Under the Auspices of

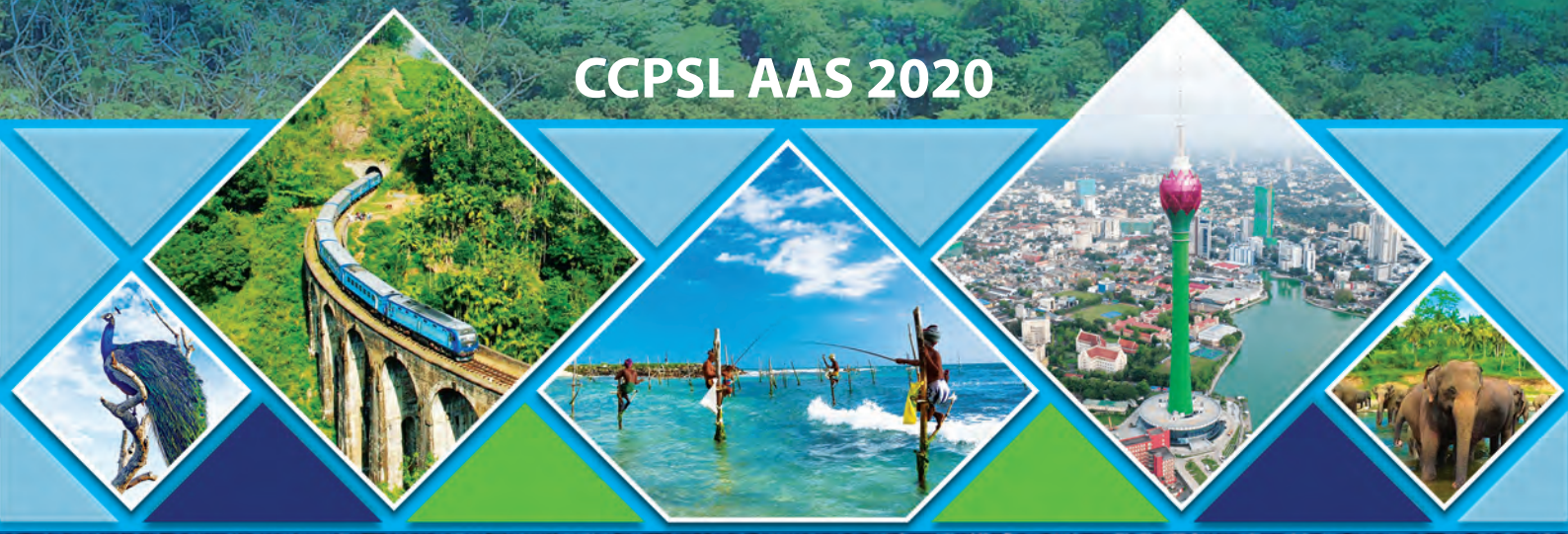
College of Chemical Pathologists of Sri Lanka

5th Annual Academic Sessions 2020

PROGRAMME & ABSTRACT BOOK

"Transcending Boundaries for Better Healthcare"

CCPSL AAS 2020



14th and 15th February 2020
Hotel Hilton, Colombo, Sri Lanka

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COLLEGE OF CHEMICAL PATHOLOGISTS OF SRI LANKA

"Transcending Boundaries for Better Healthcare"

5th Annual Academic Sessions 2020

14th and 15th February, 2020
Colombo, Sri Lanka

CONTENTS

MESSAGE FROM THE PRESIDENT

Dr Manjula Dissanayake
MBBS, D.Path, MD (Chem.Path)
Consultant Chemical Pathologist
Teaching Hospital Karapitiya, Galle

It is with great pleasure and honour that I invite you to participate in the 5th Annual Academic Sessions of the College of Chemical Pathologists of Sri Lanka (CCPSL ASS 2020) at Hotel Hilton, Colombo, on 14th and 15th of February 2020. The theme for year 2020 is "Transcending Boundaries for Better Healthcare". In this conference we bring modern concepts in Chemical Pathology, laboratory professionals and laboratory industry together under the auspices of International Federation of Clinical Chemistry and Laboratory Medicine (IFCC) and Asia Pacific Federation for Clinical Biochemistry and Laboratory Medicine (APFCB).

CCPSL was established in 2015 and consists of Chemical Pathologists and postgraduate trainees in Chemical Pathology. CCPSL is the major organization to foster and lead the field of clinical chemistry in Sri Lanka, committed to the improvement of quality of the standards and services of the laboratories in Sri Lanka.

This year academic programmes have been designed for medical professionals and laboratory professionals to update their knowledge on the current practices in Chemical Pathology. There will be two parallel programmes conducted by renowned local and foreign speakers with a wide coverage of current and important topics in the field of Chemical Pathology. The discoveries of latest technology will be presented at the large industrial exhibition.

I together with my council, cordially invite you to participate in this great event.

Dr Manjula Dissanayake
5th President
College of Chemical Pathologists of Sri Lanka

MESSAGE FROM THE CHIEF GUEST

Professor Chandrika N Wijeyaratne
Vice Chancellor
University of Colombo

I extend my warmest congratulations to the President and Council of the College of Chemical Pathologists of Sri Lanka for organizing the 5th successive Annual Academic Sessions of your College this year. I am very pleased to note your dedication and commitment as a group of experts, for filling a long existing void within our local health service and extending your outreach to research and scholarship within a relatively short period.

The quality of training you provide by incorporating your colleagues from the relevant fields to form a specific group of professionals with a common interest, has greatly benefited our clinicians and patients alike, ranging from the diagnosis of subclinical disease to monitoring of treatment protocols. Your dual experience as medical doctors and scientists has supported and added value to the existing undergraduate and postgraduate training and continuing professional development programmes in the health care divisions of Sri Lanka. I am certain, that as a highly active professional organization, you can play wide range of roles. Your professional inputs would be greatly valued in the rationalization of an evidence based approach to laboratory testing in Sri Lanka from the clinicians' perspective, and extended to an effective monitoring and evaluation of laboratory data from the perspectives of quality assurance and cost-effectiveness. Your efforts are applauded by all your partners from the differing fields. We have no doubt that the College of Chemical Pathologists of Sri Lanka can sustain its good work initiated by your predecessors.

I extend my very best wishes for fruitful scientific and professional discussions and the formulation of a strong platform to enable sustained collaborations in training and research at national and international levels.

Best wishes,
Professor Chandrika N Wijeyaratne

MESSAGE FROM THE GUEST OF HONOUR

Dr Samuel Vasikaran
Consultant Chemical Pathologist
PathWest-Laboratory Medicine
Western Australia

It is with admiration and pride that I have watched the College of Chemical Pathologists of Sri Lanka establish itself and grow rapidly within a few years into a dynamic professional organisation that provides leadership to the Chemical Pathology profession in Sri Lanka. This is in no small measure due to the leadership, vision and hard work of the professionals in the field of Chemical Pathology in Sri Lanka and I congratulate you on your great achievement.

Quality laboratory practice is essential for the provision of optimal healthcare to patients and it is important for the clinical laboratory professionals to meet regularly to share your knowledge and experience and discuss best laboratory practice to support the health system in the country.

The Annual Sessions of the College showcases the talent and achievements of the professionals in Sri Lanka and provides training and education to the trainees and continuing professional development and networking opportunities to all in the field. The comprehensive Scientific Program of the 2020 Sessions is attractive not only to the local pathologists and scientists, but also the overseas delegates. The breadth of overseas participation is a testament to the high regard with which the College is held internationally.

As a product of Sri Lanka, I am honoured and delighted to participate in these sessions. I wish the College all success in all its endeavours and especially for the success of the 2020 sessions, and wish all delegates an enjoyable and productive meeting.

Best wishes,
Dr Samuel Vasikaran

MESSAGE FROM THE SPECIAL GUEST (IFCC PRESIDENT-ELECT)

Professor Khosrow Adeli
President-Elect
International Federation of Clinical Chemistry and Laboratory Medicine (IFCC)

It is my great pleasure to present this welcoming message to all attendees of the Annual Academic Sessions 2020, College of Chemical Pathologists of Sri Lanka. The 2020s will be an exciting and fast evolving time for the field of clinical laboratory medicine, and this timely conference will be an excellent opportunity to present and discuss the latest advances in clinical laboratory diagnostics and meet colleagues from across Sri Lanka and other countries in Asia. I very much look forward to meet many of you and discuss the opportunities and challenges for laboratory medicine over the coming decade. I strongly believe that the future holds considerable promise for the field of diagnostic medicine and laboratory professionals around the world including the very active members of the College of Chemical Pathologists of Sri Lanka.

The IFCC organization is pleased to partner and support this conference, enabling scientific exchange and close interactions among pathologists, laboratory scientists and diagnostic industry colleagues. Bringing all of us together in forums like this will ensure that our organization and the field of laboratory medicine remain at the cutting edge. It is important that we all encourage a culture of innovation contributing to technological and process innovations across all aspects of clinical laboratory operation. We also need to strive towards a new vision for laboratory medicine, moving from a specimen-centred laboratory testing service to a partner in clinical care, supporting patient-centred clinical decision making and being faithfully vested in patient outcomes.

I look forward to participating in the excellent scientific and social programmes organized by the College of Chemical Pathologists of Sri Lanka. I wish you an enjoyable and productive conference and a pleasant stay in the beautiful city of Colombo.

Best wishes,
Professor Khosrow Adeli

MESSAGE FROM THE PRESIDENT OF APFCB

Professor Sunil Sethi
President
Asia-Pacific Federation for Clinical Biochemistry and Laboratory Medicine (APFCB)

The Asia-Pacific Federation for Clinical Biochemistry and Laboratory Medicine (APFCB) conveys its congratulations to the CCPSL on the occasion of the 5th Annual Academic Session on 14th - 15th February, 2020.

As is the case with the previous sessions, the 2020 Annual Academic Sessions promises a wide-ranging coverage of the major topics in laboratory medicine. I am particularly impressed with the quality of the world-class faculty. Wide-ranging contemporary topics on aspects of reference interval harmonization, thyroid, lipid, cardiac and diabetes testing are all included in this year's program.

The CCPSL AAS 2020 will no doubt be another extremely successful meeting. CCPSL has always been an active affiliate member society of the APFCB and the Annual Academic Sessions have a reputation of being vibrant and well attended by members. I wish for all the speakers and participants a rewarding time of good science and fruitful networking. On behalf of the Executive Board of the APFCB, allow me to convey my thanks and appreciation to the Organizing Committee of Annual Academic Sessions 2020. Do have a richly rewarding time to learn and refresh yourselves at the meeting.

Best wishes,
Professor Sunil Sethi

MESSAGE FROM THE DEPUTY DIRECTOR GENERAL OF LABORATORY SERVICES

Dr B V H S Benaragama
Deputy Director General of Laboratory Services
Ministry of Health, Nutrition & Indigenous Medicine
Sri Lanka

It is with great pleasure that I send this message to convey my best wishes to the 5th Annual Academic Sessions of the College of Chemical Pathologists of Sri Lanka (CCPSL).

Chemical Pathologists play a very vital role, in diagnosis and follow up of the treatment and rehabilitation phase of patients, especially those with non-communicable diseases. Their role in prevention of diseases by early detection of risk factors is immense.

Chemical Pathologists provide leadership and guidance to the entire laboratory staff in their respective work stations. Their engagement in updating new knowledge in the field by conducting continuous medical education programmes is also commendable. Furthermore, contribution by the Chemical Pathologists through active involvement during various planning, implementation and evaluation activities for the programmes conducted by the ministry of health is also greatly appreciated.

The chosen theme this year "Transcending boundaries for better healthcare" reflects the leading position of the Chemical Pathologists in collaborating and working with the policymakers and health care stake-holders to improve the status of the medical laboratory services in Sri Lanka.

I would like to congratulate the college for organizing a parallel medical laboratory science programme to disseminate the knowledge to all layers of clinical chemistry personnel to improve patient outcomes.

While conveying my best wishes for successful sessions, I wish the CCPSL all the success in its future endeavors.

Best wishes,
Dr Hemantha Beneragama

MESSAGE FROM THE JOINT SECRETARIES

Dr Dulani Jayawardana
MBBS, Dip Path, MD (Chemical Pathology)
Consultant Chemical Pathologist
National Hospital, Kandy

Dr Ganga Withanapathirana
MBBS, Dip Chem Path, MD (Chemical Pathology)
Consultant Chemical Pathologist
District General Hospital, Matara

Welcome to the 5th Annual Academic Sessions of the College of Chemical Pathologists of Sri Lanka (CCPSL AAS 2020) on 14th and 15th February 2020 at Hotel Hilton, Colombo, Sri Lanka.

CCPSL is a medical professional organization dedicated to clinical laboratory science and its application to health care in Sri Lanka. CCPSL provides essential content, conducts advocacy, outreaches and stimulates collaboration in the field of clinical chemistry to help other laboratory professionals and clinicians so that the patients get the care they need. Delivering high quality education and knowledge resources is integral to fulfil this mission.

CCPSL AAS 2020 has been organized with the theme of "Transcending boundaries for better healthcare" accompanying two-day parallel workshops for professionals and medical laboratory technologists, featuring a selection of timely topics in laboratory medicine presented by both international and local speakers.

We are honoured to have Professor Chandrika Wijeyaratne, Vice Chancellor, University of Colombo as the Chief Guest to grace the occasion at the inauguration ceremony.

We are indeed privileged to have Dr Samuel Vasikaran as the Guest of Honour. We would like to express our thanks to all the overseas resource personnel for sharing their knowledge with us. Our appreciation goes to all the local experts who will share their expertise with us.

We are grateful to the president of the CCPSL for providing leadership and the council for their continuous support in organizing AAS 2020.

We express our sincere gratitude to sponsors, event organisers, the hotel management, college coordinator and all the well-wishers for support given to make this event a success.

Thank you for joining us at CCPSL AAS 2020. We hope that you will find value in this Academic Sessions.

EXECUTIVE COUNCIL 2020, COLLEGE OF CHEMICAL PATHOLOGISTS OF SRI LANKA

Sitting (Left to right) : Dr Dulani Jayawardena, Dr Nangai Kularatnam, Dr Saroja Siriwardene, Dr Rajitha Samarasinghe, Dr Manjula Dissanayake, Dr Gaya Katulanda, Dr Dilinika Perera, Dr H.W.Dilanthi and Dr Ganga Withanapathirana

Standing (Left to right) : Dr Thamara Herath, Dr Sakunthala Jayasinghe, Dr Chandrika Meegama, Dr B.K.T.P.Dayanath, Dr Saman Peduru Hewa, Dr Thushara Hewageegana, Dr Ushani Jayawardane, Dr Deepani Siriwardhana, Dr Kisali Hirimuthugoda, Dr Neranjana Vithanage, Dr S.I.Majitha and Dr Eresha Jasinge

Absent : Dr Vithegi Kesavan and Dr Roshitha De Silva

COLLEGE OF CHEMICAL PATHOLOGISTS OF SRI LANKA COUNCIL - 2020

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Immediate Past President	-	Dr Gaya Katulanda
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		Dr Kisali Hirimuthugoda
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		Dr Vithegi Kesavan
		Dr Roshitha De Silva
		Dr Sakunthala Jayasinghe
		Dr Thushara Hewageegana
		Dr Neranjana Vithanage
		Dr Ushani Jayawardane

PROGRAMME

ACADEMIC PROGRAMME

COLLEGE OF CHEMICAL PATHOLOGISTS OF SRI LANKA Annual Academic Sessions 2020 (CCPSL AAS 2020) Academic Programme		
Day 1: 14th February 2020		
TIME	**TOPIC**	**LECTURER**
7.30-8.00 am	**Registration**	
8.00-8.30 am	**Plenary 1 – Invasive Endocrine Function Tests**	Dr B.K.T.P. Dayanath
8.30-10.00 am	**Symposium 1 – Electrolytes and Blood Gases**	
	Hypomagnesaemia – Evaluation and Management	Dr Arosha Dissanayake
	Drug Induced Electrolyte Abnormalities	Dr Rajitha Samarasinghe
	Acid-Base Disorders – Clinical Scenarios	Dr Gaya Katulanda
10.00-10.30 am	**Plenary 2 – Harmonization of Reference Intervals for Gestational Thyroid Function Tests**	Dr Tina Yen
10.30-11.00 am	**Tea**	
11.00-11.30 am	**Plenary 3 – Updates on High-Sensitivity Cardiac Troponin in Acute Coronary Syndrome**	Dr Chandrika Meegama
11.30-12.30 pm	**Symposium 2 – The Technological Advances in the Laboratory**	
	Technological Advances in Laboratory Medicine: Predicting the Laboratory of the Future	Prof Khosrow Adeli
	Data Mining – Opportunities and Challenges	Prof Zhong Lu
12.30-1.00 pm	**Plenary 4 – Metabolic Bone Disorders**	Dr Samuel Vasikaran
1.00-1.30 pm	**Plenary 5 – Current Evidence and Clinical Utility of Procalcitonin Measurement**	Dr Mahen Kothalawala
1.30-2.30 pm	**Lunch**	
2.30-3.30 pm	**Symposium 3 – Analytical Methods**	
	Emerging Technologies in POCT	Prof Sergio Bernardini
	Beyond Small Molecules – Promise of Next Generation Sequencing	Dr Chandanamali Punchihewa
3.30-4.30 pm	Research Presentations (03)	
4.30 pm Onwards	**Tea**	

ACADEMIC PROGRAMME

COLLEGE OF CHEMICAL PATHOLOGISTS OF SRI LANKA Annual Academic Sessions 2020 (CCPSL AAS 2020) Academic Programme		
Day 2: 15th February 2020		
TIME	**TOPIC**	**LECTURER**
7.30 - 8.00 am	**Registration**	
8.00 - 8.30 am	**Plenary 6 – New Lipid Guidelines: Emerging Evidence on Importance of Non-fasting Lipids**	Prof Khosrow Adeli
8.30 - 10.00 am	**Symposium 4 – Diabetes**	
	Prediction and Diagnosis of Gestational Diabetes	Prof Chandrika Wijeyaratne
	Insulin Resistance – Clinicopathological Correlations and Testing	Dr Uditha Bulugahapitiya
	Interferences in HbA_{1c} Assay	Dr Saman Peduru Hewa
10.00 - 10.30 am	**Plenary 7 – Rational Use of Nutritional Markers**	Prof Zhong Lu
10.30 - 11.00 am	**Tea**	
11.00 - 12.00 pm	**Symposium 5 – Paediatric Chemical Pathology**	
	Rare Disorders of Calcium Metabolism	Dr Navoda Atapattu
	Harmonised Paediatric Reference Intervals in Australasia – Now with HAPPi kids	Dr Tina Yen
12.00 - 12.30 pm	**Plenary 8 – Utility of Catecholamines and Their Metabolites in Diagnosis of Adrenal Medullary Tumours**	Dr Samuel Vasikaran
12.30 - 1.30 pm	**Symposium 6 – Quality Assurance**	
	Patient Based Real Time QC	Dr Tony Badrick
	Challenges in Quality Assurance – Today and Tomorrow	Dr Elizabeth Frank
1.30 - 2.30 pm	**Lunch**	
2.30 - 3.00 pm	**Plenary 9 – Critical Levels for 25(OH) Vitamin D**	Dr Saswati Das
3.00 - 4.00 pm	**Symposium 7 – Renal Disease**	
	Association of Organochlorine Pesticides with Chronic Kidney Disease and Its Implications	Dr Sudip Datta
	Acute Kidney Injury – Diagnostic Challenges	Dr Nalaka Herath
4.00 - 4.30 pm	Case Presentations (03)	
4.00 pm Onwards	**Closing Ceremony and Tea**	

MEDICAL LABORATORY SCIENCE PROGRAMME

COLLEGE OF CHEMICAL PATHOLOGISTS OF SRI LANKA Annual Academic Sessions 2020 (CCPSL AAS 2020) Medical Laboratory Science (MLS) Programme		
Day 1: 14th February 2020		
TIME	**TOPIC**	**LECTURER**
7.30 - 8.30 am	**Registration**	
8.30 - 9.10 am	**Inauguration**	
9.10 - 9.35 am	High-Sensitivity Troponin I	Dr Neranjana Vithanage
9.35 - 10.00 am	Point of Care Testing - Role of the Laboratory	Dr Saswati Das
10.00 - 10.30 am	**Tea**	
10.30 - 11.20 am	**Workshop on Quality Assurance – Case Based Approach**	
10.30 - 10.55 am	Internal Quality Control	Dr Tony Badrick
10.55 - 11.20 am	External Quality Assurance	Dr Saroja Siriwardene
11.20 - 11.45 am	Thyroid Function Tests – Essentials to Know	Dr K Hirimuthugoda
11.45 - 12.10 pm	Critical Test Results	Dr Sakunthala Jayasinghe
12.10 - 1.10 pm	**Lunch**	
1.10 - 1.35 pm	Interferences in Immunoassays	Dr Thamara Herath
1.35 - 2.00 pm	Lipid Profile – Essentials to Know	Dr Binod Kumar Yadav
2.00 - 2.25 pm	Diabetes Mellitus – Diagnosis and Follow Up in Pregnancy	Dr Ushani Jayawardane
2.25 - 3.00 pm	**Tea**	
3.00 - 3.25 pm	Common Medical Emergencies – Role of the Laboratory	Dr Dilinika Perera
3.25 - 3.50 pm	Assessing Glomerular Filtration Rate (GFR)	Dr Gawri Abeynayake
3.50 - 4.15 pm	Medical Laboratory Ethics – Case Based Discussion	Dr Eresha Jasinge Dr H.W.Dilanthi

MEDICAL LABORATORY SCIENCE PROGRAMME

COLLEGE OF CHEMICAL PATHOLOGISTS OF SRI LANKA Annual Academic Sessions 2020 (CCPSL AAS 2020) Medical Laboratory Science (MLS) Programme		
Day 2: 15th February 2020		
TIME	**TOPIC**	**LECTURER**
8.30 - 9.10 am	**Registration**	
9.10 - 9.35 am	Role of the Laboratory in Diagnosis and Monitoring of Dengue	Dr Rasika Gunapala
9.35 - 10.00 am	Total Laboratory Automation and Digitalization - What to Expect?	Dr Neepa Chowdhury
10.00 -10.30 am	**Tea**	
10.30 -10.55 am	Setting Biological Reference Intervals in Your Laboratory	Prof Zhong Lu
10.55-11.20 am	Dynamic Function Tests	Dr Dulani Jayawardana
11.20-11.45 am	Chronic Kidney Disease of Unknown Etiology (CKDu) in Sri Lanka	Dr Thushara Hewageegana
11.45-12.10 pm	PCR and RFLP: Role of the Laboratory	Dr Sudip Datta
12.10-1.10 pm	**Lunch**	
1.10-1.35 pm	Biochemical Investigations of Anaemia	Dr Homathy Sivakumar
1.35-2.25 pm	Quiz	Dr Subadra Wanninayake Dr Aruni Wijesinghe Dr Lanka Liyanage
2.25-3.00 pm	**Tea**	
3.00-3.25 pm	Investigation of Pituitary Disorders	Dr Thushari K. Withanage
3.25-3.50 pm	Medical Laboratory Errors – Case Based Discussion	Dr Ganga Withanapathirana
3.50-4.15 pm	Awards Ceremony	

INAUGURATION PROGRAMME

6.15 pm – Invitees take their seats

6.30 pm – Ceremonial Procession

6.35 pm – National Anthem

6.40 pm – Lighting of the Traditional Oil Lamp

6.45 pm – Welcome Address by Dr Dulani Jayawardana, Joint Secretary CCPSL

6.50 pm – Induction of the new President by Dr Gaya Katulanda, Immediate Past President, CCPSL

7.00 pm – Presidential Address by Dr Manjula Dissanayake

7.15 pm – Address by Guest of Honour, Dr Samuel Vasikaran

7.25 pm – Address by Special Guest, Professor Khosrow Adeli

7.35 pm – Address by the Chief Guest, Professor Chandrika Wijeyaratne

7.45 pm – Award of the Medal to Past President

7.50 pm – Award of CCPSL Felicitations

7.55 pm – Award of CCPSL Fellowships

8.10 pm – Vote of thanks by Dr Ganga Withanapathirana, Joint Secretary CCPSL

8.15 pm – Cultural Show

8.45 pm – Ceremonial Procession Leaves

8.50 pm – Reception

FELLOWSHIP AWARDS

FELLOWSHIP AWARDS

Dr Samuel Vasikaran
MBBS, MSc, MAACB, MD, FRCPA, FFSc
Consultant Chemical Pathologist

Samuel Devanesar Vasikaran was born in Inuvil, Jaffna in 1958 and lived with his family in Point Pedro as a young boy. Interestingly, he had his primary education at Methodist Girls' High School where his mother taught. He had his secondary education from St John's College, Jaffna and Hartley College, Point Pedro from where he entered the Faculty of Medicine, University of Colombo in 1977. Graduating in 1982, he trained as an Intern Medical Officer at the General Hospital, Jaffna.

He had his postgraduate training in Chemical Pathology, both from the United Kingdom and Australia; he trained as a registrar in Chemical Pathology at Flinders Medical Centre in Adelaide, obtaining FRCPA from the Royal College of Pathologists of Australasia (RCPA) in 1993, pursuing his interest in bone metabolism as a researcher, he obtained an MD from the University of Sheffield in 1999.

He commenced his career as a Consultant Chemical Pathologist at Royal Perth Hospital, Perth, Western Australia in 1994 and was appointed as the Head of Clinical Biochemistry in 1998, a post he held until 2005. While serving the PathWest Laboratory Medicine group when it was formed in 2006, he once again headed the Clinical Biochemistry Department of newly built Fiona Stanley Hospital together with the Royal Perth Hospital from 2006 – 2012. During this period he undertook the challenge of supervising the establishment of the laboratory for the new hospital. This new laboratory which he still serves as a Consultant, provides highly specialized Clinical Biochemistry services related to toxicology, endocrinology, bone metabolism, cardiovascular genetics and lipid metabolism in addition to the routine Clinical Chemistry services.

He is an active member of national and international organizations in Chemical Pathology; holding key positions related to areas of his expertise. He has been the convener and Chair of the RCPA Chemical Pathology Quality Assurance-Patient Report Comments Program from 2000 – 2018, in addition to being a member of the RCPA Chemical Pathology Advisory Group and RCPA Board of Education.

In the International Federation of Clinical Chemistry (IFCC) he held the Chair of the IFCC Working Group on Bone Marker Standards in Osteoporosis from 2009 - 2011 and the post of Secretary for the IFCC Working Group on Standardization of Bone Marker Assays from 2012 – 2018. He is an active member of the Working Groups related to bone metabolism in International Osteoporosis Foundation and American Society for Bone and Mineral Research.

FELLOWSHIP AWARDS

He has played a vital role in improving the standards of clinical laboratory testing in the Asia Pacific region as the Chair of Laboratory Management, Education and Scientific Committees of the Asia Pacific Federation for Clinical Biochemistry and Laboratory Medicine at different times.

He has been invited to share his expertise in osteoporosis and bone metabolism in many international conferences; MedLab Asia, WorldLab, EuroMedLab and AACC annual scientific meeting, which are the most sought after international meetings in the arena of Chemical Pathology.

Dr Vasikaran has shared widely the knowledge he has acquired as a scientist, and a practicing Chemical Pathologist through his publications which exceeds a hundred peer reviewed articles, four book chapters and three position papers related to bone markers and interpretative comments in Chemical Pathology, key areas of his research interests. An H index of 37 in Google Scholar with citations exceeding 5600 bears evidence for his erudition.

He has been the editor of the Clinical Biochemist Reviews from 2003 to 2011, the official journal of the Australasian Association for Clinical Biochemistry (AACB). Further to his credit as a scholar, he has served as the associate editor for Annals of Clinical Biochemistry from 2011 – 2019 and been a member of the Editorial Board of Clinical Biochemistry from 2011, both of which are high impact journals in the field.

His outstanding work as a Chemical Pathologist has been recognized by the AACB by the award of Outstanding Service Medal in 2011.

He has been an examiner for RCPA Chemical Pathology for more than a decade from 2001 and an invited external examiner for postgraduate examinations in Singapore, Malaysia and Sri Lanka. His excellent guidance and support as the external examiner during the MD Chemical Pathology examinations, conducted by the Postgraduate Institute of Medicine, University of Colombo, on three occasions have been of immense value to the local panel of examiners.

His contribution to the postgraduate training in Chemical Pathology commenced when he accepted a Sri Lankan trainee in 2005, during which time he formed a very strong bond with the Chemical Pathologists at his home country. His second trainee from Sri Lanka was Dr Ganga Withanapathirana, the current secretary of the College.

As a postgraduate trainer, Dr Vasikaran is the best role model a trainee could have, he plans the training with mutual discussions with the trainee, focuses and builds on strengths of the trainee and gives positive and constructive feedback. He ensures trainee's participation in continuous professional development activities and guides research which invariably leads to a publication in a peer reviewed journal. His kind and gentle demeanor at all times as a supervisor and mentor is hard to emulate, even if one tries.

The Sri Lankan trainees with him never miss being away from home, because he and his wife Dharshi with their two children, Anjali and James provide them with a home away from home. The home is the safe haven where Dr Vasikaran finds time to pursue his passion in music.

FELLOWSHIP AWARDS

Professor Sumedha Wijeratne
BSc, MSc, MPhil, PhD

Professor Wijeratne hails from Rambukkana in Kegalle district. Her primary education was at Rambukkana Udagaladeniya Maha Vidyalaya, with secondary education at Tholangamuwa and Piliyandala Central Colleges.

She graduated in Biological Sciences from the University of Peradeniya in 1979. She worked as a Demonstrator at the Science Faculty of the University of Colombo, later moving to the Medical Faculty as a Research Assistant, where she completed her Master of Science in Clinical Biochemistry in 1983. Having been selected as a Biochemist by the Ministry of Health, she underwent 6 months of training at the Medical Research Institute in Colombo before being appointed to Colombo South Teaching Hospital.

In 1985, she joined the newly-built Sri Jayawardenepura General Hospital as Head of Clinical Chemistry and with Japanese aid, created a veritable biochemistry section offering testing by automated biochemistry (Cobas mira), manual ELISA and immuno-electrophoresis. In addition to inspiring and assisting the postgraduate trainees in Pathology, she also took the lead to initiate the SLMC-recognised Diploma in Medical Laboratory Technology training programme at Sri Jayawardenepura General Hospital.

In 1992, Professor Wijeratne joined the Department of Obstetrics & Gynaecology, Faculty of Medicine, Colombo, as a lecturer. She was a dedicated teacher and a laboratory scientist who worked to advance education by initiating back up laboratory services in her own department. She established Sri Lanka's first ever Reproductive Biology and Endocrinology laboratory services at the Faculty of Medicine Colombo and has implemented an array of learning and skills upgrading programs for laboratory technologists, postgraduates and undergraduates within the department. She pioneered establishing the basic laboratory techniques in Assisted Reproduction at the Department. Her career as a clinical scientist, teacher, and mentor is exemplary. She has played a major role in training and guiding countless young scientists reading for various research degrees. For more than 2 decades, postgraduates in Chemical Pathology have had a mandatory rotation with Professor Wijeratne to learn aspects relevant to Chemical Pathology.

Since joining the Faculty of Medicine, Professor Wijeratne achieved a postgraduate diploma in Applied Sociology (in 2002), Master of Philosophy in Reproductive Biology (in 2003) from the University of Colombo, Master of Science in Embryology (in 2007) and Doctor of Philosophy in Biochemistry (in 2009) from University of Belford, USA. She was promoted to a post of Professor in 2008.

FELLOWSHIP AWARDS

In 1998, a group of professionals including clinical specialists with special interest in infertility including Professor Wijeratne as the laboratory scientist, ventured to establish a private enterprise , Vindana Reproductive Health Centre for Advanced Assisted Reproduction Technologies in the country with foreign collaboration. Later, they produced the first test tube baby in Sri Lanka in 2002 with expertise of a total Sri Lankan team of specialists. Professor Wijeratne is the pioneering embryologist in the country who transferred all the laboratory procedures in Advanced Assisted Reproduction Technologies and has provided a foundation that offers greatly advanced scientific therapies, research and training in the field of Advanced Assisted Reproduction Technologies. The team's dedication in treating infertility and transfer of technology was rewarded with the prestigious National Science and Technology Award for Excellence in Multidisciplinary Team Efforts in Research and Development in 2005. She was the recipient of the 'Woman of achievement in Science and Technology, Sri Lanka' award by the Zonta International in 2006 in recognition of her outstanding and sustained achievements in patient care, research and scientific leadership in Assisted Reproduction. Her other achievements include many research awards including Presidential Award for excellence in scientific publication and for best research papers by national and international professional associations.

During her career, Professor Wijeratne has achieved a remarkable feat by establishing 4 biochemistry laboratories from the inception, some of them to international standards. They are, Sri Jayawardenepura Hospital, Department of Obstetrics and Gynaecology at the Faculty of Medicine, Vindana Reproductive Health Centre and the Diabetes Centre. Professor Wijeratne is a Technical Assessor in Clinical Chemistry for the Sri Lanka Accreditation Board and a Consultant for Laboratory Accreditation (ISO 15189 & ISO 17025). Vindana Reproductive Health Centre laboratory under her leadership was the first laboratory in Sri Lanka to be accredited by the SLAB for Endocrinology and Andrology testing.

Professor Wijeratne has authored 42 publications in refereed journals which were cited by other researchers around the globe. About 300 have been published in abstract form at local and international conferences. She is also a member of many national and international professional organizations and committees on formulating national guidelines, formation of course syllabi etc.

Professor Wijeratne's research interests largely lie in the areas of infertility and stem cells. Her current research seeks to study markers for the timing of maturation of ovarian follicles to predict the best time for egg retrieval and also to study alternative methods and molecular markers for embryo biopsies for pre-natal genetic testing.

She retired from the Faculty of Medicine in 2018 after 26 years of service and has been active in upgrading the services related to Assisted Reproduction.

Professor Sumedha Wijeratne's down-to-earth (humane) nature and easy-going mannerism is known to those who associate her. She claims that her venture into treatment of infertility is no accident. Only a few will work with total dedication so that others could enjoy what she couldn't have in her own life. Professor Sumedha is such an individual.

INTERNATIONAL FACULTY

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Professor Khosrow Adeli
Head and Full Professor of Clinical Biochemistry
PhD, FCACB, DABCC, FAACC
IFCC President-Elect (2020-2023)
Hospital for Sick Children
Department of Laboratory Medicine and Pathobiology
University of Toronto, Canada

Dr Adeli is currently the Head and Full Professor of Clinical Biochemistry at the Hospital for Sick Children and the Department of Laboratory Medicine and Pathobiology at the University of Toronto in Toronto, Canada. He is also the Vice Chair of Quality in Laboratory Medicine and Pathobiology and a Senior Scientist in the Program in Molecular Medicine at the Research Institute at the Hospital for Sick Children. Dr Adeli is a fellow of the Canadian Academy of Clinical Biochemistry and a diplomate of the American Board of Clinical Biochemistry. Recently, he was elected as the President-Elect of the International Federation of Clinical Chemistry and Laboratory Medicine (IFCC) (2020-2023). He is also currently the Editor-in-Chief of the Critical Reviews in Clinical Laboratory Sciences (2017/2018 Impact Factor of 6.4). Previously, Dr Adeli served as the Editor-in-Chief of the Clinical Biochemistry Journal for 7 years (1999-2006). He has received several distinctions and career awards. Most recently, the 2019 AACC Academy Outstanding Research Award, the 2017 Graduate Teaching Award from the Laboratory Medicine and Pathobiology Department at the University of Toronto, the 2016 Senior Investigator Award at the Canadian Lipoprotein Conference, the 2015 AACC Paediatric-Maternal-Fetal Division Award, the 2015 Canadian Society of Clinical Chemists Innovation Award and the 2015 Ontario Society of Clinical Chemists Lifetime Achievement Award.

Dr Adeli has been actively involved in both molecular and clinical laboratory research since 1988 and has published over 500 articles and abstracts to date. His main area of research is focused on understanding the pathophysiology of obesity, metabolic syndrome and type 2 diabetes. Specifically, his laboratory is investigating the neuroendocrine mechanisms regulating intestinal and hepatic lipoprotein overproduction in insulin resistant states and the role of the gut-brain-liver axis in lipid and lipoprotein metabolism. Dr Adeli is also active in clinical chemistry research and has been involved in a number of projects on diagnostic test development projects. He is the principal investigator of the CALIPER (Canadian Laboratory Initiative on Paediatric Reference Interval Database) project aimed at the establishment of a laboratory reference interval database for biomarkers of paediatric disease. The CALIPER database is now used in hospitals across Canada and around the world to improve diagnosis and monitoring of children with medical concerns.

INTERNATIONAL FACULTY

Dr Tony Badrick
B. App Sc, BSc, BA, M Lit St (Math), MBA,
PhD (QUT), PhD (UQ), FAIMS, FAACB, FACB, FAIM,
Member Aust Maths Soc, FRCPA (Hon), FFSc (RCPA)
CEO of the RCPAQAP
Adjunct Professor
School of Pharmacy and Pharmacology
Griffith University
Australia

He was Associate Professor, Faculty of Health Sciences and Medicine at Bond University for 4 years before becoming the Chief Executive Officer (CEO) of the RCPAQAP in 2015. He is an Adjunct Professor School of Pharmacy and Pharmacology, Griffith University, Honorary Associate Professor, National Centre for Epidemiology and Public Health ANU College of Health and Medicine and ANU College of Science, Honorary Associate Professor, Faculty of Medicine, Bond University, Gold Coast, Visiting Fellow, Australian Institute for Health Innovation, Macquarie University.

He was President of the Australasian Association of Clinical Biochemists (2003-2007) and Vice President of the Australian Institute of Medical Scientists (2011-2018), is Chair of the Education and Laboratory Management Committee of the Asian Pacific Federation of Clinical Biochemistry, a member of three International Federation of Clinical Chemistry Working Groups (Value of Pathology, Traceability, Analytical Quality), member of the Joint Committee on Traceability in Laboratory Medicine, and currently the chief examiner of the Faculty of Science of the Royal College of Pathologists of Australasia.

Tony has also had published over 180 papers/ abstracts and one book chapter (2 editions) in Health care management and chapters in Clinical Biochemistry texts (Tietz). He was a consultant and an adviser to WHO in 2007 and 2012.

INTERNATIONAL FACULTY

Professor Sergio Bernardini
MD, PhD
Paediatrician and Full Professor of Clinical Biochemistry and Clinical Molecular Biology
Department of Experimental Medicine
University of Rome Tor Vergata

Professor Bernardini, MD, PhD, is a Paediatrician and Full Professor of Clinical Biochemistry and Clinical Molecular Biology at the Department of Experimental Medicine of The University of Rome Tor Vergata. He is the head physician of the Laboratory Medicine Department at the Tor Vergata University Hospital.

Professor Bernardini served as Secretary for two terms on IFCC EB and to date is the Chair of the Emerging Technologies Division.

Dr Neepa Chowdhury
MBBS, MD
Section Director
Department of Clinical Biochemistry and Immunology
Suraksha Diagnostics (Pvt) Ltd

Dr Chowdhury did her MBBS and MD in Biochemistry from Medical College and Hospitals, Kolkata, India in 2011.

She is currently the Section Director-Department of Clinical Biochemistry and Immunology, Suraksha Diagnostics Pvt .Ltd which is a CAP (College of American Pathologists) and National Accreditation Board for Testing & Calibration Laboratories (NABL) accredited laboratory. Her fields of expertise are clinical biochemistry, special immunology, haemoglobinopathy screening and IIFA.

She was trained as an NABL certified Technical Assessor for Biochemistry as per ISO 15189:2012 – Medical laboratories – Requirements for quality and competence since 2015. She is also a life member of Association of Medical Biochemists of India (AMBI), Association of Clinical Biochemists of India (ACBI) and Indian Medical Association (IMA).

Her department is amongst the first few users of combined robotic track (track-based automation solution) in India. Today her department performs over 2500 numbers of tests and serves over 1000 patients every day.

On a personal side she is passionate about reading and enjoy travelling, music and spending time with her family.

INTERNATIONAL FACULTY

Dr Saswati Das
MBBS, MD
Specialist in Department of Biochemistry
Dr Ram Manohar Lohia Hospital

Dr Saswati Das is Specialist in Department of Biochemistry, Dr Ram Manohar Lohia Hospital. She has trained at Lady Hardinge Medical College and did her MD biochemistry from Maulana Azad Medical College. She is Six Sigma green belt and ISO 15189 trained Auditor. She is trained as a college of Pathology Inspector. She is an associate fellow of National Academy of Clinical Biochemistry. She is a recipient of 7 International Awards from AACC, IFCC, APFCB. Her research interests include laboratory quality assurance and biomarkers in cardiovascular diseases. She is the program chair of the American Association of Clinical Chemistry, India section and also an executive member of Association of Medical Biochemists of India Delhi Chapter.

Dr Sudip Datta
MD (Biochemistry), DHM
Associate Professor, Dept. of Laboratory Medicine, AIIMS, New Delhi
Faculty In-Charge, Clinical Biochemistry, Emergency Lab and OPD Lab

Dr Sudip Datta is the Associate Professor and Faculty In-charge Clinical Bio-chemistry and CORE Lab services, Department of Laboratory, Medicine All India Institute of Medical Sciences, New Delhi. He is a Technical Assessor in Clinical Biochemistry, NABL, Corresponding Member, International Federation of Clinical Chemistry and Laboratory Medicine IFCC Task Force on Ethics (TF-E), Assistant Editor, Journal of Laboratory Physicians and Secretary, American Association of Clinical Chemistry (AACC)- India Section. In addition, he is a member of Medical Laboratory Instruments Sectional Committee, MHD-10 at Bureau of Indian Standards (BIS) and DMLT Course revision committee, NIOS.

He was awarded the International Travel Grant, 2018 by AACC at AACC 2018 Annual Meeting at Chicago and (IFCC) Travel Scholarship at IFCC World Lab at Durban, South Africa, 2017.

He has Published more than 20 research articles in National and International journals of repute and delivered lectures at several national and international conferences.

INTERNATIONAL FACULTY

Dr Elizabeth Frank
Partner
Learning 2 Lead Consultancy

Dr Elizabeth Frank is a laboratory professional and has 23-years of experience in setting up and managing both large and mid-sized laboratories. She is a partner at Learning 2 Lead Consultancy providing consulting services to clinical laboratories in India and in the Asia Pacific region.

Dr Elizabeth Frank through Learning 2 Lead consultancy provides technical and non-technical operational assessments, compliance assessment, facility planning, laboratory design development, onsite management training and staffing. She also provides consultancy to streamline process and hand hold laboratories through the various process thus adding value to the laboratory. She also conducts training programs for laboratory professionals on laboratory management, internal auditing, process streamlining preparing for accreditation and all related topics.

Dr Elizabeth Frank has authored chapters in

1. Essentials of Clinical Laboratory Management in Developing Regions
2. Quality of Management & Quality of Analysis - A Handbook for developing countries jointly developed by C-CLM and C-AQ

Dr Elizabeth Frank is an active researcher, and has worked extensively in the areas of cardiovascular disease and diabetes. She has also worked extensively on PON and its role in HDL. She is currently working on developing early diagnostic markers for Alzheimer's disease.

Dr Elizabeth Frank has earlier served on executive committee of the EMD of the IFCC. She has been actively involved in the Asia pacific Region and served earlier as secretary, treasurer and is currently the chair of the congress committee of APFCB.

In addition, to her professional affiliations and laboratory directorship, Dr Frank is an excellent motivator and visionary. Her record of conference attendance and speaking engagements distinguishes her as an influential leader, teacher and communicator. She possesses exceptional rational and analytical reasoning and while remaining undeterred in pursuit of company or organizational goals.

INTERNATIONAL FACULTY

Professor Zhong Lu
MBBS, PhD, MAACB, FAACB, FRCPA
Consultant Chemical Pathologist and Director of Chemical Pathology
Monash Pathology, Monash Health
Associate Professor
Department of Medicine
Monash University
Australia

Dr Lu is the Director of Chemical Pathology at Monash Pathology, Monash Health and an associate professor at the Department of Medicine, Monash University. Monash Health is Victoria's largest public health service and Monash Pathology is an integral part of Monash Health which currently operates five laboratories to support a network of tertiary teaching hospitals and community health facilities.

Dr Lu graduated with a medical degree in China and requalified to practice medicine in Australia. She undertook training in Chemical Pathology at Monash Health, Austin Health and Melbourne Pathology and became a Fellow of the Royal College of Pathologists of Australasia in 2006. Since then, she has been working as a Chemical Pathologist at various health networks in Australia for 16 years.

Dr Lu has also completed in Australia a Master's degree in human nutrition and a PhD in Epidemiology and Preventive Medicine. She has collaborated with many medical colleagues on various studies and published widely. Dr Lu has been actively involved in establishing appropriate method-specific reference intervals for children, adults and women during pregnancy.

INTERNATIONAL FACULTY

Dr Samuel Vasikaran
MBBS, MSc, MAACB, MD, FRCPA, FFSc
Consultant Chemical Pathologist
PathWest-Laboratory Medicine
Western Australia

Dr Vasikaran graduated from Colombo Medical College. He did his postgraduate training in Chemical Pathology in UK and Australia, and obtained the Fellowship of the Royal College of Pathologists of Australasia. He obtained an MD by thesis following research in metabolic bone diseases at the University of Sheffield in UK.

He has been working as a Chemical Pathologist at Royal Perth Hospital, Western Australia (WA) since 1994 and more recently at PathWest-Laboratory Medicine WA. He also had an academic appointment as Clinical Professor at the University of Western Australia till 2016.

Dr Vasikaran helped to establish and Chaired the RCPA-QAP Patient Report Comments Program from 2000 to 2018. He was the Chair of the IFFC working group on Quality Assurance of Interpretative Commenting which published a Position Paper on this topic. He was Chair of the IFCC working group on bone marker standards and Co-chair of the International Osteoporosis Foundation-IFCC joint working group on bone marker standards which published the Position Paper on reference bone markers for osteoporosis.

Dr Vasikaran has published around 130 peer reviewed papers and book chapters, with an H-index of 37.

INTERNATIONAL FACULTY

Dr Binod Kumar Yadev
BSc, PhD
Associate Professor (Biochemistry)
Maharajgunj Medical Campus, Institute of Medicine (IOM)
T U Teaching Hospital, Nepal

Dr Binod Kumar Yadav is an Associate Professor in Biochemistry, Maharajgunj Medical Campus, Institute of Medicine (IOM), T U Teaching Hospital (TUTH), Nepal.

He graduated with a BSc degree from Post Graduate Institute of Medical Education and research (PGIMER), Chandigarh, India. He completed his MSc degree in Biochemistry at All India Institute of Medical Sciences (AIIMS), New Delhi, India. After completion of his PhD in Medical Science he obtained Post-Doctoral Fellowship from Medical School, Chonbuk National University, South Korea.

He is the Head of Department of Biochemistry, Maharajgunj Medical Campus, Institute of Medicine. He is a member of Hospital Management Council; Faculty Board, Institute of Medicine, Tribhuvan University; Post Graduate Medical Entrance Committee; Subject committee, Department of Biotechnology, Tribhuvan University; Ethical Review Board, Nepal Health Research Council (NHRC); and Non- Communicable Disease Risk factors: STEPS survey Nepal, 2019 Technical Working Group (TWG).

He is an enthusiastic professional with an extensive experience in teaching medical graduates, health research and clinical laboratory; aspiring for challenging assignments in a growth oriented medical institution to utilize acquired skills and knowledge in achieving organizational goals, while attaining personal and professional growth.

He has an extensive publication record in scholarly journals and conference proceedings and has presented research work at many local and international scientific conferences.

Dr Binod is a recipient of several academic awards and honours including Nepal Vidhya Bhushan-"K" from President of Nepal, 2017.

INTERNATIONAL FACULTY

Dr Tina Yen
MBBS, MAACB, FRCPA
Consultant Chemical Pathologist and Head of Clinical Chemistry
St George Hospital
Kogarah Sydney
Australia

Tina Yen is a Chemical Pathologist who completed her medical training at the University of Sydney (1993) and qualified as a Chemical Pathologist with the RCPA (2005). She undertook additional 3 years training in paediatric chemical pathology with Dr John Coakley (Westmead, Sydney) to enable her to work in paediatric laboratory medicine. She has worked twice for Sonic Australia, a major private pathology provider, in Sydney at Douglass Hanly Moir Pathology and at Melbourne Pathology. She has also worked at two paediatric hospitals (Children's Hospital Westmead and Royal Children's Hospital, Parkville, Victoria). She is currently Head of Clinical Chemistry at St George Hospital, Kogarah Sydney (2019) and maintains a paediatric consulting role at the Sydney Children's Hospital Randwick.

Her professional activities include serving as an examiner for RCPA chemical pathology from 2010. She was also an examiner for the AACB (2013 – 2017). She has been AACB's Vice President of Education from 2017 and currently in her second term. Her ongoing commitment to education of scientists and pathology registrars was recognized when she received the AACB Geoffrey Kellerman Award for Education in 2017.

Tina is on the RCPA/AACB Harmonisation Committee since it was formed in 2011 and she chaired the Paediatric Experts Group (2011 – 2014) which generated the AACB/RCPA Harmonised Reference Intervals in Paediatrics (AHRIP), published with Adult Harmonised Reference Intervals in Clinical Biochemist Reviews in 2014. The Harmonisation Committee is the leadership group in chemical pathology for Australian and New Zealand and was the brainchild of the late Ms Jill Tate (Brisbane, Australia). Harmonisation has been a success story in Australia largely through Jill's efforts, and remains an important focus for Tina to ensure Jill's positive influence continues as her legacy in laboratory medicine.

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LOCAL FACULTY

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SPEAKER ABSTRACTS

DAY 1

Invasive Endocrine Function Tests

Dr B.K.T.P. Dayanath

Interventional radiology assisted venous sampling (VS) can be labelled as the gold standard for localizing abnormal hormone secretion in few of the common endocrine disorders namely; primary hyperaldosteronism, pancreatic insulin secreting tumours, hyperparathyroidism and adrenocorticotropic hormone dependent Cushing syndrome. These endocrine tumours can cause significant morbidity and mortality among young, which merits proper diagnosis and pre-operative localization of the tumour for better management. This is mandatory as the management of the disease depends on the nature (unilateral/ bilateral) of the tumour with surgical resection being curative in many of the instances.

Cross sectional radiological imaging alone is not conclusive to arrive at a diagnosis as the tumour activity cannot be assessed by imaging and most of these tumours are relatively small. In experienced hands with good liaison between endocrinology, radiology and chemical pathology; VS is a safe, accurate and highly sensitive test for localising such occult tumours and assessing their activity. The tumour localization is based on the detection of increased hormone secretion from the respective territory. The measured hormone levels can be affected by dilution in venous blood and iatrogenic hormones causing feedback inhibition on the gland or assay interference. Thus, interpretation of hormone levels during the VS should be done using standard protocols exercising caution as misinterpretation can lead to errors in the localisation.

Although, VS is a highly sensitive investigation to localise and assess the tumour activity, the difficulty in selective catheterization poses a technical difficulty in its utilization in the clinical practice which could be overcome with experience.

Hypomagnesaemia – Evaluation and Management

Dr Arosha Dissanayake

Whilst sodium, potassium and calcium remain the dominant players in the field of electrolyte disorders, disorders of magnesium remain the minion, often ignored and undiagnosed though at times holding devastating consequences for the patient. Hypomagnesaemia is associated with refractory hypokalaemia, unexplained hypocalcaemia, neurological manifestations such tetany, seizures and ventricular arrhythmias. A high index of suspicion that magnesium levels need to be assessed is necessary in the high-risk patients with above clinical manifestations. High-risk patients include those with chronic diarrhoea, proton pump inhibitor use, alcoholism and diuretic use. Normomagnesaemic hypomagnesaemia is recognized but underlying mechanisms and effects are poorly understood. Treatment of hypomagnesaemia involves both treatment of underlying cause and magnesium replacement either orally or parenterally depending on the severity of deficiency. Extreme care needs to be taken in magnesium replacement in those with renal impairment.

Hypermagnesaemia occurs in two settings, either in renal impairment or when a large dose of magnesium is given either parenterally, orally or as an enema. Cessation of magnesium therapy, hydration with normal saline and loop diuretics are effective treatment strategies.

DAY 1

Drug Induced Electrolyte Abnormalities

Dr Rajitha Samarasinghe

Drug introduced electrolytes abnormalities are a very common clinical entity most commonly encountered in in-ward patients.

Out of the electrolytes sodium, potassium, magnesium and phosphate levels are mainly affected.

Drugs cause hypokalaemia and hyperkalaemia mainly by two mechanisms, namely causing cellular redistribution by affecting the Na/K ATPase pump and by increasing and decreasing renal excretion respectively. Wide variety of drugs cause this but mainly diuretics, chemotherapy agents and antibiotics.

Hypernatraemia and hyponatraemia are caused by affecting the volume status and affecting ADH secretion or action, in which antibiotics, chemotherapy agents, antipsychotics and diuretics lead.

Lithium, calcium carbonate, diuretics, vitamin D supplements cause hypercalcaemia by preventing renal excretion and bisphosphonates, certain chemotherapy agents, and antiepileptics are the most common drugs causing hypocalcaemia with different mechanisms.

Proton pump inhibitors, antacids, some antibiotics, antivirals, antihypertensives are the most common groups that cause hypomagnesaemia whereas loop diuretics cause a large increase of magnesium levels by limiting the renal tubular excretion.

Acid-Base Disorders – Clinical Scenarios

Dr Gaya Katulanda

The acid-base balance of our body is maintained by number of mechanisms. Excessive production/intake of acids/alkali or decreased elimination of acids/alkali may lead to systemic acid-base disorders. Acid-base imbalance is detected by measuring pH, PCO_2 and $H_2CO_3^-$. The anion gap, delta gap, adequacy of compensation, base excess, renal and liver function tests help to diagnose cause of the acid-base imbalance. This is explained by presenting a series of clinical cases.

DAY 1

Harmonization of Reference Intervals for Gestational Thyroid Function Tests

Dr Tina Yen

Normal pregnancy triggers significant changes to the maternal thyroid gland in order to meet the metabolic demands associated with carrying a fetus to term, and ensure thyroid hormone is supplied to the developing fetus particularly in first trimester when fetal T_4 is completely maternal in origin. Maternal and fetal hypothyroxinaemia can lead to irreversible central nervous system (CNS) damage in first trimester. There are three types of thyroid deficiency with impact on fetal development; isolated maternal hypothyroidism, isolated fetal hypothyroidism and iodine deficiency. While over maternal hypothyroidism can be readily identified by laboratory testing and treated, there is universal concern about subclinical hypothyroidism of pregnancy, which has no clinical identifiers and is dependent on laboratory testing. Because pregnancy is a "stress" test situation for the mother, women with borderline hypothyroidism tend to be uncovered during pregnancy and these women need to be identified promptly to protect the fetus.

The American Thyroid Association's (ATA's) "2017 Guidelines for the Diagnosis and Management of Thyroid Disease during Pregnancy and the Postpartum" revised the Endocrine Society's recommendations regarding gestational thyroid function tests (TFTs) cut-offs. Pregnancy-specific thyroid-stimulating hormone (TSH) reference ranges were advocated, ideally population and trimester-specific. The reference intervals should be derived from healthy, TPOAb -negative pregnant women with optimal iodine intake and no thyroid illness. If unavailable, TSH 4.0 mIU / L should be used as the upper reference limit or decision point, noting that in practice, the first trimester upper limit will be approximately 0.5 mIU/L lower than the non-pregnant TSH upper reference limit. Further mention also of isolated maternal hypothyroxinaemia defined as serum FT_4 below 2.5th or 5th percentile of the population reference interval.

Since then, more than 10 publications have provided method and trimester specific reference intervals for TFTs in pregnancy. In Australia and New Zealand, the RPCA/AACB Harmonisation Committee's Pregnancy Expert group addressed the requirement for trimester specific reference intervals with the plan of having reference intervals for TSH, FT_4 and FT_3 that were harmonised by manufacturer. For us harmonisation means consensus approval and agreement by all stakeholders implement the reference intervals in one own's laboratory. Since 2017, this project revealed important issues that hinder harmonisation including LIS configuration, understanding the role of human chorionic gonadotropin (HCG), biological variation in TSH, FT_4 and FT_3, and concerns about likely IFCC harmonization of TSH, and standardization of FT_4 immunoassays within the next decade.

DAY 1

Updates on High-sensitivity Cardiac Troponin in Acute Coronary Syndrome

Dr Chandrika Meegama

Acute coronary syndrome (ACS) refers to a spectrum of clinical presentations all ischaemic chest pains ranging from ST-segment elevation myocardial infarction (STEMI) to non–ST-segment elevation myocardial infarction (NSTEMI) and unstable angina.

The contribution of laboratory medicine to clinical cardiology has grown in importance over the years. Highly sensitive and specific biomarkers for the detection of myocardial damage, such as cardiac hs troponins, are now available. Among those, one of the most important documents outlines the recommendations for a new definition of myocardial infarction (MI) published by the Joint European Society of Cardiology and American College of Cardiology Committee. The consensus document has based on the MI definition on biochemical grounds, a choice guided by the advent of cardiac troponins, biomarkers that provide higher sensitivity for smaller myocardial injury and virtually total specificity for cardiac damage.

It is therefore important that these clinically relevant biomarkers, on which critical decisions will rest, are measured with highly reliable and standardized methods to achieve comparability of results, independent of the measurement test reagents and platforms as well as the laboratory where the procedure is carried out.

Several studies done to evaluate rule in and rule out pathways using high-sensitivity cardiac troponin for early discharge of patients with suspected ACS using high sensitive troponin (hS troponin): TRAPID AMI, APACE, ADAPT and ASPECT trial.

Level of hS troponin is used in risk stratification of patients with suspected ACS and theses clinical risk scores are beneficial in deciding the mode of management (TIMI [Thrombolysis In Myocardial Infarction], GRACE [Global Registry of Acute Coronary Events], EDACS [hah, ECG, Age, Risk factors, Troponin]).

DAY 1

Technological Advances in Laboratory Medicine: Predicting the Laboratory of the Future

Professor Khosrow Adeli

Laboratory medicine is the branch of medicine that provides objective data to clinicians and other healthcare workers to guide appropriate clinical decision making. Laboratory medicine is integral to many clinical decisions on prevention, diagnosis, treatment and disease management. It supplies health care professionals with evidence-based data necessary to provide high-quality, safe, effective and appropriate care to patients. The past 50 years have witnessed notable achievements in the field of laboratory medicine and clinical laboratory diagnostics. There have been enormous advances in clinical laboratory technology as well as its clinical applications through the identification of a growing number of laboratory biomarkers of acute and chronic disease. These technological advances have augmented the important role of laboratory medicine in healthcare delivery clearly establishing it as a vital part of the continuum of patient care. There have been many notable achievements in the field of laboratory medicine and clinical laboratory diagnostics. In my lecture, I will elaborate on some of the key advances that I personally feel have had the greatest impact in the field and have enhanced the value and impact of laboratory medicine in healthcare delivery. These include the increased emphasis on the concept of quality systems and total quality management, technological innovations, point of care testing, informatics/data management and evidence-based laboratory medicine.

Technological innovations in analytical methodology have also had a major impact on enhancing the efficiency and quality of clinical laboratory service. Improved assay technology combined with the advent of automation have contributed to increased productivity and reduced laboratory error. Automation has particularly had a direct impact in the field of clinical pathology including clinical chemistry, immunology, serology, and haematology. Automated analyzers combined with the use of track technology has allowed the processing of thousands of samples in a single day and significant improvements in laboratory turnaround time in both hospitals and community reference laboratories. In addition to technological advances in routine chemistry and haematology, the introduction of advanced analytical instrumentation such as mass spectrometry (MS) and nuclear magnetic resonance (NMR) into the clinical laboratory has revolutionized complex and specialized areas of laboratory testing particularly in the areas of special chemistry, therapeutic drug monitoring (TDM), toxicology, microbiology and metabolic disease screening.

Another major breakthrough in laboratory medicine has been the miniaturization of assay systems and the advent of point of care testing (POCT) at patient bedside. POCT is a fast-growing area and is likely to have an immense impact on the future delivery of laboratory services. A growing number of biochemical, immunochemical, toxicological, haematological and coagulation markers can be measured at the point of care on small handheld devices. Despite the initial challenges with analytical performance, major advances have been made in improving precision and reproducibility of POCT technology and increased confidence in these devices from both clinical programs and clinical laboratories. Along with the implementation of more precise and accurate point of care devices, a fundamental shift in the provision of POCT has recently occurred with implementation of complete eConnectivity solutions allowing documentation of all POCT results in patient charts and bidirectional communication between various devices and the central laboratory information system.

DAY 1

The relatively recent advent of web-based and mobile communication has also created the unique opportunity for effective communication between patients, clinicians and laboratories to engage in the process using innovative electronic and online modalities. Mobile EMR and web applications are used to provide tools which help physicians provide safe, cost-effective, high-quality care, allowing online access to scientific medical information, key medical reference resources, graphical presentations of disease workflows and tele-medicine. Indeed, laboratory medicine is a domain which offers a unique opportunity to analyze extremely large, rich and complex data sets of information concerning medical laboratory test results. In recent years, an increasing number of web-based and mobile applications have been developed to improve access to laboratory test information and aid in test result interpretation. They range from simple apps that provide reference lab value information to complex medical diagnostics data management.

In closing, during my almost 30 years as a laboratory scientist, I have witnessed enormous advances in laboratory medicine and the science of clinical diagnostics. However, it has also been my experience that many clinical laboratories do not take full advantage of technological advancements as well as emerging scientific evidence in test selection and test result interpretation. What is critically needed in the field of laboratory medicine is building a culture of innovation and adopting the concept of evidence-based laboratory medicine across the continuum of the laboratory testing process including post-analytical interpretation of laboratory test results using the latest evidence-based reference intervals.

Data Mining – Opportunities and Challenges

Professor Zhong Lu

Increasing reliance on medical laboratory testing combined with automation, amalgamation of laboratories has resulted in laboratories with huge databases of patient results. Community laboratories predominantly have the results from patients unaffected by diseases as their clinicians are often engaged in testing for wellness and disease rule-out. The use of laboratory data to derive reference intervals is an indirect approach, especially useful in paediatrics, obstetrics and geriatrics where direct methods are problematic in finding healthy volunteers.

This technique often relies on statistical techniques to exclude disease affected data. If clinical information is also available, the combination of laboratory results and clinical data empowers not only the accuracy of reference intervals by this indirect method but also helps to define clinical decision limits and answer specific clinical questions. Laboratory data is an important resource for knowledge discovery that cannot be found from text books. Just as clinicians are expected to use their training and clinical experiences to optimise patient management, it can be argued that laboratories have an obligation to use their accumulated experience, stored as big data in their laboratory information system, to optimise the role of laboratory medicine in patient management.

Laboratorians need to develop skills in big data analyses. This lecture provides a few examples how to use laboratory data to set reference intervals, define decision limits and answer clinical questions. Challenges in data mining including privacy and ethical concerns will also be discussed.

DAY 1

Metabolic Bone Disorders

Dr Samuel Vasikaran

Common metabolic bone disorders include osteoporosis, mineral and bone disorder of chronic kidney disease, osteomalacia and hyper and hypoparathyroidism.

Parathyroid overactivity due to autonomous parathyroid hormone (PTH) secretion (primary hyperparathyroidism) can cause hypercalcaemia, and parathyroid under-activity, hypocalcaemia. Secondary hyperparathyroidism is seen in response to hypocalcaemia due to any cause, commonly chronic renal failure and vitamin D deficiency. Long-standing secondary hyperparathyroidism can, over time, lead to autonomous overproduction of PTH: tertiary hyperparathyroidism. Investigation for the diagnosis of any of the above conditions should initially entail the measurement of calcium and PTH in the same venous draw. Current generation immunoassays measure the intact PTH molecule; third generation 'bio-intact' assays are also now available. Ionised calcium is more sensitive than total (albumin adjusted) calcium for the diagnosis of hypercalcaemia. Urine calcium and phosphate handling are affected by PTH action and are a useful adjunct in the diagnostic work up. The above measurements may also point to the rarer genetic conditions such as familial hypocalciuric hypercalcaemia, peudohypoparathyroidism etc, for which genetic testing is available, as for the familial forms of primary hyperparathyroidism, either on its own or as part of multiple endocrine neoplasia syndromes.

Mild vitamin D deficiency (serum 25-hydroxyvitamin D <50 nmol/L or 20 ng/mL) is common and may contribute to the development of osteoporosis. More severe deficiency causes osteomalacia in adults and rickets in childhood. Vitamin D standardisation program (VDSP) is an initiative to help harmonize the measurement of 25 - hydroxyvitamin D worldwide.

Osteoporosis is a disease characterized by low bone mass and structural deterioration of bone tissue, leading to bone fragility and an increased risk of fractures of the hip, spine and wrist. Increased bone turnover and bone loss at menopause, in old age and due to secondary causes are thought to contribute to the development of osteoporosis. The diagnosis of osteoporosis is based on bone density measurement. Biochemical markers of bone turnover (BTM) released during bone remodeling can be measured in blood or urine as non-invasive surrogate markers for the bone remodeling rate, and are useful in investigation and management of osteoporosis and other metabolic bone diseases. Procollagen type I amino-terminal propeptide (PINP) and carboxy-terminal cross-linking telopeptide of type I collagen (CTX), in blood, have been designated as the reference bone turnover markers for use in osteoporosis. Method specific differences for some BTM have led to initiatives to standardize or harmonize commercial assays. BTMs increase around menopause and a raised BTM is a risk factor for fracture independent of bone mineral density. The changes seen in BTMs with anti-resorptive and anabolic therapies have been well characterized and this has led to their widespread use for monitoring therapy in osteoporosis and Paget's disease.

DAY 1

Current Evidence and Clinical Utility of Procalcitonin

Dr Mahen Kotalawala

Sepsis is a time critical and a potentially life-threatening condition caused to dysregulated immune response to an infection. Its pathogenesis is incompletely understood and hypothesized to be due to an interaction of multitude of pre and pro inflammatory cytokines. Though guises simple, the entity carries a considerable mortality and morbidity. Lack of gold standard diagnostic criteria and unreliable clinical symptoms often lead to delays in diagnosis which may favour an adverse outcome. Therefore, many scientists have looked for a possible biomarker which will enable them to detect sepsis well in advance before the irreversible effects of sepsis set in. Many biological molecules were put-forward as markers of sepsis and none were proved to be effective in detecting sepsis early.

In the backdrop, procalcitonin emerged as a potential biomarker of early detection of sepsis. It was found to be advantageous over many other existing biomarkers in detecting bacterial causes of sepsis. In spite of limitations, many researchers have demonstrated usefulness of procalcitonin as a diagnostic, theranostic and prognostic marker of bacterial causes of sepsis. It may not be the perfect marker, but, if used rationally, with clinical features to backup, procalcitonin would provide us valuable information for patient care specially to identify patients who could end up with an adverse outcome. Its usefulness is proved in antibiotic stewardship programs worldwide.

Procalcitonin will remain useful till a suitable marker emerge in future.

Emerging Technologies in POC

Professor Sergio Bernadini

Several technological implementations can be predicted for the POCT future. These include a prominent role for mobile health (mHealth) and associated real time medical data, the emergence of wearable analytical devices and new types of POCT analyzers.

The potential of a smartphone for healthcare applications was quickly realized and it has been used in a number of different ways. A device that plugged-into a smartphone to create a medical test device was the next phase of development and current capabilities range from glucose testing to ultrasound scanning. A further development has been medical test devices that connect wirelessly to a smartphone (e.g., Bluetooth connected pregnancy test; Clearblue Connected Ovulation test).

Another use of a smartphone in POCT testing exploits the built-in camera for urinalysis.

The expanding scope of smart devices for mHealth is exemplified by the growing number of smart wearables, i.e., clothing or accessories that have sensors integrated or weaved into their structure and that can provide health information unobtrusively during daily living. Wearables includes devices worn on the wrist (e.g., Apple

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Watch® for monitoring heart rate and rhythm); Embrace smartband to detect epileptic seizures, a mouthgard (e.g., measure linear and rotational acceleration, impact location and direction and counts every impact for concussion assessment); clothing (e.g., CardioInsight Noninvasive 3D Mapping System); and different types of wireless patches (e.g., Smartcardia - vital signs temperature, pulse, blood pressure, blood oxygen levels, cardiac rhythm and cardiac electrical activity) that in some cases are flexible and stretchable (e.g., e-skin with pressure and thermal sensors).

Two other emerging technologies that may be relevant to the future of noninvasive POCT testing are breath analysis (volatolomics) and voice analysis. The non-invasive nature of breath sampling is attractive for POC testing and several analytical systems have been developed (e.g., nanosensors, gas-chromatography, field asymmetric ion mobility spectrometry (FAIMS)). Voice analysis as a diagnostic modality is relatively new. Algorithms have been developed for voice analysis and have had some success in detecting the presence of coronary artery disease.

It seems likely that the amount and modes of access to POCT testing will have increased by 2020. Perhaps mHealth is best positioned because of the ubiquity of smartphones, their connectivity, which underpins a future vision of widespread telehealth with data sent in real-time to a patient's medical record for assessment and interpretation by a medical professional.

Beyond Small Molecules – Promise of Next Generation Sequencing

Dr Chandanamali Punchihewa

DNA contains instructions for everything our cells do, from conception until death. Reading one's genetic component gives an important backdrop on which to operate, from understanding disease predispositions, to diagnosis, prognosis and personalized treatment. With the complex involvement of multiple genes in majority of disease states, and with common clinical presentations of different monogenic disorders, evaluating single genes as in traditional molecular diagnostics has limited value, and therefore the technology of Next Generation Sequencing (NGS), with which hundreds and thousands of genes can be sequenced in parallel, has become extremely useful.

Testing by NGS may include targeted panels, whole exome, whole genome or mitochondrial DNA sequencing, as well as 16s rDNA, metagenomic and metatranscriptomic sequencing in the case of infectious disease testing. NGS is an established test method for detecting inherited mutations, and is used for a wide variety of inherited disorders such as immune deficiencies, bone marrow failure syndromes, blindness, deafness, mitochondrial, renal, neurologic and connective tissue disorders, cardiomyopathies and cancer predisposition syndromes, among others. One of the most common applications of NGS is testing for acquired mutations in oncology, for which either more focused or broad targeted panels are used. Some of the new applications of NGS that has recently moved into clinical laboratories include pharmacogenomics, cell-free DNA testing, human leukocyte antigen (HLA) typing, tumour mutation burden (TMB) and minimal residual disease analysis (MRD), microbial analysis, RNA sequencing and expression, and methylation. New applications for the technology continue to be developed, along with new bioinformatics and wet bench techniques as well as new knowledge regarding interpretation of variants.

DAY 1

Lipid Profile – Essentials to Know

Dr Binod Kumar Yadev

Lipid is heterogeneous organic complex molecules which are insoluble in water and soluble in organic compound. A lipid profile is a measurement of various lipid and related lipoproteins which are present in blood. Deposition of lipid and its derivatives in tissues and blood circulatory system are noted one of the major cause of cardiovascular disease. Lipid profile test is one of the most common tests requested by the physician to assess the risk of heart disease. In general lipid profile measurement includes total cholesterol, HDL-Cholesterol, LDL –Cholesterol and triglyceride.

Values of lipid profile are expressed in numeric, but in order to simplify explanation, ranges of numerical values are often placed into categories such as 'low risk,' moderate risk or 'high risk.' For example, a total cholesterol level over 250 mg/dL is said to be 'high risk', but that doesn't mean a reading of 240 mg/dL have no risk. Higher the total cholesterol, triglyceride and LDL- cholesterol, the higher the cardiovascular risk. Conversely, the lower the LDL cholesterol and higher the HDL-Cholesterol, the lower cardiovascular risk the risk. However, a low number is not a guarantee against cardiovascular risk. The population with low cholesterol is at lower risk of heart disease, but heart disease is not always associated with cholesterol level only.

Lipid profile needs to be evaluated in the context of other risk factors for cardiovascular disease. If you have several other risk factors, a cholesterol level of 200 mg/dL might be considered as additional risk factors, while if you have no other risk factors, it might not be. There is a great variations of plasma lipid levels in different populations and usually are affected by age, sex, food habits, life style, socio-economic status, races, heredity etc. Different methodology adopted for the determination of lipids and lipoproteins also may have some role in variation which could not be ignored. Though in clinical chemistry, reference values are commonly based on reference of the western population or reagents manufacturing countries, these usually do not match with the local population specially noted in case of lipid profile. As reference values are used by clinicians for interpretation of the results of measurements, it should correctly represent a defined group of population which should have close similarity with the patients under treatment coming for investigation. A reference value may be defined as a value obtained by observation or measurement of a particular type of quantity on a reference individual. It is always better to have a reference values for local population to reach in clinical decision.

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New Lipid Guidelines: Emerging Evidence on Importance of Non-fasting Lipids

Professor Khosrow Adeli

Cardiovascular disease (CVD) is the leading cause of death in both men and women in the United States, claiming almost a million lives annually. Coronary heart disease (CHD) is caused by atherosclerotic narrowing of the coronary arteries. Although the death rate for CVD has declined significantly over the years in western countries, the rates are increasing in many developing countries. Evidence has shown that lifestyles associated with a western culture, such as a diet rich in saturated fats and high in calories, smoking and physical inactivity, are some of the modifiable risk factors leading to an increase in the prevalence of cardiovascular (CV) events. Smoking is responsible for 50% of all avoidable deaths, half of which are due to CVD. Dyslipidemia—in particular, raised low-density lipoprotein (LDL-C) cholesterol and triglyceride (TG) levels, and low high-density lipoprotein (HDL-C) cholesterol— is associated with increased risk of CHD. The National Cholesterol Education Program Adult Treatment Panel guidelines have established LDL-C treatment goals, and secondary non-HDL-C treatment goals for persons with hypertriglyceridaemia. The use of lipid-lowering therapies, particularly statins, to achieve these goals has reduced cardiovascular disease (CVD) morbidity and mortality; however, significant residual risk for events remains. This, combined with the rising prevalence of obesity, which has shifted the risk profile of the population toward patients in whom LDL-C is less predictive of CVD events (metabolic syndrome, low HDL-C, elevated triglycerides), has increased interest in the clinical use of inflammatory and lipid biomarker assessments. An expert panel convened by the National Lipid Association has evaluated the use of selected biomarkers [C-reactive protein (CRP), lipoprotein-associated phospholipase A(2), apolipoprotein B (apoB), LDL particle concentration, lipoprotein (a), and LDL and HDL subfractions] to improve risk assessment, or to adjust therapy. These panel recommendations will be reviewed. Further emphasis will be given to important biomarkers including apo B and CRP.

Most common forms of dyslipidaemia in many parts of the work are associated with insulin resistant states such as obesity, metabolic syndrome and type 2 diabetes This condition is also referred to as 'diabetic dyslipidaemia', characterized by a cluster of quantitative and qualitative lipid and lipoprotein abnormalities. This includes increased plasma concentrations of fasting and postprandial apolipoprotein B (apo B)-containing triglyceride-rich lipoproteins (TRL), including very low-density lipoprotein (VLDL) and chylomicrons (CM). Also evident is reduced HDL particle number and cholesterol content, as assessed by plasma apo A-I and HDL-C, respectively, and a predominance of small, dense LDL (sd LDL) particles. Altered metabolism of TRL, both overproduction and impaired clearance, is central to the pathophysiology of atherogenic dyslipidaemia. In humans, there are significant correlations between fasting and postprandial TG concentrations, both of which are inversely correlated with HDL-C and apo A-I plasma concentrations, suggesting a close link between TRL and HDL metabolism. In fact, an elevated TG:HDL-C ratio may be the single most characteristic biomarker of the metabolic syndrome, even more predictive than the presence of abdominal obesity. Therefore, abnormalities in TRL metabolism quantitatively and qualitatively affect the metabolism of both HDL and LDL, leading to increased plasma TRL remnants, low HDL and increased sd LDL, all of which are strongly associated with increased CVD risk.

In this presentation, I will review the latest lipid guidelines from Canada, USA, and Europe. I will also discuss the predictive value of lipid measurements done in fasting versus non-fasting states. The non-fasting lipid profile may be more reflective of the daily circulating plasma lipids and simplifies lipid monitoring for patients, laboratories, and clinicians. Non-fasting TG levels are also independently associated with cardiovascular events, leading to several clinical guidelines (e.g. in Denmark, the UK, Europe and Canada) now recommending non-fasting lipid testing in the primary prevention setting.

DAY 2

Prediction and Diagnosis of Gestational Diabetes

Professor Chandrika Wijeyaratne

The screening and diagnostic issues of Hyperglycaemia in Pregnancy (HIP) has evolved over the past three decades amongst much debate and disagreement, and currently formulated as an international consensus. Gestational Diabetes Mellitus (GDM), although perceived at one point of time as a pregnancy specific phenomenon with its long-term impact on the metabolic health of mother and baby being questionable, is well recognized in the 21st century as a metabolic continuum in high-risk women. The current understanding of GDM/HIP translates into a major public health issue with a significant trans-generational impact on adiposity and cardiovascular health of geographic populations and ethnic groups.

The acceptance of a uniform policy on universal screening for GDM/HIP at field level and an institutional confirmation of the diagnosis with a long term follow up of affected women and their babies has been well affirmed in the Maternal & Child Health (MCH) programme of Sri Lanka since 2013. A pragmatic approach to the prediction of short-term and long-term risks of maternal hyperglycaemia is today a national priority that requires multi-sector commitment. This presentation will include local data, both community based and clinical based, that supports the current practice adopted by health care providers in MCH in Sri Lanka.

Insulin Resistance - Clinicopathological Correlations and Testing

Dr Uditha Bulugahapitiya

Insulin resistance is defined where a normal or elevated insulin level produces an attenuated biological response. This refers to impaired sensitivity to insulin mediated glucose disposal. The syndromes of insulin resistance actually make up a broad clinical spectrum, which includes obesity, glucose intolerance, diabetes and the metabolic syndrome and extreme insulin-resistance. Polycystic ovarian syndrome is also closely associated with insulin resistance. Homeostatic model assessment for insulin resistance (HOMA-IR) and quantitative insulin sensitivity check index (QUICKI) are the most widely used simple indices for assessing insulin resistance in clinical research and practice. Both are based on fasting glucose and insulin measurements. HOMA-IR is derived from the product of the insulin and glucose values divided by a constant. It is calculated by using the following formula: fasting glucose (mg/dL) X fasting insulin (μU/mL) / 405). A value greater than 2 indicates insulin resistance. QUICKI is derived by calculating the inverse of the sum of the logarithmically expressed values of fasting insulin and glucose: 1/[log (fasting glucose) + log (fasting insulin)]. It measures insulin sensitivity, which is the inverse of insulin resistance. A value of less than 0.339 indicates insulin resistance.

In clinical practice, no single laboratory test is used to diagnose insulin resistance syndrome. Diagnosis is based on clinical findings corroborated with laboratory tests. Patients are screened based on the presence of comorbid conditions. Useful tests include the plasma glucose level, HbA_{1C}, lipid profile and fasting insulin levels. Studies have demonstrated that fasting insulin sensitivities are not better than routine clinical variables in predicting insulin sensitivity. Treatment involves pharmacologic therapy to reduce insulin resistance while evaluating and addressing comorbid conditions. The metabolic syndrome requires control of cardiovascular and metabolic risk factors. Modifications of diet and activity are recommended. Medications that reduce insulin resistance include metformin and thiazolidinediones.

DAY 2

Interferences in HbA_{1c} Assay

Dr Saman Peduru Hewa

Association of HbA_{1c} and incidence of macrovascular and microvascular complications of diabetes was first established by the Diabetes Control and Complications Trial (DCCT) and United Kingdom Prospective Diabetes Study (UKPDS) trails. This fact has been endorsed by number of other researchers thereafter and the links with other diabetic related clinical features have been explored by them.

HbA_{1c} assay is widely regarded as the most useful test in assessing the glycaemic control of diabetes mellitus and currently, the test is also used for the diagnostic purposes. However, inherent defects in the technology used in the analysis allow number of interferents to affect on the accuracy of results adversely.

This lecture discusses commonly used HbA_{1c} assay methods, their interfering substances, the level of their interferences and the impact of the generated on the clinical decision making.

Rational Use of Nutritional Markers

Professor Zhong Lu

Nutrients are classified as macro- and micro-nutrients. Carbohydrate, protein and fat are macronutrients that provide energy and building blocks for our body. Micronutrients include vitamins, which include water-soluble and fat-soluble subgroups and minerals. Water soluble vitamins consist of the B-group vitamins and vitamin C while fat-soluble vitamins are vitamin A, D, E and K.

Malnutrition is one of the common clinical problems encountered in clinical practice, commonly present as chronic diarrhoea. It could be caused by inadequate intake, maldigestion (due largely to insufficiencies of pancreatic enzymes) and/or malabsorption (problems with small intestine absorptive membrane). A detailed history on faecal frequency, consistency and volume, surgery and medication will help with the diagnosis. Malabsorption is unlikely if the patient has firm stools. Patient's concept of diarrhoea may be different and faecal incontinence may sometimes be reported as "diarrhoea".

An intact gastro-intestinal tract is important for nutrient absorption. Knowledge on where the nutrients are absorbed will help to provide personalised-testing when a part of the gut has been removed. The proximal jejunum is the main site for absorption of most of the vitamins and minerals, however folate is absorbed mainly in distal jejunum while vitamin B_{12}, magnesium and calcium are absorbed in ileum.

Some simple tests are helpful but often under-utilized, such as, microscopic examination for presence of fat globules (probably due to pancreatic insufficiency) and fat crystals (fat digested but not absorbed in the small intestine) or spot urine sodium concentration for investigation of hyponatraemia.

Biochemical monitoring of nutritional markers is an integral part of clinical management for patients who are on total parental nutrition (TPN). During TPN, biochemical monitoring for refeeding syndrome, hyperglycaemia, fluid status, electrolytes balance, energy-protein turnover, micronutrient balance and liver function is very important. A series of cases will be presented for different scenarios during this lecture.

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Rare Disorders of Calcium Metabolism

Dr Navoda Atapattu

Calcium within the body mainly exist in hydroxyapatite form. Only 1% is in plasma out of which 45% is in the ionized form, 45% is bound to protein, 10 % is complexed with anions. Normal range of total serum calcium is 2.2-2.6 mmol/L. Ionized calcium which is the active form is kept at a narrow range 1.17-1.3 mmol/L. This well controlled ionized calcium involves in muscle contraction, coagulation, neural transmission, bone metabolism. Two main hormones regulate the calcium level in the body namely parathyroid hormone (PTH) and 1,25-dihydroxyvitamin D. PTH increases mobilization of calcium from bone, increases kidney reabsorption of calcium, decreases reabsorption of phosphate and increases kidney conversion of 25-hydroxy to 1,25-dihydroxyvitamin D. Increased calcium and phosphate absorption from gut and increased calcium mobilization from bone is done through 1,25-dihydroxyvitamin D.

PTH is produced in response to low serum calcium and is suppressed when serum calcium is elevated. 1,25-dihydroxyvitamin D formation is regulated by PTH and serum calcium level. Disorders associated with altered calcium levels may be environmental or genetic. Understanding of calcium metabolism and associated disorders is important to control symptoms and reduce the risk of potential complex problems.

Harmonised Paediatric Reference Intervals in Australasia – Now with HAPPi kids

Dr Tina Yen

In Australia and New Zealand paediatric reference intervals were a major challenge. While tertiary paediatric hospitals had excellent laboratory reference intervals, there was no mechanism to transfer their reference intervals to non-paediatric major hospital laboratories, private hospital laboratories, small suburban- and/or regional laboratories. Method and analyser differences, and requirement for extensive verification ensured this paediatric barrier would continue without solution. This was a profession-wide concern, and paediatric chemical pathologists could no longer feel secure in their own institutions, knowing that errors of interpretation would continue in non paediatric facilities.

Around the same time (2011) the Australian government requested laboratories provide health data for the single national e-health record. The government insisted patient laboratory results had common reference intervals because there was no provision for excessive information in the database.

In 2012, RCPA and AACB jointly held the first Harmonisation Workshop in Sydney where surveys, literature search and local data was presented to key stakeholders in a debate on Common Reference Intervals. There was a unanimous agreement to harmonise pathology practice across Australia and New Zealand and remove

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unnecessary variation. In paediatrics, patient safety an additional motivation and the Paediatric expert group undertook to ensure every child's laboratory test would have the correct, safe, age-specific reference interval for making clinical decisions.

The AACB/RCPA Harmonised Reference Intervals in Paediatrics (AHRIP) were published in Clinical Biochemist Reviews in 2014 together with the adult reference intervals and made available for laboratories to adopt and cite for accreditation purposes. There are number of provisos: serum/plasma creatinine ranges applied to enzymatic assays, so Jaffe creatinine methods did not have harmonized reference intervals. Potassium ranges were separated for serum and plasma. Finally, paediatric harmonised reference intervals applied to laboratories using the stated manufacturers and methods only.

The database of the paediatric harmonized reference intervals project was created from paediatric biochemistry results in 2011 – 2012 which were generously provided by every major laboratory in Australasia. The database of more than one million individual results had exhaustive analysis, and the final reference intervals were corrected for method biases as well as reviewed by five paediatric chemical pathologists. The principle of AACB harmonisation was that the methods were methodologically sound, had clear traceability and current performance was within the RCPAQAP allowable limits.

The final step for the Australasian Harmonised Paediatric reference intervals was the important retrospective validation by an Australian primary reference interval study. In 2014 the Harmonizing Age Pathology Parameters in kids (HAPPi kids) project commenced. HAPPi kids is a large prospective cross-sectional study based at the Royal Children's Hospital in Melbourne. Specimens were collected from healthy neonates and children for commonly requested biochemical, immunological and haematological tests. The outcomes for biochemistry test panel was published in Clinical Chemistry (2019). Work is continuing for haematology, endocrinology and immunology panels.

The concordance of HAPPi kids with AHRIP is the assurance which can be provided to the government and department of health regarding safety. These projects take many years to reach the final step, 8 years in this example, and involve hundreds of people. In this way, the profession has generated this outcome with contributions from laboratories and the paediatric community.

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Utility of Catecholamines and Their Metabolites in Diagnosis of Adrenal Medullary Tumours

Dr Samuel Vasikaran

Phaeochromocytomas and paragangliomas (PPGL) are catecholamine-producing tumours arising from the chromaffin cells of the adrenal medulla or extra-adrenal paraganglia, which usually manifest with moderate or severe hypertension. Whilst adrenal medullary tumours (phaeochromocytomas) produce adrenaline and noradrenaline, extra-adrenal tumours (parganglioma) may also produce dopamine. Measurements of catecholamine metabolites (metadrenaline, normetadrenaline and 3 methoxy tyramine) rather than the parent compounds (adrenaline, noradrenaline and dopamine) provide the best test for excluding or confirming phaeochromocytoma due to their better sensitivity and specificity. Therefore, the recommended initial biochemical testing for PPGL is measurement of either plasma free or urinary fractionated metanephrines (metadrenaline and normetadrenaline) which, if increased, demonstrate excess production. Liquid chromatography with tandem mass spectrometry (LC-MS/MS) or electrochemical detection (LC-ECD) are the recommended methodologies for their measurement, and require specialised and expensive equipment as well as scientific expertise and experience in chromatographic technology. The measurement of catecholamines including dopamine in urine is still used in paediatric practice for the diagnosis and monitoring of neuroblastomas.

Whilst very high concentrations of metanephrines (> three times the upper reference limit for normetanephrine and four times the upper reference limit for metanephrine) have a high predictive value for the diagnosis of PPGL, borderline increased values, which are seen in up to 25% of patients with PPGL, can also be the result of inappropriate sampling conditions, medications (especially psychoactive agents) and acute illness or physiological stress and should be clarified with repeat testing after exclusion of these factors. Sampling should be performed in fasted patients under resting, supine condition. Potentially interfering medications should be tapered and safely ceased for two weeks prior to testing if possible.

Among unselected patients screened for PPGLs, prevalence of PPGLs ranges from 0.8% to 1.6%. Therefore, false-positive results in the borderline range will greatly exceed true-positive results. Whilst at the clinical interface the biochemical results can be considered in the context of pre-test probability, the reporting laboratory often does not have adequate information regarding the patient's presentation and the pre-test probability in order to report increased values in terms of the likelihood of the presence of PPGL in individual patients. Therefore, we use the practice of reporting increased metanephrine values a 'borderline increased – phaeochromocytoma not excluded' or 'clearly increased – phaeochromocytoma likely'.

The diagnosis of PPGL requires both proof of excessive secretion of catecholamines as well as anatomical documentation of the presence of tumor. However, imaging studies before biochemical confirmation of PPGL can be costly and time consuming and, in many cases, unnecessary. On the other hand, the widespread use of sensitive imaging technologies has led to the common finding of an incidental adrenal mass (incidentaloma). In addition, asymptomatic cases of PPGL are increasingly being identified by family studies and genetic testing for genes such as RET, VHL, SDH and NF1. Among patients with incidentalomas, prevalence of PPGLs is higher at 4%–9%. Prevalence of PPGLs among patients with germline mutations of PPGL susceptibility genes runs even higher, reaching 40% in multiple endocrine neoplasia type 2 (MEN 2). The differences in pre-test probability should be considered when interpreting positive results to assess post-test probability of PPGL.

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Follow-up biochemical tests to further exclude or confirm PPGL in patients with persistently raised plasma metanephrines in the borderline range include the examination of plasma normetanephrine responses to clonidine to distinguish positive results due to sympathetic activation from those due to a PPGL. Clonidine suppression test has a specificity approaching 100% with a sensitivity of 97% in diagnosing.

Whilst persistently positive results should be followed up, whether additional comprehensive testing procedures or a wait-and-retest approach is pursued remains a matter of clinical judgment based on the pre-test probability of a tumour and the extent and pattern of increases in test results.

Patient Based Real Time QC

Dr Tony Badrick

Internal Quality Control (IQC) has evolved over time and practice to become an essential component of laboratory process control. Stop/go decisions are made based on the results of well trialed rules using highly defined material. However, patient based real time quality control (PBRTQC) models have been around for many years and have recently been investigated as alternatives because:

- sometimes other controls are unavailable or impractical.
- patient results might detect an issue that other forms of Quality Control (QC) cannot because of commutability issues.
- the state of the testing process can be assessed between the times of routine control-based QC, which may be run infrequently.
- there is little cost.

External Quality Assurance (EQA) is a process designed to independently:

- assess the performance of methods,
- provide feedback, often to Regulators, of individual laboratory performance
- assess of method robustness to clinically relevant interference
- audit of wider aspects of analytical performance and educational activities

These two processes, IQC and EQA, are often conducted independently, except when IQC results may be reviewed following a failed EQA report. However, looking at these two processes in this way loses much of the power of EQA, it can be more than just a regulatory exercise.

The development of better techniques and middleware to allow the practical application of PBRTQC has led to a rethinking of conventional QC, and the relationship between IQC and EQA.

In this presentation we will consider PBRTQC and how it could be used in conjunction with IQC or indeed instead of it. The information that can be gathered from some forms of EQA will also be described in terms of understanding of assay stability and capability. A model of integrating IQC/PBRTQC and EQA will also be described.

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Challenges in Quality Assurance – Today and Tomorrow

Dr Elizabeth Frank

In the era of a fast-changing healthcare system and the global increase in health demand, the role of the laboratory medicine specialist has gone beyond someone who just looks into the accuracy of the testing process. The laboratory professionals now need to ensure the quality of service from end to end and at sustainable costs. Quality assurance is therefore the key to provide confidence by giving attention to every stage of the process. By default, quality assurance sometimes is understood only in paradigm of the analytical quality ie internal quality control (IQC), external quality assurance scheme (EQAS) and accuracy. Quality assurance encompasses and assures quality in the entire workflow of a clinical laboratory and an in depth understanding of the process of quality assurance and effectively monitoring helps to stay the course.

The identification and monitoring of the quality assurance process is rather challenging with different accepted practices and lack of harmonization in testing methods and reporting patterns. The use of quality indicators should not be limited to internal assessment and participation in EQAS but must be developed into a suitable tool for supporting the management decisions for patient management and customer satisfaction. The laboratory and instrumentation of tomorrow will be more automated and will have lesser human intervention. This poses a new challenge in developing monitoring matrices that are relevant. We need to develop algorithms that ensure quality, help in understanding nuances and pitfall and automation.

Laboratory professionals today also need to add value to both the patient and the doctor. The quality assurance process enables the lab to adapt into patient centric clinical pathways based on both classical outcomes and innovative patient evaluation keeping the cost affordable and relevant.

Critical Levels for 25(OH) Vitamin D

Dr Saswati Das

Vitamin D plays an essential role in the regulation of metabolism, calcium and phosphorus absorption of bone health. However, the effects of vitamin D are not limited to mineral homeostasis and skeletal health maintenance. The presence of vitamin D receptors (VDR) in other tissue and organs suggest that vitamin D physiology extends above and beyond bone homeostasis. Vitamin D is produced by skin exposed to ultraviolet B radiation or obtained from dietary sources, including supplements. Persons commonly at risk for vitamin D deficiency include those with inadequate sun exposure, limited oral intake or impaired intestinal absorption. Vitamin D adequacy is best determined by measurement of the 25-hydroxyvitamin D concentration in the blood. The mechanism of action of vitamin D3 through its hormonal form, dihydroxyvitamin D3, involves a nuclear VDR that regulates the transcription of several target genes in a variety of vitamin D target cells that are primarily involved in the calcium homeostasis of cell differentiation. Average daily vitamin D intake in the population at large and current dietary reference intake values are often inadequate to maintain optimal vitamin D levels. Reliance on a single cut-off value to define vitamin D deficiency or insufficiency is problematic because of the wide individual variability of the functional effects of vitamin D and interaction with calcium intakes. Vitamin D toxicity occurs when pharmacologic doses of vitamin D are consumed for prolonged periods of time or from a single megadose translating to a large increase in circulating 25 - hydroxyvitamin D concentrations. The plethora of vitamin D studies over the past decade highlight the pleomorphic effects of vitamin D outside its conventional role in calcium and bone homeostasis. Vitamin D deficiency, though common and known, still faces several challenges among the medical community in terms of proper diagnosis and correction. In this talk, the different levels of vitamin D, recommended cut-off levels and its clinical implications will be highlighted.

DAY 2

Association of Organochlorine Pesticides with Chronic Kidney Disease, and Its Implications

Dr Sudip Datta

Authors from several parts of the world report high levels of organochlorine pesticides (OCP) found associated with chronic kidney disease (CKD); however, whether it initiates kidney damage or get accumulated due to falling glomerular function rate (GFR) is not yet clarified. We have observed that blood OCP levels as analyzed by gas chromatography, show significantly higher levels in CKD patients. Spearman's correlation analysis of OCP levels with eGFR exhibit significant negative correlation for most individual OCPs which persist even after statistical adjustments for age, sex, body mass index (BMI), total cholesterol and triglycerides. Another of our studies pointed out association of higher OCP loads in patients with genetic polymorphisms involving CYP1A1. Subjects carrying at least one mutant allele of CYP1A1*2A (TC, CC) and *2C (AG, GG) were found to have a modest rise of odds (1.4–2) of association with CKD. However, genotypic combinations of hetero-/homozygous mutants were found to be significantly associated with CKD with odds ratios ranging from 1.8–3. We have also analyzed genetic polymorphisms of GSTM1 and GSTT1 in these patients. We observed that, double deletion or GSTM1 (-) / GSTT1 (-) genotype was associated with 1.8-fold higher odds of association with CKD compared to wild genotypes i.e. GSTM1 (+)/GSTT1(+). Logistic regression analysis by taking wild genotypes GSTM1 (+)/GSTT1 (+) as reference revealed that, in CKD patients several pesticides showed significant association with either null or both null genotypes. The above results suggest that decreasing GFR and genetic polymorphisms involving xenobiotic metabolising genes both play a role in accumulation of OCPs in CKD patients.

Based on the above we concluded that OCPs might be accumulated in patients with decreased urinary clearance. We further hypothesized that after successful renal transplant, accumulated OCPs should gradually be cleared out of the system through the transplanted kidney. Hence, 51 adults with CKD stage-5D on maintenance hemodialysis and planned for renal transplantation were recruited. Blood samples were drawn twice: first before renal transplantation and second after about 6 months (after confirmation of renal graft stabilization) with estimation of OCPs twice by gas chromatography. However, we found that, although, OCP levels in blood are inversely related to the eGFR, significant decrease in accumulated OCPs were not observed 6 months after successful renal transplantation.

DAY 2

Acute Kidney Injury – Diagnostic Challenges

Dr Nalaka Herath

Acute kidney injury (AKI) is a clinical syndrome characterized by a rapid deterioration of renal function over hours to days due to variety of causes. This results in abnormal excretory, secretary and synthetic functions.

Kidney damage is diagnosed with elevation of serum creatinine. However, due to number of reasons, it makes complexities in diagnosis. Biomarkers of kidney disease is one way forward. Cost and availability will be the key disadvantages. High degree of suspicion and urine output monitoring can be promising in clinical settings.

Total Laboratory Automation and Digitalization – What to Expect

Dr Neepa Chowdhury

Laboratory automation is a multi-disciplinary strategy to research, develop, optimize and capitalize on technologies in the laboratory that enable new and improved processes. The presence of automation and robotics in the laboratory is becoming increasingly common. The use of these new tools is not, however, without its problems. For example, the first-time user is faced with the problem of how best to introduce automation. Even the experienced user may face recurrent, nagging problems in the use of automation. This presentation discusses the need for automation, the points to keep in mind while shifting to automation, the range of problems that may be experienced by users and managers of automation and offers suggestions for practical solutions.

ORAL PRESENTATIONS

Effect of Serum Selenium on Thyroid Function among Adult Population in Sri Lanka

Ms Fathima Fahima Jainulabdeen
BSc Medical Laboratory Sciences (Hons)
Higher Diploma in Medical Laboratory Technology
Medical Laboratory Technologist
Department of Biochemistry
Medical Research Institute, Colombo

Serum Sex Hormones Concentrations and Hormone Receptor Status of Breast Cancer Patients in Sri Lanka

Dr Kasuni Akalanka
BSc (Hons), PhD, M.I Chem C
Senior Lecturer
Department of Medical Laboratory Science
Faculty of Allied Health Sciences
University of Ruhuna, Galle

Correlation between HbA_{1c} and Fructosamine in Determining Glycaemic Control in Diabetic Thalassaemia Population and Type II Diabetic Population in Sri Lanka

Dr U.E. Senanayake
MBBS, Dip Chem Path
Registrar in Chemical Pathology
North Colombo Teaching Hospital Ragama

Idiopathic Central Diabetes Insipidus in a Patient with Morquio A Syndrome

Dr P.M.S. Fernando
MBBS
Registrar in Chemical Pathology
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ORAL PRESENTATIONS

An Unrecognized Cause in a Long-term Psychiatric Patient

Dr T. Inthujah
MBBS
Registrar in Chemical Pathology
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A Thyrotoxic Patient Presenting with Recurrent Vomiting and Hypokalemic Periodic Paralysis

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ABSTRACTS OF CASE REPORTS

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CR 01

MEN-1 Associated Primary Hyperparathyroidism; Is it different?

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Introduction

Primary hyperparathyroidism (PHPT) is commonly sporadic (sPHPT) and also occurs as a part of familial syndromes. It is the main endocrinopathy associated with multiple endocrine neoplasia-1 (MEN-1) and is the presenting feature in >85% of them.

Case Presentation

A 27-year-old male with a first-degree relative of MEN-1 was detected to have hypercalcaemia on screening. He was asymptomatic and biochemical testing confirmed PHPT [serum total calcium 2.71 mmol/L (2.15-2.57), urine calcium excretion 13.12 mmol/24h (2.5-7.5), iPTH 240 pg/mL (14-72)]. Technetium (99mTc) tetrofosmin scan and 3-dimensional CT scan of neck revealed a lesion in right lower parathyroid gland while ultrasound scan was normal. Parathyroid venous sampling failed to localize a lesion. Genetic analysis revealed heterozygosity for a missense mutation of MEN1 gene [NM 130799.2, c.1736T>C; p.Leu579Pro]. Osteopenia was evident on dual-energy X-ray absorptiometry. Investigations for other MEN-1 associated endocrinopathies and non-endocrine tumours were negative. Neck exploration and total parathyroidectomy with half-gland auto-transplantation was performed. Histology confirmed a parathyroid adenoma and two hyperplastic glands. The patient developed post-surgical hypoparathyroidism requiring long term calcium and calcitriol therapy. Two years after surgery, there was no evidence of recurrence or other tumours.

Discussion

In contrast to sPHPT, the patient had mild hypercalcaemia, at an early age of onset with multiglandular involvement. In addition, MEN-1 associated PHPT occurs equally in men and women, with a greater reduction in bone mineral density and a higher rate of recurrence after surgery. Given the multiglandular nature of parathyroid involvement, the place for preoperative localizing techniques is questionable. In both, parathyroidectomy is the curative treatment.

Keywords

Primary hyperparathyroidism, sporadic primary hyperparathyroidism, MEN-1, hypercalcaemia, preoperative localizing

ABSTRACTS OF CASE REPORTS

CR 02

Endocrine Hypertension: Is Adrenal Venous Sampling Superior to CT Scan in Detecting the Cause for Primary Hyperaldosteronism?

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Introduction

Hypertension can be primary or secondary to other conditions. When evaluating a young patient for secondary hypertension, we have to consider renal and endocrine causes.

Primary hyperaldosteronism (PA) is a condition characterized by excessive/ autonomous secretion of aldosterone and is a common cause of secondary hypertension. It could be due to the presence of an adrenal adenoma, bilateral or unilateral adrenal hyperplasia, adrenal carcinoma (rare) or an inherited condition causing familial aldosteronism.

Case Presentation

We present a case of a 32-year-old male patient, presented to the medical ward with a history of non-ischaemic type chest pain and resistant high blood pressure.

Biochemical investigations revealed low serum potassium with renal potassium wasting. Arterial blood gas analysis showed metabolic alkalosis. Plasma aldosterone to renin ratio was 95.7 (aldosterone - 23.15 ng/dL, renin activity - 0.24 ng/mL/hr) with a non-suppressible saline infusion test. As computed tomographiy (CT) scan of the abdomen did not reveal any abnormalities, adrenal venous sampling was performed which indicated bilateral hyperplasia of the adrenal glands. Patient was started on spironolactone, which brought down the resistant high blood pressure immediately.

Discussion

Imaging studies are important in detecting the cause for primary aldosteronism, but have their own limitations. Adrenal venous sampling is now considered to be the gold standard, and superior to CT/MRI studies.

PA will give rise to various hypertensive complications. Early detection is important as correct diagnosis can lead to complete cure of the disease.

Keywords

Primary aldosteronism, adrenal venous sampling, endocrine hypertension

ABSTRACTS OF CASE REPORTS

CR 03

Idiopathic Central Diabetes Insipidus in a Patient with Morquio A Syndrome

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Introduction

Morquio A syndrome [Mucopolysaccaridosis IV A] is a rare autosomal recessive lysosomal storage disorder due to mutations in genes coding N-acetylgalactosamine-6-sulfatase enzyme (GALNS) resulting in a heterogeneous presentation of mainly skeletal and non-skeletal manifestations.

Diabetes insipidus (DI) is hypotonic polyuria due to defective secretion or action of arginine vasopressin in central and nephrogenic DI respectively. Central diabetes insipidus (CDI) is not common in children. Thirty to fifty percent of diagnosed patients in the pediatric population are idiopathic.

Case Presentation

We present a Sri Lankan-Tamil ancestry girl born to consanguineous parents, who was normal at birth later developed joint hypermobility, short stature, short neck, lumbar lordosis, pectus carinatum, ankle valgus, genu valgum and ulnar deviation with recurrent respiratory tract infections, myopia, hearing impairment and dental abnormalities. β-galactosidase-6-sulphate-sulphatase enzymes in leucocytes showed decreased activity of 0.05 nmol/17 hrs/mg/protein (3.9 – 21) and genetic studies revealed homozygous variant in exon 9 of the GALNS gene, c.878C>T (p.Ser293Leu) confirming Morquio A.

At 10 years of age she presented with polyuria and polydipsia. Osmolality studies showed normal serum osmolality with hypotonic urine. Diabetes mellitus, hypokalaemia, hypercalcaemia were excluded. Renal functions, thyroid and cortisol hormone levels were normal. A water deprivation test with vasopressin challenge confirmed CDI. MRI brain was normal with no pituitary stalk thickening categorizing under a working diagnosis of idiopathic CDI.

Discussion

To our knowledge there are no documented cases of Morquio patients with CDI. Deposition of glycosaminoglycans or skeletal compression of pituitary gland are possibilities. The reported observation could be used for further studies to detect endocrine abnormalities in mucopolysaccharidosis patients.

Keywords

Morquio A, MPS IVA, central diabetes insipidus

ABSTRACTS OF CASE REPORTS

CR 04

Hypopituitarism by Reflective Testing; Value-added Biochemistry

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Introduction

Reflective addition of biochemistry tests is a mechanism to improve clinical effectiveness in primary care. The added value of reflective testing during clinical validation is difficult to quantitate but largely depends upon the clinical impact of the tests being added. Hypopituitarism can present in a variety of ways, often due to specific hormonal deficiency or excess, but can often present with non-specific symptoms. We report a case of hypoptuitarism diagnosed following clinical validation of thyroid function tests.

Case Presentation

A 45-year-old lady had bloods requested at primary care with a complaint of tired all the time. Initial results noted normal electrolytes, renal functions, insufficient vitamin D, normal TSH, low fT_4 at 6 pmol/L (RR 9.01-19.05) and normal haemoglobin. The retrospectively added fT_3 was undetectable, gonadotropins and sex hormones were compatible with hypogonadotropic hypogonadism. The prolactin was 97 mIU/L (RR 109-557) and 9 am serum cortisol was 165 nmol/L. The patient was referred to endocrine team. The short synacthen test arranged later showed adequate response. Magnetic resonance imaging (MRI) of pituitary confirmed an empty sellar; proving biochemical diagnosis of anterior hypopituitarism. Her bone density scan showed spinal osteoporosis. The patient is currently on L-thyroxine, bisphosphonates and under regular review by the endocrine team.

Discussion

Hypopituitarism is associated with increased morbidity and mortality in the acute and chronic phase and even in treated patients the standardised mortality ratio is higher than that of the general population. The clinical review and validation of thyroid functions by a clinical professional provide the opportunity to identify new cases of hypopituitarism.

Keywords

Reflective testing, hypopituitarism

ABSTRACTS OF CASE REPORTS

CR 05

Laboratory Error: Admit, Ignore or Deny?

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Introduction

Laboratory errors could be unpredictable and lead to wrong reports. The error may be trivial and go unnoticed or bring serious harm to patients. Without waiting for formal complaints, the laboratory should rectify any detected error and re-issue a correct report to ensure patient safety. We report our experience in a private hospital laboratory accredited both locally and internationally.

Case Description

We measure serum triglycerides for lipid profiles by homogeneous enzymatic colorimetry on fully-automated chemistry analysers. One morning, the usually-perfect internal quality control (IQC) failed at both levels with a uniform positive bias of approximately 100 mg/dL. It transpired that the filter membrane of the reverse osmosis (RO) water plant supplying the machines was changed previous afternoon by biomedical staff, because the laboratory notified unacceptably high water conductivity. All samples assayed after that were re-assayed using another platform, with water from a different reservoir. IQC was acceptable. All results (n=53) were lower than the previous day. The identified positive bias ranged from 41 – 166 mg/dL (mean 110; SD 29) with the maximum impact noted 4-hours after changing the filter. The error percentage was 14-275% (mean 105). The vendor subsequently disclosed that during packing, the filter membrane is protected by a layer of glycerine, which positively interferes with the triglyceride assay. All reports were re-called and replaced by an amended report.

Discussion

Biomedical staff was oblivious to the need for several rounds of pre-washing before installation of the filter membrane. Communication gap between the biomedical and laboratory staff resulted in IQC not being done after its replacement. We disregarded the potential negative impact on the image of our laboratory in chasing up unsuspecting patients to provide an accurate report.

Keywords

Laboratory error, triglyceride interference, triglyceride assay

ABSTRACTS OF CASE REPORTS

CR 06

The Importance of Considering Niemann Pick Disease in Children who present with Vertical Supranuclear Gaze Palsy

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Introduction

Niemann Pick type C (NPC) is a rare autosomal recessive metabolic disorder due to pathogenic variants in either NPC1 or NPC2 genes. Bi-allelic loss of function variants in these genes lead to an impaired intracellular lipid transport with an abnormal accumulation of cholesterol and glycosphingolipids in multiple tissues of the body including brain leading to neurovisceral manifestations. The demonstration of vertical supranuclear gaze palsy (VSGP) - inability to look upward or downward is a neurological hallmark of NPC disease.

Case Presentation

We report an 8-year-old child who was normal at birth and later developed isolated splenomegaly, which progressed to hepatosplenomegaly, inability to move eyes vertically up and down, generalized seizure attacks, global developmental regression, failure to thrive, ataxia, speech delay and dysphagia. . He was born to nonconsanguineous parents. Magnetic resonance imaging of brain revealing cerebral atrophy and electroencephalogram showed low amplitude activity. The highly sensitive and specific biomarker of NPC - sphingomyelin - 509 showed an increased concentration of 1.2 ng/mL (pathological cut-off ≤0.9 ng/mL). Sanger sequencing detected 3 pathologic heterozygous variants c.1612_1619dup, c.1619C>G, c.2428G>A in NPC1 confirmed the diagnosis of NPC.

Discussion

VSGP can be the first symptom of NPC that is easily noticed by parents or clinicians. As general biochemical findings are mostly insignificant in NPC, properly interpreting VSGP would help avoiding unnecessary investigations. Definitive diagnosis requires genetic testing.

Keywords

Niemann Pick type C, vertical supranuclear gaze palsy, Sanger sequencing

ABSTRACTS OF CASE REPORTS

CR 07

An Unrecognized Cause in a Long-term Psychiatric Patient

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Introduction

Primary hyperparathyroidism (PHPT) has various presentations though most have few or no symptoms. Presentation could be a spectrum, ranging from asymptomatic normocalcaemic PHPT to severe hypercalcaemic crisis. Clinical manifestations related to PHPT can occur as renal stones, polyuria, constipation, pathological bone fractures, neuromuscular and psychiatric manifestations. We report a young female with long standing depression that was ultimately diagnosed as PHPT.

Case Presentation

A 30-year-old female with long-term depression presented with symptoms of urinary tract infection and intermittent constipation. Family history was not significant. Investigations revealed elevated serum creatinine of 1.7 mg/dL (0.52 – 1.04) with bilateral nephrocalcinosis, corrected calcium of 15.4 mg/dL (8.4-10.2), phosphate of 2.3 mg/dL (2.5-4.5), ALP of 105 IU/L (46-116) and calcium to creatinine clearance ratio of 0.06 (less than 0.01 favours familial hypocalciuric hypercalcemia). Intact PTH was 254.9 pg/mL (15-65), an inappropriately elevated level for the hypercalcaemia, which favours PHPT. Imaging studies revealed right upper pole mass in parathyroid region which was removed surgically. Her intra-operative PTH was 32 pg/mL and 27 pg/mL at 10 min and 15 min respectively. Her post-operative calcium reduced to 10.4 mg/dL and there was a dramatic improvement in her mood and depressive symptoms. Histology confirmed adenoma of parathyroid gland.

Discussion

Treatable causes like hyperparathyroidism need to be considered in patients with depression. As PHPT is associated with multiple endocrine neoplasia type 1 (MEN 1) and MEN 2A syndromes our patient is awaiting further screening such as 24-hour urinary metanephrines and serum calcitonin for MEN 2A and pituitary hormones and imaging of pituitary and abdomen for MEN 1.

Keywords

Primary hyperparathyroidism, depression

ABSTRACTS OF CASE REPORTS

CR 08

A Young Girl with Autosomal Recessive Hypercholesterolaemia

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Introduction

Familial hypercholesterolaemia (FH) is characterized by elevated LDL cholesterol and premature atherosclerotic cardiovascular disease. Autosomal dominant hypercholesterolaemia affects 1 in 300 globally and is caused by mutations in the LDLR, APOB and PCSK9 genes. We report a case of autosomal recessive hypercholesterolaemia, an extremely rare, inherited type of hypercholesterolaemia.

Case Presentation

An 11-year-old girl presented with multiple painless yellowish nodules around her elbows and knees for two-year duration, having been seen and treated by multiple medical practitioners. Her fasting lipid profile revealed a total cholesterol of 670 mg/dL, LDL-cholesterol of 603 mg/dL, HDL-cholesterol of 41 mg/dL and triglyceride of 131 mg/dL. Secondary causes of hypercholesterolaemia were excluded. Her mother and brother had normal LDL-cholesterol, while the father's was 236 mg/dL. There was no family history of adverse cardiovascular events. FH genetic testing revealed a homozygous pathogenic frameshift variant in LDLRAP1, c.71dupG, p.Gly25Argfs*9.

Discussion

Autosomal recessive familial hypercholesterolemia is a rare condition caused by loss of function mutations in the LDL receptor adapter protein 1 (LDLRAP1) which leads to reduced LDL particle uptake in the liver. Although the phenotype is less severe than homozygous autosomal dominant FH due to LDLR gene mutations, prompt initiation of aggressive lipid-lowering treatment is required to improve the cardiovascular prognosis in these high-risk patients.

Keywords

Familial hypercholesterolaemia, autosomal recessive, LDL receptor adapter protein

ABSTRACTS OF CASE REPORTS

CR 09

A Baby with Familial Hypercholesterolaemia

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Introduction

Prevalence of autosomal dominant homozygous familial hypercholesterolaemia (FH) is 1 in 250,000 and heterozygous FH is 1 in 250. Homozygous individuals have severe symptoms with onset of heart disease before the age of 30 years.

Case presentation

A 2 ½-year-old girl presented with yellow coloured patches over the buttock region since the age of eight months. These patches gradually spread to knees, ankles and elbows. Initial lipid profile revealed very high total cholesterol (775 mg/dL) and high LDL (697 mg/dL) with a normal triglyceride level. Tendon xanthomas observed in the Achilles tendon, knee, elbows and buttocks. No xanthelasma was observed. Fundoscopy revealed no arcus cornealis with a normal echocardiogram and ultrasound scan of the abdomen. Younger sister also has tendon xanthomas. There is a strong family history from maternal side (uncles) with two premature deaths due to ischaemic heart disease. Father had a premature myocardial infarction. Index patient and the younger sister were homozygous for a pathogenic variant in the LDLR gene. Parents are heterozygous. Babies were started with simvastatin 10 mg nocte, diet control and vitamin K supplements. They were followed up with lipid profiles and dose was increased accordingly. Now the patient is on simvastatin 70 mg nocte.

Discussion

Diagnosis of familial hypercholesterolemia was made with the genetic studies. Newer treatment options available include PCSK 9 inhibitors, plasmapheresis, partial ileal bypass surgery and liver transplantation which is the treatment of choice.

Keywords

LDLR, PCSK 9, tendon xanthomas, familial hypercholesterolaemia

ABSTRACTS OF CASE REPORTS

CR 10

Acute Pancreatitis in a Young Woman with Eruptive Skin Lesions

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Introduction

Acute pancreatitis is caused by several aetiologies such as gall stones, alcohol abuse, viral infection, drugs, hypercalcaemia, hypertriglyceridaemia and idiopathic in some cases. We report a young female who presented with acute pancreatitis due to undiagnosed familial chylomicronaemia syndrome.

Case presentation

A 21-year-old previously healthy girl presented with acute epigastric pain and vomiting. She had xanthomatous eruptions in dorsum of hands, elbows and abdomen. Investigations revealed serum amylase of 700 U/L (22-80) and serum corrected calcium 7.9 mg/dL (8-10.2). Her fasting lipid profile showed triglyceride (TG) of 4449 mg/dL (<150), total cholesterol of (TC) 704 mg/dL (<200) and HDL of 16 mg/dL (>40). LDL could not be calculated due to high triglyceride level and direct LDL measurement was not available. The ratio of TG:TC was >5 suggestive of high chylomicrons and VLDL. Following immediate plasmapheresis, her TG level came to 712 mg/dL and TC came to 238 mg/dL.

The genetic studies of the patient and father revealed heterozygous missense variant of LPL C.808C>G(pArg270Gly) and genetic studies of mother was normal. Heterozygous variant with polygenic and/or environmental factors may explain the chylomicronaemia syndrome in this patient. However, father was not affected as heterozygous carriers of LPL variant may also have normal or elevated triglyceride concentration as seen in her father (TG- 265 mg/dL).

Discussion

Familial chylomicronaemia syndrome is a rare autosomal recessive disorder (1 in 1 million) frequently caused by mutations in lipoprotein lipase (LPL) gene resulting in accumulation of chylomicrons even in 12-14 hours fasting. Acute pancreatitis is a well-known serious complication of this condition.

Keywords

Acute pancreatitis, familial chylomicronaemia syndrome, lipoprotein lipase

ABSTRACTS OF CASE REPORTS

CR 11

Acute Paraparesis Beyond Precipitating Factor

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Introduction

Acute paraparesis is due to diseases of central nervous system (CNS) and metabolic conditions such as hypoglycaemia, altered blood potassium levels and thyrotoxicosis. We present a case of acute flaccid paraparesis due to severe hypokalaemia which turned out to be Bartter syndrome.

Case Presentation

A 20-year-old differently abled boy with hearing impairment presented with acute onset flaccid paralysis and low–normal blood pressure. Prenatal history revealed polyhydramnios. He had polyuria and polydipsia. No history of diuretic abuse. Examination did not reveal features suggestive of CNS disease. He had severe hypokalaemia [1.8 mmol/L (3.5-5.1)] with 'u' waves in the ECG. He was found to have metabolic alkalosis in blood gas analysis, increased urinary potassium:creatinine ratio of 14.57 mmol/g (<14.5 mmol/g) and increased 24-hour urinary potassium excretion of 81.8 mmol/day (<15 mmol/day). The calculation of transtubular potassium gradient was at 7.22 (> 4- increased distal secretion of potassium). Urine calcium:creatinine ratio of 0.21 mmol/mmol (>0.2 hypercalciuria) and low normal serum magnesium of 0.88 mmol/L (0.8 – 1.1) suggested Bartter syndrome over Gitelman syndrome. Deafness and polyhydramnios favoured type 4 Bartter syndrome and he is awaiting genetic analysis for confirmation. He was started on potassium which made dramatic symptomatic improvement.

Discussion

Bartter syndrome is an autosomal recessive condition with metabolic alkalosis, hypokalaemia, hypercalciuria, occasionally hypomagnesaemia, normal blood pressure and an elevated plasma renin and aldosterone. This is caused by defective functions of ion transporting channels in the tubules. The type 4 variety is associated with defects in inner ear as well.

Keywords

Acute paraparesis, hypokalaemic metabolic alkalosis, sensorineural deafness, Bartter syndrome

ABSTRACTS OF CASE REPORTS

CR 12

Respiratory Distress in a Preterm Neonate due to a Milky Pleural Effusion

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Introduction

Chylothorax is a rare presentation defined as presence of chyle in the pleural space due to leakage from thoracic duct or its tributaries following damage or blockage. The discriminating feature of chylothorax is the presence of high triglycerides and lymphocytes in the pleural effusion. Main clinical manifestations depend on the rate of chyle leakage resulting in respiratory compromise.

Case presentation

A neonate born at 25 weeks of gestation (665 g) was ventilated due to respiratory distress at birth and started on treatment for presumed sepsis. Her chest X-rays revealed obliterated right costophrenic angle indicating a pleural effusion which prompted thoracentesis. Interestingly, pleural fluid was milky in appearance with high triglyceride level [57 mg/dL(>110)], low cholesterol level [<50 mg/dL (<50)] with lymphocyte predominance on microscopy. The pleural fluid remained uniform during centrifugation and fluid to serum triglyceride ratio was 1.9 (>1) with cholesterol ratio of <1 (<1) confirming the diagnosis of chylothorax. The baby was kept nil-by-mouth and started on parenteral nutrition following clinical diagnosis of chylothorax. However, baby expired on day 12 due to extreme prematurity, sepsis.

Discussion

The established cut-off for triglyceride in pleural fluid for chylothorax is 110 mg/dL which has been noted to be too high for premature neonates. In such instances, demonstration of chylomicrons by lipoprotein electrophoresis (gold standard) may not be freely available. Therefore, fluid-to-serum triglyceride (>1), cholesterol (<1) ratios can be conveniently used as the cut-off limits for the diagnosis of chylothorax. Also, demonstration of low triglycerides in the infranatant of centrifuged sample is another method to attribute high triglyceride to the presence of chylomicrons.

Keywords

Chylothorax, chyle, milky pleural effusion

ABSTRACTS OF CASE REPORTS

CR 13

Elevated Creatine Kinase-MB Activity Exceeding the Total Creatine Kinase due to Macro-Creatine Kinase

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Introduction

Macro-enzymes are macro-molecules formed by enzymes complexing with other proteins or by auto-polymerization. Their high-molecular-weight interferes with the clearance, prolonging their half-life in systemic circulation. Macro-creatine kinase (macro-CK) is of rare occurrence (1-2%) in health and disease. Macro-CK type-1 occurs due to CK-BB complexing with IgG (rarely CK-MM-IgA), whereas type-2 is auto-polymerized mitochondrial-CK. Both types cause spuriously high CK and CK-MB levels resulting diagnostic confusion especially with regard to acute myocardial injury (AMI).

Case Presentation

A 54-year-old woman with chest pain but negative troponin-I, had normal total-CK of 102 U/L (20-180) but elevated CK-MB of 129 U/L (<25), which was interestingly 26% higher than total-CK. AST [28 U/L (<32)] and LDH [202 U/L (135-250)] were normal excluding an AMI. Due to the discordance of CK-MB level with other myocardial markers, the possibility of macro-CK was investigated by polyethylene glycol (PEG) precipitation method. The recovery of non-macro-CK was 13% (50-70%) and polyethylene glycol (PEG) precipitation activity of Macro-CK was 86% (30-50%), which confirmed the presence of macro-CK as the underlying cause for high CK-MB in the absence of AMI.

Discussion

Immuno-inhibition method for CK-MB measurement is based on inhibition of 'M-subunits' of CK to remove the interference by CK-MM and multiplication of remaining activity by 'two' to derive CK-MB activity. In the presence of macro-CK which is not inhibited by anti-immunoglobulin against 'M-subunits', measured CK-MB activity is spuriously increased which is further magnified by the multiplication step. The resultant elevated CK-MB level may even exceed the total-CK activity by more than 25%.

Keywords

Macro-CK, polyethylene glycol (PEG), CK-MB, acute myocardial injury

ABSTRACTS OF CASE REPORTS

CR 14

Globulin interference in Detection of Bence Jones Proteinuria by Heat Test

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Introduction

The heat test for Bence Jones proteins (BJP) is not sufficiently sensitive to detect free light chains in urine in patients being screened for multiple myeloma. Yet, due to low cost, it is frequently requested compared to more sensitive and specific immunological methods. We report a patient with gross proteinuria which masked the BJP on heating due to a thick coagulum of globulins.

Case Presentation

A 54-year-old female presenting with a haemoglobin level of 80 g/L had pancytopaenia. Repeatedly normal ESR, CRP, total proteins, albumin, albumin:globulin ratio, creatinine and calcium in blood delayed the diagnostic bone marrow which confirmed multiple myeloma with 50% plasma cells. Serum protein electrophoresis and immuno-fixation showed bi-clonal separation of both heavy (IgG lambda, 1.5 g/L) and light chains (monoclonal lambda, 0.7 g/L) with evidence of immune paresis. Serum IgG was low-normal while IgA and IgM were markedly suppressed. Heat test for BJP showed a thick coagulum, unfilterable at 100˚C and was unreportable. Immunofixation electrophoresis (IFE) for BJP was positive for lambda free light chains. Urine protein excretion was 14.6 g/day. Loss of monoclonal protein found at the gamma region on electrophoresis was 8.6 g/day while albumin loss was a mere 0.3 g/day.

Discussion

The reversible solubility of BJP at high temperatures could not be demonstrated by the heat test because a thick protein coagulum prevented filtering at 100˚C. Free light chains in urine were identified by the IFE technique, which is more sensitive and specific and provided a diagnostic solution.

Keywords

Bence Jones proteinuria, urine protein immuno-fixation, multiple myeloma.

ABSTRACTS OF CASE REPORTS

CR 15

Hypokalaemic Paralysis due to Primary Hyperaldosteronism

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Introduction

Primary hyperaldosteronism (PA) is a condition with inappropriately high serum aldosterone. PA is due to aldosterone producing adrenal adenoma, unilateral or bilateral adrenal hyperplasia, ectopic aldosterone secretion or aldosterone producing adrenocortical carcinoma. We report a case of PA due to adrenal adenoma presented with hypokalaemic paralysis.

Case presentation

A 51-year-old gentleman with hypertension for six years, presented with acute onset bilateral weakness of all four limbs for two days. Examination revealed reduced muscle power in all four limbs, diminished reflexes and no sensory impairment. His serum potassium was 1.7 mmol/L (3.5-5.1) and was less than 3.5 mmol/L for 10 days. ECG showed changes of hypokalaemia. Spot urinary potassium was 13 mmol/L (<20). Blood gases revealed metabolic alkalosis. Aldosterone/ renin ratio was 6020 (ng/dL)/(ng/mL/hr) (<30). Computed tomography (CT) scan showed small lesion in left adrenal gland while magnetic resonance imaging (MRI) suggested bilateral adrenal hyperplasia. Adrenal venous sampling was inconclusive as left side was not cannulated properly. He was managed with potassium (intravenous and oral), spironolactone and anti-hypertensives. A repeat CT scan after18 months revealed a left adrenal adenoma. Adrenalectomy was performed and diagnosis was confirmed. Patient became normokalaemic and manageable with less antihypertensive drugs.

Discussion

PA should be suspected in patients presented with hypokalaemia, metabolic alkalosis and hypertension. Aldosterone/renin ratio helps in diagnosis. Spot urinary potassium may be normal due to polyuria. A correct diagnosis requires combination of biochemical and radiological investigations.

Keywords

Primary hyperaldosteronism, adrenal adenoma, hypokalaemia, hypertension, metabolic alkalosis

ABSTRACTS OF CASE REPORTS

CR 16

An Elderly Man Presenting with Milky Urine

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Introduction

Abnormal connections between lymphatics and the urinary tract lead to leakage of chyle in to urine resulting in milky urine. Urine triglyceride more than 15 mg/dL is indicative of chyluria. Causes can be divided as parasitic and non-parasitic causes. Most common parasitic cause is the Wuchereria bancrofti infestation. Non-parasitic causes include trauma, malformation of lymphatics, infections (tuberculosis), infiltrating malignancies, radiation, pregnancy, lymphangioma and stenosis of the thoracic duct.

Case Presentation

A 70-year-old male presented with postprandial milky urine and weight loss for four months duration. Urine full report (UFR) on fully automated urine analyser revealed 241 red cells/cumm. Light microscopic examination of urine deposit after Giemsa stain revealed field full of lymphocytes with occasional red cells. Postprandial urine triglyceride level was 370 mg/dL (<15 mg/dL) with increased protein excretion. Imaging studies of abdomen were normal. Ureteroscopic examination revealed obvious chyluria from left ureter and follow up contrast images showed abnormal lymphatic connection in to the upper calyx of the right renal pelvis. He was treated with endoscopic sclerotherapy using 0.5 % Silver Nitrate.

Discussion

UFR in patients presenting with chyluria can be deceiving and it is important to look for lymphocytes in urine deposit and analyze urinary triglycerides.

Keywords

Chyluria, triglyceride, lymphatics

ABSTRACTS OF CASE REPORTS

CR 17

Suspected Pseudo-elevation of Serum Creatinine following Dexamethasone Injection

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Introduction

Dexamethasone is a synthetic steroid medication which is used in the treatment of many conditions including cancer. Cancer patients are given dexamethasone to reduce certain side effects of chemotherapeutic drugs as well as to improve the antiemetic effect of 5-hydroxytryptamine (5-HT3) receptor antagonists. Creatinine is used as a buffer in some intravenous (IV) dexamethasone preparation and creatinine assay can be falsely elevated immediately after sample collected from dexamethasone injection.

Case presentation

A 3-year-old diagnosed patient with hepatoblastoma was admitted for her chemotherapy course. Before starting chemotherapy, creatinine was measured using enzymatic method for creatinine. Assay was normal and chemotherapy was started. IV dexamethasone was also given to the child to prevent adverse effects. Immediately after IV dexamethasone, a blood sample was taken to measure the serum creatinine level before discharge and was found to be elevated. However, her clinical history, examination and investigation findings did not reveal acute kidney injury. Same sample was repeated for serum creatinine by a different method and the finding was the same. Another sample taken 24 hours after IV dexamethasone revealed a normal value. Further investigations revealed that the IV dexamethasone used for this patient contains creatinine as a buffer and blood had been taken from same arm following dexamethasone injection.

Discussion

Extrinsic creatinine in some brands of IV dexamethasone can interfere the serum creatinine concentration.

Keywords

Creatinine, dexamethasone

ABSTRACTS OF CASE REPORTS

CR 18

A Patient with Tumour Lysis Syndrome

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Introduction

Tumour lysis syndrome is an oncological emergency comprised of a group of metabolic derangements including hyperuricaemia, hyperkalaemia, hyperphosphataemia, hypocalcaemia, which may result in serious complications such as acute kidney injury, cardiac arrhythmia and neurological complications. In most of the cases it is due to initial treatment of underlying haematological malignancy or it can occur spontaneously in bulky chemosensitive disease and very rarely in patients with solid tumours.

Case Presentation

A 50-year-old previously healthy man was admitted with a history of fever, cough loss of appetite, faintishness and generalized bodyaches for 4 weeks' duration associated with reduced urine output. However, he had no other urinary symptoms. Examination revealed pallor, breathlessness with bilateral ankle oedema and hepatosplenomegaly.

Basic biochemical investigations showed hyperkalaemia, hyperuricaemia, hyperphosphataemia, hypocalcaemia hypomagnesaemia, elevated lactate dehydrogenase, serum creatinine and blood urea levels. The electrolyte abnormalities were compatible with spontaneous tumour lysis syndrome as he was not on chemotherapy, radiotherapy or high dose steroid therapy. Patient was managed with allopurinol, intravenous (IV) fluids, hemodialysis and extensively investigated for the primary site of the tumour with available tumour markers, serum protein electrophoresis, radiological investigations and bone marrow aspiration biopsy. The bone marrow biopsy showed marrow infiltration of non-haematopoietic tumour cells but primary site could not be identified.

Discussion

Although tumour lysis syndrome is an oncological emergency, early recognition of high-risk patient, abnormal clinical and laboratory values can lead to successful prevention of life threatening complications.

Keywords

Hyperkalaemia, hyperuricaemia, hyperphosphataemia,hypocalcaemia

ABSTRACTS OF CASE REPORTS

CR 19

Thyrotoxicosis and Renal Tubular Acidosis causing Hypokalaemic Periodic Paralysis

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Introduction

Hypokalaemic periodic paralysis (HPP) is a rare disease. The commonest aetiologies include an autosomal dominant familial inheritance, thyrotoxicosis and renal tubular acidosis. Since the treatment of each of these underlying causes is different, careful evaluation of the patient is essential to arrive at the correct diagnosis.

Case Presentation

A 53-year-old woman presented with recurrent vomiting and gradual onset of upper and lower limb weakness for three months. She also had significant weight loss of 20 kg over six months. She was emaciated and had a tachycardia (HR: 112 bpm, BP: 135/80 mmHg) with reduced muscle power in the proximal muscles (UL:4/5, LL:2/5). Investigations revealed hyperthyroidism [TSH <0.01 mIU/L (0.465-4.68) and free T4 >90 pmol/L (10-28.2)] and severe hypokalaemia [1.67 mmol/L (3.5-5.1)]. Blood gas analysis revealed a compensated hyperchloraemic metabolic acidosis. She was unable to acidify urine despite marked acidaemia with increased urinary potassium excretion. The diagnosis of renal tubular acidosis-1 (RTA-1) was confirmed by an acid loading test and low urinary citrate excretion.

She was commenced on antithyroid therapy for hyperthyroidism and potassium citrate for the correction of hypocitraturia and hypokalaemia, following which her muscle weakness and vomiting resolved.

Discussion

The underlying pathophysiology of hypokalaemia in RTA-1 and thyrotoxicosis are different and both conditions are likely to have contributed to the clinical presentation in this patient. Correction of hypokalaemia is not recommended in thyrotoxic-HPP since potassium redistribution is the underlying cause. In RTA-1 correction of both hypokalaemia and acidosis must be done, since the underlying pathology is urinary potassium wasting and failure to acidify urine. Therefore, assessment of the acid-base status of patients presenting with severe kypokalaemia is of paramount importance for the accurate diagnosis and administration of proper treatment.

Keywords

Renal tubular acidosis, hypokalaemia, thyrotoxicosis

ABSTRACTS OF RESEARCH PAPERS

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RP 01

Clinical and Demographic Characteristics of Organic Acidaemias in a Tertiary Care Hospital, Sri Lanka: A 4-year Experience in a Single Center

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Introduction

Organic acidaemias (OAs) are a biochemically heterogeneous group of inborn errors of metabolism. They are rare and infrequently reported worldwide. Our aim is to describe the clinical presentation, demographic characteristics and the incidence of OAs in Sri Lanka.

Methods

A retrospective descriptive cross-sectional study was conducted over a 4-year period from June 2015 to June 2019 by reviewing records of patients suspected of having OAs referred to the Department of Chemical Pathology, Lady Ridgeway Hospital.

Demographic, clinical manifestations and biochemical investigations were recorded and analyzed using descriptive statistics. Definitive diagnosis was established by gas chromatography and mass spectroscopy (GC-MS) of urine for organic acids.

Results

Among the 458 patients suspected, 21 (4.5%) were confirmed of an OA resulting in an incidence of 5/340,622 live births per year. Mean age at onset of symptoms and diagnosis were 2.8 years (range; day 1 – 42 years) and 4.1 years (range; day 10 - 42 years) respectively. Among the 21 patients, propionic acidaemia was the commonest, 5 (23.8%) followed by beta-ketothiolase deficiency 4 (19%). Nineteen (90.4%) presented acutely. Majority manifested with respiratory distress 12 (57.1%) and persistent or recurrent vomiting 10 (47.6%). Learning difficulty, dyskinesia, macrocephaly and ear ochronosis were some of the chronic manifestations. Biochemically, 15 (71.4%) had acidosis and 9 (42.8%) had ketosis. Mortality rate was 13 (62%) and 6 were neonates with acute presentation.

Conclusions

Propionic acidaemia and beta-ketothiolase deficiency were the commonest OAs identified. Most common clinical presentations were respiratory distress and persistent or recurrent vomiting. Acidosis was a common biochemical finding.

Keywords

Organic acidaemias, gas chromatography /mass spectrometry, urine organic acid analysis

ABSTRACTS OF RESEARCH PAPERS

RP 02

Comparison of Dried Blood Spot and Venous Blood Sample for Measurement of Total Cholesterol by Enzymatic Method on Patients Attending Diabetic Centre at Teaching Hospital, Jaffna

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Introduction

Measurement of total cholesterol is crucial to assess the cardiovascular risk and to monitor hypercholesterolaemia. Currently, serum samples are being used to measure total cholesterol but dried blood spot (DBS) samples can also be used. It can serve as a good screening tool for total cholesterol measurement rather than monitoring the level.

Methods

This was a laboratory based experimental study, aimed to find the correlation between total cholesterol measurements from venous and DBS samples. This study included twenty patients who attended the Diabetic Centre at the Teaching hospital Jaffna. Venous blood sample was collected in a red-top plain tube and DBS from capillary blood was collected on Whatman 3 filter paper from each participant. Serum and DBS total cholesterol levels were measured by enzymatic method.

Results

An independent sample t – test was performed to compare total cholesterol measurement in venous and DBS samples. There was a significant difference between venous (M = 134.2 mg/dL, SD = ± 20.7) and DBS (M = 96.7 mg/dL, SD = 22.4) cholesterol levels, t (20) = 5.5, $p < 0.05$. Pearson correlation coefficient between venous and DBS samples for total cholesterol was 0.476.

Conclusions

This study showed a significant negative bias between DBS and serum samples for total cholesterol measurement. Hence, an appropriate cut-off level for this method should be defined by a larger study involving hyperlipidaemic subjects to determine the possibility of using DBS as a screening tool for total cholesterol measurement.

Keywords

Venous blood, dried blood spot, total cholesterol

ABSTRACTS OF RESEARCH PAPERS

RP 03

Comparison of Immunoturbidimetric (QUO-LAB) Method for the Determination of HbA_{1c} with HPLC (D-10) Method

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Background

HbA_{1c} is a fundamental measure for the assessment of diabetes control. HPLC is a chromatographic separation method used in Bio-Rad D-10 HbA_{1c} analyzer. Since this method has some disadvantages, alternative methods have to be introduced. One main disadvantage is wastage of reagents when running a single sample. The QUO-LAB is an immunoturbidimetric analyzer which can run samples one by one. This research study aims to evaluate the immunoturbidimetric method against HPLC method.

Methods

Thirty patients, who attended the OPD clinic Ruhunu Hospital Karapitiya, were enrolled to the study during the period from 1st to 20th August 2019. EDTA whole blood samples were used after routine laboratory examinations. HbA_{1c} values were obtained from both analyzers. r value between the two methods was calculated. For further analysis, data was divided into 2 groups as normal values (HbA_{1c} <6.5%) and higher values (HbA_{1c} >6.5%). r values were calculated separately. Bland-Altman plots were constructed for further clarification of the reliability of the new method.

Results

The r value for the relationship between haemoglobin values by HPLC method and the immunoturbidimetric method is 0.9944. r values for groups of normal and high HbA_{1C} levels are 0.9020 and 0.9916 respectively. The Bland-Altman plot bias results were within the acceptable range.

Conclusions

The Quo-Test gave results comparable to those given by the D10. Confirming to Pearson's correlation coefficient rank system, there is an excellent correlation among HbA_{1c} higher values and a good correlation among HbA_{1c} normal values. This study reveals that the immunoturbidimetric method can be used as a substitute for the established HPLC method to estimate HbA_{1c}.

Keywords

HbA_{1C}- haemoglobin A_{1C}, HPLC- High Performance Liquid Chromatography, immunoturbidimetric method

ABSTRACTS OF RESEARCH PAPERS

RP 04

Correlation of Jaffe and Enzymatic Methods in Serum Creatinine Measurement: Among CKD Patients and CKDu Patients in Central Province

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Introduction

High prevalence of Chronic kidney disease (CKD) and Chronic kidney disease of unknown aetiology (CKDu) is seen in certain areas of Sri Lanka. Serum creatinine level is used as a screening test for CKD staging.

Methods

The Study was designed as a comparative cross sectional study in renal clinic of Teaching Hospital Kandy. One hundred and fifty-four CKD patients and CKDu patients participated. Serum was analysed using Jaffe–compensated and enzymatic methods in the same analyser using the same calibrator. Outcome variables are creatinine values with Jaffe method (Jaffe-Cr), creatinine values with enzymatic method (enzymatic-Cr), estimated Glomerular Filtration Rate (e-GFR) values calculated with both methods, age, sex & CKD stages. e-GFR values were calculated using the CKD-EPI formula. Correlation of enzymatic-Cr and Jaffe-Cr according to CKD stages were evaluated using Pearson correlation. All the continuous variables were compared using one way Anova test.

Results

There is strong and positive correlation among Jaffe-Cr and enzymatic-Cr assays, $r^2 = 0.993$ ($r^2 > 0.8$). Further correlation studies were done according to the CKD staging. CKD Stage 1- poorly correlated, $r^2 = 0.572$ (R2 <0.6), CKD stage 2- satisfactorily correlated, $r^2 = 0.658$ ($r^2 > 0.6$), CKD stage 3, 4 & 5- positively & strongly correlated. $r^2 = 0.914$, $r^2 = 0.955$ and $r^2 = 0.979$ respectively. Mean values of Jaffe-Cr were significantly lower at CKD stages 1 & 2 than enzymatic-Cr ($p < 0.05$). Mean values of Jaffe-Cr is significantly higher than enzymatic-Cr in CKD stages 3, 4 and 5 ($p < 0.05$).

Conclusions

The method of creatinine measurement has an effect on creatinine value and staging CKD using e-GFR. Standardisation of creatinine assay method in screening and staging of CKD and CKDu patients is crucial for proper diagnosis and management.

Keywords

Chronic kidney disease, CKDu, Jaffe-Creatinine, enzymatic-Creatinine, e-GFR

ABSTRACTS OF RESEARCH PAPERS

RP 05

Effect of Serum Selenium on Thyroid Function among Adult Population in Sri Lanka

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Introduction

Selenium (Se) is an essential trace element in thyroid hormone synthesis. Se exists as selenoproteins in enzymes used in the synthesis of thyroid hormones. Therefore, Se levels in serum affects the thyroid function. According to the existing literature, prevalence of goiter is 6.8%. Certain provinces show high prevalence of goiter, even without deficiency of iodine.

Objectives

Assess Se levels in adults in Sri Lanka and describe the association between serum Se levels and thyroid function among Sri Lankan adults.

Methods

A cross-sectional descriptive study was done. Consecutive 346 adult patients who were referred to the Medical Research Institute (MRI) from government hospitals in the nine provinces in Sri Lanka for the investigation of thyroid functions were selected. Normal group consisted of adult males and females from the same areas. Se concentration was measured in serum by the Inductively Coupled Plasma Mass Spectrometry (Agilent 7900 × ICP-MS system). Measurement of serum TSH, fT_3, fT_4 were done by Architect i1000 chemiluminescence immunoassay analyzer

Results

Mean serum Se in our patient population was 93.416 µg/L while that in our normal subjects is 93.435 µg/L. The accepted range for normal adults is 70-150 µg/L. Regression equation, r^2 value and p values for associations of fT_3, fT_4 and TSH with serum Se respectively are fT_3=3.76-0.00131Se, r^2=0.2%, p=0.397, fT_4=12.3+0.00199Se, r^2=0.0%, p=0.697, TSH=2.52+0.0185Se, r^2=0.3%, p=0.3. The p values for fT_3, fT_4, TSH versus serum Se were greater than α. Therefore H_o accepted (H_o=there is no effect by serum Se on thyroid function).

Conclusions and recommendations

No serum Se deficiency in our population. No association between serum TSH, fT_3, fT_4 and serum Se levels.

Keywords

Selenium, Selenoproteins, trace elements, thyroid function, Inductively Coupled Plasma Mass Spectrometry, Chemiluminescent immunoassay

ABSTRACTS OF RESEARCH PAPERS

RP 06

Evaluation of Methods for Bedside Urinalysis for the Detection of Proteinuria in Pregnancy

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Introduction

Hypertensive disorders of pregnancy carry high maternal and fetal morbidity. Identification of significant proteinuria is important for early detection and management of pregnant mothers who develops preeclampsia.

Main purpose of this study was to check whether the available test methods reliably detect significant proteinuria and to introduce the most suitable screening test method to detect proteinuria in antenatal clinics of Sri Lanka.

Methods

This study was designed as a comparative cross sectional study among 240 pregnant mothers who were more than twentieth week of gestation in Teaching Hospital Kandy. Early morning urine samples were collected and separated in to four aliquots. Heat Coagulation Test (HCT), Dipstick Test (DST) and Sulfosalicylic Acid Test (SSAT) were performed for each sample and interpreted. Quantitative urinary protein analysis was performed by pyrogallol red method using the biochemistry analyzer.

Quantitative test results were considered as standard and true positive, false positive, true negative, false negative results for each test methods were calculated. Specificity, Sensitivity, Positive Predictive Value (PPV) and Negative Predictive Value (NPV) were expressed for each test method as percentages.

Results

According to current study, in detection of proteinuria up to ≥30 mg/dL, sensitivity specificity, PPV and NPV of HCT are 53.8%, 98.1%, 77.7% and 94.5% respectively.

In DST sensitivity, specificity, PPV and NPV were 100%, 44.3%, 68.4% and 100%.

In SSAT Sensitivity, specificity, PPV and NPV are about 100%, 90.6%, 56.52% and 100% respectively.

When the sensitivity of HCT, DST and SSAT are compared it is 53.8%, 100%, 100% in detecting proteinuria up to 30 mg/dL.

Conclusions

HCT which is practiced in antenatal setup of Sri Lanka is less sensitive and contain high false negative rate compared with other test methods. Introducing two parameter dipstick test strips to detect proteinuria in antenatal wards are justifiable.

Keywords

Proteinuria, heat coagulation test, dipstick test

ABSTRACTS OF RESEARCH PAPERS

RP 07

Quality of Laboratory Test Requests Received by the Laboratories in Teaching Hospital, Karapitiya

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Background

With advancement of laboratory technologies, analytical errors have been significantly reduced, however, pre-analytical errors remain a major contributor for deficiencies in laboratory services. Quality of the request forms sent to laboratories affects the test results in pre-analytical phase.

Objectives

To assess the quality of laboratory request forms received by the laboratories of Teaching Hospital, Karapitiya (THK).

Materials and methods

In a cross-sectional survey, consecutive samples of request forms (n=96 each) received by four laboratories of THK were selected retrospectively and relevant data were extracted using a data extraction sheet. The quality of request forms was assessed in terms of the use of correct form, legibility of hand writing and the completeness of essential criteria to be filled according to College of Pathologist Sri Lanka (CPSL) National Guidelines of 2007 and expert opinions. Data were analyzed using SPSS statistical software.

Results

Out of 384 request forms received by the four laboratories of THK (excluding forms received from peripheral hospitals) analyzed, approximately four percent of the requests used incorrect forms. Overall completeness of request forms according to CPSL guidelines was zero. A satisfactory level of completion according to ISO 15189 standards was observed in 30.2% of the request forms. Request forms received by the Chemical pathology and Microbiology laboratories had the highest level of incompleteness (100.0%). Time of sample collection (5.6%), clinical history (50%) and clinician's name (27.6%) were inadequately filled. Completeness of request forms was not associated with the use of correct form or urgent /routine nature of requesting investigations ($p > 0.05$ for both).

Conclusions

Quality of request forms received by the laboratories of THK is unsatisfactory. The requesting officers should be made aware about the importance of proper use of request forms to minimize pre-analytical errors and enhance the quality of services.

Keywords

Laboratory, request forms, quality, completeness

ABSTRACTS OF RESEARCH PAPERS

RP 08

Serum Sex Hormones Concentrations and Hormone Receptor Status of Breast Cancer Patients in Sri Lanka

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Background

Association of sex hormones, receptor status and breast cancer (BC) incidence is studied with inconclusive results.

Objectives

To assess serum oestrogen, progesterone, testosterone concentrations and ER, PR, HER2 status of newly diagnosed Sri Lankan BC patients.

Methods

Serum oestrogen, progesterone, testosterone concentrations of newly diagnosed BC patients (n=155) from National Cancer Hospital (Apeksha), Maharagama were assessed and compared with apparently healthy age matched females (n=75). Hormone receptor status of each patient was recorded from histopathology reports. Ethical approval for the study was obtained. Data were statistically analyzed using SPSS version 16.

Results

The highest incidence (24.8%) of hormone receptor expression was ER+PR+HER2- (negative) followed by, ER-PR-HER2+ (21.4%). Triple negative cancer incidence was 17.2 % of women with breast cancer and the least common was ER-PR+HER2- tumors.

Serum, progesterone concentrations of premenopausal breast cancer patients at each menstrual phase were not significantly different ($p > 0.05$) when compared with apparently healthy females at each menstrual phase. Serum, progesterone concentrations of postmenopausal breast cancer and healthy women were also not significantly different ($p > 0.05$). Oestrogen, progesterone concentrations were not significantly different ($p > 0.05$) according to ER, PR status. However, serum progesterone concentrations were significantly different ($p < 0.05$) among HER2 over expressed women when compared to HER2 negative women. A woman having a progesterone concentration below 0.25 ng/mL was more likely to have HER2 over expressed ($p < 0.05$). Serum testosterone concentrations of BC patients were significantly lower ($p < 0.05$) than healthy women and women having serum testosterone levels below 0.26 ng/mL showed a higher risk of having breast cancer.

Conclusions

ER+PR+HER2- had a higher incidence compared to other receptor types. Serum progesterone concentrations of BC patients were significantly different among HER2 over expressed women compared to HER2 negative women. Females with BC had significantly low testosterone concentrations.

Keywords

Breast cancer, oestrogen, progesterone, testosterone, hormone receptor status

ABSTRACTS OF RESEARCH PAPERS

RP 09

An Audit to Assess Appropriateness of Thyroid Function Tests in a Cohort of in-patient Population

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Introduction

Biochemical assessment of thyroid function in patients with non-thyroidal illness (NTI) is difficult, given that illness may cause either decreased or normal thyroid stimulating hormone (TSH) and decreased free thyroid hormones in acute phase. The consensus view in the literature has been that thyroid function tests (TFTs) should not be requested in ill patients unless thyroid dysfunction is contributing to their clinical condition. The appropriateness of TFT was assessed in an inpatient population, in the context of clinical history rendering thyroid disease more likely.

Methods

Eighty-eight inpatient TFTs in an acute care setting in Buckinghamshire NHS Trust were examined during 1-month period. TSH was measured as frontline test with free thyroxine by immunoassay using Abbott Architect analyser. A TFT request was justified as appropriate when clinical history and examination increased the probability of thyroid disease. Drug treatment with amiodarone or lithium was considered as a reasonable indication.

Results

TFTs were clinically justified for thyroid disease only in 56 cases (64%). Other 32 cases did not show a clear reason for the request and mostly showed discordant results. The yield of abnormal TFTs found was 30% in justifiable requests' cohort and nine patients (16%) showed NTI. These figures are comparable to previous studies according to literature.

Conclusions

TFTs should only be requested when clinically indicated. The manifestations of thyroid disease can be non-specific, and in many cases subtle, that requests may be justified in unwell patients. It is important that clinicians remain aware of the effects of NTI on TFTs and of the poor specificity of TSH in this situation.

Keywords

Non thyroidal illness, thyroid function tests

ABSTRACTS OF RESEARCH PAPERS

RP 10

Correlation between HbA_{1c} and Fructosamine in Determining Glycaemic Control in a Diabetic Thalassaemia Population and a Type II Diabetic Population in Sri Lanka.

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Introduction

HbA_{1c} is considered as not useful in diagnosing and monitoring diabetes in thalassaemia patients due to assay interferences and shortened life span of red blood cells. Therefore, diagnosis and monitoring of glycaemic control is a challenge.

Methods

A prospective case control study was carried out among 25 thalassaemia major diabetic patients, 12 thalassaemia minor diabetic patients and age and sex matched type II diabetic patients from Hemal's Thalassaemia Unit and diabetic clinic, North Colombo Teaching Hospital, Ragama respectively. Capillary blood glucose monitoring [(two fasting samples (FPG) and one postprandial sample (PPPG) weekly] was done using glucometers for a period of three months. Blood was drawn from participants every 20 days for HbA_{1c} and fructosamine. HbA_{1C} was measured by HPLC and capillary electrophoresis. Results were analysed using SPSS version 21.

Results

There was a good correlation among the thalassaemic population between HbA_{1C} values measured by capillary electrophoresis, with fructosamine levels ($r = 0.606$, $p<0.001$), mean FPG ($r=0.526$, $p=0.002$) and mean PPPG ($r=0.489$, $p=0.004$). There was also a good correlation between the HBA_{1C} values measured by HPLC, with fructosamine ($r = 0.505$, $p=0.003$), FPG ($r=0.441$, $p=0.01$) , PPPG ($r=0.537$, $p=0.001$). The two methods used to assess HbA_{1C} levels correlated significantly with each other ($r=0.816$, $p<0.001$). When the cut-off value of HbA_{1C} is 7.0 % for the whole population, the sensitivity and specificity for control of diabetes (defined as fructosamine <330 µmol/L) are 90.9 % and 37.5%, respectively (AUC: 0.800).

Conclusion

Although fructosamine is considered as the gold standard to assess the glycaemic control in thalassaemia patients HbA_{1C} can also be used reliably.

Keywords

HbA_{1C}, thalassaemia, diabetes, fructosamine

ABSTRACTS OF RESEARCH PAPERS

RP 11

Utility of Urine Albumin-to-Creatinine Ratio (UACR) in a Tertiary Care Hospital and its Correlation with Other Biochemical Parameters

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Introduction

Urine albumin-to-creatinine ratio (UACR) is an expensive test and is often misused in detecting proteinuria. We aim to determine the utility of UACR in a tertiary-care hospital and its correlation with other biochemical parameters. The correlation between a dipstick method for proteinuria and an automated urine protein-to-creatinine ratio (UPCR) was also assessed.

Methods

We recruited 81 patients who came with UACR requests and collected random urine samples for UACR and proteinuria by a reagent-strip method. Samples with proteinuria ≥1+ by strip method were analyzed for UPCR. Renal-function tests, liver-function tests and lipid-profile results were collected from recent clinic records.

Results

Out of 81 participants, 33% of subjects were diabetic and only 7.4% of them were tested for UACR annually. Only 16 (19.8%) were tested by dipstick before requesting UACR. Forty-five participants had ≥1+ proteinuria by dipstick method and 7 had <15 mg/mmol proteinuria by UPCR.

Sensitivity, specificity, negative-predictive-value and positive-predictive-value of dipstick method against UACR were 89.9%, 81.48%, 97.8% and 72.9% respectively. There was a moderate association between UACR and dipstick results (p=0.0001, r =0.637) and strong association between UPCR and dipstick results p=0.042, r =0.814). There was significant correlation of UACR with serum creatinine, total protein, eGFR and total cholesterol (p=0.049, 0.009, 0.001 and 0.012 respectively) emphasizing the importance of measuring UACR to identify early renal injury.

Conclusions

Laboratories can adopt to do dipstick testing first and do UPCR if dipstick results are (≥1+) for cost-effective utility of UACR. To avoid missing patients with microalbuminuria patients with UPCR <15 mg/mmol can be redirected for UACR.

Keywords

Urine albumin-to-creatinine ratio, urine protein, microalbuminuria

ABSTRACTS OF RESEARCH PAPERS

RP 12

Non-fasting Lipid Screen: Do We Need Direct LDL-cholesterol Measurement?

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Introduction

The standard lipid profile requires fasting for 12-14 hours. However, non-fasting samples are accepted by many countries for screening for hyperlipidaemia considering patient convenience and improved compliance. Higher triglycerides found in non-fasted samples may lead to lower calculated LDL-cholesterol values, the target of therapy. We investigated their relationship by comparing with fasting direct LDL-cholesterol measurement as gold standard.

Method

Twenty subjects (12 F, 8 M) not on lipid medication underwent 12-hour-fasting and non-fasting lipid profiles on the same day with direct LDL-cholesterol estimation by homogeneous enzymatic colourimetric assay.

Results

Seven subjects had fasting total-cholesterol >200 mg/dL (maximum value 267 mg/dL). Non-fasting samples had higher triglycerides (r value=0.73), the range being 53-253 in fasting and 50-356 in non-fasting subjects. HDL-cholesterol was the parameter most unaffected by food (r=0.98), closely followed by direct LDL-cholesterol (r =0.97). Total cholesterol was more stable (r=0.95) than calculated LDL-cholesterol (r=0.93). Comparison of non-fasting calculated LDL-cholesterol with fasting direct LDL-cholesterol (gold standard) provided an r value of 0.90 and that with non-fasting direct LDL-cholesterol was 0.92.

Discussion

Chylomicrons present in non-fasted samples account for the increased triglycerides in them. The results suggest that non-fasting lipid profile adequately represents the lipid status for screening purposes without measurement of direct LDL-cholesterol. However, its suitability, with or without direct LDL-cholesterol estimation, for follow up of patients on therapy has not been evaluated here. Hence we recommend follow up with fasting lipid profiles. A larger study is required for better understanding.

Keywords

Non-fasting lipids, direct LDL-cholesterol

ABSTRACTS OF RESEARCH PAPERS

RP 13

Serum Creatinine Measurement: Do We Need to Change to an Enzymatic Assay?

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Introduction

The Jaffe and enzymatic methods are two widely used methods for serum creatinine measurement. Jaffe method is susceptible to interference by non-creatinine chromogens such as protein, glucose, ascorbic acid, cephalosporins and ketones. Although, enzymatic method is less prone to interferences, it is considerably more expensive.

Methods

In this study, assay performance of Jaffe and enzymatic methods were compared using routine 426 samples at a tertiary care hospital in Sri Lanka.

Results

Creatinine level in routine specimens ranged from 30–1017 µmol/L. Two methods had a good correlation (r^2=0.95). Jaffe method gave higher results than enzymatic method with a mean bias of 5.9 µmol/L. According to Bland-Altman plots, difference between the two methods was significant at higher creatinine levels with a positive bias in Jaffe method compared to enzymatic assay. The average total protein, bilirubin and glucose concentrations in the routine samples were 72.8 g/L, 12.46 µmol/L and 111.28 mg/dL respectively. According to the bias plots, both positive and negative biases were seen with lower glucose values (<100 mg/dL) while mainly positive biases were seen with higher glucose values (>200 mg/dL). The biases were evenly distributed among different levels of protein and bilirubin in the routine samples. However, all values had a clinically acceptable percentage bias (<18.2%) with an average of 17.5% when outliers were excluded.

Conclusions

The results of the above comparison study indicate that Jaffe method can produce comparable results to enzymatic method with clinically insignificant level of bias. Therefore, decision of changing into an enzymatic method from Jaffe method requires detailed risk-benefit assessment.

Keywords

Serum creatinine, Jaffe method, enzymatic method

ABSTRACTS OF RESEARCH PAPERS

RP 14

The Correlation between Direct and Calculated LDL-C among Patients Referred for Lipid Profile at a Tertiary Care Hospital, Sri Lanka

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Introduction

Patients with metabolic syndrome (MS) have altered lipoprotein metabolism that affects usual ratios between different lipid fractions; especially triglycerides. This may affect the LDL-C estimation by Friedewald formula (FF) even with triglyceride levels <400 mg/dL. Our objective was to describe correlation between direct and calculated LDL cholesterol (LDL-C) among patients referred to a laboratory.

Methods

A cross sectional study was conducted among 291 patients referred for lipid profile to a tertiary care hospital Sri Lanka, over a period of one month. The average percentage of patients with MS referred to laboratory for lipid profile is 60-65%. Direct LDL-C and conventional lipid profile with calculated LDL-C by FF were measured.

Results

The mean fasting triglyceride level in the sample was 138.6 mg/dL (SD:64.9; range:45-464 mg/dL). The mean calculated LDL-C was 103.6 mg/dL (SD:38.4, range:14.3-233 mg/dL) while mean direct LDL-C measurement was 111.6 mg/dL (SD:39.6, range:11.2-252.2 mg/dL). The calculated and direct LDL-C measurements had good correlation at different levels of triglycerides (r^2=0.9319, r^2=0.9188, r^2=0.9542, r^2=0.9121 at triglyceride <100 mg/dL, 101-150 mg/dL, 151-200 mg/dL, >200 mg/dL respectively). Use of calculated LDL-C caused a mean negative bias of 7.38 mg/dL with a percentage bias of >5.46% (the desirable specification for bias) in 63.9% of the patients while only 1/3 of them had a triglyceride level >150 mg/dL and the majority (117; 63%) had normal triglyceride levels.

Conclusions

Calculated LDL-C by FF may result in clinically significant bias even in patients with normal triglyceride levels. Therefore, normal triglyceride levels do not warrant accurate LDL-C results by FF especially if the metabolic disease status of the patient is unknown.

Keywords

Calculated LDL-C, direct LDL-C, Friedewald formula

ABSTRACTS OF RESEARCH PAPERS

RP 15

The Effect of Gym Training and Cycling on Albuminuria among Gym Trainees and Professional Cyclists – A Study from Gampaha District

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Introduction

Albuminuria is a sign of defective glomerular filtration membrane. It can be benign and reversible in physical exercise or pathological as in nephrotic syndrome and diabetic nephropathy. The prime aim of this study was to describe effects of exercise on urine albumin excretion.

Methods

A quasi experimental study was conducted using 30 gym trainees and 12 cyclists selected using proportionate stratified random sampling and total population sampling respectively from Gampaha district. Urine albumin to creatinine Ratio (ACR) was used to assess both groups before and after the standardized training sessions. Paired t-test and Mann Whitney test were used for data analysis.

Results

The pre and post-session ACR for gym trainees were 1.147 mg/mmol, 3.293 mg/mmol while that of cyclists were 1.144 mg/mmol, 1.305 mg/mmol. There was a significant difference between pre and post session ACR for both groups (p=0.003) with a positive correlation between the ACR difference and the intensity of exercise (gym trainees; p=0.004, r=0.519), (cyclists; p=0.002, r=0.793). Gym trainees showed a higher elevation of mean post session ACR reaching the cut-off limit (2.5 mg/mmol for males) for micro-albuminuria while mean ACR of cyclists remained normal throughout.

Conclusion

The albuminuria is directly proportional to the intensity of the exercise. More research needs to be done in order to state that the demonstration of recovery of albuminuria can be beneficial in athletes engaged in severe exercise to ensure absence of negative effect of training on glomerular function. Also, studies can be done on the possibility of employing post-exercise urinary ACR in diabetic and hypertensive patients for early detection of nephropathy.

Keywords

Exercise induced albuminuria, diabetic/hypertensive nephropathy

ABSTRACTS OF RESEARCH PAPERS

RP 16

Complaint-Handling in Chemical Pathology: Facing them is Road to Prevention

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Introduction

Logging and investigating complaints or feedback received by phone or script in a Chemical Pathology laboratory is an important tool in identifying poor performance and improving them. It is an essential component in Laboratory Accreditation. We share our experience over 5 years in a private laboratory, starting mid-2014.

Methods

A 'Quality Improvement Form' is filled for each complaint. An investigation starts almost immediately to discover the root cause. Corrective measures and action taken to prevent recurrence are discussed and implemented. Properly stored primary samples and laboratory information system (LIS) audit trails were available for investigators.

Results

Total complaints were 152 (30+26+37+26+20+13 each calendar year). Thyroid function tests (TFT), C reactive protein (CRP), potassium (K+) and creatinine assays were often involved. Forty-eight (32%) were pre-analytical, equally split into pre-pre-analytical and pre-analytical areas. They were related to patient preparation/timing, establishing identity (ID), tube type, contamination, mislabeling/mix-up, wrong storage, transport and accessioning errors. Thirty-two (21%) were post analytical, evenly split between post-post-analytical and post-analytical areas and were related to report delays, panic value notification, phoned results, report format, transcription errors, interpretation and report loss. There were 13 analytical errors. Seven were categorised as random errors. Seven IT errors occurred initially. Laboratory safety and management issues were 3 each. Eighteen of 30 attributed to biological variation, related to TFTs. Nine complaints had no identifiable error. Last 2 years showed a 50% drop in pre- and post-analytical errors. The severity of errors also reduced.

Conclusions

Pre-analytical errors were commoner. Analytical errors were comparatively few. Errors were considered opportunities for learning and sharing. Punishments were not meted out to staff. Implementation of quality processes identified by these exercises proved fruitful.

Keywords

Laboratory errors, complaint-handling

ABSTRACTS OF RESEARCH PAPERS

RP 17

Specific Biomarkers for Screening for CKDu in Sri Lanka: A Scoping Review

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Introduction

Chronic Kidney Disease of uncertain etiology (CKDu) has become a major health care burden in Sri Lanka. Early diagnosis and eliminating known causes for Chronic Kidney Disease (CKD) are vital steps in the management. Traditional biomarkers of CKD are not the best tools for early diagnosis of CKDu. We aimed to identify the specific biomarkers evaluated for screening CKDu in Sri Lanka.

Methods

A literature search was conducted in pubmed using keywords, "Biomarkers, CKDu, Screening, Sri Lanka" from January 1990 - December 2019. In a yield of eight articles, we selected five studies which used biomarkers for early diagnosis of CKDu instead of traditional biomarkers.

Results

The selected studies have used ELISA and multiplex biomarker assays for the evaluation of urinary biomarkers and RT-qPCR for genetic biomarkers. The markers were evaluated among CKD and CKDu patients compared with healthy controls from both CKDu endemic and non-endemic areas. Urinary biomarkers including, Alpha 1 microglobulin (A1M), Kidney Injury molecule 1 (KIM-1), Cystatin C, Beta 2 Microglobulin (B2M), Osteopontin (OPN), Tissue Inhibitor of Metalloproteinase 1 (TIMP1), Retinol Binding Protein-4 (RBP-4), Neurophil Gelatinase-Associated Lipocalin (NGAL), Fibrinogen, Clusterin, and genetic biomarkers have been tested in different studies. KIM-1 was identified as a predictive biomarker of CKDu in four out of five studies. Urinary KIM-1 and RBP-4 have been identified to distinguish CKDu from healthy population as well as from CKD population when tested as components in biomarker panels. A1M, NGAL, B2M, fibrinogen and Cystatin C were also effective in differentiating CKDu from healthy population. Genes including KIM-1 and Glutamate Cysteine Ligase catalytic subunit have been identified effective in screening and monitoring of CKDu.

Conclusions

Urinary KIM-1 levels and KIM-1 gene have been identified as potential biomarkers for the early diagnosis of CKDu in Sri Lanka. However, A1M, NGAL, B2M, RBP-4 and fibrinogen too merit further investigation.

Keywords

Bio-markers, CKDu, screening, Sri Lanka

ABSTRACTS OF RESEARCH PAPERS

RP 18

A Comparison of Jaffe and Creatininase methods for Serum Creatinine as a Screening Test for Renal Dysfunction

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Introduction

Serum creatinine is used for screening for renal dysfunction with the upper reference limit (URL) as cut-off. When our laboratory changed its method for creatinine from Jaffe to enzymatic (creatininase), the URL dropped from 1.3 mg/dL to 1.17 mg/dL in males and from 1.0 mg/dL to 0.95 mg/dL in females, resulting in flagging on the reports at a lower level. We studied its impact.

Method

Hundred males and hundred females (n=200) with creatinine results around the URL by creatininase method on Roche cobas c501, were also tested by Jaffe method on Dimension EXL200.

Results

The mean age was 52.7 years (range 18-90) in males and 62.8 (range 16-92) in females. The mean serum creatinine in males was 1.18 mg/dL (SD 0.07, range 0.97-1.31) by the enzymatic method and 1.26 mg/dL (SD 0.11, range 0.96-1.68) by Jaffe method. In females it was 0.94 mg/dL (SD 0.05, range 0.80-1.16) and 1.05 mg/dL (SD 0.11, range 0.84-1.39) respectively. The mean difference between the two methods, expressed as percentage deviation from the creatininase result was 7.1% (range -11.1% to 34.4%, median 6.3%) in males and 11.6% (range -6.7% to 42.8%, median 10.1%) in females. The deviation was > 20% in 26 (13%) patients. Three outliers took cephalosporins. Thirty Five patients (29M, 6F) were flagged by creatininase method alone and 37 patients (6M, 31F), only by Jaffe method. Sixty Three were flagged high by both methods and 65 were normal by both. Correlation between methods was moderate (r=0.77).

Discussion

Both Jaffe and creatininase methods are equally effective in identifying possible renal dysfunction using their URL in the majority (64%) but had 36% discrepancies. Jaffe results were >20% higher in 13%, warranting confirmation of positive screening tests by creatininase method.

Keywords

Creatinine, Jaffe, creatininase.

ABSTRACTS OF RESEARCH PAPERS

RP 19

Evaluation of the Interference of Biotin on Thyroid Stimulating Hormone measurement by Enzyme-linked Immunosorbent Assay (ELISA) in pooled serum

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Introduction

Biotin in moderate to high concentrations can interfere with thyroid stimulating hormone (TSH) immunoassay, when using streptavidin-coated microtiter plates. Free biotin displaces TSH- biotinylated monoclonal anti-TSH antibody complex by competitive inhibition and causes a negative interference on TSH measurements. This study was conducted to evaluate the interference of biotin on measurement of TSH by enzyme-linked immunosorbent assay (ELISA).

Methods

This is a laboratory-based experimental study performed using a pool of serum having a high TSH value. Biotin interference was assessed by manual sandwich ELISA using TECO Diagnostics commercially available kit. Biotin Active Pharmaceutical Ingredient (API) was used to prepare 2000 µg/L stock solution. Eight different concentrations of biotin were added in equal volumes to five different concentrations of TSH (prepared using normal saline as diluent) to get final biotin concentrations of 25, 50, 75, 100, 150, 200, 300 and 400 µg/L. All tests were performed in duplicate. ANOVA was used to evaluate the mean differences between TSH subgroups and different concentrations of biotin.

Results

Baseline TSH concentrations were 2.1, 4.2, 9.1, 17.5 and 36.9 mIU/L. There was a statistically significant ($p<0.05$) negative interference in all the baseline measurements of TSH at biotin concentrations ≥100 µg/L. There was a statistically significant ($p<0.05$) negative interference in baseline TSH measurements of 2.1 and 4.2 mIU/L at biotin concentrations ≤75 µg/L. However, the interference was not statistically significant ($p>0.05$) for baseline TSH measurements of 9.1, 17.5 and 36.9 mIU/L at biotin concentrations ≤75 µg/L. Interference at Biotin concentrations between 75 to 100 µg/L were not evaluated in this study.

Conclusion

This study shows that, the presence of high concentrations of biotin in the serum would produce a negative interference on TSH measurement in streptavidin coated manual sandwich ELISA method.

Keywords

Biotin, streptavidin, TSH, immunoassay, interference

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BIOTIN INTERFERENCE IN IMMUNOASSAYS

Recent studies and case reports are driving awareness that Biotin can interfere with laboratory testing. Patients, laboratories and physicians may not know about the presence of Biotin, so education and awareness can help reduce the potential for diagnostic errors.

Biotin beware – why?

GORDON AVERY MSC, SCIENTIFIC LIAISON MANAGER IN ABBOTT, GIVES A BRIEF OVERVIEW OF BIOTIN INTERFERENCE IN SOME IMMUNOASSAYS

In 2015 a 55-year-old man with multiple sclerosis was referred to a hospital thyroid unit because the screening thyroid function tests showed markedly elevated FT4 and FT3 results and low (apparently suppressed) levels of TSH[1], this pattern of results typically suggests a severe form of Graves' disease. However a thyroid scan with 123-Iodine showed a normal thyroid gland with normal radioiodine uptake. The patient showed no symptoms of hyperthyroidism. As the biochemical results were discordant with the patient's clinical assessment, investigations for assay interference from drugs or other compounds were conducted. It emerged that the patient had taken very high doses of biotin (300 mg daily, roughly 1,000 times the recommended daily intake) as a study had suggested that biotin might be beneficial for multiple sclerosis patients. The discontinuation of biotin supplements resulted in the FT4, FT3 and TSH results returning to within reference range values in just a few days.

BIOTIN INTAKE AND ASSAY INTERFERENCE

Biotin interference in immunoassays from several manufacturers has been described by other authors, with clear examples of potential clinically misleading test results[2]. The mechanisms for biotin interference in immunoassays have also been described[3]. Biotin (vitamin B7) is a hydrophilic compound that acts as a coenzyme in carboxylase reactions, and is therefore an essential nutrient. Biotin is readily available in many foods and the recommended daily intake (about 30 µg per day) is easy to achieve.

Although initially only very high levels of biotin have been considered as a cause of "incorrect" laboratory results, further studies demonstrated that even at moderately elevated biotin concentrations, some assays may be affected, causing either a falsely elevated or a falsely decreased test result[4,5].

The mechanism of biotin interference differs depending on the format of the assay[3]. When biotin-streptavidin binding is used as part of a sandwich assay format, for example for some TSH assays, excess biotin in the sample can displace biotinylated antibodies resulting in falsely low results. In contrast in competitive immunoassays, for example some FT4 assays, excess biotin in the specimen can compete with the biotinylated analog for the binding sites on streptavidin resulting in falsely high results.

Patients may not realize they are taking supplements that contain biotin, labs will not know if specimens contain biotin and physicians could make decisions based on inaccurate lab results.

Immunoassays involving streptavidin-biotin interaction are used by many reagent manufacturers and have the potential to show interference from biotin by one of the mechanisms described above. Patients not taking biotin supplements would not be expected to show any assay interference.

However, people taking biotin supplements may have much higher biotin intakes, with daily oral doses of up to 40 mg per day. Supplements, often described as "good for nails and hair", containing very high doses of biotin are readily available, even on supermarket shelves, and are becoming increasing popular. Some studies, in patients with multiple sclerosis and demyelinating pathologies, show patients receiving very high doses of biotin (300 mg per day). In the presence of high biotin concentrations there is potential for competitive and sandwich assays using the streptavidin-biotin format to generate misleading test results[3]. It is therefore important that the laboratory considers its choice of assay, and recognises the possibility of biotin interference if test results do not fit with each other or with the clinical picture. Where biotin interference is possible or expected, the biochemical results should be obtained or checked with assays that are not affected by biotin interference.

Abbott has recently conducted an evaluation and no on-market ARCHITECT assay formulations use the free capture streptavidin/biotin assay format referenced in recent articles that have been associated with interference from ingested high dose biotin.[6]

ABOUT: BIOTIN

Biotin, also referred to as Vitamin B7 or H, is a water-soluble B-complex vitamin that helps the body metabolize proteins, fats, carbohydrates and process glucose. Biotin is a safe and essential vitamin for supporting overall health and plays a role in medicine and the beauty sector.

SUMMARY

- Biotin (vitamin B7) is an essential nutrient for which an intake of 30 µg per day is recommended. Supplementation is normally not necessary since biotin is ubiquitous in common foods.
- As well as being available as a "beauty" supplement, biotin may be administered to patients with multiple sclerosis, myopathies and with some inherited metabolic diseases.
- Though biotin is considered non-toxic even at high dosage, the potential clinical issue is that these doses have the potential to generate misleading results in some immunoassays.
- Biotin has been demonstrated to impact assays that use biotin-streptavidin binding as part of the assay format, including thyroid function tests, other endocrine assays, assays for cardiac biomarkers and other analytes.
- Some immunoassay formats are not affected by biotin and may be used to check unexpected results from assays that are affected, and/or may be preferred if the patient is known to be receiving biotin supplementation.

5 STEPS TO HELP REDUCE LABORATORY ERRORS CAUSED BY BIOTIN

1. Raise Awareness
2. Know your assays and the impact biotin can have on them
3. Educate your health care providers and patients
4. Have a contingency plan for acute care settings
5. Recognize there are laboratory methods that are not impacted by biotin that can provide an alternative option for your patients

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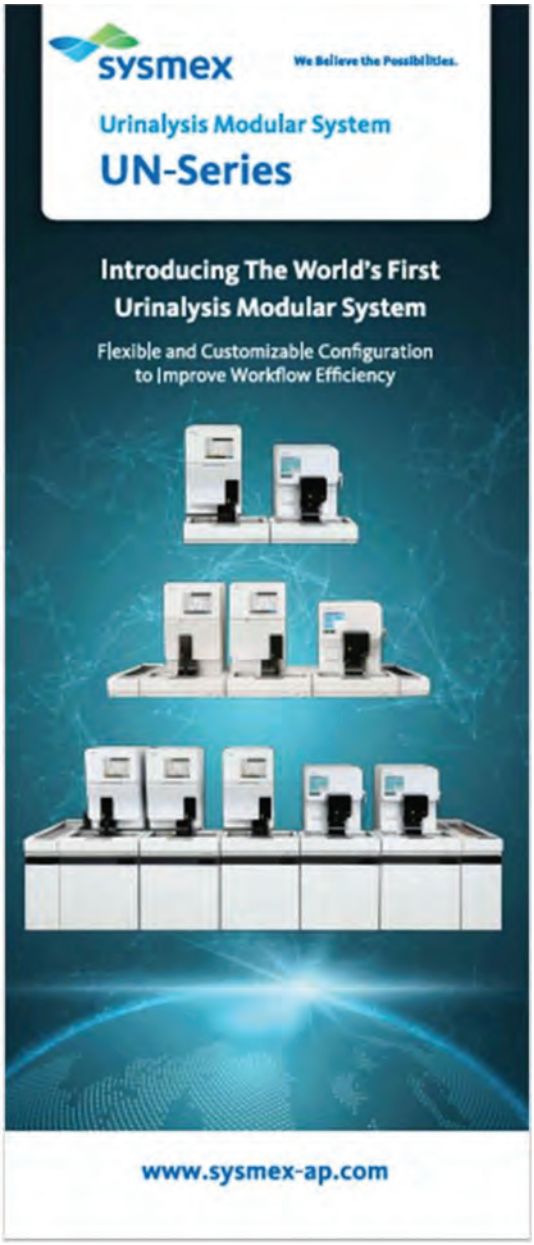
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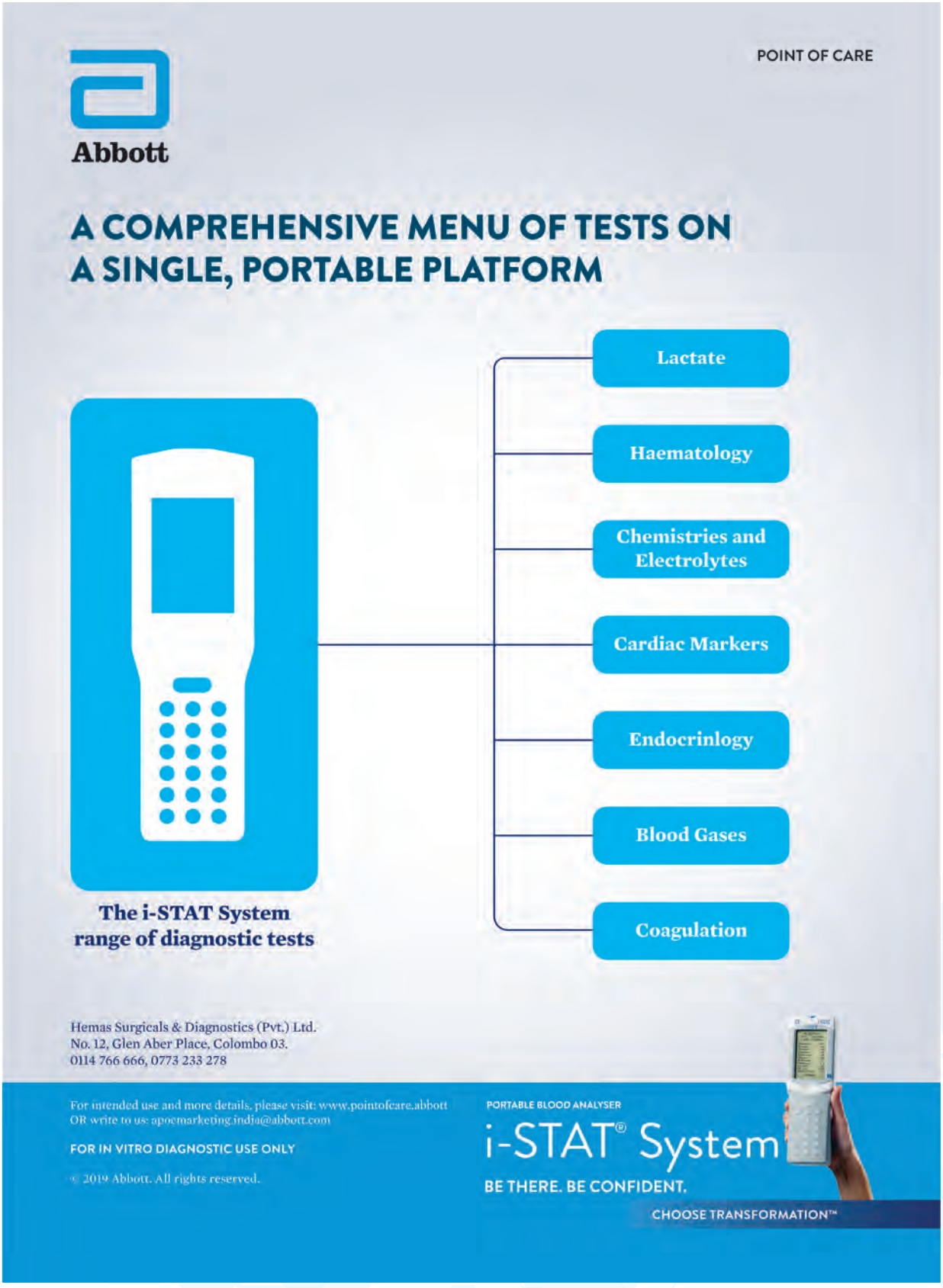
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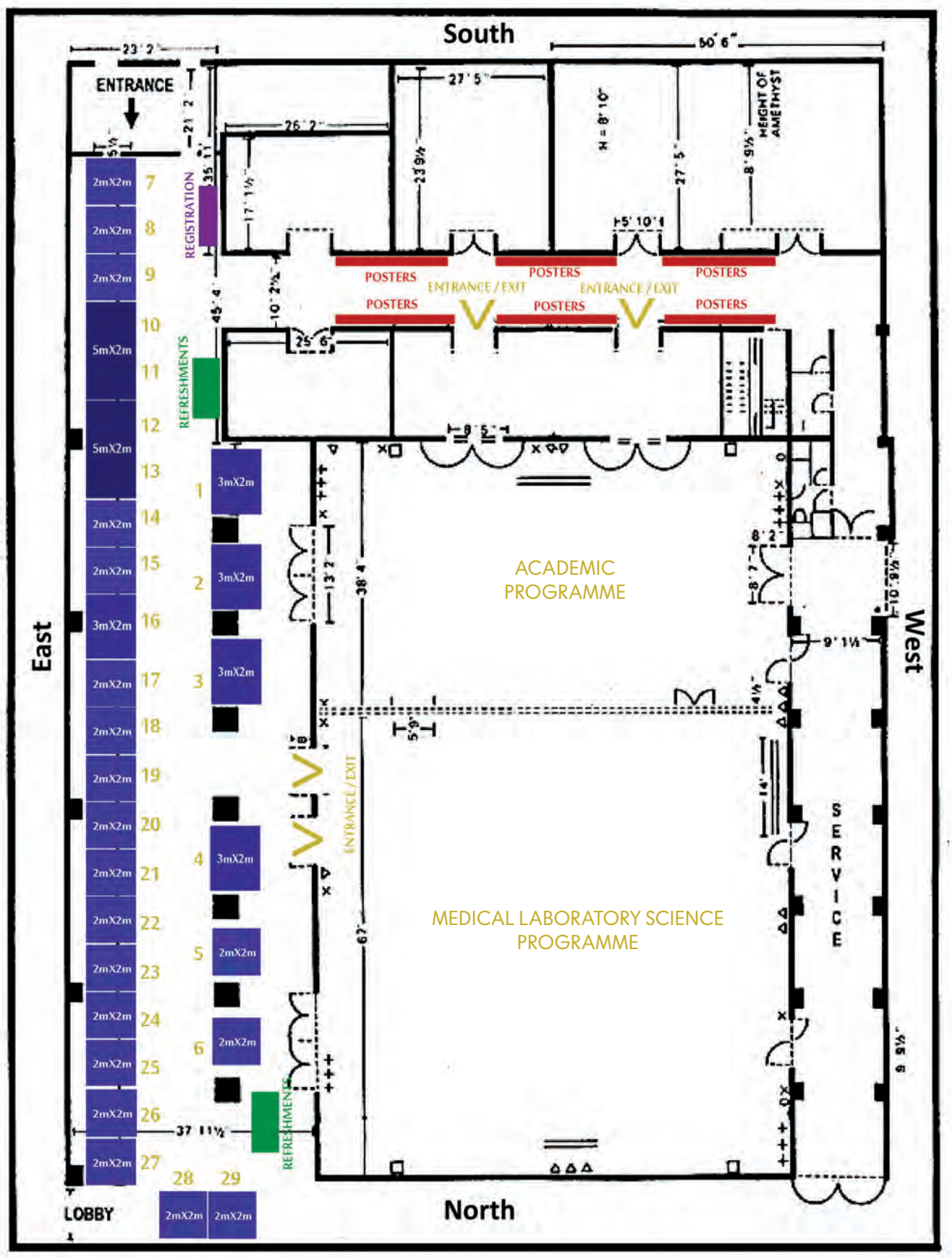
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