under a great vision. This growth is putting a strain on the healthcare system. As a result, there is a high demand for qualified healthcare professionals, including medical biochemists/ clinical pathologists.

How to Apply: The online application submission period is usually one month during February to the KSU Postgraduate Center and the interview during March every year. The potential candidate should fulfil all requirements of KSU for admission to postgraduate studies and have graduated within the last 5 years with MBBS degree. The candidate should also pass the interview.

Conclusion: The KSU Board in Medical Biochemistry is the only board currently offered in the Kingdom for medical graduates, which proudly graduates highly qualified medical biochemists/ chemical pathologists who are skilled for laboratory services and management. Graduates of the program have a bright future ahead of them at several levels, including clinical services, research, and management. The graduates from the KSU Board in Medical Biochemistry will lead the field with major impact on the healthcare of the Saudi community and contribute significantly to the practice of the Laboratory Medicine.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

KSU CLINICAL PATHOLOGY RESIDENCY PROGRAM: AN OVERVIEW: HISTORY, DISCIPLINES, IMPORTANCE, AND FUTURE

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General & Medical Director for HMG Labs
Executive Director for Quality, Dr. Sulaiman Al Habib Medical Group
Riyadh, KSA

History and Definition: Clinical pathology is a medical specialty that deals with the diagnosis and treatment of diseases through the analysis of body fluids and tissues. The first clinical pathology residency programs were established in the United States in the early 1900s. The current well-recognized ongoing program in Saudi Arabia was established at King Saud University in Riyadh in 2013 by the visionary leader Dr. Abdulmalik Al-Shaiekh. Since it was established, four program directors have been managed the program over the last 10 years:

1. Prof. Ali Sumaily.
2. Dr. Osamah Khojah.
3. Dr. Omar Al-Mugren.
4. Prof. Fawzia Al-Otaibi.

Disciplines: Clinical pathology is a broad field typically lasting four years of training that encompasses many different disciplines. However, the six major disciplines include:

- Clinical chemistry
- Hematology
- Microbiology
- Immunology
- Transfusion medicine
- Genetics

Why is this program important? The clinical pathology residency program is an important program because it produces highly skilled pathologists who are essential to the healthcare system. Pathologists play a critical role in diagnosing diseases and providing information to clinicians to help them make informed decisions about patient care. Pathologists are also involved in research to develop new diagnostic tests and treatments. They also play an important role in healthcare leadership & public health by monitoring disease outbreaks and developing strategies to prevent disease.

The future of the graduates: Graduates of the clinical pathology residency program have a bright future ahead of them. They can pursue a variety of career paths, including:

- Clinical pathologist in a hospital or laboratory
- Researcher/Administrator in a university or pharmaceutical company
- Public health pathologist
- Healthcare Leader
- Governmental Official

Saudi Arabia's need for clinical pathologists: Saudi Arabia is a rapidly developing country with a growing population under a great vision. This growth is putting a strain on the healthcare system. As a result, there is a high demand for qualified healthcare professionals, including clinical pathologists. In addition, Saudi Arabia is committed to developing its own healthcare system and reducing its reliance on foreign healthcare workers.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

ADDICTION AND MENTAL HEALTH RELATED TO METHAMPHETAMINE

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The significant negative effect of methamphetamine abuse in societies is a real threat, especially for youths around the world. The use of amphetamines, in general, is known to worsen psychopathology, including mood and anxiety disorders, crime, and violent behaviors. Methamphetamine is a dopaminergic central nervous system drug, the mechanism of action is by encouraging release of norepinephrine and inhibiting its re-uptake, in addition, methamphetamine is known to be a potent blocker of dopamine re-uptake.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

UP TO DATE FOR DETECTION METHAMPHETAMINE

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Consultant Forensic Toxicologist
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Methamphetamine abuse is one of the most medical and social problems many countries face. In spite of the ban on the use of methamphetamine, it is widely available in black market. There are many analytical methods for the detection of methamphetamine in biological specimen. The purpose of the presentation is to present information about a develop method for the extraction and detection of methamphetamine in biological specimen and other samples.

Another aspect are going to be focused on such as collection samples and immunoassay's screening test.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

FATALITY RELATED TO METHAMPHETAMINE

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Death is processing not event, that will help us to find what is the reason behind this event. In cases of toxicology the journey of forensic doctor starting from the scene of event, then go to mortuary which there the body will dissect to looking and prove the cause of death, that do not mean the autopsy enough to give opinion about the cause of death, especially in toxicology cases that need the toxicology study, in sometimes more than that. However, the death is uncommon from overuse of the amphetamines alone. From other hand, the manner of death not easy to decide and making any conclusions before the careful medico-legal evaluation of the circumstantial evidence which through an investigation of the crime scene, a post-mortem examination, and a toxicological analysis should all be taken together when put the opinion.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

EPIDEMIOLOGICAL OF METHAMPHETAMINE ABUSE AND DEATHS IN JEDDAH, SAUDI ARABIA: FORENSIC TOXICOLOGY OVERVIEW

DR. AHMED IBRAHIM AL-ASMARI

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A more than 500% increase in the number of deaths involving methamphetamine occurred between 2016 and 2018 in Jeddah, Saudi Arabia. As such, this report employed a validated liquid chromatography tandem mass spectrometry method to quantify methamphetamine and its metabolites in bodily fluids from 47 post-mortem cases in which methamphetamine was involved. The mean age of the deceased was 33 years old (median: 30, range: 16–63), and 94% were male. Methamphetamine was co-ingested with another drug in 32 of the cases (68%); however, the deaths were only due to the combined toxicity of methamphetamine and another drug in 15 of the cases (32%). Of note, 13 of these deaths (28% of all deaths) involved heroin. When methamphetamine was the sole cause of death (32% of the studied cases), the median concentrations of methamphetamine and amphetamine were 527 and 128 ng/mL. When methamphetamine was combined toxicity with another drug, the median concentrations of methamphetamine and amphetamine decreased to 161 and 53 ng/mL. When deaths were unrelated to methamphetamine, the median concentrations of methamphetamine and amphetamine were 130 and 44 ng/mL. The highest methamphetamine concentration was found in urine (5281 ng/mL), followed by stomach contents (878 ng/mL), bile (762 ng/mL), vitreous humor (308 ng/mL), and blood (208 ng/mL). Almost 40% of the studied cases involved violence, 61% were accidental, 21% were suicides, 17% were homicides, and 2% were natural deaths. Methamphetamine is highly addictive. Increase in deaths have been seen in various countries. More awareness, education and treatment programs are required to reduce the likelihood of addiction, crimes, suicide, and other fatalities resulting from methamphetamine abuse.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

INNOVATIVE TECHNOLOGICAL ADVANCEMENTS IN LABORATORY MEDICINE: PREDICTING THE LAB OF THE FUTURE

KHOSROW ADELI Ph.D., FCACB, DABCC, FAACC

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The Hospital for Sick Children, University of Toronto, Toronto, Canada
President, International Federation of Clinical Chemistry and Laboratory Medicine (IFCC)

Laboratory medicine is integral to public health and healthcare provision, and it relies on numerous analytical techniques to provide timely, objective data to healthcare professionals to guide disease prevention, diagnosis, treatment, and monitoring. Driven and defined by a culture of innovation, recent technological advances have revolutionized modern laboratory medicine and added significant value and visibility to its role in healthcare and clinical decision-making. Noteworthy innovations in laboratory automation, genomics, nuclear magnetic resonance spectroscopy, mass spectrometry, microfluidics, and electronic tools have changed the face of omics research. The growing application of these technologies, as well as their integration with microtechnology and point-of-care testing, has contributed to improved patient outcomes and narrowing of the clinical-laboratory interface to facilitate a patient-centered approach to healthcare. However, to adequately capitalize on these advancements, new tools such as artificial intelligence and data mining are needed to harness the exciting potential of medical big data derived from these novel techniques. In this presentation, I will provide an overview of the recent technological advancements in laboratory medicine, with a critical discussion on their clinical utility and future perspectives. The promise and potential for precision and personalized medicine will also be discussed and appraised, with specific attention paid to the contingency of its success on advanced information technology capabilities.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

ATHEROGENIC MARKERS FOR RESIDUAL CARDIOVASCULAR DISEASE RISK

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Senior Consultant Cardiologist & Electrophysiologist

Council of Health Insurance, Riyadh, KSA

Despite advances in treatment of atherosclerotic cardiovascular disease, it remains the leading cause of death and disability worldwide. Treatment of major traditional risk factors, including low-density lipoprotein-cholesterol, serves as the foundation of atherosclerotic risk reduction. However, there remains a significant residual risk of cardiovascular events despite optimal risk factor management. Therefore, residual cardiovascular risk is defined as residual risk of macro-vascular events, including risk from established factors, (such as unhealthy lifestyles, dyslipidemia, high blood pressure, high blood sugar and obesity) and emerging risk factors, that persists in patients in spite of current evidence-based medical care. Beyond traditional risk factors, other drivers of residual risk have come to the forefront, including inflammatory, pro-thrombotic, and metabolic pathways that contribute to recurrent events and are often unrecognized and not addressed in clinical practice. Related biomarkers to these pathways include markers of inflammation and markers of atherogenic lipids and lipoproteins. Identification and treatment of residual cardiovascular risk is critical to optimize patient outcomes, particularly in those at risk for recurrent events despite optimal treatment of traditional risk factors. As we reach the limits of benefit of currently available therapies, it will be important to investigate and await the results of new approaches to managing residual cardiovascular risk. In the meantime, it seems prudent to recognize emerging risk factors and adopt new therapeutics that address some of these risk factors.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

ROLE OF LIPOPROTEIN(A) IN CORONARY DISEASE: AN EMERGING NOVEL TARGET

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In the 1960s, Lipoprotein(a) (Lp[a]), alternatively referred to as "Lp little a" was initially discovered in the laboratory of Norwegian scientist Kre Berg. Subsequent to that period, substantial progress has been achieved in comprehending the correlation between lipids and coronary artery disease (CAD). Lp(a), an intriguing type of lipoprotein, is exclusively synthesized in the liver. It consists of two fundamental constituents: a single copy of apolipoprotein (apo) B-100 tethered to a single copy of a protein denoted as apo(a). Plasma concentrations of Lp(a) begin to increase shortly after birth and stabilize within the initial few months of an individual's life. Individual Lp(a) concentrations can vary significantly, spanning from 0.2 mg/dl to 250 mg/dl. CAD is influenced by elevated Lp(a) levels exceeding 30 mg/dL, according to substantial evidence. The development of isoform-independent assays, in conjunction with the results of epidemiologic research, meta-analyses, genome-wide association studies, and Mendelian randomization studies, has contributed to the identification of Lp(a) as the most prevalent independent genetically inherited risk factor for CAD. As a consequence of this notable progression, Lp(a) has transformed from a biomarker indicative of atherosclerotic risk to a therapeutic target. We maintain optimistic expectations that the introduction of the second-generation antisense treatment will enable us to definitively address the inquiry regarding the readiness of Lp(a) for significant clinical implementation.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

DYSLIPIDAEMIA SAUDI GUIDELINES

PROF. ZUHIER AHMED YAHYA AWAN
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King Abdulaziz University and Jeddah University
Jeddah, KSA

Cardiovascular disease is the leading cause of death in Saudi Arabia and in the world. Dyslipidemia is the leading risk factor in developing atherosclerotic and cardiovascular disease. In Saudi, cardiovascular diseases present 10 years earlier than developing countries due to higher incidence of diabetes and higher genetic dyslipidemia rates. Local guidelines are essential to better treat our population. Despite advances in therapy, there are some individuals with residual risk that require special biomarkers.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

CHRONIC DISEASE. DOES WHAT WE EAT MAKE ANY DIFFERENCE?

PROF. PETER BRUKNER
Professor of Sports Medicine
La Trobe University, Melbourne, Australia

The various chronic diseases that affect modern society would appear to have a number of common underlying factors – insulin resistance, inflammation and the gut microbiome. These conditions include obesity, diabetes, metabolic syndrome, atherosclerosis, hypertension, heart failure, NAFLD, GERD, inflammatory bowel disease, chronic kidney disease, various cancers, endocrine disorders such as PCOS, epilepsy, Alzheimers, Parkinsons disease, multiple sclerosis, mental illnesses such as autism, bipolar, schizophrenia, anxiety, depression, as well as dental caries. The underlying factors, and therefore the diseases themselves, can be modified by lifestyle issues such as diet, exercise, sleep, stress, smoking, alcohol and sun. This presentation will examine the evidence for the role of diet and in particular carbohydrate restriction, in a number of these conditions - diabetes, epilepsy, Alzheimers, Parkinsons, multiple sclerosis and PCOS.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

METHOD VERIFICATION OF SERUM AND URINE OSMOLALITY BY OSMO PROMICRO-OSMOMETER ANALYZER USING FREEZING POINT METHOD

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Background: Osmolality test is used to check balance between water and chemicals mainly electrolytes dissolved in blood, urine or stool to find out severe dehydration or over hydration, it is also help in evaluating body's water balance. Osmolality test is needed if the patient has symptoms of a fluid imbalance, diabetes insipidus or certain types of poisoning. Osmo Pro Multi-Sample Micro-Osmometer using freezing point method can determine osmolality within only 120seconds with a sample volume of only 20ul.

Methods: Method verification of serum and urine osmolality performed by Osmo Pro Multi-Sample Micro-Osmometer using serum and urine samples. Method verification was done according to the laboratory policy followed CLSI guidelines. Precision study was performed for both serum and urine osmolality using 50 quality control samples of 2 different concentrations for each test , run for a period of 5 days. Mean, SD and %CV were calculated and compared to the manufacturer recommendation. Method comparison study for serum and urine osmolality was done comparing 25 samples of patients for each test. Linearity study was done using 5 different concentrations of linearity material that are spanning the analytical measurement range (AMR).

Results: Both serum and urine osmolality met allowable precision criteria. Within-run and between days precision study for low and high concentrations, %CV were 0.8&1.0 (serum osmolality) and0.7&0.9 (urine osmolality) respectively and both were within total allowable error TEa of 10% or 5 mOsm/kg H2O. Method comparison acceptable criteria slope 0.9 – 1.1 and correlation coefficient (r) >0.975,data for each analyte were calculated by EP evaluator and the yielded slope for both analytes showed satisfactory correlation between the results with correlation coefficient(r) value 1.000(serum osmolality) & 0.9996 (urine osmolality) and slope values close to one, and the y-intercept were close to zero.Both serum and urine osmolality found linear over the AMR and agreed with the manufacturer claim0- 2000 mOsm/kgH2O.

Conclusion: Overall performance of both serum and urine osmolality tests were acceptable on Osmo Pro Multi-Sample Micro-Osmometer. They provided reliable results for patients' samples testing.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

FALSE-POSITIVE URINE AMPHETAMINE: COMPARISON BETWEEN TWO COMMON IMMUNOASSAY TECHNIQUES

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Background: False-positive results in screening tests are significant occurrences in medical diagnosis and laboratory examinations. Immunoassay techniques are commonly employed for swift urine drug screening in clinical and workplace settings. These tests are susceptible to false-positive outcomes due to their high sensitivity, specificity, and other factors. The frequency of false positives may differ across various immunoassay techniques. Hence, the aim of this statistical study is to investigate the factors that contribute to an increased probability of false-positive screening test results.

Methods: In this study, we collected data retrospectively on positive Amphetamine urine samples after drug of abuse screening from various clients. We obtained a total of 878 positive samples for the Amphetamine screening test, which were tested using two different principles. Specifically, half of the samples were tested using the EMIT (Enzyme Multiplied Immunoassay Technique) principle by SYVA, while the other half were tested using the DRI (Drug Recognition Immunoassay) principle by Thermo Scientific. Notably, all of these samples yielded positive results on both principles. Subsequently, confirmatory tests were conducted using a Gas chromatography-mass spectrometry method to determine the accuracy of the positive results. Finally, the obtained results and data were thoroughly examined and analyzed.

Results: Among 439 confirmed samples, only 3 (0.68%) yielded negative results when tested using the EMIT principle by SYVA, whereas 63 (14.35%) showed negative outcomes when assessed using the DRI principle by Thermo Scientific.

Conclusion: Based on the results obtained, it seems that the EMIT principle from SYVA exhibits greater specificity for detecting target drug metabolites compared to the DRI principle from Thermo Scientific. On the other hand, the DRI principle from Thermo Scientific appears to be more sensitive than the EMIT principle from SYVA.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

ESTABLISHING THE INITIAL CUT-OFF VALUES OF FREE CARNITINE LEVEL BY TANDEM MASS SPECTROMETRY FOR NEWBORN SCREENING

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Background: Newborn screening programs improved healthcare by enabling the early detection and intervention of critical metabolic disorders. The primary Carnitine deficiency is a serious disorder affecting metabolic decompensation, cardiomyopathy, and skeletal myopathies. Measuring free Carnitine (C0) was recently implemented in the newborn screening program at Saudi Arabia. The current challenge lies in establishing accurate cut-off values for carnitine levels in newborns that can reliably distinguish between normal and deficient cases. This study aims to establish the initial cut-off values of free carnitine level by the tandem mass spectrometry for newborn screening and to enhance the accuracy of early diagnosis and intervention.

Methodology: Cut-off values were calculated using 9400 dry blood spot samples collected as part of routine newborn screening. Free Carnitine levels were analyzed using the tandem mass spectrometry method. Statistical analysis was performed using computing software to initiate the optimal Free carnitine cut-off values.

Results: The free carnitine cut-off values were estimated at different percentiles. The lower limit cut-off values were analyzed at 1th, 0.75th and 0.5th percentiles using 9334 normal sample concentration. The calculated cut-off values were determined as 7.46, 6.9 and 5.8 respectively. In order to detect the elevated free carnitine metabolic disorder, the upper cut-off values were analyzed at 99th, 98th, 97th, 96th, and 95th percentiles.

Conclusion: Establishing the optimal cut-off values were achieved successfully for testing free carnitine using the liquid chromatography tandem mass spectrometry derivatized method, to facilitate the early detection of the carnitine deficiency. This will influence positively in making decisions regarding further diagnostic evaluations and medical interventions.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

UTILIZING TARGETED METABOLOMICS FOR STREAMLINED DIAGNOSIS AND MANAGEMENT OF INBORN ERRORS OF METABOLISMS (IEMS)

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Metabolomics, the study and quantification of the metabolome at a given temporal intersection, provides a powerful diagnostic lens in identifying and understanding Inborn Errors of Metabolism (IEMs), a collection of approximately 500 rare genetic diseases with a cumulative incidence as high as 1:667. Numerous IEMs correlate with serious conditions, including Intellectual disability, epileptic encephalopathies, myopathies, liver disease, and cardiomyopathy, making early recognition vital for improved health outcomes.

Difficulties such as handling variants of unknown significance (VOUS) have commonly left next-generation sequencing as an underutilized resource. However, the use of metabolomics can potentially circumvent this challenge, not only increasing the sensitivity of genetic testing but also enhancing its speed in diagnosis through the development of cutting-edge technologies. Moreover, metabolomics represents a cost-effective alternative to genomics, transcriptomics, and proteomics.

This study aims to ascertain the efficacy of a targeted metabolomic approach in VOUS interpretation, resulting in expedited diagnosis through familial studies and other functional assays. The research also concentrates on validating the pathogenicity of newly identified variants by whole exome sequencing (WES), via functional analysis of their molecular effects. Our ultimate objective is to advance early diagnosis and monitor therapeutic applications to circumvent brain damage and associated health complications. This comprehensive metabolomics-based approach could revolutionize the diagnostic landscape of IEMs and dramatically enhance therapeutic strategies.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

BIOCHEMICAL APPROACH FOR THE DIAGNOSIS AND MONITORING PATIENTS WITH INBORN ERRORS OF METABOLISM

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Inborn errors of metabolism (IEM) are a group of genetically derived diseases that are individually rare but collectively common, with a prevalence of 1 in 8000 births. These disorders can be very severe. Therefore, applying the newborn screening (NBS) programs (a group of tests) and many specialized laboratory tests (basic or advanced) help to establish a potential diagnosis and initiate treatment for these disorders. Early detection of IEM would lead for better management, treatment plan, and reduced morbidity & mortality. The diagnosis of IEM require specialized laboratory investigations and attendant interpretation. However, the basic facilities available in the typical clinical chemistry laboratory could help for early detection of some IEM in combination with the phenotype. Here, a brief overview will be given on numerous different biochemical diagnostic approaches that used for the diagnosis and monitoring patients with IEM.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

THE MOLECULAR AND BIOCHEMICAL LANDSCAPES OF MITOCHONDRIAL DISEASES: THE KNOWN AND UNKNOWN

DR. NAIF A . ALMONTASHIRI, Ph.D., FACMG , DABMGG
Taibah University
Almadinah Almunawrah, Saudi Arabia

The genetic landscape of mitochondrial diseases in highly consanguineous populations are not yet studied at the population level to gain a population-level clinical data and genetic data about the known diseases, confirm the recently discovered genes, and discover new nuclear genes in association with mitochondrial diseases and biochemical metabolomic signatures. To achieve this, we invited nine large genetic and metabolic centers in Saudi Arabia to retrospectively recruit patients with confirmed or suspected diagnosis of mitochondrial diseases. We recruited 384 families (443 patients) with a consanguinity rate of 93%. Of those, 347 families had confirmed mitochondrial diseases due to pathogenic (P) or likely pathogenic (LP) variants. All the P and LP variants were detected by sequencing-based assays. About 27% of the families had mitochondrial DNA depletions syndromes and 15% had multiple mitochondrial dysfunction syndrome. Most of the patients had P or LP variants in nuclear-encoded mitochondrial genes (92%) with predominant recessive pattern of inheritance (90%). FBXL4 and ISCA2 are the commonly mutated gene accounting for 14% and 11%, respectively, of the confirmed families. Biochemically, 79% of the confirmed families presented with biochemical abnormalities, of which lactic acidosis accounts for ~90%. Interestingly, the global mortality rate at median age of 1 year reached 38%, likely due to the enrichment of nuclear gene-associated mitochondrial diseases in this cohort. We have confirmed the candidacy of several candidate genes and identified two candidate mitochondrial genes, DMAC2 and ME2, as novel recessive causes of mitochondrial diseases. In conclusion, our study establishes the genetic landscape of known and unknown genetic causes of mitochondrial disease in consanguineous population.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

REFERENCE INTERVALS OF COMMON LABORATORY TESTS FOR SAUDI POPULATION: OVERVIEW AND SUMMARY

DR. ANWAR ABDULLAH BORAI, PhD, FAACC, FIBMS, MLS (ASCP)
Clinical Scientist
Section Head, Clinical Chemistry
King Khalid National Guard Hospital
King Abdulaziz Medical City (KAMC), Jeddah, KSA

In this presentation we will overview and summarize the outcomes of 10 years of study and research about Reference Intervals for the most common laboratory tests in Saudi Population.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

HARNESSING THE POWER OF BIG DATA ANALYTICS TO HARMONIZE REFERENCE INTERVALS ACROSS POPULATIONS AND ANALYTICAL PLATFORMS

PROF. KHOSROW ADELI Ph.D., FCACB, DABCC, FAACC
Head and Professor, Clinical Biochemistry and Senior Scientist, Research Institute,
The Hospital for Sick Children, University of Toronto, Toronto, Canada
President, International Federation of Clinical Chemistry and Laboratory Medicine (IFCC)

Several national surveys have reported wide variation in reference intervals across healthcare centres in certain regions, even those using the same analytical platform and reagents for the same assay. There is a high risk of inappropriate test result interpretation when reference intervals are not appropriately harmonized. The Canadian Society for Clinical Chemistry (CSCC) Working Group on Reference Interval Harmonization was established in 2015 to develop evidence-based harmonized/common reference intervals (hRIs) and support their implementation in laboratories across Canada. Harnessing the power of big data, laboratory results were collected across populations and testing platforms to derive common adult RIs for 16 biochemical markers. A novel comprehensive approach was established, including: (1) analysis of big data from community laboratories across Canada; (2) statistical evaluation of age, sex, and analytical differences; (3) derivation of hRIs using the refineR method; and (4) verification of proposed hRIs across nine laboratories with different instrumentation using serum and plasma samples collected from healthy Canadian adults. Harmonized RIs were calculated for all assays using the refineR method, except free thyroxine. Derived hRIs met proposed verification criterion across nine laboratories and five manufacturers for alkaline phosphatase, albumin (BCG), chloride, LDH, magnesium, phosphate, potassium (serum), total protein (serum). Further investigation is needed for select analytes due to lower verification in one or more laboratory (albumin (BCP), calcium, total CO2, total bilirubin, sodium) or concern regarding too wide hRIs (alanine aminotransferase, creatinine, TSH). In this presentation, we will discuss the work completed by the Working Group on Reference Interval Harmonization in Canada, challenges encountered, and future plans to support implementation.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

REFINE R FOR INDIRECT ESTIMATION OF REFERENCE INTERVALS

DR. HADY ELKHODARY MD, PhD, PMP, MScHQ
Director of Laboratory Services & Outreach
American Hospital Dubai, UAE

Combining the concepts of indirect estimation, Refine R, and a reference interval, we aim to achieve a more reliable estimate of the population parameter, reducing uncertainty and potential bias in the estimation process. This approach is particularly relevant in scenarios where traditional direct estimation methods may be limited, and additional information is available to improve the estimation accuracy.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

REFERENCE INTERVALS: IMPORTANCE AND SUITABILITY FOR DIAGNOSIS OF DISEASES

DR. GHASSAN SHANNAN
Head of Biochemistry Department, Al Raheed Private University
Damascus, Syria

Laboratory test results have no value in the management of diseases without appropriate reference intervals to relate the patient results to a set of values to be used as a reference.

In this presentation we will shed lights on the importance of Reference Intervals and the definition of various terms such as reference values, reference range, normal values etc.

In addition, we will discuss various methods to establish Reference Intervals for each laboratory. The limitation of direct methods with inherited issues of demographic variation such as ethnicity, physical activities, BMI, age, gender and other pre-analytical variables and the definition of normal and healthy subjects. Indirect methods also have their limitation and pros and cons.

Selecting samples and methods of calculation will be discussed. Furthermore, the recommendation and guideline of the International Federation of Clinical Chemistry and Laboratory Medicine, IFCC and CLSI document EP28, Definition, Establishing, and Verifying Reference Intervals in the Clinical Laboratory, 3rd Edition will be presented.

Definition of Clinical Decision Limit and Critical Values will be discussed.
Verification of IVD Reference Intervals will be addressed from critical point of view.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

AUTO-VALIDATION RULES TESTING TO ENSURE CONTINUOUS QUALITY AND RELIABILITY

DR AHMAD ABOAMER,
Clinical Chemistry Consultant
Al- Noor Specialist Hospital, Makkah, KSA

Autoverification is a process whereby clinical laboratory results are released without manual human intervention. Autoverification uses predefined computer rules to release of results. Creating and validating these rules are the most demanding steps for setting up an autoverification system. We aimed to help users to establish autoverification rules and evaluate their validity and performance.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

METHOD VALIDATION/VERIFICATION PROTOCOL

MR. RAFIQ KHAN
Supervisor, Biochemical Metabolic Laboratory
National Guard Health Affairs, DPLM, Metabolic Laboratory, Riyadh, KSA

For all unmodified-FDA approved non-waved test, method and instruments, diagnostic laboratories are required to perform analytical verification of performance specifications such as accuracy, precision, reportable range. These must be verified in the location in which patient testing will be performed. If an instrument is moved, the laboratory is responsible for determining that the relocation process does not affect the method performance specifications (Verification).

Validation applies to testing instruments/method that are not FDA approved, FDA-approved but modified, CE approved and laboratory developed method. The laboratory must establish its own performance specifications including precision, accuracy, reportable range, interference, sensitivity, specificity and reference interval. This presentation will explain simple and practical approach for method validation / verification procedure and results evaluation with acceptable criteria.

Keywords: method Validation, verification, test performance

SCIENTIFIC ORAL PRESENTATION ABSTRACT

MOVING AVERAGES FOR QUALITY CONTROL IN MEDICAL LABS

DR. HADY ELKHODARY MD, PhD, PMP, MScHQ
Director of Laboratory Services & Outreach
American Hospital Dubai, UAE

Explore the utility of moving averages as a robust tool for quality control in clinical laboratory settings. This method offers a dynamic approach to monitor long-term trends and variations, allowing for timely interventions and system improvements. Tailored to healthcare professionals interested in optimizing lab operations, the presentation will delve into the practical application of moving averages, their advantages over traditional methods, and case studies demonstrating their impact on quality assurance.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

THE INFLUENCE OF DELTA CHECK IN AUTO-VERIFICATION AS LABORATORY QUALITY CONTROL

DR. LAILA O. ABDEL-WARETH, MBBCh, FRCPC, FCAP, EMHCA
Executive Director
National Reference Laboratory, Abu Dhabi, UAE

Delta checks and auto verification are quality control tools in clinical laboratories. Delta checks involve comparing current and previous patient results to identify significant changes. If the change exceeds predefined limits, it triggers review. Auto verification automates result approval if predefined criteria are met, enhancing efficiency. Both ensure accuracy and reliability of lab results. The presentation will address how to develop delta checks based on the reference change values and the implantation of various auto-verification rules in the clinical laboratory sitting.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

BREAKING BARRIERS: A 360-DEGREE DIVE INTO OPERATIONAL CHALLENGES IN DIAGNOSTIC LABORATORIES

MR. JAFFAR ABDULAZIZ KHIARIY
Head of Department of Pathology & Laboratory Medicine
King Faisal Specialist Hospital & Research Center, Jeddah, KSA

The presentation delves into the multifaceted landscape of clinical laboratories and the array of challenges they face in providing crucial healthcare services. It commences by emphasizing the pivotal role that clinical laboratories play in healthcare, underlining their significance in delivering accurate and timely test results to facilitate patient care. The presentation systematically explores the mounting challenges these laboratories encounter.

The increasing demand for laboratory services, driven by factors such as population growth, aging, and a surge in disease prevalence, is discussed in detail. It elucidates how this demand surge poses a substantial challenge to the healthcare system. Simultaneously, resource constraints, encompassing budget limitations and staffing shortages, emerge as substantial hurdles that impact the effectiveness of laboratory operations.

The rapid march of technological advancements within clinical laboratories creates a two-fold challenge: the need for continuous training of personnel and the investment in state-of-the-art equipment. The critical aspect of quality assurance, encompassing accreditation requirements and compliance issues, is stressed upon as a cornerstone of reliable patient care.

Data management presents an operational challenge due to the massive amount of data generated by clinical laboratories. Efficient data storage and retrieval systems become indispensable. Regulatory compliance and its complexities are explored, emphasizing the importance of adhering to guidelines to avoid severe consequences.

Sample management issues, turnaround time challenges, and the increasing complexity of diagnostic tests further paint a vivid picture of the hurdles faced in clinical laboratory operations. Supply chain disruptions and cybersecurity threats enter the discussion as modern challenges that require proactive solutions and strategies.

The presentation also touches upon the unique challenges clinical laboratories face during health crises like pandemics, necessitating adaptability and preparedness. In conclusion, it reiterates the vital need for ongoing improvement in clinical laboratory operations to ensure quality patient care and support healthcare systems effectively.

This presentation offers valuable insights into the operational challenges that clinical laboratories must navigate, underscoring the need for innovation, adaptation, and continuous improvement in this critical sector of healthcare.

SCIENTIFIC ORAL PRESENTATION ABSTRACT

QUALITY COSTS BETWEEN THE TRUTH AND DENIAL

MR. ABDULAZIZ MOHAMMED ALJOHANI
Laboratory department, Ministry of National Guard
Prince Mohammed Bin Abdulaziz Hospital Medina

In the rapidly evolving healthcare landscape, the significance of medical laboratories cannot be overstated. However, there exists a contentious debate around the true costs associated with maintaining a high level of quality in these labs. This presentation aims to dissect the multifaceted aspects of quality costs in medical laboratories, unravelling both acknowledged and hidden expenses. Utilizing real-world case studies and empirical data, the presentation explores the balance between quality and cost-efficiency, and challenges the commonly held beliefs that compromise either. The talk aims to equip healthcare professionals, administrators, and policymakers with insights into making informed decisions that benefit both patient care and economic sustainability

SCIENTIFIC ORAL PRESENTATION ABSTRACT

ARE LABORATORIES READY FOR OPERATIONAL EXCELLENCE AND AWARDS

DR. NASHAT NAFOURI
Chairman of Healthcare Interest Group & Executive Officer
Medical & Quality Director, Futurelab

Understanding the cost of quality is one of the oldest quality business methods. The root goes back to 1951, when Dr. Joseph M. Juran's first quality control handbook made the analogy of "Gold in the Mine". That is, there are often hidden costs we cannot see but which can be recovered. Other publications adding to an understanding of quality in a service or product. They may be seen as the costs of preventing quality problems, measuring quality levels, monitoring and/or inspecting quality level or failing to accomplish the desired quality levels. Over the last several decades, quality costs have been divided into several categories, but the most accepted and comprehensive classification has categorized them as 1) Prevention, 2) Appraisal, 3) Internal Failure, and 4) External Failure.

WORKSHOP ORAL PRESENTATION ABSTRACT

DIANGNOSIS OF NEONATAL SPESIS USING DIFFERENT SEPSIS MARKERS

DR. HISHAM ABD EL-AZIZ
Head of Lab in Mouwasat Hospital

Introduction of Tumor Markers;
Classification and pathology of tumors;
Causes of cancer;
Metastasis;
Diagnosis and staging of cancer;
Tumor grades and stages;
Cancer treatment;
Tumor markers;
Uses of tumor markers;
Types of tumor markers;
Examples of Clinical correlations and tumor markers.

WORKSHOP ORAL PRESENTATION ABSTRACT

THE FUTURE OF THE CLINICAL LABORATORY

MR. ALAA SALAMA
Regional Marketing Manager - Core Lab
Roche Diagnostics Saudi Arabia

At Roche Diagnostics, we develop diagnostic tests, instruments and digital solutions with the power to transform healthcare for people around the globe. Our core business is the discovery, development and manufacturing of in vitro tests for the diagnosis of various diseases that include cancer, diabetes, Covid-19, hepatitis, human papillomavirus and many others.

In vitro diagnostics (IVDs) are tests that can detect disease, conditions and infections done on samples such as blood or tissue that have been taken from the human body. They allow doctors to diagnose patients effectively and work to provide appropriate treatments.

The samples are analysed directly at physicians' offices or in laboratories, which we supply with our tests and instruments.

Most of our in vitro tests run on diagnostic instruments that we develop and manufacture ourselves or with external partners. Some of these devices are small, and are used to analyse a patient's blood or urine. You can find these in doctors offices and clinics.

Other instruments are large analysis modules, some the size of small cars, which can be integrated to provide a seamless molecular diagnostics solution for central laboratories. These systems allow hundreds of samples to be analysed in parallel, testing for many different diseases.

The laboratory-based diagnostic systems work with advanced technologies equally as sophisticated as those you might find in modern aircraft. These analytical laboratory instruments are fully automatic, enabling the analysis of a large number of samples in a short time. In addition, advanced automation reduces the opportunity for error, which benefits patients. Thus, laboratories are able to deliver high-quality patient results in a highly efficient manner.

We are transforming healthcare with innovation and collaboration. Using an evidence-based approach, our insights-driven digital health solutions aim to support patient care.

At Roche, we have a rich heritage in healthcare innovation and care reinvention. And, together with our efforts to build collaborative open digital ecosystems, we can leverage diagnostic data and turn them into insights. These insights can help inform decisions and improve efficiencies in labs and clinics.

WORKSHOP ORAL PRESENTATION ABSTRACT

INNOVATION BEYOND THE LABORATORIES: TRANSFORMATIVE ADVANCES AND FUTURE FRONTIERS

MR. MESHAAL HAMED ALMALKI
Technical Solution Design Manager
Abbott, Saudi Arabia

The field of healthcare and diagnostics is constantly evolving, with a strong emphasis on improving patient care, reducing errors, and increasing efficiency. While much attention has traditionally been directed towards scientific discoveries and innovations within laboratory settings, significant advancements have also been made in the preanalytical and post-analytical stages of testing.

The preanalytical and post-analytical stages of diagnostic testing have undergone significant innovation outside the laboratory, leading to improved patient care, reduced errors, and streamlined workflows. By highlighting these advancements, this presentation aims to inspire further development and promote the integration of innovative solutions into clinical practice, ultimately contributing to the advancement of healthcare and diagnostics.

WORKSHOP ORAL PRESENTATION ABSTRACT

A NOVEL APPROACH USING BIG DATA TO MEASURE SIGMA METRICS IN CLINICAL LABORATORIES

MS. CECILIA SCARPONI
Clinical Liaison, Commercial Marketing
QuidelOrtho

A novel approach for automatically assessing laboratory Sigma metrics for a broad range of Vitros® assays

WORKSHOP ORAL PRESENTATION ABSTRACT

ANALYTICAL INTERFERENCES IN HIGH SENSITIVITY CARDIAC TROPONINS: A CHALLENGE THAT CAN BE SOLVED

DR. MILICA MIJATOVIC, PhD
Assays and Clinical Marketing Manager, MEA Region
Siemens Healthineers

This presentation will give an overview of the most common interferences in cardiac troponin testing and will highlight the unique approach of Siemens Healthineers with the high sensitivity Troponin I assay design to minimize these interferences.

WORKSHOP ORAL PRESENTATION ABSTRACT

REVOLUTIONIZING LABORATORY EFFICIENCY AND DIAGNOSTIC ACCURACY

MR. AHMED SHEHATA
Chemistry and Immunoassay Product Manager - ME
Beckman Coulter Diagnostics

This Presentation will shed the light on the latest innovation in Immunoassay for high and Ultra-high laboratories, addressing the daily challenges and how Beckman Coulter DxI 9000 technology will help overcome these challenges. Join this symposium to help:

- Revolutionize your Laboratory Efficiency and Diagnostic Accuracy for an enhanced Impact.
- Power your Immunoassay performance.
- Create time to focus on what matters most

WORKSHOP ORAL PRESENTATION ABSTRACT

MONOCLONAL GAMMOPATHIES, DIAGNOSIS AND MONITORING

DR. MOHANNAD YACOUB
Medical Scientific Liaison
Binding Site

Accurate monitoring of MM patients is paramount for assessing the effectiveness of treatment and to assign responses. Current guidelines for monitoring rely in the quantification of the M-Ig by serum protein electrophoresis (SPEP) and/or immuno-precipitation assessment of total immunoglobulin (total Ig). For patients with no measurable disease (serum M-Ig <10g/L or urine M-Ig <200mg per 24 h) and those with LCMM, serum FLC measurements are recommended.

Traditional laboratory techniques for measuring the M-Ig present analytical limitations which may prevent appropriate monitoring of a significant percentage of patients. Likewise, advances in our understanding of the biology of the disease have highlighted the need to revisit current protocols for monitoring MM. New developments in immunodiagnostic technologies warrant comparative studies to address these issues and to provide with comprehensive solutions leading to improvements in patient management,

Recently, polyclonal antibody based assays have been developed that separately identify and quantify the different heavy/light chain (HLC) types of each immunoglobulin class (e.g. IgG_K and IgGλ), providing a precise measure of both the monoclonal immunoglobulin (involved) and polyclonal background of the same Ig' class (uninvolved). Whilst SPEP and total Ig' measurements do not compensate for variable metabolism via the FcRn receptor for IgG, HLC κ/λ ratios are not affected by receptor recycling. HLC assays can overcome some of the limitations of SPEP and immuno-precipitation total Ig' techniques and can aid in monitoring MM patients.

Serological testing remains at the core of patient monitoring and response assessment, and usually provides the first indication of relapse after treatment. Alternative methods for monitoring MM patients are necessary that complement and/or substitute current ones because: 1) If serum FLC and intact immunoglobulins are produced by different plasma cell clones does reductions in one or other assessment in isolation truly monitor patient response?; 2) Non-linearity and poor CV at low concentrations means SPEP may not be the most accurate method for assigning response (MR, PR, VGPR, CR), especially after short timescales; 3) The impact of the FcRn is likely to prolong low concentration M-proteins after successful therapy.

Therefore, the increased sensitivity of FLC and HLC measurements suggests a clinical advantage of these methods over traditional techniques for monitoring

WORKSHOP ORAL PRESENTATION ABSTRACT

GLYCOMARK - A NEW TEST FOR PREDIABETES AND DIABETES (CLINICAL AND TECHNICAL OVERVIEW)

MR. ERIC A. BUTTON
Founder and CEO, Precision Diabetes Inc.
Raleigh, NC, USA

GlycoMark, which measures 1,5-anhydroglucitol, is a new blood test for the detection and management of prediabetes and diabetes. New studies indicate that the GlycoMark blood test identifies high-risk, asymptomatic patients with prediabetes, not detected by standard diabetes tests, hemoglobin A1C and glucose. This is a critical clinical need, as physicians can identify those patients closest to developing type 2 diabetes and administer treatment to prevent the onset of diabetes. Type 2 diabetes can take years to develop, and if caught early, it is an entirely preventable disease. However, not everyone with prediabetes will develop type 2 diabetes. Unfortunately, it is not possible with current diabetes tests such as hemoglobin A1C and fasting glucose to identify with an acceptable degree of certainty which prediabetic individuals have the highest risk of progression. As the GlycoMark test reflects a progressive decline of functional beta-cell mass, it can identify prediabetic patients with the highest risk of developing diabetes before the first symptoms develop. By making positive lifestyle changes such as eating a well-balanced diet, exercising regularly, and maintaining a healthy weight, many of these high-risk patients can prevent the development of type 2 diabetes entirely. Several studies validate the association of 1,5-anhydroglucitol (GlycoMark) with beta-cell function and mass, including a recent study published in the Journal of Clinical Endocrinology and Metbolism (2022), "Circulating 1,5-Anhydroglucitol as a Biomarker of Beta-Cell Mass Independent of a Diabetes Phenotype in Human Subjects."

GlycoMark is also a well-established, FDA-cleared test for diabetes and is a specific indicator of hyperglycemic episodes and glycemic variability. The test provides an indication of whether a patient has had recent hyperglycemic episodes, and the results are related to the average daily maximum glucose level over a 1-2 week period. Nearly 40 percent of diabetes patients in "good control" have significant glycemic variability, and routinely assessing patients' glycemic variability is challenging. Hemoglobin A1c (HbA1c) glucose levels can vary widely among patients, and fasting and infrequent finger-stick glucose tests often miss glucose peaks at their durations. The GlycoMark test reveals differences in glycemic variability, providing personalized care and management of patients' diabetes therapy to reach glucose goals. Glycemic variability has been shown to be associated with higher rates of repeat cardiovascular events, retinopathy in type 2 diabetes, and an increased risk of microvascular complications.

WORKSHOP ORAL PRESENTATION ABSTRACT

DETECTION AND IMPROVEMENT OF PREANALYTICAL ISSUES IN CLINICAL LABORATORY

DR. MESHARI ALABDULLATIF
Medical Affairs Manager, Saudi Region
Becton, Dickinson and Company (BD)

Pre-analytical variation, encompassing the changes that occur in a biological sample before analysis, significantly impacts test accuracy, leading to misdiagnosis and inappropriate treatment. Comprising up to 70% of all laboratory errors, pre-analytical variation necessitates proper sample handling and processing. Guidelines from organizations like CLSI and ASCLM emphasize patient education, standardized protocols, and continuous quality monitoring to minimize pre-analytical errors and ensure patient safety.

POSTER PRESENTATION ABSTRACTS

Abstract # 1

PREDICTIVE BIOMARKERSOF CARDIOVASCULAR RISKIN OVERWEIGHT SUBJECTS

Younes Benchaar[1], Rima Laskri[1], Adel Gouri[1], Djaouida Kerbi[2], Samia Benyahia[1], Saddek Benharkat[1]

[1]Biochemistry Department, University Hospital Centre Annaba, Badji Mokhtar University Annaba, Faculty of Medicine, Annaba , 23000, Algeria
[2]Department of Clinical Physiology and Functional Exploration. Metabolics and Nutrition, University Hospital Centre Annaba, Badji Mokhtar University Annaba, Faculty of Medicine, Annaba, 23000, Algeria

Background: Screening and assessing cardiovascular risk are crucial in cases of overweight, an independent risk factor for coronary disease. This study aims to evaluate the cardiac enzyme biomarkers (CPK, LDH, ASAT, and ALAT) in relation to BMI and investigate their correlation with the reference marker, CRPus.

Methods: Sixty-two subjects were included in a cross-sectional pilot study with an analytical focus, divided into two groups based on BMI. The first group consisted of overweight subjects (BMI ≥ 25 kg/m²), and the second group comprised normo-weight volunteers (18.5 ≤ BMI < 25 kg/m²). Analysis of CPK, LDH, ASAT, ALAT, and Lp(a) was conducted for the entire study population, while CRPus, EAL, and IA were evaluated only in the overweight population.

Results: The levels of cardiac enzyme markers LDH (p = 0.000*) and CPK (p = 0.001*) were significantly higher in overweight subjects compared to normo-weight individuals. Lp(a) levels were elevated in obese subjects. The evaluation of cardiovascular risk based on CRPus revealed that 81.2% of overweight subjects had a moderate to high atherogenic risk, while 45.2% had a high risk according to IA. ConsideringLp(a) levels, 35.5% of overweight subjects and 33.3% of normo-weight individuals were exposed to high risk. CRPus showed a positive and significant correlation with ASAT (r = 0.356*, p = 0.046) and LDH (r = 0.370*, p = 0.037).

Conclusion: LDH exhibited a significant difference based on BMI and showed a positive correlation with CRPus. These findings suggest that LDH could be a promising indicator in the evaluation of cardiovascular risk in overweight subjects. Keywords include BMI, cardiovascular risk, cardiac enzymes, and CRPus
Keywords: Cardiovascular risk, overweight, cardiac enzymes, CRPus, Lp(a).

POSTER PRESENTATION ABSTRACTS

Abstract # 2

EFFECTS OF ENERGY DRINKS ON HEPATIC METABOLIC ALTERATIONS AMONG UNIVERSITY STUDENTS IN NORTHERN IRAQ

Kajeen Hassan Jasim, Ronak Haj ERSAN, Zilan Mousa Younis, Lozan Nazar Mustafa, Loreen Jamaladeen Said

Department of Medical Laboratory, College of Health Science, Cihan University, Duhok, Iraq

Background: This study sought to investigate the potential effects of energy drink consumption on liver parameters, body mass index (BMI), and anthropometric measurements. The consumption of energy drinks has been implicated in a range of health issues, encompassing hypertension, cardiovascular ailments, headaches, sleep disorders, substance misuse, stress, and hyperactivity .

Methods: This cross-sectional inquiry delved into the interrelation between energy drink usage and markers of liver health. The study cohort comprised 50 participants, including both male and female individuals aged between 18 and 40. These participants were divided into two distinct groups: (1) a healthy group (n = 25) comprising individuals within the university environment who abstained from energy drink consumption, and (2) a case group (n = 25) consisting of university residents who regularly consumed energy drinks. The serum concentrations of liver parameters, specifically aspartate aminotransferase (AST) and alanine transaminase (ALT), were quantified using a spectrophotometer. Serum levels of vitamin B12 were measured using the VIDAS® method. Anthropometric measurements were additionally carried out.

Results: The outcomes unveiled statistically significant elevations in the levels of ALT, AST, and vitamin B12 within the energy drink consumption group when contrasted with the healthy group ($p < 0.001$). Further analysis discerned that the increases in ALT, AST, and vitamin B12 were more pronounced in the male subset compared to females ($p < 0.01$).

Conclusion: This study concludes that regular energy drink consumption is associated with considerable alterations in key biochemical parameters, notably liver function markers such as ALT and AST, as well as anthropometric indices. Furthermore, the findings highlight a potential association between excessive energy drink consumption and instances of clinically detectable acute liver injury. These insights underscore the importance of considering the potential health implications of energy drink usage

POSTER PRESENTATION ABSTRACTS

Abstract # 3

GLYCEMIC CONTROL IN PATIENTS WITH TYPE 1 DIABETES: COMPARISONS OF HOLIDAYS VERSUS SCHOOLDAYS

Ayman Abdullah Al Hayek &Mohamed Abdulaziz Al Dawish

Department of Endocrinology and Diabetes, Diabetes Treatment Center
Prince Sultan Military Medical City, Riyadh, Saudi Arabia

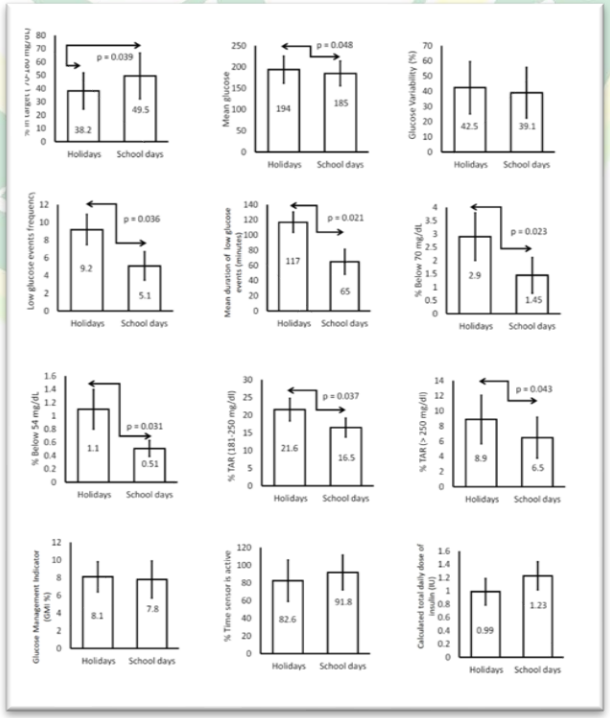
Background: To investigate the impact of school life by comparing the glycemic control and ambulatory glucose profile (AGP) between holidays and schooldays in children and adolescents with type 1 diabetes (T1D).

Methods: This retrospective study done using 147 patients with T1D (14-19 years) who self-tested their glucose levels by intermittently scanned continuous glucose monitoring (isCGM) system during school and holidays periods. Continuous glucose monitoring (CGM) metrics were gathered during school and holidays i.e., Glucose Variability (GV) (%), mean Time in Range (TIR), Time above Range (TAR), Time below Range (TBR), and average duration of hypoglycemic events.

Results: Significant differences were observed between holidays and schooldays on % in target 70-180 mg/dL (38.2 vs 49.5; p = 0.039), mean glucose (194 vs 185; p = 0.048), frequency of low glucose events (9.2 vs 5.1; p = 0.036),mean duration of low glucose level(117 vs 65; p = 0.021), % below 70mg/dL (2.9 vs 1.45; p = 0.023), % below 54mg/dL (1.1 vs 0.51; p = 0.031), TAR 181-250 mg/dL (21.1 vs 16.5; p = 0.037) and TAR >250 mg/dL (8.9 vs 6.5; p=0.043). Compared to holidays (8.34%), school days (8.13%) HbA1c level was lower among the study population; however, no significant changes between holidays and school days on HbA1c level. Compared to holidays (n= 6.2), the FreeStyle Libre (FSL) scanning frequency was significantly higher during the school days (n=9.5) (p=0.042).

Conclusion: Children with T1D appear to have good diabetes control during the schooldays compared to the holidays. These individuals may need more attention and guidance to improve their glucose control during holidays.

Figure 1: Glucose management and glucometric variables among the study population reported as "holidays" and "schooldays"



POSTER PRESENTATION ABSTRACTS

Abstract # 4

PERFORMANCE ASSESSMENT OF 10 EQUATIONS FOR LOW DENSITY LIPOPROTEIN CHOLESTEROL CALCULATION AGAINST DIRECT HOMOGENEOUS METHOD

Rawaa E.K. Alsadig[1,2], Adel N.Morsi[1]

[1]Department of Chemical Pathology, Faculty of Medical Laboratory Sciences, University of Khartoum – Sudan.
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Background: Low density lipoprotein cholesterol (LDL-C) elevation is a major cause of Coronary heart disease (CHD), a common cause of morbidity and mortality worldwide. National Cholesterol Education Program Adult Treatment Panel III (NCEP- ATP III) has stated the primary goals of therapy and the cutoff points for initiating treatment of hypercholesterolemia in terms of LDL-C. That's why reliable estimation of LDL-C is essential for proper diagnosis and monitoring of CHD. Among Different methods of LDL-C estimation, the ß- quantification is the reference procedure, Nevertheless, it has disadvantages of being labor-intensive, time-consuming and requiring large sample volume. While, Homogeneous method requires full automated analyzers that might not be available in every laboratory. As a result, Friedewald equation was accepted as an alternative in routine clinical practice worldwide, but it has its own limitations. To bypass them, other equations using different constant ratios or fixed factors had been suggested, including a novel equation by Martin et al. applying an adjustable factor. The aim of this study was to assess these equations against routinely accepted homogeneous method for LDL-C estimation and validate their application in the clinical utility not only in the hospitalized patients, but also in the general Sudanese population.

Methods: Lipids profile Data of 1006 Sudanese individuals were retrieved form Hospitals.Total Cholesterol (TC) and Triglycerides (TG) were measured using enzymatic method, high density lipoprotein cholesterol (HDL-C) and LDL-C were estimated using direct homogeneous methods on Mindray BS-308. LDL-C by 9 equations was calculated using Microsoft Office Excel 2007. Martin LDL-C was calculated using online calculator (http://www.ldlcalculator.com). Statistical analysis was conducted with SPSS 16. Average values were presented as mean ± standard deviation (SD). Bland Altman Plot demonstrated difference between measured and calculated LDL-C against mean of measured and calculated LDL-C. Linear regression was used to demonstrate relationship between calculated and directly measured LDL-C, correlation coefficient (r) was used as a numerical value for relationship, regression formula to calculate expected values at LDL-C cutoff values, then difference between expected and calculated LDL-C (Bias) which is compared to NCEP Laboratory Standardization Panel specified criteria for acceptable performance as accuracy within ±4% of expected values.

Results: Of the 10 equations, Delong, Rao and Martin equations displayed an acceptable performance among LDL-C cutoff points (100, 130, 160 and 190 mg/dl) for Delong (Bias was 1.4, -0.1, 1.7 and -3.2 mg/dl), Rao (Bias was 2.8, 1.9, 1.0 and 0.1 mg/dl), Martin (-1.2, -3.3, -5.4 and -7.5 mg/dl), respectively. While Friedewald equation bias exceeded ±4% performance (-3.4, -5.5, -7.6 and -9.7). In relationship measures between calculated and measured results (r was 0.872 for Delong, 0.862 for Rao and 0.875 for Martin equation). Delong formula performance was also superior when assessed at different TG and HDL-C levels followed by Martin equation.

Conclusion: Delong equation and Martin equation should be taken into consideration for estimating LDL-C for routine laboratory applications because they both seemed to be more reliable than the most widely used Friedewald equation in the Sudanese population.

POSTER PRESENTATION ABSTRACTS

Abstract # 5

CLINICALANDBIOLOGICALDIAGNOSISOF A FATAL METHAMPHETAMINE POISONING

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Background: MDMA (3,4-methylenedioxy-N-methylamphetamine) also known asecstasy, is the most commonly designer drug abused by young adults at rave parties. Ecstasy pills have attractive appearance in shape, logo and colors resembling to candy but can wreak havoc on the body and mind of young consumers due to its side effects. MDMA acts by increasing adrenergic and serotonergic neurotransmission, resulting mainly in cardiovascular and neuropsychiatric symptoms that can threaten the vital prognosis of young users even at low doses.

Methods: We report a case of a 27-year-old male who died following the ingestion of two Ecstasy pills in rave party. The patient was extremely restless when presented to the emergency unit with tachycardia at 150 beats / min and hyperthermia at 40.5°C. Biochemical parameters were analyzed by Cobas Integra400 analyzer and urinalysis was performed by an Agilent 6890 type gas chromatograph coupled to a mass-selective detector model HP 5973. The chromatographic elution was carried out on an HP-5MS capillary column (30m * 0.25 mm * 0.25 µm) at a helium flow rate of 1.8 ml/min. Sample injection volume was 2 µL. The injector temperature was set at 260°C; column temperature was initially set at 180°C with a hold time of 1 min and then gradually increased by 20°c/min up to 290°c then to 300°c at a heating speed of 5°C/min. The mass spectrometer was operated in a full scan scanning mode.

Results: Biochemical analyzes revealed an acute renal failure with serum creatinine at 310 µmol/L and uremia at 88.7 mmol/L, ametabolic lactic acidosis, a rabdomyolysis with CPK at 752 mmol/L and LDH at 3044mmol/L. Liver enzymes were 13 times higher than normal levels. Troponin level was 10875ng /L. Disseminated intravenous coagulation was settled down with PT 10%, DDimers at 12000µg/mL and platelets at 41,000 elements/mm3. Fibrinogen and factor V were undetectable. The patient died after a few hours from multiple visceral failures.

Conclusion: The diagnosis of exstasy intoxication is based on a serotoninergic toxidrome, which explains clinical symptoms; biologically, intoxication can simulate disseminated intravascular coagulation (DIC), that's why mastering the diagnosis of this kind of intoxication is very important.

POSTER PRESENTATION ABSTRACTS

Abstract # 6

CORRELATION BETWEENGLYCATED ALBUMIN AND OTHER MEASURES OF GLYCEMIC CONTROL INDIABETIC AND NON-DIABETIC SAUDI ADULTS - A PILOT STUDY

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Background: The current methods to detect dysglycaemia include glycated hemoglobin (HbA1c), fasting plasma glucose (FPG), and oral glucose tolerance test (OGTT).HbA1c, however, does not always accurately reflect glycemic status, particularly in medical conditions that impact red blood cells. In contrast, the glycated albumin test, which measures glycated albumin in plasma,can reflect glycemic status and is unaffected by medical diseases that cause inaccurate HbA1c values. In this study, we aimed to assess the possibility of using glycated albumin for diabetic screening, diagnosis, and monitoring among Saudi adults by investigating its correlation with current indicators.

Method: A total of 132 subjects,74 men and 58 women,wereincluded.112 individuals were not previously diagnosed with diabetes, and 20 were diabetic patients. Fasting Blood samples were obtained, and a one-hour glucose challenge test was performed. HbA1c, FPG, and1-hour plasma glucose (1-hPG)were analyzed to assess the glycaemic status of the participants according to the reference range. Serum albumin was also measured routinely. Serum glycated albumin was measured by ELISA technique, and results were converted to % by using the equation (GA%= serum GA/ total albumin x100), where GA% at<14 % was considered as normoglycemic, 14% -16% as prediabetes, ≥17% as diabetes. The correlation between GA and HbA1c, FPG, and 1-hPG was calculated, and results were considered significant at a P value <0.05.

Results: The mean age (±SD) was 39±14 (range:19-82 years). Using HbA1c, 36.4% (n=48) were considered to be normoglycemic, 31.8% (n=42) prediabetics, and 31.8% (n=42) diabetics. Using FPG, 71% (n=94) were considered to be normoglycemic, 6.8% (n=9) prediabetic, and 22% as diabetic(n=29). Using 1-hPG, 28%(n=38) were considered to be normoglycemic, 23.5% (n=31) were prediabetic, and 20.5% (n=27) were diabetic. Using GA%, 43.2% (n=57) were considered to be normoglycemic,24.2% (n=32) were prediabetic, and 32.6% (n=43) were diabetic. Glycated albumin significantly correlated with all glycaemic biomarkers; with HbA1c (r=0.197, P=0.023), with FBG (r=0.21, P= 0.015) and with 1h-PG(r=0.25, P= 0.015), while HbA1c correlated significantly with FPG and 1h-PG (r=0.82, r=0.84) respectively at P value <0.001.

Conclusion: Different measures of glycaemic status did not agree in identifying dysglycaemia. Since Glycated albumin correlated significantly with other markers, it can be suggested as a possible biomarker to diagnose and monitor glycaemic status among Saudi people. Further research is required to determine ranges in our population so that it can be applied in clinical practice.

POSTER PRESENTATION ABSTRACTS

Abstract # 7

FECAL CALPROTECTIN AND FECAL LACTOFERRIN REFERENCE RANGES IN THE PEDIATRIC HEALTHY OMANI POPULATION

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Background: Both Faecal calprotectin (FCAL) and faecal lactoferrin (FLAC) are useful, non-invasive biomarkers for the detection and monitoring of intestinal inflammation in patients with Inflammatory bowel disease (IBD). The two markers correlate with each other suggesting that measuring at least one of them is required in clinical practice. There is a need to examine and determine the age-related reference ranges of FCAL and FLAC to aid in interpreting their changes in diseases. It appears that there are limited studies that refer to the paediatric reference range for these tests especially in the Middle East countries.

Objectives: 1. To establish the reference ranges of FCAL and FLAC in apparently healthy Omani paediatric population aged from 1 to 16 years (divided into sub-groups accordingly). 2. To conduct a verification study for the FLAC assay as it is a relatively new assay that is not used as an in-house test in our laboratory. 3. To conduct a comparative study to observe the changes in FCAL in sub-groups of children with IBD and with infective enterocolitis to check for any significant difference in FCAL levels in these sub-groups compared with healthy individuals.

Methods: A total of 472 children and adolescents were recruited, from whom 348 faecal samples were obtained for FCAL and FLAC measurements respectively. The total population was divided into age groups; 1 to <3 years, 3 to <6 years; 6 to <9 years and 9 to <16 years of age. A verification study for FLAC assay was conducted by performing precision, accuracy, and stability studies. The levels of FCAL were also measured in a subgroup with infective enterocolitis patients (n= 19), and patients with IBD (n= 10), and compared to normal controls. Both FCAL and FLAC were measured by ELISA technique (Immunodiagnostik, Germany). The statistical methods used included Shapiro-Wilk test, density, quantile-quantile plots, logarithmic (10 and natural base) data transformation, Kruskall Wallis comparison, analysis of variance (ANOVA), and Pearson correlation.

Results: The reference range of FCAL and FLAC for each age group was determined by the 2.5th and 97.5th percentile. The reference ranges of FCAL were 17.5-435.4µg/g (1 to <3 year), 9.2-203.4µg/g (3 to <6 year), 6-196.1µg/g(6 to <9 year), and 4.5-179.5 µg/g (9-16). The reference ranges for FLAC were: 0.2-76.5 µg/g (1 to <3 year), 0.2-144.3 µg/g(3 to <6 year), 0.1-31.2 µg/g(6 to <9 year), and 0-59.8 µg/g (9 to 16 year). For validation study of FLAC assay showed a good analytical performance. Comparison of FCAL levels in subgroups of infective enterocolitis and IBD patients showed significant differences compared with health subgroup.

Conclusion: The reference ranges of FCAL and FLAC for paediatric healthy Omani population were determined. Validation of FLAC assay showed a good analytical performance. In IBD and infective enterocolitis study we concluded that, can be a co-founding factor for high FCAL levels overlapping with IBD FCAL levels. However, with proper history taking, clinical examinations, and simple blood investigations we will be able differentiate infective enterocolitis from IBD.

POSTER PRESENTATION ABSTRACTS

Abstract # 8

PREVALENCE OF METABOLIC SYNDROME AND INSULIN RESISTANCE IN A POPULATION OF WOMEN WITH PCOS IN ALGIERS

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Background: Polycystic ovary syndrome (PCOS) is the leading endocrinopathy in young women of childbearing age. Its worldwide prevalence varies from 6 to 22%. In Algeria, it is between 9 and 11%. This syndrome leads to excessive production of androgens by the ovary, which, among other things, encourages the development of adiposity, predisposing to insulin resistance. PCOS also increases the risk of metabolic syndrome, which also leads to insulin resistance and diabetes, and is therefore a risk factor for cardiovascular disease. The aim of this study is to assess the prevalence of metabolic syndrome and insulin resistance in a population of women with PCOS in Algiers.

Method: This was a descriptive cross-sectional study. All women aged between 18 and 40 diagnosed with PCOS at the gynaecology consultation of the CHU Mustapha Bacha and several private gynaecology practices in Algiers between February and July 2023 were included. The diagnosis of PCOS was made according to the Rotterdam criteria, the presence of metabolic syndrome was assessed according to the criteria defined by the International Diabetes Federation (IDF) and insulin resistance by an HOMA-IR index and/or a Triglycerides/HDL-C ratio greater than 2.5. A fasting blood test was performed on a venous blood sample collected in heparinised tubes. Insulin was measured by electrochemiluminescence on the Cobas® e411 (Roche). Blood glucose, cholesterol, triglycerides, HDL-cholesterol and LDL-cholesterol were measured using the Trinder principle on the ADVIA® 1800 (Siemens).

Results: 27 patients were included in the study, the median age of which was 25 (22 -28) years. The average BMI of 28.62 ± 6.69 (kg/m²), 33.3% had moderate obesity and 7.4% morbid obesity. Systolic blood pressure was 115 ± 13 (mm Hg) and 75 (70 - 80) (mm Hg) for diastolic. The plasma insulin level was 13.30 (6.92-18.00) µIU/ml, Cholesterol 1.56 ± 0.29 (g/l), Triglycerides 0.94 (0.74 -1.32) (g/l), HDL-cholesterol of 0.41 ± 0.10 (g/l) and LDL-cholesterol of 0.92 ± 0.22 (g/l). Metabolic syndrome was found in 40.7% of patients and insulin resistance in 55.6% of women according to the HOMA-IR index, the median of which was 2.86 (1.75-4.75) and also in 55.6% of women according to the Triglycerides / HDL-C ratio, the average of which was 2.63 ± 1.21. These two indices demonstrated a good correlation (r = 0.612, p = 0.001). No significant difference was found when comparing these biological parameters between the different PCOS profiles.

Conclusion: Our study showed a high prevalence of insulin resistance in PCOS patients, and consequently also of metabolic syndrome. This is a major cause of long-term morbidity and mortality. Systematic screening for insulin resistance and metabolic syndrome and metabolic management of all PCOS patients would appear to be essential in order to improve nt only the cardiovascular prognosis but also the fertility of these patients

POSTER PRESENTATION ABSTRACTS

Abstract # 9

SERUM SIRTUIN-1 LEVELS IN ELDERLY PATIENTS WITH TYPE 2 DIABETES MELLITUS

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Background: Sirtuin (SIRT) family has 7 variants (SIRT1– SIRT7) in mammals. They are important players in aging biology. Sirtuins have a role in expanding the lifespan in laboratory models by mediating the anti-aging effects of a low-calorie diet (calorie restriction). SIRT1 is a class I histone deacetylase that helps to maintain the balance between acetylation and deacetylation in posttranslational modifications. It plays an important role in the regulation of glucose and lipid metabolism.SIRT1 may exert antidiabetic effects via the modulation of insulin secretion and improvement of insulin resistance via its regulatory effects on insulin signaling, inflammation, mitochondrial function, and circadian rhythms. Therefore, SIRT1 may be a therapeutic target for T2DM. So, this study aimed to assess serum SIRT1in elderly type 2 diabetic patients and investigate its correlation with some clinical and biochemical features

Methods: This case-control study included 2 groups. Group 1 included 35 elderly diabetic patients and group 2 included 35 elderly non-diabetic subjects. All participants were subjected to full history taking, clinical examination and laboratory investigations including complete blood picture, kidney functions (serum creatinine and BUN) and liver functions (AST, ALT, serum albumin, serum alkaline phosphatase and serum bilirubin). Lipid profile, fasting blood glucose (FBS), two-hour post prandial blood glucose (2hr-PPS), hemoglobin A1c (HbA1c) and SIRT1 levels were measured, as well. Body mass index (BMI) was calculated for all participants.

Results: Concerning diabetic measures, FBS, 2hr-PPS, and HbA1c were significantly higher among cases compared to controls ($P<0.001$ for each). Lipid profile results demonstrated that total cholesterol, triglycerides, and LDL were significantly higher in cases compared to controls ($P<0.001$, 0.001, 0.005, respectively). However, there was no significant difference regarding HDL. SIRT1 levels were significantly higher in cases compared to controls ($P<0.001$). Regarding correlation studies, SIRT1 had significant inverse correlations withBMI ($r=-0.316$, $P= 0.006$),FBS ($r=-0.581$,$P<0.001$), 2hr-PPS ($r=-0.676$, $P<0.001$),HbA1c ($r=-0.648$, $P<0.001$), total cholesterol ($r=-0.232$,$P= 0.029$),andLDL ($r=-0.263$, $P=0.013$). Regression analyses showed that BMI and HbA1c were found to be significant influencers of SIRT1.

Conclusion: SIRT1 can be considered as a possible diagnostic and prognostic marker in elderly diabetic individuals.

POSTER PRESENTATION ABSTRACTS

Abstract # 10

DETERMINE THE PHARMACOKINETICS (HALF-LIFE, VOLUME OF DISTRIBUTION AND CLEARANCE) OF AMB-FUBINACA IN BLOOD SAMPLES OF RATS USING GC-MS / MS

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Background: AMB-FUBINACA is one such synthetic cannabinoid that has gained prominence in recent years. As a potent agonist of cannabinoid receptors, AMB-FUBINACA has been associated with a range of adverse effects and potential health risks. Understanding its Pharmacokinetics, specifically its half-life, volume of distribution, and clearance, is essential for determining its disposition and possible toxic effects in the body.

Methods

Study sample: Rats' blood (injection rats by AMB-FUBINACA)

Chemicals: Dimethyl sulfoxide (DMSO), Acetonitrile, Methanol, Distilled water, Ethyl acetate, 1-Chlorobutane, Granisetron(50µg/ml), Sodium bicarbonate (0.01M),Chloroform, Potassium bicarbonate (1 M) and AMB-FUBINACA.

Materials: Polypropylene test tube, EDTA tubes, GC vial, and Insert Vial

Instruments: GC-MS/MS, Technique, Nitrogen Evaporator. Vortex Mixer and Centrifuge

Instrumental parameters: The experiment utilized an Agilent GC-MS/MS instrument and an Agilent autosampler. The GC column employed was an Agilent HP-5MS (5%-phenyl)-methyl polysiloxane capillary column, measuring 30 m long, 250 µm in diameter, and with a film thickness of 0.25 µm. The carrier gas was helium, flowing at a 1 mL/min rate. A 2 µL sample volume was injected into the system using a split-less injection method. The injector and interface temperatures were maintained at a constant value in degrees Celsius. Electron impact ionization mode was employed for ionization, with an ionizing force of 70 eV. The analysis was performed in the selected ion monitoring (SIM) mode, focusing on specific ions for both qualitative and quantitative measurements.

Results: Forensic chemists and toxicologists continually face challenges from misusing emerging synthetic drugs, especially synthetic cannabinoids. This research aimed to investigate the pharmacokinetic characteristics of AMB-Fubinaca in rat blood samples using Gas Chromatography Tandem Mass Spectrometry (GC-CI-MS/MS) with chemical ionization mode.

Conclusion: The pharmacokinetic parameters of AMB-Fubinaca in whole blood were evaluated, indicating rapid absorption after oral administration. The plasma half-life (t1/2) was determined to be 5.9 hours, with a volume of distribution (V d) of 203.13 liters and a plasma clearance of 23.81 L/h. These findings provide valuable insights into the Pharmacokinetics and pharmacodynamics of AMB-Fubinaca. The current study contributes to advancing physiological research on AMB-Fubinaca and its application.

POSTER PRESENTATION ABSTRACTS

Abstract # 11

EFFECT OF SUPPLEMENTATION WITH MODIFIED BIOAVAILABLE POLYPHENOLS ON THE LEVEL OF LIPOCALIN-2 AND ABDOMINAL OBESITY- RANDOMIZED DOUBLE BLINDED STUDY

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Introduction: Obesity is a risk factor for cardiovascular disease (CVD) and type 2 diabetes (T2D) and is a central and causative component of the metabolic syndrome. lipocalin 2 (LCN2), an adipokine, is commonly associated with obesity. Studies have shown that polyphenols may play a role in the management of obesity and its complications. A modified bioavailable polyphenol, namely Oligonol, has been reported to have beneficial effects on weight loss, particularly abdominal obesity. We aimed to investigate the effects of Oligonol, as an adjunct to lifestyle modifications, on serum LCN2 levels and abdominal obesity in Saudi overweight and obese non- diabetic adults.

Methods: Saudi overweight/ obese subjects were screened to ensure suitability before being enrolled in a double-blind case/control design. They were divided into two groups (A and B) matched in age, BMI and gender and assigned randomly to take either Oligonol or placebo for six months. Weight, height, waist circumference (WC) of each participant were measured, and blood samples were taken at the baseline, to measure LCN2 and liver function tests All measurements were repeated after 3 months and after 6 months of supplementation.

Results: A total of 52 of recruited participants completed the study so far divided equally between group A and group B .The mean values of BMI were significantly reduced after supplementation in both groups; BMI values of group A at base line and after three and six months were (34.0 ± 3.5, 33.0 ± 3.7 and 32.8 ± 3.8 respectively P-Value = 0.000); and for group B were (33.06 ± 3.9, 31.68 ± 3.8 and 31.08 ± 3.9 respectively P-Value <0.001).Similarly, the mean values of WC were significantly decreased following supplementation in group A (108.8 ± 11.4, 106.1 ± 9.1 and 105.0 ± 10.7 respectively P-Value<0.001) and even more in group B (107.6 ± 8.9, 102.7± 9.7 and 97.0 ± 21.8 respectively P-Value<0.001).

In addition, the mean LCN2 levels showed significant decrease from the baseline, after 3 months and after 6 months of supplementation in group B(50.0 ± 18.7, 37.3 ±10.5 and 40.3 ± 17.6, respectively P-Value = 0.005); with no significant change in group A at the 3 time points of study (38.9 ± 13.5, 38.9 ± 17and 42.0 ± 21.8, respectively P-Value = 0.58).

Conclusion: The results indicated that adhering to a healthy diet can be useful in reducing BMI and WC. Interventions with Oligonol supplementation caused differences between the study groups for WC and LCN2, if Oligonol was found in Group B after unblinding, it can be considered a useful supplement for controlling metabolic dysregulation among obese Saudi people.

POSTER PRESENTATION ABSTRACTS

Abstract # 12

THE SIGNIFICANE OF BECLIN AND MIR 124-3PA EXPRESSIONS IN BLADDER CANCER TISSUES

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Background: In Egypt, cancer bladder is the second most prevalent cancer among males and the fourth type among both sexes. Cancer bladder is tightly associated with genetic alterations. Beclin protein is a 60-kDa protein that interacts with Bcl-2. It participates in the autophagy process. Impaired autophagy has been linked to the development of a wide range of neurodegenerative, cardiac, respiratory, hepatic, renal and systemic disorders as cancer and autoimmunity. MicroRNAs (miRNAs) are small, noncoding single-stranded RNA molecules that regulate gene expression. This work aims to investigate the significance of Beclinand miR 124-3pa expressions in bladder cancer diagnosis.

Methods: This study included one hundred and six tissue samples of patients with primary urothelial bladder cancer. The tissues were divided into two parts. The first part was immediately frozen and kept at -80 °C for total RNA extraction with subsequent detection of miR 124-3paand Beclin expressions. The other part was preserved in formalin solution for histopathological examination.

Results: In the cancerous tissues, there was a significant up regulation of Beclin expression and down regulation of miRNA-124-3pa expression compared to the adjacent control tissues ($P<0.001$ for each). Also, there was a highly statistically significant strong negative correlation between miRNA-124-3pa and Beclin expression ($r=-0.726, P<0.001$). Receiver operating curve (ROC) for combined miR-124-3pa and Beclin expression revealed that they can be used as predictors of cancer bladder at a cut-off level of ≥4.3 with a sensitivity of 96.2% and a specificity of 90.6%.

Conclusion: miR-124-3pa and Beclin expressions can be used as predictors of presence of cancer bladder.

POSTER PRESENTATION ABSTRACTS

Abstract # 13

SERUM ZINC PERFORMANCE ON FLAM ATOMIC ABSORPTION SPECTROPHOTOMETER: METHOD DEVELOPMENT AND VALIDATION

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Background: Zinc is the 25th most common element on Earth, and is an essential trace element and is commonly ingested as a nutritional supplement. Divalent zinc is one of the most important of the micronutrients. More than 100 enzymes are zinc dependent. The key roles for zinc in biological systems, particularly as structural components of a large number of proteins, are attributed to the ability to bind to a wide range of tetrahedral sites, lack of redox chemistry, and binding and exchange kinetics. Excessive exposure to extracellular zinc can damage central neurons. It has been demonstrated that zinc accumulates in degenerating neurons after ischemia, and that the accumulation occurs prior to neurodegeneration, offering therapeutic chelation possibilities. This toxic increase in zinc could be a key mechanism causing selective neuronal death after short ischemia.

Methods: The method have been developed and validated following the departmental policy which also follows international regulations and recommendations from Clinical and Laboratory Standard Institute (CLSI). Samples are collected using trace element free evacuated tubes (Royal Blue) and centrifuged to obtain a clear serum. The procedure only needs 400 µl of serum. A dilution factor of 5 is made to improve the handling and testing quality of serum due to matrix avoidance and viscosity. The diluted sample is aspirated into a nebulizer feeding an air-acetylenemixture flame. The standard solutions are prepared fresh, daily calibration and quality controls are run in every analytical batch run. Calibration is achieved with aqueous standards prepared in a glycerol matrix and diluted to simulate the viscosity of the diluted sample.

Results: Method found to be linear over the range of 5 – 50 µmol/L. Analytical precision was verified using 2 levels of quality control (normal and high range) and the results were acceptable with the CV of 5.5% in normal range and CV of 3.3% in high range. The assay sensitivity was verified at a concentration of 4.7µmol/L. The assay recovery rate is 96%. Accuracy study was verified by method comparison, analyzing 30 patient samples by the Thermo M6-series –AAS and ZEEnit 700P-AAS, results are comparable with the slope = 1.0; intercept b = 0.108 and correlation coefficient (r) = >0.99. The method shows no carry over detected.

Conclusion: The overall performance of the Zinc method was confirmed to have the simplest, accurate and reliable. Furthermore, the laboratory has participated in the proficiency program offered by College of American Pathologist (CAP) all results are acceptable, suggesting that the methods developed in our laboratory are valid and accurate for the analysis of serum Zinc for patient samples.

POSTER PRESENTATION ABSTRACTS

Abstract # 14

ESTABLISHMENTOFREFERENCEINTERVALFORHOMEOSTATICMODELASSESSMENTOF INSULINRESISTANCE AMONGHADHRAMOUTUNIVERSITYSTUDENTSINMUKALLACITY, YEMEN

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Background: Insulin resistance (IR) is known as impaired sensitivity to the metabolic action of insulin, that is means decreased response to the effect of the hormone, mainly on the liver, skeletal muscle, and adipose tissue. Its pathophysiology has been strongly associated with a number of pathological conditions, including type 2 diabetes and cardiovascular disease. Homeostatic model assessment of insulin resistance (HOMA-IR) is a simple and practical method for the estimation of IR. The study was designed to establish reference interval (RI) for HOMA-IR among healthy Hadhramout University students based on the C28-A3 document stringent from the Clinical and Laboratory Standards Institute (CLSI) and determine the relationship of HOMA-IR with gender, age, BMI, lifestyle habits and anthropometric measurements,

Methods: An analytical-cross-sectional study was conducted in selected Colleges from Hadramout University, Mukalla, Yemen during the period from 1st December 2022 to 30th July 2023. Four hundred twenty-three healthy students were selected randomly by multi-stage sampling. A pretested questionnaire including demographics, lifestyle habits, and anthropometric factors was collected. Blood samples were collected from participants, serum was separated and to investigate the fasting blood glucose (FBG) as well as fasting blood insulin (FBI) in serum samples by using a chemical auto analyzer, then HOMA-IR was calculated by using a specific formula (FBG (mg/dl)*FBI(μU/ml))/405. Data was analyzed by using the SPSS software program.

Results: This study established the RI in Hadhramout University Students which was between 0.3 and 3.9. The results also demonstrated a significant correlation between HOMA-IR with gender and BMI, in addition to a positive linear relationship between HOMA-IR with FBG and FBI ($p<0.001$). Otherwise, regarding gender, we found a slight increase in the mean of HOMA-IR in females compared to males (1.499, 1.324) respectively, $P=0.005$. Besides, there was no significant difference in HOMA-IR based on age, lifestyle habit factors included physical activity, sleeping, and bad habits.

Conclusion: The current study is the first trial to establish HOMA-IR in Mukalla City following the CLSI C28-A3 document stringent. We found that the RI between 0.3 and 3.9 and HIMA-IR > 3.9 can be considered a reasonable indicator of IR in Yemeni subjects. Our study demonstrated significant differences in HOMA-IR based on blood glucose, insulin, gender, BMI, and W/H ratio. Otherwise, there was no significant difference in HOMA-IR based on either difference in age.

POSTER PRESENTATION ABSTRACTS

Abstract # 15

EVALUATION OF THE ANALYTICAL PERFORMANCE OF A NEW PROGNOSTIC BIOMARKER IN HEART FAILURE, GDF-15, ON THE COBAS® E411 AUTOMATED SYSTEM

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Background: Heart failure (HF) is a severe pathology in which the heart is no longer able to provide sufficient blood flow to meet the body's needs. The number of heart failure patients is constantly increasing worldwide due to the aging of the population and the improvement in the management of its main etiologies. The prognosis for this disease is poor, requiring appropriate and early treatment.

In the last decade, alongside the classic natriuretic peptides, new circulating cardiac biomarkers, reflecting different aspects of the molecular interactions involved in HF, have been sought. Among these markers, Growth Differentiation Factor 15 (GDF-15) is emerging as a molecule which provides information on the cardiac and extra cardiac pathways involved in cardiovascular diseases and which is related to the incidence, progression and prognosis of the disease.

The objective of our work was to verify the analytical performance of the GDF-15 test on the Cobas© e411 analyzer, in order to be able to use it routinely in our laboratory.

Material and Methods:

- This is a diagnostic reliability study.
- This work was carried out in the biochemistry laboratory of the Pierre and Marie Curie Center of Algiers.
- For the verification of analytical performance, we followed the recommendations of the SFBC protocol for Verification/validation of the performance of an analysis method (Vassault et al., 2010).
- Repeatability and reproducibility were assessed using control sera of two concentration levels.
- To verify the reference range of GDF-15 in our population, we followed the IFCC/CLSI recommendations.
- Apparently healthy controls, aged over 20 years, were recruited.
- A biochemical assessment was carried out for the controls on a Cobas© integra400 analyzer.
- The statistical study was carried out using the XL-Stat 2014 software.

Results: The coefficients of variation found for the two levels of control were less than 1% for the repeatability study and less than 4% for the reproducibility study.

Verification of the reference values was carried out with 20 witnesses including 10 women and 10 men of different age groups.

The observed Range was 409.7 – 1593 pg/ml which is included in the range given by the supplier which was 400-3076 pg/ml.

Conclusion: The various criteria examined were deemed acceptable, the reference values established by the supplier can be extrapolated to our population. The GDF-15 test has been validated on Cobas© e411 and can now be measured routinely

POSTER PRESENTATION ABSTRACTS

Abstract # 16

EVALUATION OF INTERNAL QUALITY CONTROL IN A BIOCHEMISTRY LABORATORY IN ALGIERS

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Background: Medical biology laboratories (MBL) play an important role in the healthcare system, which is why the quest for quality must be the first concern of laboratory staff. Quality is represented by the accuracy and reliability of the results. A quality assurance system controlling all processes and procedures is essential to achieve the highest possible level of quality. With this in mind, laboratories must embark on an accreditation procedure governed by the ISO 15189 standard. In Algeria, only a few MBL are accredited according to this standard. As the accreditation process is only just beginning, the question of quality remains. With this in mind, we conducted an internal audit of the analytical phase of medical analyses carried out in the biochemistry laboratory of the Pierre and Marie Curie Centre in Algiers.

Methods: We recorded 30 values for two levels of controls performed daily on biochemistry automated systems: Cobas INTEGRA 400 plus® (Roche); Cobas e 411® (Roche); ADVIA (1800)® (Siemens); For each analyzer, we plotted the Levey-Jennings diagrams corresponding to each parameter for the two levels of control sera, then we checked the percentage of compliance with each rule among the six Westgard rules.
The "QI Macros 2016" application on Excel 2013 was used to draw the Levey-Jenning diagrams.

Results: During the 30 days, the different Westgard rules were respected according to the following percentages: Rule 1_{2S}: 94%; Rule 1_{3S}: 95%; Rule 2_{2S}: 96% Rule R_{4S}: 99.7% Rule 4_{1S}: 96%, Rule 10x: 89%. These rates represent an average for the three analyzers.

Conclusion: The audit revealed good overall compliance with quality control rules. However, the creation of a quality manager position whose role is to ensure daily compliance with these rules will certainly ensure the most reliable results.

POSTER PRESENTATION ABSTRACTS

Abstract # 17

IS THE BIOCHEMICAL PROFILE THE SAME FOR PATIENTS WITH HEART FAILURE WITH PRESERVED, AVERAGE AND ALTERED EJECTION FRACTION?

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Background: Heart failure represents a major public health problem, its prevalence is estimated at 2% in the general population. It is characterized by significant morbidity and mortality. Several clinical forms are defined for this disease. The European Society of Cardiology (ESC) proposes to classify it according to the left ventricular ejection fraction (LVEF). The treatment is different depending on the clinical form. This study aims to compare the biochemical profile of patients with heart failure with preserved (HFpEF), mid-range (HFmEF) and reduced (HFrEF) ejection fraction.

Method: This is a descriptive comparative study. Inclusion in the study was systematically offered to any patient consulting for heart failure in the A2 cardiology department of Mustapha Pacha University Hospital. The diagnosis of heart failure was made in accordance with the ESC recommendations. Patients were sampled fasting on two tubes containing lithium heparin, which were centrifuged and sent to the Biochemistry laboratory of the Pierre and Marie Curie Center in Algiers, where they were stored in a serum library at -20°. A blood cardiac(GDF-15, NT-Pro-BNP and TnT-hs) and biochemical profile (iron, lipid, liver function, renal function, electrolytes, proteinemia, albuminemia, calcium, phosphoremia, magnesiumemia) were carried out on a Roche Cobas 6000 biochemistry machine. The statistical analysis performed using XLSTAT 2014 software.

Results: 221 patients were recruited, 131 patients had HFpEF, 18 an HFmEF and 72 an HFrEF. A statistically significant difference between the results obtained for the three categories of patients was found for the following parameters: ferritinemia: mean HFpEF=127 µg/L; HFmEF=198 µg/L; HFrEF= 199 µg/L (p= 0.0008); average gamma-glutamyl transferase level HFpEF=664 IU/L; HFmEF=154 IU/L; HFrEF = 552 IU/L (p = 0.0044); bilirubinemia: average HFpEF=34 mg/L; HFmEF=18 mg/L; HFrEF = 80 mg/L (p = 0.0134); uric acid: average HFpEF=178 mg/L; HFmEF=142 mg/L; HFrEF=200 mg/L (p=0.0091) and cholesterol: average HFpEF=3.58 g/L; HFmEF=2.68 g/L; HFrEF = 2.83 g/L (p = 0.0438).

Conclusion: Comorbidities are more frequent in patients with HFpEF, this leads us to suppose that the biological assessment would be more disturbed in the latter. However, in our study we only found a significant difference in the rate of a few parameters, which can be explained by the pathophysiologies of the different types of HF.

POSTER PRESENTATION ABSTRACTS

Abstract # 18

DEVELOPMENT AND VALIDATION OF THE NEW LIQUID CHROMATOGRAPHY-TANDEM MASS SPECTROMETRY METHOD FOR THE DETERMINATION OF TACROLIMUS IN THE WHOLE BLOOD OF TRANSPLANT RECIPIENTS

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Background: Tacrolimus (TAC) is the first-choice immunosuppressive agent after solid organ transplantation. Although the safety and efficacy of TAC are well established, drug doses need to be targeted in a narrow therapeutic window. Today, analytical methods for TDM of immunosuppressive drugs comprise immunoassays based on different methodologies and chromatographic methods mainly coupled to mass spectrometric detectors. Immunoassays methods suffer from inherent cross-reactivity between the drug and their metabolites and do have limited sensitivity. This results in overestimation of drug concentrations and unacceptable uncertainty in measurement at low concentrations. The LC–MS/MS technique is able to overcome these problems by offering more selective and sensitive detection. Therefore, high performance liquid chromatography in combination with atmospheric pressure ionization tandem mass spectrometry is providing the best method of choice for the determination of immunosuppressive drugs in whole blood samples.

Methods: Tacrolimus whole-blood concentration was determined by LC-MS/MS according to the method provided by (Recipe® GmbH, Germany). Chromatographic system based on an Analytical column (AC), guard column (GC), SPE column and inline filter and performed with Nexera LC system with LC-MS/MS 8060 triple quadrupole MS (Shimadzu®, Kyoto, Japan) using Immunosuppressant Whole Blood Kit(Recipe® GmbH, Germany). Tacrolimus level was determined in 24 patients after solid organ transplantation (n = 24) with an acceptable criteria of ±12.5%. Linearity, precision and coefficient of variations (CV) were measured according to CLSI criteria.

Results: A lower limit of quantification (LoQ) 0.93 ng/mL was achieved, and the assay was linear between 1.38 and 44.0 ng/mL (R^2 = 0.996). No carry-over was detected. The range of CVs observed with the tacrolimus panel was as follows: LC-MS 6.3, 5.4 and 5.9% with acceptable analytical precision of less than 10%. No Matrix effects which compensated by deuterated internal standards (Istd).

Conclusions: The developed method using Immunosuppressant Whole blood Kit (Recipe® GmbH, Germany) in combination with LC–MS/MS 8060 provides precise and accurate quantification of Tacrolimus in a sample volume of 100 µL of whole blood. The sample preparation procedure is manual, simple and fast. The use of Immunosuppressant Whole blood Kit along with an online application can offer a possibility of an automated analytical solution suitable for routine TDM laboratories with short turn- around-times. Tacrolimus assay standardization is required in order to provide optimized drug dosing and consistent care across transplant centers globally.

POSTER PRESENTATION ABSTRACTS

Abstract # 19

THE BIOLOGICAL ASSESSMENT AND METABOLIC DISTURBANCES IN PATIENTS WITH NON-HODGKINAL LYMPHOMA

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Introduction and Aims: Non-Hodgkin's lymphoma (NHL) is the most frequent hematological malignancy. The American Cancer Society has estimated 74,200 new cases of NHL for 2019. The incidence has doubled in the last 50 years, resulting from improved diagnostic techniques and access to medical care. Lymphoma genesisis a complex process resulting from the interactions between genetic and environmental factors. It involves a complex, multi-step process. We know that chemotherapy is associated with an increase in the formation of reactive oxygen species and the depletion of plasma and these antioxidants. In this work, we try to evaluate the diet in patients with NHL undergoing first-line chemotherapy (CHOP) in a retrospective study and the demonstration of metabolic disturbances of lipids and lipoproteins, oxidative stress and the level of serum proteins.

Materials and Methods: fifty new patients with NHL (26 men, 24 women, age: 54.30 ± 3.04) and sixty controls (25 men, 35 women, age: 49.30 ± 2.12) were recruited to the Hematology Department of the Tlemcen University Hospital Center. All patients underwent first-line chemotherapy (CHOP: cyclophosphamide, adriamycin, oncovin, prednisone), with a number of courses ranging from 1 to 8.

Results and Discussion: The analysis of the biological assessment has objectified a disturbance of lipid and protein profiles, including increased serum triglycerides, LDL-TG, the VLDLc and decreased levels of HDLc and α-LP and a significant increase of albumin and alpha-1 globulin in line with high CRP found in our assays. However, the rate of gamma globulin was significantly lower in patients. The study of demographic characteristics of practice has revealed the presence of risk factors, namely smoking. Dietary assessment revealed a daily diet reduced in calories, protein, carbohydrates, fiber, saturated and polyunsaturated fatty acids, vitamins E, and C and observed at a low level of plasma ORAC.

Conclusion and Perspective: Daily food intake can be reduced to cause lowering of plasma levels of ORAC and observed the altered metabolism of lipids and proteins observed may be related to the poor prognosis of patients and often poses the problem therapeutic care during chemotherapy. The current evidence suggests that oxidative stress is involved in lymphoma genesis, genetic instability, disease progression and NHL management. Further studies are therefore necessary to evaluate if and how oxidative stress modulating therapies can influence these processes.

POSTER PRESENTATION ABSTRACTS

Abstract # 20

ASSESSMENT OF THE EFFECT OF HEMOGLOBINOPATHIES ON THE MEASUREMENT OF HbA$_1$c: COMPARISON OF TWO HPLC SEPARATION KITS ON D10 BIO-RAD (HBA$_1$c KIT AND DUAL KIT).

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Background: Hemoglobinopathies, such as sickle cell disease and thalassemia, are highly prevalent hereditary genetic conditions in the Mediterranean region. They are characterized by qualitative or quantitative abnormalities in hemoglobin. These conditions can influence the results of glycated hemoglobin (HbA$_1$c), a crucial marker for monitoring glycemic control in diabetic patients. In order to assess the impact of hemoglobinopathies on HbA$_1$c results, we examined and compared two HPLC separation kits on D10 BIORAD: the HbA$_1$c kit designed specifically to measure HbA$_1$c, and the Dual kit which allows for the separation and quantification of both HbA$_1$c and other hemoglobin variants.

Methods: The study included 75 patients recruited at Rouiba Hospital over a duration of seven months, from October 25, 2022, to May 16, 2023. We included all diabetic and non-diabetic patients with qualitative or quantitative hemoglobinopathies. Blood samples were subjected to both HPLC D-10 separation kits.

Data entry and statistical analysis were performed using IBM SPSS Statistics version 29 software. The comparison of the two chromatographic separation methods was conducted in accordance with the instructions of the Clinical and Laboratory Standards Institute (CLSI EP09) protocol

Results: The study results demonstrated good agreement between the two kits for hemoglobinopathies (HbC, S, beta-thalassemia heterozygotes, alpha-thalassemia heterozygotes). However, we were unable to examine the effect of hemoglobin E and D.

Conclusion: Therefore, in the event of an incidental discovery of a hemoglobin variant (S, C) by the HbA$_1$c kit, the result may still be reported. For quantitative abnormalities such as homozygousbeta-thalassemia, Homozygous sickle cell disease, Homozygous hemoglobin C disorder or Homozygous SC composite subject, other methods for assessing glycemic control should be considered (measurement of fructosamines).

These findings underscore the importance of considering hemoglobinopathies when interpreting HbA1c test results, as the accuracy of the measurement is essential for diabetes management. This approach will help prevent long-term complications and ensure appropriate therapeutic decisions for these patients.

POSTER PRESENTATION ABSTRACTS

Abstract # 21

COMPARATIVE STUDY BETWEEN THREE CREATININE ASSAY METHODS: WHAT IS THE IMPACT ON GFR ESTIMATION BY CKD-EPI?

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Background: The glomerular filtration rate (GFR) is the best marker reflecting renal function, as it is directly correlated to the number of functional nephrons. Its assessment is essential in the diagnosis, classification, monitoring and management of chronic kidney disease (CKD), but also in the dosage adjustment of medications.

Today, creatinine remains the main biomarker used to calculate formulas for estimating GFR. Several creatinine measurement methods are used in routine laboratory practice; the kinetic Jaffé method, the compensated Jaffé method and the enzymatic method. The accuracy in the assessment of renal function depends essentially on the creatinine measurement, in this context, we wanted to compare these three methods and evaluate their impact on the most recent GFR estimation formula; The CKD-EPI.

Methods: 90 samples divided into 50 controls and 40 cases (different stages of CKD) were collected and analyzed by the three measurement methods. A comparison following the CLSIEP 09-A2 protocol was then performed.

Results: The kinetic Jaffé method tends to over-estimate creatinine levelsc ompared to the enzymatic method standardized to IDMS, especially in the low to normal range of creatinine values and cannot be used for the calculation of the CKD-EPI. On the other hand, the compensated Jaffé method shows good agreement with the enzymatic method, and both methods can be used interchangeably in calculating the CKD-EPI. However, the enzymatic method remains more sensitive and specific, and its use is preferred in certain situations (pediatrics, icteric serum).

Conclusion: The results of ourwork show that the different creatinine measurement methods each have their own characteristics and limitations that must be taken in to consideration when they are used to estimate GFR. This study has confirmed that creatinine measurement, despite being a routine test, remains challenging. It is therefore important for the biologist to be aware of the limitations of each method of measurement and to include this information in the report to assist the clinician in the most accurate estimation of renal function.

POSTER PRESENTATION ABSTRACTS

Abstract # 22

DETERMINANTS OF LEPTIN, ANGPTL8, AND THYROID HORMONES LEVELS IN SAUDI FEMALES WITH T2DM: A RETROSPECTIVE STUDY

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Background: Previous studies have observed a correlation between thyroid dysfunction, type 2 diabetes mellitus (T2DM) or its consequences, and several biomarkers. However, the subject matter remains intricate, and published data exhibit conflicting findings.

Aim: This study aims to assess the prevalence of thyroid dysfunction, as measured by hormone levels, in Saudi women with T2DM. The study will also assess thyroid hormones and leptin, ANGPTL8, obesity markers, and risk factors ofcardiovascular disease (CVD) in T2DM patients.

Methods: 250 women aged 40–60 with diagnosed T2DM were retrospectively studied in 2021 and 2022.

Results: All participants were Saudi females with T2DM, aged 54.5 years. Out of 250 subjects, 32% had hypothyroidism, 14.8% had hyperthyroidism, and 40.8%had no thyroid disease. Hypothyroidism (7.8±0.67mmol/L) exhibited greater fasting blood glucose (FBG) levels than hyperthyroidism (7.1±0.64 mmol/L) ($P< 0.05$). Hypothyroid and hyperthyroid females had significant differences in HDL-C, Triglycerides (TG), triglyceride glucose (TyG) index, body mass index (BMI), waist circumstance (WC), hs-C reactive protein (hs-CRP), leptin, angiopoietin-like protein 8 (ANGPTL8), insulin resistance (IR), and insulin levels ($P< 0.05$). Pearson's correlation test showed that T2DM patients' high-density lipoprotein-cholesterol (HDL-C) levels were favorably but negatively correlated with leptin and ANGPTL8. In hypothyroidism, thyroid-stimulating hormone (TSH)is linked favorably with HbA1c, TG, TyG index, BMI, WC, leptin, ANGPTL8, hs-CRP, and IR.

Conclusion:T2DM has been found to be associated with thyroid dysfunction, particularly hypothyroidism. This relationship is characterized by a positive correlation with TSH levels and a negative correlation with free thyroxine (FT4) levels. The potential impact of elevated levels of leptin, ANGPTL8, and TyG index on TSH fluctuations in Saudi females withT2DM may contribute to an increased susceptibility to insulin resistance-related conditions, including obesity and CVD. Therefore, it is essential to conduct regular assessments for TSH, FT4, leptin, and ANGPTL8. Additionally, it is advised to promptly initiate thyroid medication during the initial stages. To effectively address and reduce adverse cardiovascular outcomes, it is crucial to engage in regular monitoring of glucose and insulin levels.

POSTER PRESENTATION ABSTRACTS

Abstract # 23

BIOCHEMICAL AND RADIOLOGICAL CHARACTERISTICS OF UREA CYCLE DISORDERS AND FACTORS ASSOCIATED WITH POOR OUTCOME

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Background: Urea cycle disorders are inborn errors of metabolism causing episodic acute hyperammonemic encephalopathy and long-term neurological damage. This study aims to describe the biochemical, and radiological findings associated with disease and to determine the factors associated with poor prognosis. Furthermore, we aim to promote the importance of early diagnosis.

Methods: This study gathered clinical, biochemical, radiological data on patients attending the tertiary metabolic center at Prince Sultan Hospital. We stratified the patients on the basis of ammonia at diagnosis, number of complications, and stage of diagnosis (early diagnosis being before the onset of clinical manifestations).

Results: 15 patients were included in the study. The molecular characteristics were highly diverse, with four different genes (and thus four different biochemical subtypes) and 13 different mutations found among our patients. Among the 4 genes affected among our patients, the ASL gene causing arginosuccininc aciduria is the most common, at 8/15 (53%). Figure 1 illustrates the genes affected and the corresponding biochemical subtypes among our patients. Overall, the clinical picture was wide-ranging, with the number of hyperammonemic crises suffered by our patients ranging from 0 to 17, and ammonia at diagnosis ranging from 131 µmol/L to 1029 µmol/L. Global developmental delay, epilepsy, failure to thrive, and hypotonia are among the complications suffered by our patients, as shown in figure 2. Ammonia at diagnosis above 592 µmol/L was shown to be associated with poor developmental outcome (p= 0.067). Furthermore, patients who have suffered more hyperammonemic crises were more likely to present with epilepsy and GDD (p=0.034). The most important finding of this study is the statistically significant improved outcome in those with early diagnosis, who had lower incidences of global developmental delay, epilepsy, and failure to thrive, as shown in table 1.

Table 1: Complication profile of patients stratified on the basis of stage of diagnosis

	GDD	Epilepsy	FTT
Early Diagnosis (6)	1/6 (17%)	1/6 (17%)	1/6 (17%)
Late Diagnosis (9)	6/9 (67%)	6/9 (67%)	6/9 (67%)
p-value	0.029	0.029	0.029

Conclusion: UCD is a disease of considerable genetic and molecular heterogeneity, whose subtypes seem to have one thing in common: The proclivity to cause marked debilitation. Factors associated with this debilitation include number of exacerbations and late diagnosis, thus highlighting the importance of newborn screening and of screening family members of affected individuals. An elevated ammonia at diagnosis (above 592 µmol/L) has been shown to be associated with a poor prognosis and thus may be used as a prognostic marker.

POSTER PRESENTATION ABSTRACTS

Abstract # 24

IMPACT OF PSYCHOLOGICAL STRESS AND DIET ON THE REDUCTION OF ANTIOXIDANT CAPACITY AND DEVELOPMENT OF INFLAMMATORY BOWEL DISEASES (IBD): AN ANALYTICAL CASE-CONTROL APPROACH

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Background: Inflammatory Bowel Diseases (IBD) are chronic inflammatory conditions affecting the digestive tracts' wall. They primarily encompass three entities: Crohn's Disease (CD), Ulcerative Colitis (UC), and Indeterminate Colitis (IC). Among the environmental factors involved in the genesis of IBD, stress and diet are the most significant.

Methods: The main objective of this study is to understand the impact of stress on the development of IBD. The secondary objectives of this study are:

- To assess the inflammatory syndrome in patients with IBD.
- To propose an appropriate dietary diet to them and to evaluate adherence to this recommended diet.
- To measure an antioxidant stress parameter through the assessment of the Total Antioxidant Capacity (ORAC).

We conducted a comparative case-control analytical study involving 30 IBD patients and 30 controls recruited from Tlemcen Hospital (Algeria) over a three-month period. The results were statistically analyzed using ANOVA.

Results: The obtained results revealed that the average age of the cases was 51.40, while the average age of the controls was 51.33, with a clear male predominance. The mean ORAC in cases was 0.8350 and 1.7960 in controls; this difference was highly significant with a *p-value*< 0.0001.

Conclusion: Based on these findings, we conclude that our initial hypothesis was well-confirmed, clearly demonstrating that psychological stress and dietary factors have an influence on the onset and progression of IBD. This influence can be explained by a decrease in antioxidant capacity during inflammation, contributing to intestinal inflammation and the genesis and/or maintenance of tissue lesions in both UC and CD.

POSTER PRESENTATION ABSTRACTS

Abstract # 25

PRECISION IN PIPETTING IMPACT ON CHEMISTRY LABORATORY RESULTS

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Background: The developed pipetting events in order to assess the technicians' practical sample handling by the use of matrices common to the labs. As precise pipetting considered as a reason for the accurate laboratory results that aid to know the sources of the imprecision and bias presented in the step of both aspirating and dispensing samples in addition to internal standard in clinical LC-MS/MS assays in highlighting importance of the laboratory to investigate that source of variability in addition to indicating its impact.

Methods: The Procedures include pipetting methanol, water serum, and the whole blood. The types of pipettes used include disposable, graduated, single-channel and multichannel. The Gravimetric analysis used in order to indicate the accurate volumetric delivery of every matrix utilizing two various techniques. Then the imprecision and bias calculated depended on the volume got from the density and mass of every matrix, by the use of the literature values for every matrix type.

Results: Low bias and imprecision was indicated when pipetting the water, as in investigated in the commercial pipetting assessment programs. Significantly elevated bias and imprecision were indicated in most of the applicable matrices (such as whole blood, methanol and serum), showing that the water-indicated pipetting proficiency assessment results in false sense of the technical ability or air bubbles. In addition to the events in the illuminated aspects for training, resulting in the improved bias and imprecision, it was indicated that the pre-rinsing (dispensing and aspirating matrix three times in order to coat the tip) enhanced bias, especially for the delivery of the whole blood and methanol.

Conclusion: Accurate and precise pipetting in the clinical laboratory would not be considered for granted, nor implicitly inferred from the proficiency assessment by the use of the aqueous solutions. The collegial and engaging events fostered training chances. The Assay-specific sample delivery considerations (pipets) may inform the practicality of those events the Pipetting Olympics and also drive enhancements in the laboratory.

POSTER PRESENTATION ABSTRACTS

Abstract # 26

OXIDATIVE STRESS, ENVIRONMENTAL FACTORS: WHAT CAN MALONDIALDEHYDE (MDA), DO IN INFLAMMATORY BOWEL DISEASE?

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Background: Chronic inflammatory bowel diseases (IBD) have multi-factorial aetiology with complex interactions between genetic and environmental factors, psychological stress and diet are the most significant environmental factors that contribute to the genesis of IBD.

The aim of this study was to determinate the influence of the environmental factors on an oxidative stress factor which is malondialdehyde (MDA), which may be the consequence of this inflammation and can aggravate it.

Method: Case control study was conducted to compare between 30 patients with IBD and 30 controls recruited from Tlemcen hospital (Algeria). During three months, plasma MDA level was measured. ANOVA was used for statistical analysis.

Results: The mean age of cases is 51.40 years and 51.33 years is the mean age of control, with a clear men predominance. The mean MDA levels in the case was 1.5817±0.459 µmol/L, however it was 0.6593± 0,370µmol/L in the control.

Conclusion: It has been reported that stress and diet effectively influence the development of IBD, which is explained by an increase in oxidative stress during this inflammation and participates in intestinal inflammation and the genesis and/ or maintenance of lesion tissue during ulcerative colitis (UC) and also Crohn's disease (MC).

POSTER PRESENTATION ABSTRACTS

Abstract # 27

ANALYTICAL PERFORMANCE OF DRUGS OF ABUSE IN URINE ON ADVIA XPT ANALYZER AS SCREENING PLATFORM AT PSMMC

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Background: Immunoassays provide a rapid tool for the screening of drugs-of-abuse (DOA). However, results are presumptive and confirmatory testing is warranted. To reduce associated cost and delay, laboratories should employ assays with high positive and negative predictive values (PPVs and NPVs). The performance of the ADVIA® XPT analyzer (Siemens, Munich, Germany) was evaluated to the pervious standalone Viva-Twin® analyzer (Siemens, Munich, Germany) used for measuring drugs of abuse and specimen validity testing, to determine whether ADVIA XPT measurements were accurate and acceptable for screening testing of Ministry of defense (MOD) units and would be as reliable as those performed by the previous V-Twin.

Methods: Total Precision was studied based on CLSI EP05-A3 at 5 levels of Calibration Verification solutions for each test, the solutions were run in 5 replicates over 5 days and coefficients of variation (%CVs) were calculated. Linearity was done according to CLSI EP06-A using different concentrations spanning the analytical measuring range for each test. Accuracy and linearity were performed by evaluating 20 samples, patient specimens and reference materials samples. Precision study was done on Multi-levels of reference materials and coefficients of variation (%CVs) were calculated. Cut-off verification was done using a reference material with cut-off concentration verifying the analytical cut-off of the test.

Results: The coefficients of variation (CVs) were less than 10% for all parameters and the standard deviation (SD) were consistent with those claimed by the manufacturer for all tests. ADVIA XPT showed satisfactory correlation with V-Twin with (R) values equal to or greater than 0.996, slope values were within 0.964 - 1.09, the results were within the recommended total allowable error values. Identical results compared to reference instrument with 100 % agreement with no carryover.

Conclusion: Overall performance of ADVIA XPT analyzer was acceptable, it provided reliable results with respect to precision and linearity, and it demonstrated good correlation with the previous V-Twin analyzer for all tests.

POSTER PRESENTATION ABSTRACTS

Abstract # 28

EFFECT OF COVID-19 IN CARDIOVASCULAR SYSTEM

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Background: The objective of this study was to investigate the effect of COVID-19 on the cardiovascular system, including its impact on cardiac function, incidence of cardiovascular complications, and potential long-term consequences. The study had several sub-objectives, including reviewing existing literature, examining the prevalence of cardiac dysfunction among COVID-19 patients, identifying risk factors for cardiovascular complications, assessing long-term cardiovascular outcomes, exploring potential mechanisms of cardiovascular injury, evaluating the effectiveness of treatments, and identifying gaps in knowledge for future research.

Methods: Data from 137 subjects aged 40-76 who underwent COVID-19 and cardiac markers tests between January 2022 and June 2023 were analyzed. The study utilized the ARCHITECT c8000 clinical chemistry analyzer for laboratory analysis. Statistical analysis was conducted using SPSS version 26, including descriptive statistics and t-tests for comparisons between COVID-19 patients and normal control subjects.

Results: The findings revealed significant differences in High Sensitivity Troponin (HS-Troponin) and Creatine Kinase (CK) levels between infected and non-infected male subjects, suggesting their potential as indicators of COVID-19 severity in males. However, no significant differences were observed in biomarker levels between infected and non-infected female subjects, indicating that these markers may not be as informative for COVID-19 severity in females. These results highlight the importance of considering gender-specific differences in disease manifestation and progression.

Conclusion: This study provides valuable insights into the relationship between COVID-19 and cardiovascular markers, emphasizing the need for further research to confirm these findings and better understand the underlying mechanisms. Future studies should consider gender-specific differences and investigate additional biomarkers to enhance our understanding of the cardiovascular effects of COVID-19.

POSTER PRESENTATION ABSTRACTS

Abstract # 29

VALIDATION OF SPECIMEN VALIDITY TESTING "SVT" FOR DRUGS OF ABUSE SPECIMENS ON ADVIA XPT ANALYZER PLATFORM AT PSMMC

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Background: Specimen validity test (SVT) has a significant place in healthcare efforts to measure patient adherence, behavior, and honesty in communication with clinicians. SVT is typically ordered by treating clinicians who use the results to make therapeutic decisions regarding specific medical problems of their patient, including those related to medication and illicit drug use. In the absence of SVT, a healthcare provider may fail to identify a patient's adulteration of their urine sample in an attempt at deceiving the provider. In recent decades, urine drug testing in the workplace has become common in many countries in the world. There have been several studies concerning the use of the urine SVT for drug abuse testing administered in the workplace. However, very little data exists concerning the urine SVT on drug abuse tests from court specimens, including dilute, substituted, adulterated, and invalid tests.

Methods: Validation performed using ADVIA XPT(Siemens, Munich, Germany) as a screening testing platform for drugs of abuse (DOA) with Syva® ready-to-use calibration and reagents. Method validation was done according to the laboratory policy following Clinical Laboratory Standards Institute (CLSI) guidelines. Method comparison study was done by comparing 20 known samples that extracted by the old platform Viva-Twin™ (Siemens, Munich, Germany) at Prince Sultan Military Medical City (PSMMC). Precision study was done on Multi-levels of reference materials and coefficients of variation (%CVs) were calculated for each level. Cut-off verification was done using a reference material with cut-off concentration verifying the analytical cut-off of the test.

Results: Method comparison, Accuracy and carry-over were all passed and within acceptable criteria. Creatinine, pH and Specific gravity slope were 1.02, 0.997 and 1.0 respectively, which are within acceptable criteria and correlation coefficient (r) equal to 1.000. SVTs Precision for three levels of reference materials with different concentrations, were all have CV were 5 %. Linearity/Calibration verification analyzed over a measured range points for Creatinine, pH and Specific gravity and were acceptable.

Conclusion: The performance of SVT using ADVIA XPT platform provides a reliable results for diagnosis and detecting invalid, diluted and substituted specimens, which is suitable for detection and analysis in Toxicology laboratories.

Keywords: Urine, SVT, Creatinine, Specific gravity, pH.

POSTER PRESENTATION ABSTRACTS

Abstract # 30

ASSESSMENT OF CHEMICALDISPOSITION OF PENTYLONE DRUG IN BRAIN USING GC-MS/MS

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Background: Pentylone is a stimulant drug, developed in the 1960s. It is a substituted cathinone (a type of substituted phenethylamine). It has been identified in some samples of powders sold as "NRG-1", along with varying blends of other cathinone derivatives including Flephedrone, MDPBP, MDPV and 4-MePPP. It was also found in combination with 4-MePPP being sold as "NRG-3". Reports indicate side effects include feelings of paranoia, agitation and inability to sleep, with effects lasting for several days at high doses.

Methods: Sample preparation was involved derivatization and extraction method, using acetic anhydride as the derivatization reagent, and ethyl acetate as the extraction solvent. Methylenedioxyamphetamine (MDA-D5) was used as internal standards (ISs). Sample was analyzed by GC-MS\MS.

Results: The calibration curves were linear within concentration range of 5-1000 ng/mL for Pentylone was (5-1000 ng/mL) with correlation coefficient (0.99). The limit of quantitation (LOQ) was (5.0 ng/mL). Intra- and inter-assay precision (%RSD) for Pentylone in blood was within (0.99-26.3) and (1.48-6.11), respectively, Intra- and inter-assay accuracy (%Bias) for Pentylone in blood was between -3.22 and 31.11 -0.17 and 10.18, respectively. The values of precision and accuracy were within the acceptable limits recommended by FDA. And the result of (%RSD) for Pentylone in brain was within (4.93-8.10) and the result of (%Bias) for Pentylone in brain was within (-2.35) and (7.36) the values of precision and accuracy were within the acceptable limits recommended by FDA. Pentylone has been successfully detected and quantified in blood samples and brain. It was a higher blood concentration after 15 and 30 minutes (466 ng / ml.) at a dose (20 mg / kg) and (4843 ng / ml) at dose (100mg / kg)

Conclusion: Based on the results, the brain samples are appropriate biological samples to detect the Pentylone in post-mortem cases when difficulties to take blood sample from post-mortem.

POSTER PRESENTATION ABSTRACTS

Abstract # 31

EVALUATION OF SERUM FERRITIN LEVELS IN TYPE 2 DIABETES MELLITUS AND THEIR CORRELATION WITH CARDIOVASCULAR COMPLICATIONS IN KHARTOUM STATE

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Background: Elevated serum ferritin levels, indicative of increased iron stores in the body, have been well-documented in individuals diagnosed with type 2 Diabetes Mellitus (T2DM). T2DM stands as the most prevalent endocrine disorder, and its pathogenesis involves complex interplays between factors such as vascular atherosclerosis, insulin resistance, and systemic inflammation. Notably, cardiovascular disease (CVD) often co-occurs with T2DM, with its prevalence steadily on the rise. Inflammation is a pivotal player in the development and progression of accelerated atherosclerosis in individuals living with T2DM. Consequently, there is a growing interest in assessing novel inflammatory biomarkers, including C-reactive protein and ferritin, as tools for predicting cardiovascular risk in this population. Thus, the primary objective of our study was to investigate serum ferritin levels in individuals with T2DM and their potential associations with cardiovascular complications.

Methods: A case-control study was conducted in Khartoum, Sudan from July 2019 to September 2019. The study included a total of 60 samples from patients with Type 2 Diabetes Mellitus (T2DM), with 30 of them categorized as cases due to the presence of cardiovascular disease (CVD), and 30 as controls without CVD. We assessed serum ferritin levels using the Cobas e411 platform, while Random Blood Glucose (RBG), HbA1c, and CRP levels were measured using the Cobas e311 analyzer. Ethical approval was obtained from the Sudan International University Review Board, and verbal consent was obtained from each participant.

Results: In our study, the serum ferritin levels in the case group (413.9±65.93 µg/L) were significantly higher than those in the control group (60.84±19.86 µg/L) with a p-value of 0.000. Similarly, the case group exhibited markedly elevated Random Blood Glucose levels (274.3±87.68 mg/dL) compared to the control group (102.4±16.64 mg/dL, p-value 0.000), as well as higher CRP levels (69.07±16.71 mg/L) compared to the control group (5.71±1.65 mg/L, p-value 0.000). Additionally, the HbA1c levels in the case group (8.62±1.74) were significantly higher than those in the control group (5.24±0.54, p-value 0.000).

Conclusion: This study revealed significant differences between the case group and the control group across multiple parameters. Specifically, serum ferritin levels were notably higher in the case group compared to the control group. Additionally, random blood glucose, CRP levels, and HbA1c levels were all significantly elevated in the case group when compared to the control group. These findings highlight potential associations between elevated serum ferritin levels and markers of poor glycemic control and inflammation in the context of our study population. Further investigation is warranted to elucidate the clinical implications of these observations and their potential relevance to individuals with diabetes.

POSTER PRESENTATION ABSTRACTS

Abstract # 32

ENDOGENOUS INTERFERENCE: FALSELY ELEVATED VITAMIN D RESULTS IN PATIENTS WITHMULTIPLE MYELOMA

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Background: Immunoassays are a critical high-sensitivity detection technology in modern clinical laboratories, but their Achilles heel is their susceptibility to interference. Monoclonal immunoglobulins can cause interference in many laboratory analytes, and the results obtained with this method are more prone to analytical errors than conventional biochemistry tests. Given the prevalence of vitamin D deficiency in multiple myeloma and its association with various pathological conditions, it is imperative to perform biochemical evaluations of vitamin D status to improve patient care and mitigate the risk of bone fractures. The study aims to provide valuable information on the accuracy and reliability of vitamin D measurements in patients with multiple myeloma.

Methods: 100 serum samples from patients with multiple myeloma were analysed using Abbott Alinity-ci, and high-performance liquid chromatography, patients with falsely elevated 25(OH)D were included in further studies to elucidate the cause of interference. Spuriously elevated results were also analyzed on two alternative platforms (Beckman-Coulter and Roche).

Results: Falsely elevated 25(OH)D levels were present in thirty patients on the Abbott analyser and twenty-six on the Beckman-Coulter platform. The results of Roche were comparable to those of HPLC.

Conclusions: It is important to be cautioned when interpreting 25(OH)D results using immunoassay in multiple myeloma patients. Additionally, alternative assays such as chromatography and mass spectrometry should be used to confirm results. If there is no alternative method, the problem can be solved by precipitating with polyethylene glycol.

POSTER PRESENTATION ABSTRACTS

Abstract # 33

POINT-OF-CARE TESTING WITHIN THE RADIOLOGY DEPARTMENT

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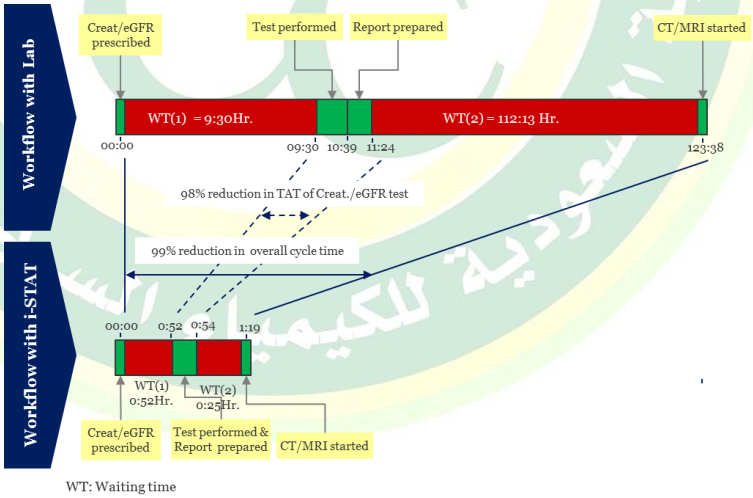
Background: Although the side effects from the administration of intravenous contrast agents vary from insignificant physiological disturbances, to rare but severe life-threatening conditions are also well-documented. Pre-imaging measurement of creatinine levels and the calculation of estimated glomerular filtration rate are considered as the most important means of identifying patients at risk of developing Contrast induced acute kidney injury and nephrogenic systemic fibrosis. According to the US National Kidney Foundation, a creatinine-based equation for the estimation of GFR provides the best index of overall kidney function. This study has evaluated the feasibility of implementing a point of care (POC) creatinine testing as a method to manage the risks of post contrast acute kidney injury. We also focused on the patients who arrive for their procedure without prior screening and poses issues for rescheduling exam, patient satisfaction, and increased financial burdens on radiology departments.

Methods: We examined the effects of implementation of a point-of-care creatinine test (iSTAT, Abbott Point-of-Care) in our radiology department on patients receiving radiology procedures and evaluated its impact on clinical operations. These measured parameters included: (1) Overall cycle time to start CT/MRI procedure; (2) Waiting time before starting Creatinine / eGFR test; (3) Turnaround time of Creatinine/eGFR test; (4) Waiting time before starting CT/MRI procedure.

Results: Prior to implementation of POC creatinine/eGFR testing in radiology, 25-35% of patients arrived for an appointment without a required creatinine/eGFR. The overall cycle time to start the procedure was 123 Hr 38 Min, which has been reduced to 1 Hr 19 Min after introduction of POCT Creatinine test. Also, the waiting time before creatinine test has been reduced from 9 Hr 30 Min to 52 Min due to elimination of laboratory pre-appointment and reduction in pre-analytical steps. The implementation of POCT also changed the turnaround time of Creatinine test from 1 Hr 56 Min to 2 Min. In earlier scenario, patients had to make multiple visits before CT/MRI.Therefore, the waiting time to start CT/MRI is also reduced from 112 Hr 13 Min to 25 Min as in new scenario patients can go for CT/MRI procedure immediately. Following operational and procedure compliance challenges that existed earlier, are eliminated:

- Approximately 30% of patients were not following pre-appointment from laboratory for creatinine test.
- Doctors relying on previous creatinine result.
- In 11% of cases, creatinine test was done after CT procedure. Thus, doctor didn't rely on lab test result



WT: Waiting time

Key Observations:

- 99% reduction in overall cycle time.
- 98% reduction in TAT of creatinine test.
- 91% reduction in WT(1).
- 99.6% reduction in WT(2).

Conclusions: POC creatinine/eGFR had a positive impact on the workflow of the radiology department. It reduced the number of rescheduled exams and decreased the average amount of time patients had to wait when they arrived without laboratory results. It also

eliminated the need to reschedule exams for a different day. Not only does this increase the department's efficiency, it also has the potential to greatly improve patient satisfaction.

POSTER PRESENTATION ABSTRACTS

Abstract # 34

RISK-BASED QUALITY CONTROL PLAN INCORPORATING PATIENT BASED REAL TIME QUALITY CONTROL USING MOVING AVERAGE AND INTERNAL QUALITY CONTROL

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Background: Patient-based real-time quality control (PBRTQC) avoids limitations of traditional quality control methods. PBRTQC uses the statistical characteristics of a patient population. However, PBRTQC needs to be adapted to individual laboratories with parameters such as algorithm, truncation, block size, and control limit. The aim of this study is to implement a QC strategy using patient test results to assess the performance of biochemistry instruments and identify changes in process stability. In addition, developing a total quality control plan applying risk management principle.

Methods: The risk-based flow chart was applied to determine, per test, whether the moving average (MA QC) should be considered. Next, in a computer simulation, biases were added to the results of 14 analytes with diverse patient results. Different PBRTQC methods were assessed on their ability to detect these biases early.MA QC was examined and optimized MA QC procedures and corresponding MA validation charts were obtained. When a relevant systematic error was detectable within an average daily run, the MA QC was added to the QC plan. For further implementation of MA QC for continuous QC, the software was configured based on proposed requirements. In addition, protocols for alarm work-up were designed to allow the detection of temporary assay failure.

Results: On the flowchart, 10 chemistry, 4 immunochemistry tests were considered for MA QC. The simulation based on a total of 300,000 historical patient measurements, 20 000 for each analyte, revealed several recommendations for PBRTQC. After obtaining optimal settings and the validation charts, the MA of albumin, bicarbonate, calcium, chloride, potassium, urea, sodium, total protein, phosphate, ALT, FT4, B12, and TSH were added to the plan.

Conclusion: A method has been demonstrated to design QC plans that integrate MA QC and internal QC. The method is based on adding MA QC when internal QC performance is limited. Furthermore, since MA validation charts provide realistic insight into the overall bias detection, they can have an important role in the design of analytical quality control plans and for laboratory risk management purposes.

POSTER PRESENTATION ABSTRACTS

Abstract # 35

SIGNIFICANCE OF PLASMA COLLAGEN IV MEASUREMENTIN SEPSIS INDUCED-ACUTE KIDNEY FAILURE IN SAUDI ILLPATIENTS

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Background: Sepsis is a potentially lethal organ dysfunction occurred by an unbalanced host immunological response to an infection. With a mortality rate of 25–30%, it is the most common cause of death in the intensive care unit (ICU), accounting for nearly 50% of all patients with acute kidney injury(AKI), whereas septic shock is linked to a mortality rate of 45–63%.Collagen synthesis is expertly regulated in various tissues and cell types. Transcription controls a big portion of how much collagen is produced. Over the past years, research on the expression of collagen genes, in particular type I and IV collagen genes, has offered a useful model system to investigate the molecular mechanisms and cellular variables that regulate ECM assembly and function in both healthy and sick states. A healthy kidney maintains connective tissue homeostasis by maintaining a balance between the production and assembly of ECM and degradation. Type IV collagen makes up the majority of basement membranes in healthy adult kidneys in terms of protein content.

Aim: The aim of this study was to investigate the potential of collagen IV plasma measurements as an early biochemical maker in acute renal failure induced by sepsis in ICU patients.

Methods: We recruited 300 critically ill adult-patients, 187 patients of them developed sepsis-induced acute kidney injury (S-AKI). Circulating collagen-4 serum levels has been measured using commercial kit (COL4A1/Collagen-IV ELISA Kit, MyBioSource, Cat.No:MBS9306207). Organ dysfunction was described as requiring the use of vasopressors, having a PaO2/FIO of less than 250, having a urine output of less than 0.5 mL/kg/h, having a platelet count below 80,000/mm3, experiencing altered consciousness, or having an acidosis with a pH below 7.30.Ethical Approval and informed consent were obtained.

Results: Collagen-IV levels in blood showed an excellent prediction of S-AKI (AUC=0.871) with sensitivity of 89.9.2%. Serum collagen IV concentrations (mean +/- SEM) showed significant difference between normal control group (48.9 +/- 12 ng/ml) versus AKI group (110.4 +/- 38ng/ml) (p-value > 0.001). Collagen IV concentrations showed significant correlation with WBCs count (r = 0.270, p-value 0.002), while no significant correlation was shown with serum creatinine ((P > 0.25).

Conclusion:
Type IV collagen is the main component of the glomerular basement membrane and the extracellular matrix (ECM). The renal inflammatory responses to infection may cause glomerular basement membrane dysregulation with an increase in plasma type IV collagen. Measurement of serum collagen-IV in Septic patients may helpful in the early prediction of the subsequent development of sepsis induced-acute renal injury.

POSTER PRESENTATION ABSTRACTS

Abstract # 36

EFFECT OF INCOME AND FOOD INTAKE TO THE LIPID PROFILE OFTHE MIDDLE-AGED GROUP IN A LOCALITY IN BULACAN, PHILIPPINES

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Background: Ischaemic Heart Diseases account for the leading cause of mortality among Filipinos. Preventive measures thereof are exerted in diagnosis and management of dyslipidemia or serum lipid levels—an established risk factor for the development of the disease diagnosed by measuring clinical indicators primarily through lipid profile testing. Serum lipid levels may be affected by various behaviors and risk factors; however, there is no clear correlation between abnormal serum lipid levels and specific socioeconomic strata.

Methods: Our aim was to investigate the correlation between abnormal serum lipid levels and socioeconomic status in middle-aged adults living in Barangay Poblacion, City of Meycauayan, Bulacan, filtering out outlying intrinsic factors such as genetic predisposition, lifestyle, medication, and behavioral risk factors, and limiting only to the inclusion of the major behavioral risk factor, diet. Out of the 304 population, 84 participated to which their serum lipid levels stood as quantitative data collected through lipid profile testing; encompassing the measurement of serum total cholesterol, triglycerides, high-density lipoprotein cholesterol (HDL-C), and low-density lipoprotein cholesterol (LDL-C). As the study employed correlational methods, quantitative data in the form of serum lipid levels were run against quantitative data from the respondent profiling which were collected through survey questionnaires examining respondent demographics, including their eating practices. Data collected were employed through regression analysis to quantify relative association strength and determine a significant correlation, or lack thereof, of dyslipidemia among middle-aged Filipinos and specific socioeconomic strata.

Results: The study showed 25 participants (29.8%) to have high cholesterol, 57 (67.9%) to have high triglycerides, 1 (1.2%) to have high HDL, and 6 (7.1%) to have high LDL, albeit statistical analysis concludes no significant differences between income class and food intake—only VLDL demonstrates a significance between high and normal levels to which the high income class is 33.3 times more likely to have increased VLDL as compared to the low middle income class while the low income class is 15.6 times more likely to have increased VLDL as compared to the low middle income class. Common foods identified to have significant effect on VLDL and LDL were peas, squash, and bananas while those that have an effect on VLDL and triglycerides were beef, chicken, carrots, and bananas.

Conclusion: Given the limited factors used in this study, we recommend the consideration of further intrinsic and extrinsic factors surrounding hyperlipidemia not limited to food intake frequency for a more comprehensive review.

POSTER PRESENTATION ABSTRACTS

Abstract # 37

AZACITIDINE ALONE OR WITH METFORMIN REDUCES INSULIN RESISTANCE IN HIGH-FAT DIET DIABETIC RATS

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Background: High-fat diets (HFDs) and other forms of chronic over nutrition are increasingly recognized as modifiable risk factors for metabolic diseases such as obesity, insulin resistance (IR), and diabetes mellitus (DM). Through inflammatory pathways, HFD causes metabolic disorders. Epigenetic mechanisms such as DNA methylation regulate environmental effects in the genome by regulating gene expression and phenotypic and disease development. It is known that insulin resistance (IR) happens when genetic and environmental factors interact, which suggests that it may be subject to epigenetics regulated. In this sense, epigenetic changes would explain the link between lifestyle and the risk of disease. This would suggest sensitive biomarkers and possible therapeutic targets for treating this pathology. Recent research has shown promise for Azacitidine (AZ), a ribonucleoside analog, as an antioxidant and anti-inflammatory agent. AZ drug is incorporated into DNA, and it inhibits DNA methylation. Therefore, it was a satisfying option for treating insulin resistance including the use of AZ, which has been demonstrated to diminish insulin resistance by inhibiting the secretion of pro-inflammatory cytokines and improving glucose uptake by loss of methylation in specific gene regions. The study objective is to compare the effectiveness of AZ alone and in combination with the standard oral hypoglycemic drug, metformin (ME), in reversing IR in rats fed a high-fat, high-carbohydrate diet.

Methods: In this study, rats will serve as a model for IR and DM by consuming a high-fat diet for three months before receiving an injection of streptozotocin (35 mg/kg; HF-STZ). Five groups (n = 10 rats/group) of male Wistar rats (200-250 g) will be used for this study. These groups were negative control (NC):(commercial feed), positive control(PC): (high-fat diet), and streptozotocin 35 mg/kg i.p. (HFD-STZ), AZ: HFD-STZ with AZ treatment, ME: HFD-STZ with metformin treatment, and AZ-ME: combination treatment. An oral glucose tolerance test (OGTT; 2.5 mg of glucose/kg v.o.) will be conducted for all groups. Blood samples were collected after 39 days of treatment for serum, ELIZA, and Cobas e411 analysis of IR and DM target markers.

Results: In comparison to NC rats, PC rats appeared to have DM based on their body weight, blood glucose levels, and OGTT results. When compared to untreated HFD rats, treatment with AZ, ME, or a combination of AZ and ME led to a decrease in several biochemical parameters, including LDL, TG, Glucose, and HbA1C, and increase in levels of Insulin, HDL, and K levels, while also leading to a decrease in the inflammatory markers, including IL-6, IL-1β, and TNF-α.

Conclusions: As an adjunctive agentazacitidine could be used in IR and DM therapy either alone or in combination with metformin. In future work, it's important to do more studies about AZ, obesity, and related diseases in clinical and experimental settings.

POSTER PRESENTATION ABSTRACTS

Abstract # 38

THE MOST CORRELATIVE AND PREDICTIVE TEST THROUGH LIPID PROFILE FOR ISCHEMIC HEART DISEASE

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Background: Low-density lipoprotein cholesterol (LDL-C) only partly represents the atherogenic lipid burden, and a growing body of evidence suggests that none high-density lipoprotein cholesterol (Non-HDL-C), and Apolipoprotein B (ApoB) are more accurate in estimating lipid-related Atherosclerotic cardiovascular disease such as ischemic heart disease (IHD) [1-3].

Aim of this study: Comparison of Apo B, Non-HDL-C, and LDL-C to identify the most accurate and predictive test for IHD.

Methods and materials: A case-control study, 200 males; 100 patients suffer from ischemic heart disease were taken from the Cardiology Department of Al-Mouwasat University Hospital in Damascus, and 100 healthy persons. Participants' data were taken (age, education, anthropometric measurements, smoking and alcohol consumption, diabetes and hypertension). Then laboratory tests were done (creatinine, albumin, glucose, cholesterol, triacylglycerol, HDL-C, ApoB, CRP), and the values of LDL-C and Non-HDL-C were calculated. The results were compared using t test and the SPSS program. The correlation, accuracy, prediction were studied.

Results: ApoB test was the most significant and strongest predictor for IHD, followed by Non-HDL-C, but LDL-C had not acceptable predictive value.

Conclusion: This study recommends to perform ApoB as the best test to predict IHD if it is available, calculate Non-HDL-C in all cases routinely, LDL-C was not reliable.

Key words: Apolipoprotein B(ApoB),ischemic heart disease (IHD), Low-density lipoprotein cholesterol (LDL-C), None high-density lipoprotein cholesterol (Non-HDL-C)

POSTER PRESENTATION ABSTRACTS

Abstract # 39

MAIN CAUSES FOR PSEUDOHYPERKALEMIA COMPARED THE TRUE HYPERKALEMIA IN EMERGENCY LABORATORY (CHEMISTRY DEPARTMENT)

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Background: Hyperkalemia is a medical condition characterized by higher-than-normal levels of potassium (usually defined as potassium levels greater than 5.1mmol/L) in the bloodstream. It can be caused by various factors, including kidney dysfunction, certain medications, severe tissue injury, or excessive intake of potassium-rich foods., while Pseudohyperkalemia is a condition where blood tests show elevated levels of potassium when the actual potassium concentration within the body's cells is normal. The aim of this study is to showcase the most common errors at detecting hyperkalemia and Pseudohyperkalemia and minimize them.

Method: Using Cobas pure c 303 analytical unit we can see that from the date of 8/29/2023 to 9/29/2030 the test has run around 800 samples per day and the result showed that around 100 samples are appearing as Pseudohyperkalemia which accumulates to a percentage of 12.5% of all samples per month, so we recommend the following methods to try tominimize the occurrence of a false positive result.

- Start by reviewing the patient's medical history and clinical symptoms. Patients with pseudohyperkalemia typically do not exhibit symptoms associated with high potassium levels (such as muscle weakness or palpitations) because their actual potassium levels in the body are normal.
- Collect another blood sample from the patient, making sure to follow proper blood collection techniques to minimize the risk of hemolysis (the breakdown of red blood cells) during sample collection. This step helps confirm whether the initial elevated potassium level was a result of laboratory error.
- Examine pre-analytical factors that might have contributed to the pseudohyperkalemia, including: Hemolysis during blood collection: Hemolyzed blood samples can release potassium from red blood cells into the serum, leading to falsely elevated potassium levels. Blood clotting: Blood samples that clot before testing can release potassium from cells and lead to falsely elevated levels. Delayed sample processing: Prolonged storage of blood samples at room temperature can also lead to potassium leakage from cells.

Results: After identifying hemolysis as the primary cause of pseudohyperkalemia in the chemistry lab, the implementation of corrective measures has led to a significant improvement in the accuracy and reliability of potassium level results. By addressing issues related to blood sample collection and handling, the incidence of hemolysis has been notably reduced. These measures have not only contributed to more precise potassium measurements but have also enhanced overall laboratory quality control. As a result, healthcare providers can now confidently interpret potassium levels in patient samples, reducing the potential for misdiagnosis and unnecessary clinical interventions related to hyperkalemia.

Conclusion: Detecting pseudohyperkalemia is essential to ensure accurate diagnosis and appropriate management for the patient. Proper phlebotomy techniques and attention to blood sample handling can help prevent and identify pseudohyperkalemia.

POSTER PRESENTATION ABSTRACTS

Abstract # 40

EFFECT OF MONOCLONAL ANTIBODY INTERFERENCES ON VITAMIN B12 IMMUNOASSAY MEASUREMENT BY ABBOTT ALINITY

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Background: Laboratory tests play an important role in patient diagnosis and in monitoring for different diseases about 70% of the decision that been taken on the hospital mainly based on laboratory result. Immunoassay results can be affected by interferences which could be classified as specific (known) or unspecific (unknown). Quality control assurance, through analytical measurement, cannot detect all the measurement errors that occur because the presence of some interferences. Vitamin B12 can be measured as total or active B12 on an Abbott Alinityi machine. Monoclonal antibodies that present on a multiple myeloma patient sample could affect the immunoassay test result significantly. The presence of endogenous antibodies may affect a B12 immunoassay test result.

This study aims: To evaluate the effect of monoclonal antibodies present in multiple myeloma and MGUS patients on the immune assay used to measure both total vitamin B12 and active B12 in the Abbott Alinity platform.

Methodology: Multiple myeloma samples that have monoclonal antibodies were collected for 3 months and analysed in an immunoassay to test both active and total vitamin B12. Samples were analysed before and after treatment with polyethylene glycol 6000, which was used to precipitate monoclonal antibodies in the patient sample, and the supernatant was measured in the post-treatment sample.

Results: The Wilcoxon test was used to calculate the p-value of total vitamin B12 and active vitamin B12 in the; the p-value of total vitamin B12 was >0.05, which is not significantly different. Furthermore, the p-value of active vitamin B12 was <0.05, which is significantly different. The result indicates that the presence of interferences can affect the immunoassay method. However, there are significant improvements in immunoassay methods that are used in the laboratory. Monoclonal antibodies significantly affect active vitamin B12, and post-treatment samples show significant variation from pre-treatment samples. However, total vitamin B12 was not significantly affected by the presence of monoclonal antibodies, but only 3 out of 40 samples showed significantly low total vitamin B12 after treatment. The presence of interferences in these studies was evaluated through two criteria: firstly, by calculating the recovery percentage of the post-treatment sample of multiple myeloma patients; secondly, by using the post-polyethylene glycol reference interval.

Conclusion: Treatment of multiple myeloma patients with PEG 6000 could be effective to detect the presence of interference in total vitamin B12; however, it is not effective to assess the presence of interference in active vitamin B12. Modifying the reference interval is necessary while using PEG 6000 for precipitation to calculate monoclonal interference to eliminate any possible effect of PEG 6000 on the analyte.

POSTER PRESENTATION ABSTRACTS

Abstract # 41

EVALUATION OF ANALYTICAL ACCURACY OF COAG-SENSE POCT DEVICE FOR PROTHROMBIN TIME (PT) IN HEALTHY INDIVIDUALS AND IN PATIENTS UNDER WARFARIN TREATMENT

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Introduction: The prothrombin time (PT) is a test to evaluate blood clotting. Prothrombin is a protein produced by liver. It is one of many factors in your blood that help it to clot appropriately. Most often, the prothrombin time is monitored if you are taking the blood-thinning medication warfarin that helps prevent blood clots, which can cause serious conditions such as deep venous thrombosis or pulmonary embolism. In this situation, the prothrombin time is shown as an international normalized ratio (INR). Most of coagulation analyzers are central based laboratory and very few are available to be used near the patient site. The aim of this study was to compare and evaluate the accuracy INR level results for one of the Point of care Coag-Sense.

Methods: A total of 20 individuals scheduled for PT/INR draw at Clinic (10 healthy individuals and 10 patients under warfarin monitoring) were recruited. Blood capillary and venous samples were collected simultaneously from each participant to measure of PT/INR by both point-of-care device (Coag-Sense and laboratory instrument (Sysmex CS-5100). The venous samples were collected by phlebotomists and sent to the laboratory to be performed within 1 hour. While blood capillary tests were performed immediately after sample collection by the POC team. For the method comparison, analysis was based on the CLSI EP09-A2 protocol Deming and regular regression analysis was performed to compare the Coag-Sense (PT-INR POCT device) against the laboratory method Sysmex CS-5100. The Total Allowable Error was selected TEa 15% according to CLIA. For simple Precision 2 level of manufacturer-supplied and certified reference materials were used, the degree to which repeated measurements of a single specimen recover the same result when run under the same conditions in a limited time frame. A total of 10 results for each level were obtained.

Results: All the results for precision met the overall repeatability criteria and were within the acceptable CV% (< 10%). The mean, standard deviation SD and coefficient of variation CV% for low and high quality controls were calculated to be (17.4,0.65, 3.7%) and 32.9, 1.1, 3.31%) respectively. The accuracy study has shown that Coag-Sense VS Sysmex CS-5100 has an excellent correlation Coefficient (R) (0.9863, n=29) compared over a range of 1.5 to 5.4 sec. The mean and SD for PT on Sysmex CS-5100 and Coag-Sense were found to be 2.56 sec±0.78 and 2.4sec±0.61 (p=0.0005) repectively. The average error index was found to be -0.26% within a range of (-0.83 to 0.33%).

Conclusion: Coag-Sense had a good comparison and precision agreement and pass Accuracy-Correlation with reference laboratory Sysmex CS-5100.

POSTER PRESENTATION ABSTRACTS

Abstract # 42

THE IMPACT OF EARLY SAMPLING ON NEWBORN SCREENING FOR CONGENITAL HYPOTHYROIDISM

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Background: Thyroid stimulating hormone (TSH) plays a pivotal role in regulating essential bodily processes by prompting the production of thyroid hormones. Infants with congenital hypothyroidism, if untreated during the initial development phase, risk intellectual disability and stunted growth. Often, these symptoms are indistinct or absent at birth, even though TSH levels typically surge during the first day postpartum. Timely thyroid hormone supplementation can effectively mitigate these complications. This study aims to elucidate the incidence of false-positive TSH results within our Newborn Screening (NBS) program.

Methods: We executed a retrospective analysis at the newborn screening laboratory of Prince Sultan Military Medical City. The cohort consisted of infants screened between January 2019 and September 2023. TSH concentrations were ascertained using the Genetic Screening Processor (Perkin Elmer, Finland). Initial dried blood spot specimens were procured 24-72 hours post-birth. Preliminary remarkable results were first validated by a second (recall) sample before final confirmation. To discern the underpinnings of the false positives, we meticulously analyzed these remarkable results, comparing them against the program's database, guidelines, protocols, and policies.

Results: Of the 104,058 infants screened, there was a 100% coverage rate. Initial screenings rendered 271 noteworthy results. Subsequent tests confirmed congenital hypothyroidism in 45 cases, leaving 226 as false positives. Notably, all false-positive samples were obtained prematurely, specifically within 24 hours post-birth.

Conclusion: Our findings emphatically suggest that, to minimize false positives, dried blood spot samples for congenital hypothyroidism screening should be garnered strictly after 24 hours post-birth. Adherence to this timing is instrumental in enhancing the program's performance indicators.

POSTER PRESENTATION ABSTRACTS

Abstract # 43

DRIED BLOOD SPOT ANALYSIS: COMPARING DIAGNOSTIC OUTCOMES BETWEEN UNIFORM AND LAYERED SAMPLES IN NEWBORN SCREENING

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Background: Newborn screening (NBS) is a routine medical examination conducted on newborns shortly after birth to identify potential medical conditions and disorders not immediately apparent. The objective is to detect diseases that may lead to severe complications if left untreated. The national NBS program in Saudi Arabia, established in 2005, is tailored to detect inborn errors of metabolism (IEM) manifesting complications within 24-72 hours post-birth. Dried blood spot samples (DBS) play a pivotal role in NBS, enabling the detection and quantification of biomarkers for over 50 congenital diseases, mainly metabolic in origin. DBS samples can be rejected due to insufficiencies in quality or quantity, affecting analytical screening outcomes. We aim was to discern potential discrepancies in Thyroid-stimulating hormone (TSH) and 17-hydroxyprogesterone (17OHP) results between the two categories.

Methods: In this investigation, we employed a comparative approach to rigorously assess the impact of different sample collection techniques on diagnostic outcomes, specifically focusing on dried blood spot samples. A total of ten carefully selected samples were analyzed in a controlled environment. Out of these, five samples were obtained using a uniform collection method, ensuring that each spot was evenly and consistently collected without overlapping layers. In contrast, the other five samples were collected using a layered method, where multiple overlaps existed within a single spot. To maintain the accuracy and consistency of our evaluation, all samples were stored under identical conditions and processed using the same batch of reagents. For each sample, we meticulously measured the levels of Thyroid-stimulating hormone (TSH) and 17-hydroxyprogesterone (17OHP) using state-of-the-art equipment, ensuring minimal deviation in readings. All measurements were taken by technicians trained in both sample collection techniques to further reduce any potential bias in results. Once the measurements were recorded, a statistical analysis was performed to compare the results between the uniform and layered samples, aiming to identify any significant discrepancies that might influence diagnostic outcomes.

Results: The mean difference between TSH values across samples was 40.35% with a percentage difference standard deviation (SD) of 44.38%, with percentage difference between coefficient of variation (CV) was (CV= 6.75%) between uniform and layered samples. For 17OHP, the mean difference between samples was 57.77% with a percentage difference SD of 53.42%, with percentage difference CV=10.3% between uniform and layered samples.

Conclusion: Upon analysis, clear and consistent variations were identified between the values obtained from uniform and layered samples. This differentiation is not merely nominal but presents implications for clinical practice. The discrepancies noted can have a substantial impact on diagnostic precision, potentially leading to either false positives or false negatives. Moreover, these variances underscore the necessity for standardized collection protocols and rigorous quality control in newborn screening to ensure reliable and reproducible results. Addressing these inconsistencies is crucial for maintaining the integrity and accuracy of the screening process, ultimately safeguarding newborn health.

POSTER PRESENTATION ABSTRACTS

Abstract # 44

CIRCULATING MICRORNAS AS NOVEL BIOMARKERS FOR MEASURING THE POTENCY OFGINGER EXTRACT AGAINST CYCLOPHOSPHAMIDE TOXICITY IN RAT RENAL TISSUES: MOLECULAR AND HISTOPATHOLOGICAL STUDY

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Introduction: It is believed that microRNAs (miRNAs) can serve as predictive biomarkers to assess the toxicity of different substances or medications in biological systems. This is due to their role as specialized regulators of gene activity and biological processes within cells. Unfortunately, there is currently no information available about the functions of miRNAs in preventing cyclophosphamide (CP)-induced nephrotoxicity. This study aims to explore underlying molecular variations in the expression of miRNAs in kidney tissues of ginger-treated and non-treated CP-intoxicated rats, focusing on their correlation to cellular fibrosis, apoptosis, and oxidative stress profiles. The study also involves in-vitro screening of phytoconstituents, as well as the evaluation of the antioxidant and free radical scavenging activity of ginger.

Methods: Rats received 300 mg/kg body weight ginger for four weeks and a single injection of 75 mg/kg CP on days 3, 4, 5, 19, 20, and 21 of the study. The kidney tissues of CP-intoxicated rats displayed an increase in lipid peroxidation (MDA), DNA damage, and fibrosis markers (HA and Hypx) with a decrease in the SOD and TAC antioxidant activity. In addition, molecular expressions of mRNA fibrotic (a-SMA and Col-1a1), and apoptotic (Bax, caspase-3, Bax/BCl-2 ratio) genes were significantly up-regulated and the expression levels of BCl-2 mRNA and oxidative (Nrf2/ HO-1) genes were down-regulated respectively. Moreover, CP-toxicity extensively increases abnormal changes in the expression of cellular miRNAs in kidney tissues. The miR-155-5p, miR-34a-5p, miR-21-5p significantly increased while the miR-193b-3p, miR-455-3p, and miR-342-3p significantly decreased.

Results: Administration of ginger at a dose of 300mg/kg was found to improve kidney function markers and prevent tissue damage induced by CP. Furthermore, ginger was observed to significantly reduce oxidative stress, inflammation, fibrosis, and apoptosis by enhancing antioxidant defenses and increasing Bcl-2 expression, while suppressing the expression of fibrotic genes such as a-SMA, and Col-1a1, and pro-apoptotic markers including Bax, Bax/Bcl-2, and caspase-3. Ginger also increased the expression of Nrf2, HO-1, and BCl-2 in the kidneys of rats induced with CP. Treatment with ginger in rats induced with CP resulted in significant improvement in the expression of certain molecular miRNAs. The kidney tissues of these rats showed a marked decrease in the expression of miR-155-5p, miR-34a-5p, and miR-21-5p, while the levels of miR-193b-3p, miR-455-3p, and miR-342-3p were observed to increase significantly. Additionally, the differential expression of these miRNAs was found to be significantly associated with renal function, oxidant-antioxidant status, fibrosis, and apoptosis in the CP-intoxicated rats treated with ginger.

Conclusion: Ginger can protect rats from CP-induced nephrotoxicity. The study suggests that the improvement in kidney parameters observed in the rats treated with ginger could be attributed to the antioxidant, anti-apoptotic, and anti-fibrotic properties of the phenolic constituents found in the ginger extract. Furthermore, the results indicate the potential use of molecular miRNAs as diagnostic biomarkers for kidney disease.

Keywords: Ginger; miRNAs; Real time PCR; apoptosis, phytoconstituents; oxidant-antioxidant status; cyclophosphamide; kidney.

POSTER PRESENTATION ABSTRACTS

Abstract # 45

ASSESSMENTOF ZINC LEVELANDMETABOLIC VARIABLESIN OBESE AND NORMAL HEALTH SUBJECTS

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Background: Global obesity prevalence has substantially increased during the past few decades. The obesity rate in Saudi Arabia is higher than that of many other countries. WHO reported that the prevalence of obesity in Saudi Arabia was 35.4 %. Despite obesity associated with many metabolic complications, it receives little attention from medical professionals. In the literature, many studies have linked a zinc deficiency to obesity. Contrary to earlier studies, high zinc levels found in obese subjects over a recent study carried out in southern region Saudi Arabia. Our study attempts to assess serum zinc level and some metabolic variables in obese subjects from Tabuk province (Northern region of Saudi Arabia). We seek to determine whether zinc level in northern region agree with southern region.

Methods: The study included 24 obese and 24 healthy subjects as a control. Obesity was defined as BMI ≥35 kg/m2.Short survey was used to assess general health and eating habits for participants. Serum vitamin D, Vitamin B12, and thyroid profile were measured by chemiluminescent immunoassay. Complete blood count was measured by a Beckman Coulter DXH 900 hematology analyzer. Serum zinc, copper and other metabolic variables level were determined by colorimetric methods, using Au 700 Beckman coulter chemistry analyzer . The significant differences between groups were determined by statistical analysis using independent sample t-test

Results: In this study, obese subjects have significantly increased levels of serum zinc and copper than healthy control. Glucose, alanine aminotransferase (ALT), gamma glutamyl transferase (GGT), Aspartate aminotransferase (AST), alkaline phosphatase (ALP), triglycerides and low-density lipoprotein(LDL) were significantly increased in obese participants. In contrast, high-density lipoprotein (HDL), calcium and amylase were significantly decreased in obese individuals than healthy control.

Conclusion: Our study found that there is a high positive correlation between BMI and serum zinc level. However, the data of the present study conclude that high zinc level in diabetic obese is correlated with developing diabetes complications. It is possible that the normal zinc level may contribute to prevent diabetes complication which is another possible area of future research

POSTER PRESENTATION ABSTRACTS

Abstract # 46

ANALYSIS OF INFLAMMATORY CYTOKINES IN PATIENTS WITH MULTIPLE SCLEROSIS IN SAUDI ARABIA

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Background: Multiple Sclerosis (MS) is a neurological disorder that disables young adults and affects over 2.3 million people worldwide. The inflammatory condition of the central nervous system (CNS) in MS patients affects the motor, sensory, visual, and autonomic systems differently, resulting in a wide range of symptoms and indications. Microglia activity may cause neurotoxicity during lesion development and MS progression by releasing inflammatory cytokines, reactive oxidant species, and proteases.

Aim: This study aims to assess the level of serum cytokines (INF-γ, IL-8, TNF-α, IL-6, and IL-1β) in Saudi MS patients compared to matched healthy subjects in King Fahad Medical Center (KFMC) in Riyadh.

Methods: The level of serum cytokines (INF-γ, IL-8, TNF-α, IL-6, and IL-1β) of 22 MS Saudi patients were measured based on the Luminex® xMAP® technology and compared to 22 matched healthy controls.

Results: Serum levels of INF-γ, IL-8, TNF-α, IL-6, and IL-1β were significantly higher in patients versus control ($p < 0.0001$ for all). A moderately significant correlation was found between INF-γ and IL-8 ($r= 0.467$ and $p= 0.028$).

Conclusion: This study concluded that MS patients release considerable amounts of inflammatory cytokines, and this finding would aid in understanding the clinical course of MS.

Keywords: Multiple Sclerosis (MS), Neurodegenerative Diseases, Inflammatory Cytokines, Interleukins, Interferons, Tumor Necrotic Factors.

POSTER PRESENTATION ABSTRACTS

Abstract # 47

EVALUATION OF THE IMPACT ON WORKFLOW WHEN REPLACING TRADITIONAL Q.C. MATERIAL BOTTLES WITH A READY TO USE NEW COMMERCIL BARCODED Q.C. TUBES

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Background: A comprehensive Quality Management System starts with performing a daily Q.C. process. The daily Q.C. process monitors the Instrument's optimal performance and detects shifts and trends. However the existing traditional daily Q.C. process is not only prone to manual errors, it is also time consuming, costly and labor intensive. We evaluated a Bio-Rad InteliQ™ Load - and - go Quality Control that comes in a bar-coded tube ready to be loaded. We monitored the workflow efficiency gained in comparison to our traditional quality control material in glass vials.

Materials and Methods: We evaluated the new quality control material ready to load on the instrument. This new Q.C. (Bio-Rad InteliQ Assayed Multiqual Control – 3 levels) were processed in parallel with our routine Q.C. (Bio-Rad Assayed Chemistry Lyphocheck vials – 2 levels). We performed the evaluation on Abbott Architect c8000 Chemistry analyzers in our central Laboratory (NGHA-Jeddah). The Q.C. was stored frozen. Before testing it was thawed at room temperature as per the insert instruction. Over 5 days' period, in parallel with our routine quality control, we run the new Q.C. 2 times per day for 33 analytes. We monitored the processing time difference between the new and current approaches. We monitored the stability of all the analytes in the in-use tube after 2 days and again after 5 days. We also monitored the cost effectiveness, labor intensiveness, probability of operator error and the overall improvement in workflow and turnaround time.

Results: Over the evaluation period, we observed the following:

- 40 minutes saving per week only for chemistry Q.C (time spent reconstituting, mixing and aliquoting old Q.C)
- Plastic waste reduction for consumables such as pipette and plastic tubes. Green solution.
- Save an average of 1.0 ml dead volume in every 5.0 ml old Q.C. vial (20% of the volume, hence saving 20% of the total Q.C. cost). The dead volume wasted due to aliquoting the old Q.C.
- Eliminated delays caused by operator error such as wrong reconstitution, inadequate mixing and wrong Q.C. aliquoting. Not needed for the InteliQ. It is mistake proof.
- Stability of the 32 analytes was excellent except that of CO2, which deteriorated by 14% after 2 days as indicated in the insert package. CO2 day 5 result deteriorated by 34%.

Conclusion: Bio-Rad InteliQis easy to use. It saves time and cost. When combined with Unity Q.C. data management solution it can streamline Q.C. workflow, eliminate operator errors, reduce T.A.T. and increase the overall laboratory performance. It may also work optimally with Instruments that have on-board fridge for Q.C.

POSTER PRESENTATION ABSTRACTS

Abstract # 48

V-PRO BLOOD COLLECTION TUBES IN COMPARISON TO BD VACUTAINERS: CLINICAL AND TECHNICAL VALIDATIONS

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Background: BD tubes are commonly used inclinical laboratory compared to others due to their high-quality results and less analytical and technical errors. The V-PRO tubes are newly introduced to the Saudi market, and they have not been validated yet. In this study, the V-PRO tubes will be compared to the BD tubes to determine whether V-PRO tubes are valid for blood testing or not. The purpose of this study is to evaluate the V-PRO tubes clinically and technically. This was achieved by the analysis of the most common laboratory tests for chemistry, immunoassay and CBC parameters. The blood collection tubes used in the study were EDTA (lavender top), and Serum Separator Tubes (SST, yellow top) tubes. Both tubes were provided by Advance Medical Co (V-PRO) and Becton, Dickinson(BD).

Materials and Methods: Blood samples were collected simultaneously into two different tubes (V-PRO and BD) from 60 subjects (10 healthy and 50non-healthy). The collected specimens were measured for 26 chemistry tests, 25 immunoassay tests and complete blood count (CBC) using Abbott analyzers (Architect c8000, i2000, and Alinity respectively). By using the EP Evaluator system, the differences between each test using either SST or EDTA were calculated using the error index (EI) and the allowable total error (TEa) values. For technical validation, a designated survey was distributed to 15 different laboratorians using both tubes in their laboratories.

Results: By using the calculated EI, the difference between the BD and V-PRO tubes for chemistry, immunoassay and CBC tests were acceptable for the TEa with the maximum bias values for CO2 (3.2%), progesterone (10.2%) and basophil (13.1%) respectively. Survey outcomes showed major pre-analytical and analytical errors in using the V-PRO in comparison to BD tubes.

Conclusion: In comparison to BD tubes, the validation outcomes for major chemistry, immunoassay and CBC tests obtained using the V-PRO tubes were clinically acceptable but technically not acceptable due to major faults.

POSTER PRESENTATION ABSTRACTS

Abstract # 49

EFFECT OF STORAGE TEMPERATURE ON SAMPLES' INTEGRITY FOR ROUTINE CHEMISTRY TESTS

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Background: Storage temperature in clinical laboratory is one of crucial factors that may affect samples quality, thus will reflect on tests results. Short-term storage of samples within range 2 to 8°C is the common temperature range for most laboratory tests especially in Clinical Chemistry. This experiment will focus on routine chemistry tests and see the integrity of samples during short storage periods by re-processing of previous verified results after 24 hours of storage up to 48 hours. The goal is to verify vendor claim in regards of stability of samples after processing. Twenty-eight tests shown below considered as routine Chemistry tests.

Method: Equipment: The study is conducted on Abbott Alinity ci series instrument (c Module), which using Spectrophotometry as a method of measurement.

Materials:

1- Sample: Serum samples collected and stored in SST tubes (serum separated with gel).
2- Reagents/Calibrators: Abbott Alinity reagents kits/calibrators for each test.
3- Quality Controls: Biorad quality control material.

Experiment: Retrieved 16 to 20 samples previously tested for each test, stored properly as required (2-8°C). After 24 hours of storage, the samples reprocessed on same instrument then re processed after 48 hours of storage. After couple of reprocessing, the results logged in a table for evaluation, the results after 24hr and 48hr compared with original result. The acceptance criteria: to be within approved total allowable error (TEa) for each test, also applying delta check percentage as factor and criteria for acceptance.

Results: The table below describing the summary of the experiment:

Test	Manufacturer Claim	Tea%:	Delta%	Test	Manufacturer Claim	Tea%:	Delta%
Albumin	150 days	8%	5	**iron**	21	20%	10
Calcium	21	8%	5	**LDH**	4	20%	10
Cholesterol	7	10%	5	**Creatinine**	7	15%	10
Chloride	7	5%	5	**Uric Acid**	7	17%	10
CK	7	30%	5	**BUN**	7	9%	10
DLDL	5	15%	5	**GGT**	10	22%	15
Magnesium	7	25%	5	**CRP**	60	4%	15
Sodium	14	5%	5	**ALK**	7	30%	15
Total Proteins	30	10%	5	**ALT**	7	20%	15
TRIG	7	25%	5	**AMY**	10	15.70%	15
UHDL	7	11%	5	**AST**	7	20%	15
Glucose	7	8%	8	**BILI T**	7	20%	15
Phosphorus	4	10.20%	8	**BILID**	7	20%	15
All Above tests accepted to be processed up to 48 hours of storage							
Test	**Manuf. Claim**	**TEa:**	**Delta%**	**Test**	**Manuf. Claim**	**TEa:**	**Delta%**
CO2	7	20%	10	Potassium	7	5.80%	5
Accepted up to 24hr				Not accepted			

Conclusion: As per table above, found out that 26 out 28 tests can be re processed up to 48 hours (all within manufacturer claims); while 1 test "CO2" accepted for re processing only up to 24hr, it's also within manufacturer claim but with short period. Remaining is "Potassium" test, experiment showed unacceptability of re processing neither after 24hr nor 48 hr.

POSTER PRESENTATION ABSTRACTS

Abstract # 50

NEWBORN SCREENING EXPERIENCE FOR CYCSTIC FIBROSIS IN A TERTIARY CENTER IN SAUDI ARABIA

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Background: Cystic Fibrosis (CF) is caused by mutations in the cystic fibrosis transmembrane conductance regulator (CFTR) gene, which encodes for a chloride/bicarbonate channel located in the apical membrane of epithelial cells. Defective CFTR gene affects multiple organs, leading to pancreas organ failure with maldigestion and malnutrition, liver and gastrointestinal disease, male infertility, and progressive destructive lung disease causing early mortality. Early diagnosis of CF helps to prevent early severe complications in children. It prolongs adequate life quality and longevity. Therefore, newborn screening (NBS) for CF is used in many countries worldwide. The survival of CF patients has continuously improved to a median survival of up to 50 years of age in some countries today. Immunoreactive trypsinogen (IRT) increases in blood due to the pancreatic damage often present in infants with CF. CF is not included in the national NBS in Saudi Arabia. To our knowledge, Prince Sultan Military Medical City (PSMMC) is the only center in Saudi Arabia which provides this screening service. The current study aims to identify the incidence of CF in PSMMC & to determine the accurate cut-off value for IRT in our community compared with the used cut-off value Caucasian population.

Methods: A retrospective study conducted between 2019 and 2023, dried blood spots (DBS) specimens were collected on Guthrie cards from the newborns between 24-72 hours after birth. IRT concentrations were measured utilizing genetic screening processor (GSP) based on time-resolved fluoroimmunoassay detection method. Initial remarkable results were reanalyzed using recall samples. All remarkable recall samples were undergone to further diagnostic confirmation by sweat chloride test and genetic study respectively.

Results: A total of 42,614 newborns in PSMMC were screened for CF during the study period. 95 initial samples gave remarkable results with unremarkable recall results (0.22 %). However, only 6 cases were confirmed and diagnosed with CF revealing an incidence of 1:7,102. Newborns with Arab ethnicity seem to have higher levels of IRT compared with Caucasian ethnicity underscoring the need to use higher cut-off value for IRT screening in Arab countries than the currently used in Europe (85 µg/L, 70 µg/L, respectively).

Conclusion: Our study reported the incidence of CF in our community highlighting the importance of adding CF to the national NBS panel in Saudi Arabia. Moreover, Ethnicity is a crucial factor to be considered in the optimization and validation the cut-off value of IRT screening

POSTER PRESENTATION ABSTRACTS

Abstract # 51

METABOLIC PROFILE OF SEVERAL AMINO ACID DISORDERS

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Background: Proteins are composed of amino acids. Disorders such as Phenylketonuria (PKU) arise due to decreased phenylalanine hydroxylase (PAH) activity, leading to phenylalanine accumulation; Urea Cycle Defects from urea cycle enzyme deficits, resulting in ammonia accumulation; and Maple Syrup Urine Disease (MSUD) leading to accumulation of leucine, isoleucine, and valine. Common symptoms include developmental delays, seizures, lethargy, and coma. Diagnosing these autosomal recessive disorders involves amino acid concentration analysis in dried blood spots, plasma, and urine. We aim to detail the metabolic profiles of these disorders.

Methods: We enrolled patients with aminoacidopathies. We assessed dried blood spot amino acid levels using LC-MS/MS. Fresh urine samples were collected, processed using liquid-liquid extraction with ethyl acetate, and analyzed with GC-MS/MS. We evaluated chilled plasma samples stored in heparin tubes using LC-MS/MS.

Results:

- **MSUD:** Elevations in leucine, isoleucine, and valine were noted in DBS and plasma samples. Urine samples revealed distinct alpha keto-acids peaks.
- **Urea Cycle Defects:** Elevated citrulline levels were observed in DBS and plasma. Organic acid samples remained normal.
- **PKU:** Elevated phenylalanine levels were detected in DBS and plasma. No organic acid sample orders were noted.

Conclusion: Our study emphasizes the importance of a comprehensive approach to diagnose amino acid disorders by analyzing DBS and plasma amino acid levels alongside urinary organic acid profiles. The distinct amino acid elevations in MSUD and PKU patients, as well as the unique metabolic signatures, underline their diagnostic value. Such detailed metabolic profiling is crucial for clinicians to offer timely interventions. Future research should extend this metabolic profiling for early detection and broader populations.

POSTER PRESENTATION ABSTRACTS

Abstract # 52

EFFECTS OF TEMPERATURE AND TIME ON LACTIC ACID AND AMMONIA SAMPLES USING ABBOTT ALINITY C ANALYZER

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Background: Blood Lactic Acid "Lactate" is commonly ordered for patients with high risk of multiple organ failure following cardiogenic, hemorrhagic or septic shocks and acute pulmonary insufficiency. An accurate lactate results are influenced by temperature and storage, Clinical and Laboratory Standards Institute guidelines recommended placing the drawn blood sample on ice bath immediately, and centrifuge it within 15 minutes. Ammonia is essential for many metabolic disorders. However, ammonia level is extremely unstable in blood specimens "in vitro" due to amino acid degradation and red blood cells lysis. Specimen must be transported on ice and processed within 15 minutes after collection. This study is to investigate whether lactate and Ammonia levels vary in relation to time and temperature.

Methods: In this study, 20 samples from 5 subjects were collected for both Lactic Acid (Sodium Fluoride tube, gray top) and Ammonia (Sodium Heparin, green top). Samples were centrifuged at 3500 RPM for 5 minutes using MEGA-FUGE centrifuge from thermo scientific, and plasma was tested using Abbott Alinityc analyzer. Determinations of lactate and ammonia were made at different times (30, 60, 90, 120 and 150 minutes) and different temperatures, room temperature (24°C) and on ice (4°C).

Results: Findings show changes in Lactate and Ammonia values when samples were kept at room temperature where the difference reached +20 mmol/L in ammonia and +0.7mmol/L in lactate samples.

Conclusions: A delay in processing Lactate and Ammonia samples for more than 30 minutes at room temperature and an hour on ice will falsely increase tests' concentrations.

POSTER PRESENTATION ABSTRACTS

Abstract # 53

ASSESSMENT OF THE SYSTEMIC IMMUNE-INFLAMMATION INDEX IN TYPE 2 DIABETIC PATIENTS WITH AND WITHOUT DRY EYE DISEASE

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Background: The association of Inflammatory Blood Biomarkers for Type-2 Diabetes with Dye Eye Disease Patients (DM2-DED) is not fully understood. In this study, routine biomarkers are used to assess the severity of inflammation and to evaluate the relationship between glycosylated hemoglobin(HbA1c), neutrophil-to-lymphocyte ratios (NLR), platelet-to-lymphocyte ratios (PLR) fasting blood glucose (FBS), andsystemic immune-inflammation index (SII) levels in DM2- DED patients.

Methods: A retrospective study of 430 patients was divided into four groups: DM2-DED (n=121), DED only (n=106), DM2 only (n=103), and healthy (n=100) groups. Data on demographicsand biomarkers were categorized as either categorical or continuous variables.

Results: Females were more likely to develop DM2-DED compared to males. Mean age was 60.2±12.29 years in DM2-DED (study group), 52.1±16.9 years in DED (control group), 59.2±14.3 years in DM2 (control group), 54.3±6.4 years healthy (control group).There were statistically significant differences between the study groups in terms ofneutrophil, HbA1c, FBS, and SII levels ($P = 0.010$, $P< 0.001$, and $P< 0.05$, respectively)compared to all groups. There was a positive correlation in DM2-DEDon the levels of HbA1c and PLR; HbA1c and NLR; and HbA1c and SII($r=0.003$, $P=0.976$; $r=0.084$, $P=0.362$; and $r=0.145$, $P<0.015$, respectively).

Conclusion: Our finding indicates that patients with DM2 who have poor control of HbA1C are more prone to developing DED. In DM2-DED, HbA1c level is positively correlated with PLR, NLR, and SII. Accordingly, this study provided a cost-effective biomarker, utilizing SII as a prognostic indicator of inflammatory status in DM2-DED, with a positive correlation between the HbA 1c value and PLR and NLR, as well as SII.

POSTER PRESENTATION ABSTRACTS

Abstract # 54

METHOD VERIFICATION OF ALANINE AMINOTRANSFERASE & ASPARTATE AMINOTRANSFERASE NEW GENERATION IN CLINICAL CHEMISTRY

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Background: The enzyme alanine aminotransferase (ALT) has been widely reported as present in a variety of tissues. The major source of ALT is the liver, which has led to the measurement of ALT activity for the diagnosis of hepatic diseases. Elevated serum ALT is found in hepatitis, cirrhosis, obstructive jaundice, carcinoma of the liver, and chronic alcohol abuse. ALT is only slightly elevated in patients who have an uncomplicated myocardial infarction. The enzyme aspartate aminotransferase (AST) is widely distributed in tissue, principally hepatic, cardiac, muscle, and kidney. Elevated serum levels are found in diseases involving these tissues. Hepatobiliary diseases, such as cirrhosis, metastatic carcinoma, and viral hepatitis also increase serum AST levels. Serum AST is elevated and reaches a peak 2 days after onset. Although both serum aspartate aminotransferase (AST) and (ALT) become elevated whenever disease processes affect liver cell integrity, ALT is the more liver-specific enzyme.

Method: ALT catalyzes the reaction between L-alanine and 2-oxoglutarate. The pyruvate formed is reduced by NADH in a reaction catalyzed by lactate dehydrogenase (LDH) to form L-lactate and NAD+ . Pyridoxal phosphate serves as a coenzyme in the amino transfer reaction. AST in the sample catalyzes the transfer of an amino group between L-aspartate and 2-oxoglutarate to form oxaloacetate and L-glutamate. The oxaloacetate then reacts with NADH, in the presence of malate dehydrogenase (MDH), to form NAD+ . Pyridoxal phosphate serves as a coenzyme in the amino transfer reaction. It ensures full enzyme activation. ALT & AST validation was performed using Roche Reagent on Cobas c501 and c303 modules using serum and heparinized plasma samples. Method validation was done according to the laboratory policy followed CLSI guidelines. Precision study was performed using 50 quality control samples of 2 different concentration in inter run for a period of 5 days each test. Mean, SD and CV% were calculated and compared to the manufacturer recommendation. Method comparison study was done comparing 25 samples of patients.Linearity study was done using 5 different concentration patient samples that spanning the analytical measurement range (AMR) from 5 – 700 U/L.Sensitivity test performed of sample got<5 U/L which is LLOD.

Results: Between days precision study for low and high concentrations, ALT CV% were 2.1 and 1.1 and AST were 0.7 and 0.6 respectively. Method comparison acceptable criteria: slope(1.011 – 1.026) of ALT& AST .correlation coefficient ® ≥0.998, data was entered to EP evaluator, the yield slope ALT was 1.017 and 1.018 AST correlation coefficient ® = 0.999 the method was found linear over the AMR of 5 – 700 U/L. The low limit of quantitation observed <5 which is agreed with the manufacturer claim (<5).

Conclusion: Overall performance of ALT & AST (new generation) was acceptable on Cobas c501 and c303. It provides reliable results for patient's samples testing in Emergency Department.

POSTER PRESENTATION ABSTRACTS

Abstract # 55

THE CORRELATION BETWEEN CIRCULATING LACTOFERRIN IN PLASMA AND INFLAMMATORY BIOMARKERS IN TYPE 2 DIABETES WITH DRY EYE DISEASE: A PROSPECTIVE STUDY

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Background: Lactoferrin (LF) is a multifunctional protein that maintains human health due to anti-inflammatory. Several studies have found that different concentrations of plasma-lactoferrin in healthy adults and used as biomarkers indicators linked with the risk of dry eye disease (DED). To gain insight into the relationship between the innate immune system and metabolic disease, we aimed to investigate the effects of lactoferrin in type 2 diabetes with dry eye disease (DM2-DED) in cross-sectional human studies and in vitro experiments.

Method: A prospective case-control study data was collected from a total of 56 participants divided into two groups: the study group; DM2 (n= 40) and the control group; healthy (n= 16). Demographic and biomarker variables were classified as categorical and continuous variables. Laboratory parameters, such as LF, CBC counts, and glycosylated hemoglobin HbA1c were determined.

Results: We compared plasma lactoferrin of DM2-DED and healthy subjects. The DM2-DED group inclined 48.7% and the female group 51.2%. Among the healthy group were females 76.9%, male 23.07%. According to the study findings, the age average of DM2-DED was 52 years while the healthy average age was 29 years. This age gap is statistically significant between the groups (p=0.0001), as well as a significant difference in the gender distribution in the groups (p=0.04527). LF and Neutrophile ratio parameter revealed a strongly positive and significant correlation in DM2-DED Patients (p= 0.0001; r= 0.9201). However, HbA1C and LF found a weak positive but significant correlation.

Conclusion: This study determined a higher LF value in patients with DM2-DED which may be a remarkable marker to estimate the inflammatory severity of DED. This study predicts a useful biomarker and the inflammatory status of DM2-DED.

POSTER PRESENTATION ABSTRACTS

Abstract # 56

SPONTANEOUS RECOVERY OF PARTIAL BIOTINIDASE DEFICIENCY IN TWO SAUDI SIBLINGS

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Background: Biotinidase deficiency (BD) is a rare autosomal recessive disorder, an inborn error of biotin metabolism caused by biallelic pathogenic variants in the biotinidase (BTD) gene. They fall into two categories: profound and partial BTD deficiency. PD patients present with skin eczema, seizures, muscular hypotonia and metabolic acidosis which may lead to coma and early death. BD diagnosis cab be made early by newborn screening (NBS) which can be confirmed by the measurable enzymatic activity in blood and molecular genetic study. The disorder is treated by administering pharmacological dose of biotin. The current study aims to investigate the long-term course of BTD activity in two Saudi patients with partial BD with increasing age.

Methods: Dried blood spots (DBS) specimens were collected on Guthrie cards from the newborns between 24-72 hours after birth. BTD levels were measured utilizing genetic screening processor (GSP) based on time-resolved fluoroimmunoassay detection method. Initial remarkable results were reanalyzed using recall samples. All remarkable recall samples were undergone to further diagnostic confirmation by molecular genetic study. The long-term BTD activity was evaluated and followed-up by measuring seum BTD levels with each clinic vist for the affected patients.

Results: During the universal NBS program, we noticed that two Saudi siblings showed remarkable initial and recall NBS results suggesting BD diagnosis. The confirmatory molecular genetic studies revealed the variant (Asp444His). Serum enzymatic activity showed partial deficiency in the enzyme level. The follow-up study for those siblings with partial BD showed thattheir BTD enzyme activity increases with age. The variant (Asp444His) had the highest recovery of BTD enzyme activity in those siblings. Patients with this mutation should be regularly followed up. If they produce symptoms, we need to assess the enzyme level.

Conclusion: Our study highlights that individuals with partial BD should reassessed regularly for BTD activity in the first years of life with increasing the age and the tratment can be ceased if the enzyme normalizes.

POSTER PRESENTATION ABSTRACTS

Abstract # 57

COMPARISON OF BARRICOR™ PLASMA VS. BD VACUTAINER® SST™ TUBES FOR SELECTED ROUTINE BIOCHEMICAL ANALYTES

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Background: A new tube with a mechanical separator has recently been launched (Barricor™), which according to the manufacturer may have these benefits as follow: improving sample quality, decreasing centrifugation time, eliminating gel-related assay failures, and eliminating test interference due to gel. The aim of this study was to evaluate stability performance of this tube in comparison with serum gel tubes under clinically realistic circumstances.

Methods: Paired samples were collected from 92 patients, 18 years or older of age released from outpatient collections at the MNGHA. The collection by using BD Vacutainer® Barricor™ plasma vs. BD Vacutainer® SST™ II blood collection tubes were collected by routine phlebotomy as follow; blood drawing from each patient was collected into Barricor™ tube (with 5.5mL) and SST™ II tube (with 5 mL). BD SST™ II Tubes were allowed to clot for a minimum of 15 minutes from the time of blood collection. Then, transported to the main lab, kept upright, and centrifuged within One hour of collection. Barricor™ Vacutainers® were centrifuged for 3 min at 4000g and SST™ II Vacutainers® for 12 min at 1300 g within two hours of collection. Samples were then analyzed for 31 chemistry and immunoassay analytes (ALB, ALP, ALT, AMY, AST, BILI D, BILI T, Ca, CK, CO2, Crea, Chol, GGT, Glu, HDL, Iron, Cl, K, Na, LDL, LDH, Phos, Mg, TP, Trig, UREA, Uric Acid, TSH, TROPI, CKMB, HCG) and bias of results determined between tubes.

Results: In the study, comparison results for Barricor tube and SST for 31 parameters were evaluated according to the total allowable error (TEa); potassium (K) total error (%) between Barricor tube and SST exceeded TEa, however, all other parameters were within TEa.

Conclusion: Results of compared biochemical analytes indicates that Barricor tube can replace the SST tube in clinical laboratories and normal range change should be established for potassium before using Barricor™ tube.

POSTER PRESENTATION ABSTRACTS

Abstract # 58

NEWBORN SCREENING EXPERIENCE FOR CLASSIC GALACTOSEMIA IN A TERTIARY CENTER IN SAUDI ARABIA

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Background: Classic galactosemiais an inborn error of metabolism resulting from the deficient activity of galactose-1-phosphate uridyltransferase (GALT) enzyme, which is responsible for galactose degradation. The affected patients present with vomiting, jaundice, and failure to thrive. Death may occur within two weeks from septicemia for cases without treatment. Early diagnosis and treatment can help to prevent complications. The current study aims to determine the incidence of classic galactosemia in a tertiary medical Centre in Saudi Arabia.

Methods: Dried blood spots (DBS) specimens were collected from the newborn babies between 24-72 hours after birth during the period from 2019 to 30th September 2023. GALT levels were measured utilizing a genetic screening processor (GSP) based on the Beutler test, also known as the fluorescent spot detection method. Initial remarkable results were reanalyzed using recall samples for evaluation and confirmation before being referred for medical management. All remarkable recall samples have undergone further diagnostic confirmation by molecular genetic studies.

Results: A total of 105,553 newborn babies were screened for classic galactosemia during the study period with a coverage rate of 100 %. 9 cases were confirmed and diagnosed with classic galactosemia revealing an incidence of 1:11728 with different mutations in the GALT gene that causes changes in amino acids.

Conclusion: We reported the incidence of classic galactosemia in our Center. Our study highlights the importance of increasing the coverage rate of Newborn screening in Saudi Arabia in the first days of life for early diagnosis& subsequently early management of this fetal and highly treatable disease.

POSTER PRESENTATION ABSTRACTS

Abstract # 59

EFFECTS OF TEMPERATURE ON STABILITY OF BLOOD HOMOCYSTEINE IN SERUM AND PLASMA

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Background: Elevated Homocysteine (HCY)is considered as a risk factor for cardiovascular disease. Therefore, the measurement of HCY has become increasingly important. The aim of this study is to investigate the effect of temperature on Stability of HCY level on plasma and serum samples over a 72-h time.

Methods: 20 healthy volunteer's samples were collected into two commercially blood collection tubes, SST tube and EDTA tube. All samples were divided into two batches to be run in two different temperature. The first batch of samples was run in room temperature and while the other batch was placed on ice before run. In addition, we performed the run for the "baseline" samples (t=0h) for each tube. After approximately 2hrs of collection, all samples were centrifuged at (2500 RPM). Moreover, the samples were stored at room temperature for 24hrs and kept measured every3hrs in order to monitor the effect of temperature on HCY stability. Subsequently serum and plasma were aliquoted and stored at -82 °C and kept measured every 24hrs. The HCY concentration was determined by using chemiluminescent microparticle immunoassay (CMIA)technology of Abbott Alinity instrument. Furthermore, we compared the HCY results of the two batches (Room temperature and on ice) of both serum and EDTA tubes. The data were calculated by using the acceptable total allowable error (TEa) of 30%.

Results: As expected, there was a small non-significant elevation in-vitro HCY concentration in both EDTA and SST tubes which were kept at room temperature, However, it was within the total allowable error of 30% for HCY.

Conclusion: Our data indicates that plasma and serum HCY measurements during the whole 72hrs with different temperature conditions were stable, thus, HCY testing can be used without placing on ice, these tubes may be stored at room temperature for up to 24hrs without significant effect on HCY level.

POSTER PRESENTATION ABSTRACTS

Abstract # 60

EVALUATION OF POTENTIAL LACTATE AND LDH INTERFERENCE WITH ELEVATED SERUM ETHANOL ASSAY RESULT

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Background: Several authors reported that increased concentrations of Lactate and Lactate Dehydrogenase (LDH) can cause false-positive results with elevated serum Ethyl Alcohol (Ethanol) assay result. If the laboratory tests for Ethanol, the method should be evaluated for Ethanol specificity as stated by College of American Pathologists (CAP) in the checklist specific for Ethanol Specificity. The aim of our study is to evaluate the published literature to determine if a false positive Ethanol result could be obtained from patients with elevated Lactate and LDH.

Methods: 20 samples of patients admitted to ERat the MNGHA who had high Lactate and LDH concentration were used. LDH and ethanol were drawn in SST tubes, Lactic Acid was drawn in Plasma tubes. All samples were run on Abbott Alinity c Analyzer by enzymatic assay for the study purposes. All serum ethanol samples were sent for confirmatory gas chromatography in the Toxicology lab.

Results: A total of 20 samples were included in the final analysis. The lactate in this dataset ranged from 5.78 to13.346 mmol/L, (normal value 0.5–2.2). The LDH ranged from 123.3 to 13500 U/L with a (normal value 122–225 U/L). None of which yielded a positive enzymatic ethanol result in both Enzymatic and GC methods.

Conclusion: The data do not support the claim that a high LDH and Lactate can result in a false positive serum Ethanol result when performed by an enzymatic Ethanol assay in live patients arriving at the emergency room.

POSTER PRESENTATION ABSTRACTS

Abstract # 61

STABILITY OF CARBON DIOXIDE IN SERUM SAMPLES EXPOSED TO AIR

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Background: The acid-base status of patients is frequently inferred from the concentration of total carbon dioxide in a venous blood sample, the aim of this study is to investigate the (stability of CO2 /loss of CO2) in blood serum processed with different time periods for the purpose of knowing the effect of time while sample is exposed to air in room temperature.

Methods: A total of 19 blood samples were collected in SST (serum-separating tube), samples cap was removed and processed in Abbott Alinity-C instrument using -spectrophotometer- standard methods, then samples kept in room temperature uncapped. After one-hour samples were measured again with the same conditions, this process repeated with a total of 7 runs within 6 hours for each sample, measurements were calculated and compared with the allowed instability for CO2 provided in our laboratory, data collected and done by Microsoft Excel.

Results: Our study of CO2 levels in 19 random blood samples during a period of 360 minutes shows that there is a noticeable difference with variant levels between results, CO2 levels in blood of all samples decrease over time regardless the health situation of individual, the average level at baseline is 20.65 mmol/L and average level at 360 minutes is 16.28 mmol/L, some samples had a relatively slight decrease in results over time (e.g. A sample whose levels decreased from 18.99 mmol/L to 17.25 mmol/L), while another samples had a significant decrease in results (e.g. A sample whose levels decreased from 22.76 mmol/L to 15.75 mmol/L) also, there is a sample with baseline level of 16.51 mmol/L decreased to 11.05 mmol/L after 360 minutes and this one dropped from normal value to a critically low value according the result range reference in our chemistry lab. Overall, out of 19 samples in total there is 6 of them was affected significantly with a CV% between 12.5% and 15.6% which is above the acceptable variation and allowed instability value provided in the laboratory (10%), while the remaining 13 samples had shown a slight noticeable variation but within the acceptable allowable range of instability.

Conclusion: In conclusion, levels of CO2 can be affected if the sample is left uncapped for a period of time. Although 6 samples out of 19 were affected, the calculated CV of samples compared to the allowable instability has a significant difference. Indeed, the presented results support previous studies about loss of CO2 as blood gas in serum samples. This suggests that blood serum should be analyzed for CO2 within less than one hour to avoid inaccurate results.

POSTER PRESENTATION ABSTRACTS

Abstract # 62

PLASMA LACTOFERRIN LEVEL AS INFLAMMATORY BIOMARKERS FOR DRY EYE DISEASE IN TYPE 2 DIABETES

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Background: Lactoferrin (LF) is a key eye protein and a biomarker for dry eye disease. It has multiple functional properties, such as anti-inflammatory. Inflammation can enhance the production of bodily biomarkers such as lactoferrin, leading to changes in protein structure and functions. Lactoferrin levels can be changed by common inflammatory diseases such as diabetes, yet few studies have investigated the concentration of LF in type 2 diabetes and dry eye disease. The effects of inflammation interaction are unknown but reasonably could include changes in LF, a body protein whose changed concentration correlates with type 2 diabetes (T2D). Our goal of the study was to investigate the level of plasma lactoferrin by to developing aindirect ELISA method to measure the concentration of lactoferrin. This study will further understand the causes and provide systems for testing therapeutic strategies for dry eye disease.

Method: In this study an innovative indirect enzyme-linked immunosorbent assay (ELISA) was developed and applied to measure plasma LF levels as an inflammation marker in human samples, including healthy and type 2 diabetes. This novel indirect ELISA was developed to selectively quantify LF, utilizing a polyclonal α-LF capture antibody detector antibody. A prospective study was conducted at the diabetes centre of King Abdulaziz Medical City (Jeddah, Saudi Arabia). The institutional review board approved the study at King Abdullah International Medical Research Centre, and the national legislation and institutional requirements required written informed consent for participation. The optical absorbance of each well was measured using a microwell plate reader (BioTek). Data points are shown here as mean sample standard deviation. Statistical analysis was analyzed using Igor Pro 7 (Wavemetrics, Inc.; Oregon, USA). The experiments were carried out in triplicate, and the results were subjected to t-tests to provide a measure of significance.

Results: Under optimized conditions, the proposed indirect ELISA was evaluated and linearly responded to LF standards in a 0.05–0.5 μgmL^{-1} range. The detection limit was (LOD) of 0.05 μgmL^{-1} and a reliable quantification (LOQ) limit of 0.240 μgmL^{-1}. The developed assay showed both specificity and reproducibility, indicating the utility of this indirect ELISA in LF monitoring. This study provides a definitive indirect ELISA protocol to detect various lactoferrin antigens with accurate, reliable, and reproducible data, and it could be applied for diagnosing lactoferrin-related diseases such as type 2 diabetes. The mean concentrations of healthy and plasma type 2 diabetes plasma were 1.12 ± 0.008 $\mu g\ mL^{-1}$ and 6.68 ± 0.014 $\mu g\ mL^{-1}$, respectively.

Conclusion: This innovative approach provides a relatively cost-effective, sensitive, and precise way to assess LF in various human plasma.

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