College of Chemical Pathologists of Sri Lanka

# CCPSL NEWSLETTER

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## CCPSL NEWSLETTER

**A Biannual Magazine on Chemical Pathology**



## IN THIS ISSUE



## PRESIDENT'S MESSAGE

**Dr. B.K.T.P.Dayanath**

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"I would like to express my sincere gratitude to the members of the College of Chemical Pathologists of Sri Lanka (CCPSL) for the trust placed in me, by appointing me as the President of CCPSL for the period 2017 to 2018. I greatly appreciate the contribution of Dr. Saroja Siriwardene, the pioneer Consultant Chemical Pathologist in Sri Lanka for her untiring efforts during the last 30 years in training a group of Chemical Pathologists for the country and broadening the horizons of the field. We fondly call her "the mother of Chemical Pathology in Sri Lanka". Next my special thanks go to our founder President, Consultant Chemical Pathologist late Dr. Meliyanthi Gunatillake for the leadership and contribution given in establishing this organization. The Primary aim of the CCPSL is to direct the practice of Chemical Pathology both in clinical and technical aspects by giving leadership through dissemination of knowledge to all the layers of clinical chemistry personnel in order to improve patient outcomes.

During my tenure, three regional workshops covering Southern, Northern and Central Provinces will be organized targeting the laboratory staff of both public and private sector to disseminate knowledge and skills related to current topics of interest. Guidelines, standard operating procedures (SOPs) and position statements relevant to the field of Chemical Pathology will be formulated and approved by appointed sub-committees which will be published on the college website making it accessible to all concerned parties. Publication of this newsletter by the CCPSL would provide good opportunities to the younger generation to exhibit their achievements, which will lay the foundation for a Journal in the future. The major event of the CCPSL, the Annual Academic Sessions 2018 and Lab Expo will be held in March with participation of international speakers in order to provide current global knowledge and technology to the laboratory professionals in Sri Lanka.

In order to spread wings internationally another major international event, "Global Lab Quality Initiative Workshop" will be organized in collaboration with Association for Clinical Biochemistry of Sri Lanka (ACBSL) with sponsored speakers from American Association of Clinical Chemistry (AACC) through Asia Pacific Federation of Clinical Biochemistry (APFCB) in August 2018.

I hope, the academic calendar of CCPSL for 2017/18 once implemented will greatly contribute to the enhancement of knowledge and skills of the membership and other laboratory professionals.

# The History of Chemical Pathology in Sri Lanka

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Pathology services in Sri Lanka rested in the solid hands of Pathologists of the sixties and seventies era. They were mostly Histopathologists or Haematologists who were thorough in their work, having qualified in United Kingdom. Biochemistry sections provided basic chemistries and were manned by technicians with only 5 laboratories claiming to have one Biochemist each in their team. Pathologists paid scant attention to this section except to do some basic clinical trouble shooting.

The first Chemical Pathologist in the country was Dr. A.B.V.Perera, DCP, MCB, MRCPath, who trained full time at Hammersmith Hospital, UK from 1966 and returned 3 years later. He was in charge of the Biochemistry section at the General Hospital Colombo (now NHSL) and did Clinical Biochemistry lectures and training for medical students. He introduced new tests such as cholesterol, urinary ketosteroids and faecal fat and experimented with new methods such as recycling alcohol used for the bilirubin assay, lipid electrophoresis. Whole blood glucose was assayed using reduction and titration, urea by Nessler's reagent while electrolytes were available on an Eel flame photometer measuring one test at a time for Na and K. Pipetting by mouth was the norm of the day!

The laboratory moved to the current premises from near the blood bank in 1978. Dr. Perera ordered two Technicon continuous-flow analyzers for glucose and urea measurements by *o*-toluidine and diacetylmonoxime methods respectively, but did not live to see them being delivered to the laboratory. His untimely demise in 1981 left a huge void in the field , with no one to take over the post of Chemical Pathologist.

A new era had dawned by this time at Peradeniya University which introduced thyroid function tests by radio-immuno assay (RIA). The second RIA lab was commissioned in 1988 at General Hospital Colombo with the help of the International Atomic Energy Agency (IAEA). This laboratory developed consistently to serve 4 provinces of the country with many robust hormones, tumour markers and dynamic endocrine function tests before moving on to new technology using chemiluminescence in 2009.

Island-wide Biochemistry services were provided by Medical laboratory technicians and a handful of Biochemists using mostly, manual techniques. The Medical Research Institute (MRI) provided training in WHO methods to the staff and supplied calibrator material. Daily quality control (QC) was often not adhered to by the staff who struggled with a high workload in the non-fee levying state hospitals.

The Postgraduate Institute of Medicine (PGIM) was set up in 1984 with the aim of producing our own specialized medical personnel by giving full time training. The Pathology programme included a 2-year Diploma in 4 sub-specialties of Pathology, followed by a 2-year MD in Chemical Pathology and one compulsory year of training in a developed country. I was the first trainee to opt for MD Chemical Pathology in 1989 and had to be mostly self-taught. These were difficult times with growing unrest in the country. I returned to Sri Lanka in 1994 after two years of further training as a Chemical Pathology Registrar at Royal Brisbane Hospital, Australia and was appointed as the Consultant Chemical Pathologist at NHSL the following year. I took up the challenge to be the sole trainer in Chemical Pathology and build up the specialty, for which I braced myself while studying in Australia.

By 1999, four trainees had completed the MD Chemical Pathology and the first of them took up post as a Consultant as the new millennium dawned. The numbers slowly but surely increased, with a reasonable gender balance unlike the other fields of Pathology dominated by females! In order to make sure that the trainees reached the high standards of Australia and UK where they would be training last, I used the strategy of gradually increasing the breadth and depth of the curriculum and examination at both Diploma and MD levels, while devoting much time for teaching theory, interpretation and bench work.

In 2005, NHSL launched the 'Tube project' to change the culture of drawing blood into many recycled injection vials for multiple tests on a patient with multiple request forms. It was a roaring success and we developed a secure recycling system in order to re-issue them as new. Colour-coded request forms with the report on the reverse were welcomed by the clinicians. The project developed over several years with multiple features such as changing over to SI units, and was shared among major pathology labs island-wide.

The Association for Clinical Biochemistry (ACBSL) was formed in 2007 and I became the Founder President. It is affiliated to APFCB and IFCC and carries out multiple tasks to promote education and laboratory quality.

By 2013, Sri Lanka had a Chemical Pathologist in each province with six senior members in Colombo and the vicinity to carry out the postgraduate training for the PGIM. This island-wide distribution is seen as a major accomplishment of a young specialty.

The College of Chemical Pathologists was formed in 2015 with late Dr. Meliyanthi Gunatillaka as the Founder President. The inaugural academic sessions was held in March 2016 and was a great success.

As we move on to 2018, Chemical Pathology laboratories are looking towards LIS and Accreditation as well as introducing new technologies. The country is served by Chemical Pathologists and currently postgraduates are in varied stages of the 6-year full-time total-chemical-pathology PGIM training programme. They will be giving leadership to the large community of medical laboratory technologists in providing a timely and cost-effective chemical pathology service to the public of Sri Lanka and be in the fore front of medical diagnosis and prevention of non-communicable diseases while perusing avenues of expanding the understanding of the stakeholders by continued medical education.

## New Trends in Laboratory Medicine in Sri Lanka : CCPSL Regional Workshop Galle (21/2/2018)

**The 1st CCPSL Regional Workshop was successfully held at Galle with over 170 participants partaking in the event.**

# Procalcitonin: The Hope Unveiled?

**Dr. Neranjana Vithanage**
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Septicaemia is a clinical challenge, which increases patient mortality and the cost of care, globally. Constraints of the currently using conventional diagnostic markers, such as blood cultures and inflammatory markers (i.e., C-reactive protein), often leave the clinician in ambiguity regarding the necessity of use of antibiotic treatment.

Procalcitonin (PCT) is recognised as a better marker for bacterial infection especially in respiratory tract infection, where it can be used to reduce unnecessary antibiotic exposure and monitor the management. PCT can be detected 3-4 hours following onset of a bacterial infection with a peak at 6-12 hours. With a half-life of about 24 hours (rapid clearing when the insult is under control), it helps clinicians to diagnose bacterial infections and guide decisions on antibiotic treatment (commencement, monitoring and more convincingly in deescalating) rapidly and more accurately. Therefore, PCT is one of the best markers, the laboratory can offer for the diagnosis, prognosis, and monitoring of sepsis. However, PCT can also be raised as a result of other pro-inflammatory stimuli such as surgery, trauma, severe viral infections and fungal infections and in patients with medullary carcinoma. In healthy individuals PCT is undetectable in the blood (< 0.05 ng/mL) and the levels are usually low in patients with viral infections, chronic inflammatory disorders and autoimmune processes. PCT during early neonatal period shows a deceptively high value. Therefore, interpretation should essentially be in the background of all available clinical information.

The host response is the determinant factor for PCT release in infection and may differ significantly from one patient to another even in similar infection. Therefore, serial measurement would be more beneficial than a single measurement with a blanket cut-off level in clinical decision making. Serum and heparinised or EDTA plasma can be used in the analysis. Samples should be separated and analysed within 4 hours of the blood drawing, if not could be stored at 28°C for up to 24 hours; and should be frozen at -20°C within 48 hours to be analysed later.

Quantification of PCT is based essentially on immunoassay. The original PCT assay was developed as a luminometric immunoassay (LIA). A number of automated assays have been developed using TRACE (time resolved amplified cryptate emission), ELFA (enzyme-linked fluorescent assay), CLIA (chemiluminescent immunoassay) and ECLIA (electro-chemiluminescent immunoassay) technologies for the use on automated platforms BRAHMS Kryptor®, BioMérieux VIDAS®, Siemens Advia Centaur® and Roche Elecsys® respectively. Diazyme® immuno-turbidimetric assay can be used on a variety of validated clinical chemistry analysers. A semi-quantitative point of care test (PoCT), PCT-Q is also available, which is based on an immuno-chromatographic assay using immuno-gold labelling. Same clinical PCT cut-offs have been suggested for all above assays, even though, there is currently no agreed reference method or reference material for PCT. All automated and PoCT PCT assays have been developed to the results compared with, and the published reference ranges have been determined by, the original LIA method.

Gross Haemolysis, icterus and lipaemia may interfere with the measurement of PCT and fibrin or other particulate matter in the sample can lead to falsely low results. High dose hook effect is a possibility at very high PCT concentrations.

PCT has its own strengths and limitations as a biomarker. The usefulness depends on the specific clinical situation, and it never replaces a proper clinical judgement. Emerging concerns on efficacy, safety and availability of PCT as a marker of sepsis, stand against its way forward. A growing body of literature with a significant clinical and statistical ambiguity poses conflicting data on the clinical use of PCT.

This warrants a greater scientific rigour when establishing a diagnostic strategy that represent current evidence accurately and further evaluation and refinement of current believes on PCT.

**References**

# A Teenager with Persistent Hypokalaemia

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**Case Presentation:**

A 19-year-old girl presented with an on and off generalized body weakness for 2 months duration, especially after having iced coffee. Her symptoms were associated with muscle cramps, polyuria and nocturia.

On examination her blood pressure was a little lower (90/60mmHg) than normal and the other findings were normal.

Relevant serum Biochemistry results:

| Analyte | Result | Reference Range | |
|---|---|---|---|
| $Na^+$ | 139 | 135 – 147 | mmol/L |
| $K^+$ | 2.28 | 3.5 – 5.1 | mmol/L |
| $Cl^-$ | 100 | 98 – 106 | mmol/L |
| $Mg^{2+}$ | 1.52 | 1.7 – 2.2 | mg/dL |
| FPG | 140 | < 100 | mg/dL |
| HbA1c | 7.0% | < 6.5% | |
| ABG | Metabolic alkalosis | | |

**Questions:**

1) What are the causes for hypokalaemia with normal blood pressure?
2) What further investigations needed to be done to arrive at a diagnosis in this patient?
3) How would you confirm the diagnosis?

**Discussion:**

**Question 1**

a) Barter's syndrome
b) Gitleman's syndrome
c) Renal tubular acidosis (RTA)
d) Prolonged vomiting
e) Diuretic abuse
f) Chronic diarrhea
g) Laxative abuse

**Question 2**

The latter 4 causes were excluded by the history. Patient had metabolic alkalosis which helped to exclude RTA.

The results of 24h urinary electrolytes excretion:

| Analyte | Result | Reference Range |
|---|---|---|
| $K^+$ | 232 | 26 – 123 mmol/24hrs |
| $Ca^{2+}$ | 20 | 100 – 300 mmol/24hrs |

| | |
|---|---|
| Serum aldosterone (supine) | 213.6 pg/mL (49.3 – 175) |
| Plasma renin (supine) | 12.4 pg/mL (2.70 – 32.60) |
| Aldosterone/renin ratio | 1.9 |

In this patient, spot urinary analysis of electrolytes would not be useful in the diagnosis as polyuria can result in falsely low results.

Hypokalaemic metabolic alkalosis with hypomagnesaemia, hypocalciuria, hyperkaluria and 2ry hyperaldosteronism found during adolescence were in more favour of Gitleman's syndrome.

**Question 3**

DNA sequencing of the SLC12A3 gene should be perform to confirm the diagnosis of Gitleman's syndrome.

The patient and her brother were homozygous for the novel missense mutation p.N426Y (c.1276A>T, ref. seq. NM-0003399.2) in exon 10 in SLC12A3 gene and their mother was heterozygous for the same mutation. Therefore the diagnosis of Gitleman's syndrome with diabetes mellitus was confirmed in this patient.

**Abbreviations:**

FPG : Fasting plasma glucose
ABG : Arterial blood gas analysis

**References:**

*Lin SH et al. J ClinEndocrinolMetab 2005; 90:2500-2007.*

*Gitelman HJ, Graham JB, Welt LG: A new familial disorder characterized by hypokalemia and hypomagnesemia. Trans AssocAm Physicians 1966, 79:221-235.*

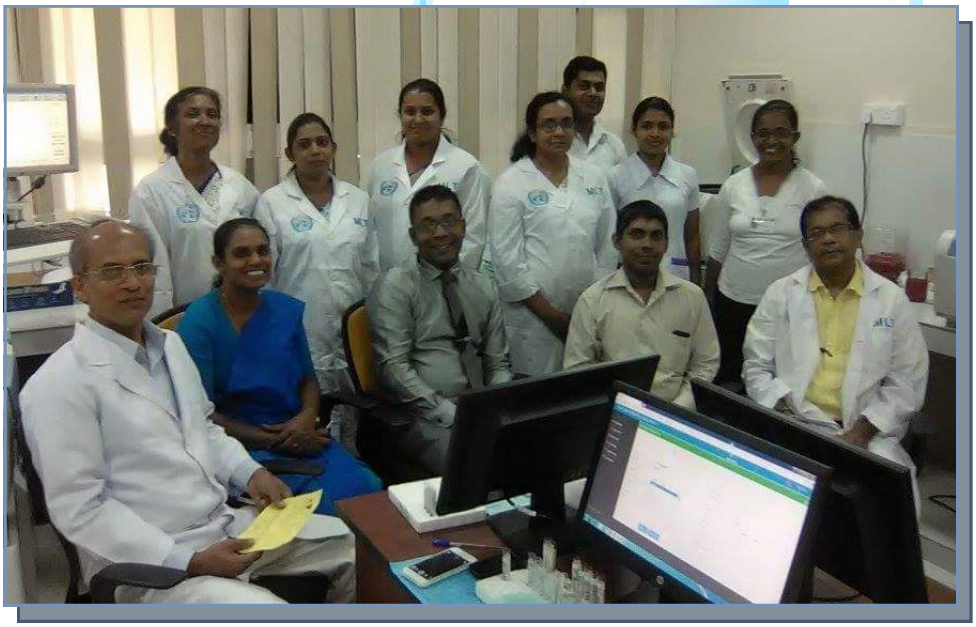
*Simon DB, Nelson-Williams C, Bia MJ. Gitelman's variant of Bartter's syndrome, inherited hypokalemic alkalosis, is caused by mutations in the thiazide-sensitive Na-*

# A Step towards A Better Service
# Department of Chemical Pathology - Teaching Hospital Karapitiya

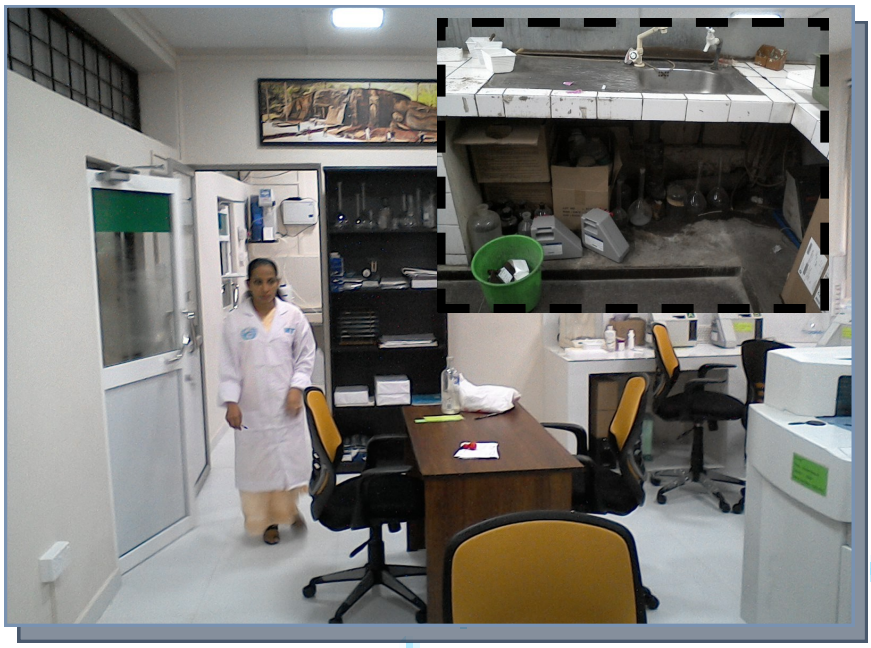
Nearly three decades back, the Department of Pathology at Teaching Hospital - Karapitiya was established as a small unit designed for a single Pathologist teamed by a few Medical Laboratory Technologists. Today, the department has vastly improved with established subunits, occupied by 3 Histopathologists, 2 Hematologists, a Chemical Pathologist, a Microbiologist, and a Virologist teamed with over 50 Medical Laboratory Technologists. One important milestone in the road towards the present improvement of the Department of Chemical Pathology was the appointment of a Chemical Pathologist for the first time to the Teaching Hospital Karapitiya in 2010.

The Department of Chemical Pathology was functioning at a very basic level in 2010 when the Consultant Chemical Pathologist, Dr.B.K.T.P.Dayanath (who at the time had returned from overseas training in Australia) was appointed as the first Chemical Pathologist at TH - Karapitiya. The available biochemical tests at time were only a few, namely plasma glucose, serum electrolytes, blood urea, CSF protein and serum creatinine. Grossly inadequate number of tests was not the only dilemma faced by Dr.Dayanath, when the laboratory was placed under his care. The sample collection, transportation and analysis also were at substandard level indicating need for improvement in both pre-analytical and analytical phases. The clinicians had lost their faith on the accuracy of hospital laboratory tests reports resulting in many patients being referred to private sector laboratories. Analyzing the situation at the Chemical Pathology Laboratory, Dr.Dayanath proceeded with immediate steps to straighten things out. The pre-analytical phase was put back on track with proper education of ward staff and new automated analyzers (Biochemistry, ISE & Immunoassay analyzers, Osmometer, Capillary Electrophoresis System) were purchased to improve the analytical phase and increase the testing capacity of the laboratory. This led to addition of over 40 new tests to the list of tests provided by the hospital laboratory. The improvement of the Department of Chemical Pathology of TH - Karapitiya became ground-breaking as it became the first government hospital laboratory to offer iPTH and Vitamin-D assays in the country. The post-analytical phase was also upgraded as the laboratory started to issue computer generated test reports with an impressive report format. The improvement of the quality of the Chemical Pathology Laboratory was able to gradually build the faith of the clinicians on test results.

In October 2014, when Dr.Dayanath was transferred to Colombo North Teaching Hospital - Ragama, Dr.Manjula Dissanayake from Teaching Hospital Anuradhapura was transferred TH - Karapitiya as his successor. The strong foundation laid by Dr.Dayanath, for a quality laboratory service at TH - Karapitiya made it easy for Dr..Manjula to continue with the laboratory development. He was able to take the initiative to improve the infrastructure of the laboratory by installing a modern new appearance along with a new reception area for the Chemical Pathology Department. Subsequently, other subunits of the department were also renovated giving an attractive look to the Department of Pathology as a whole.



The Present Team at the Department of Chemical Pathology - TH Karapitiya



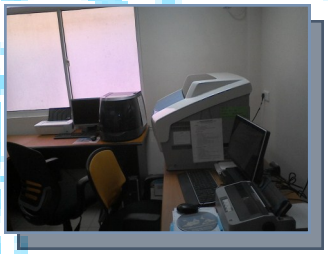
While the infrastructure was renovated new analytical technologies were also introduced for the first time in Sri Lanka at the TH - Karapitiya Laboratory. Automation of urine sediment and chemical analysis is an example for introduction of such technologies. Biochemistry and immunoassay analyzers were also upgraded with larger modular systems aiming to incorporate conveyer belts for specimen transportation to implement complete automation.

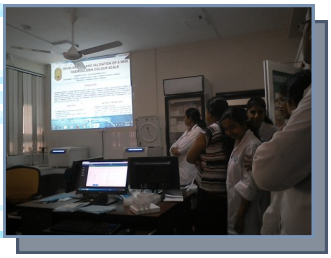
Today, the test menu is further widened with more than 60 different tests being done at the Department of Chemical Pathology, perhaps the largest test menu offered by a government hospital in the country.

The next step was to establish an advanced laboratory information system with bar-coding of the specimens. This was a completely a new challenge for the laboratory staff which they accepted without any resistance, taking another step towards automation. In the near future, patients' test results will be available online for the doctors by the laboratory information system. Further strengthening the analytical phase; commercial third party, bi-level, internal quality controls and monthly external quality assurance programs for both biochemistry and immuno-assays were introduced to certify the high quality of service. Today, the laboratory performs well in terms of all quality parameters.

Continuing professional development programs are conducted regularly by Dr.Manjula for the improvement of knowledge of all layers of laboratory staff. The laboratory is also supporting doctors and Medical Laboratory Science undergraduates for their research projects not only by providing facilities for testing but also by providing guidance. Dr.Manjula has supported and guided more than 10 research projects during past 2 years.

As a result of the dedication and commitment of the entire staff, the laboratory has become an excellent service provider for the patient care with clinicians having more faith on the accuracy of test results. According to the statistics of past few years, the number of samples received by the laboratory has increased by 75% compared to that of 2015 with approximately 1500 specimens per day been handled by the Chemical Pathology Laboratory of TH Karapitiya at present. The Laboratory at TH - Karapitiya was identified as a 'Model Lab' by the Ministry of Health attracting many laboratory professionals from various parts of the country to visit the laboratory on recommendation of the Ministry.





The College of Chemical Pathologists of Sri Lanka highly appreciates the past and present Chemical Pathologists and the entire laboratory staff for the great effort taken to uplift the Chemical Pathology Laboratory at TH - Karapitiya, to the present high standard as a state laboratory in Sri Lanka.

# An Infant with Milky Blood

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**Case Presentation:**

A boy born at 26 weeks of gestation to non-consanguineous parents was referred at the age of 3 months, from eye ward for further evaluation of high level of triglycerides. On ophthalmological examination, baby was found to have lipaemia retinalis.

Parents' lipid profiles were normal and the baby's serum biochemical results were as following;

| Analyte | Result | Reference Range | |
|---|---|---|---|
| Triglycerides | 1226 | 30 - 100 | mg/dL |
| Total cholesterol | 119 | 114 - 203 | mg/dL |
| Creatinine | 0 | 27 - 44 | µmol/L |
| Calcium | 6.55 | 2.2 - 2.7 | mmol/L |
| Total bilirubin | 126 | 3 - 20 | µmol/L |

**Questions:**

1) What are the causes for high triglyceride level?
2) What could be the reasons for high triglyceride level in this baby?
3) What further investigations are indicated?
4) What is the reason for other analyte abnormalities?
5) What are the methods for lipid removal in a lipaemic sample?

**Discussion:**

**Question 1**

"Primary" (familial or inherited) causes are associated with overproduction or impaired removal of lipoproteins. Secondary causes include high fat diet, obesity, hypothyroidism, diabetes mellitus, chronic renal failure, alcohol and certain medications (estrogen, corticosteroids, tamoxifen, progestogens, protease inhibitors, retinoids, etc.)

**Question 2**

a) Familial Chylomicronemia Syndrome

b) Familial Hypertriglyceridaemia

**Question 3**

a) Serum amylase to exclude acute pancreatitis

b) Genetic studies

Genetic studies in the following genes: *LPL, APOC2, APOA5, LMF1 or GPIHBP1* as primary cause for hypertriglyceridaemia is more likely at this age.

In this baby serum amylase was normal and there were no mutations detected in the above genes. Baby was started on fenofibrate according to the body weight and 3 months later, the lipid profile was improved with the triglyceride level reducing 145 mg/dL (30-100).

Fenofibrate was stopped after above report and the repeat lipid profile in 6 months time was reported to be normal. Therefore the diagnosis was confirmed as a rare transient infantile hypertriglyceridaemia with lipaemia retinalis in this baby.

**Question 4**

Lipeamia interference is the reason for erratic general biochemistry results. Serum electrolytes should be performed with direct ISE (ion selective electrodes) to avoid pseudohyponatremia effect due to lipid interference.

**Question 5**

a) Ultracentrifugation (the gold standard)

b) High speed centrifugation

c) Lipid clearing agents (e.g. Lipoclear)

**References:**

*Nikolac N. Lipemia: causes, interference mechanisms, detection and management. Biochemia Medica. 2014;24 (1):57-67.*

*Shah AS, Wilson DP. Genetic Disorders Causing Hypertriglyceridemia in Children and Adolescents. [Updated 2016 Jun 23]. In: De Groot LJ, Chrousos G, Dungan K, et al., editors. Endotext [Internet]. South Dartmouth (MA): MDText.com, Inc.; 2000.Available from: https://www.ncbi.nlm.nih.gov/books/NBK395571/*

# Establishment of Reference Ranges for Eight Common Analytes for the Population Served by North Colombo Teaching Hospital

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## Introduction

Reference ranges are sets of values used by the health professionals to interpret laboratory results and are considered the most authoritative tools in laboratory science to assist in the decision making phase. These are defined as sets of values within which 95% of the normal healthy population fall.

In Sri Lanka there are no published reference range studies. Commonly, laboratories use the reference ranges given by the manufacturers. Three principal methods used to determine reference ranges are; 1) Conventional method or *priori* which conducts a comprehensive reference range determination study using the International Federation for Clinical Chemistry (IFCC) recommendations, 2) *Posteriori* method, and 3) Indirect method.

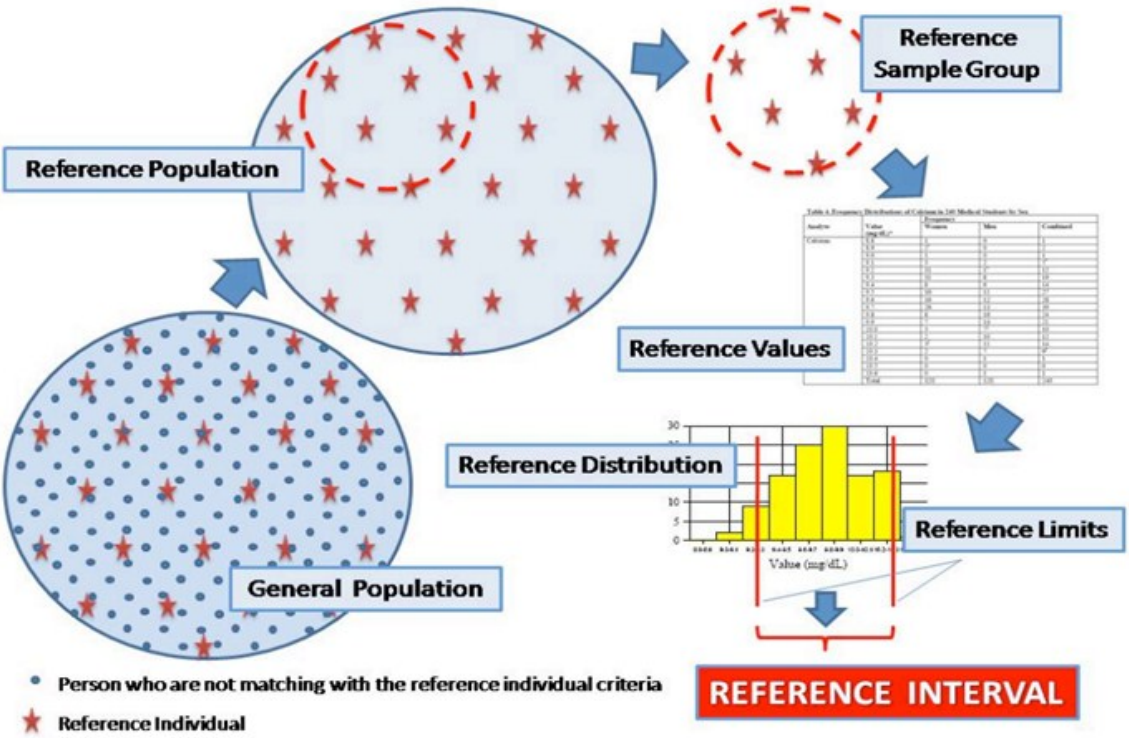


Figure 1: Reference Individuals' Selection for Reference Interval Studies

## Objective

Establishment of reference ranges for total protein, albumin, alanine transaminase (ALT), aspartate transaminase (AST), urea, creatinine, Na and K for the population served by the Colombo North Teaching Hospital - Ragama.

**Methods**

Blood samples were collected from 150 male and female blood donors between 20 – 60 years who attended the blood bank. Those who are having chronic illnesses or on treatment for acute illnesses within past three months, recent surgeries, current smokers and pregnant females were excluded from the study using a questionnaire. Samples were separated within two hours and analyzed on the same day of collection. Reference ranges were calculated using the interquartile ranges after omitting outliers. Statistical assessment of significant difference was calculated.

**Results & Discussion**

According to the above results there is a clear difference of reference ranges between the existing value and established value. As an example serum total protein, transaminases, urea and potassium were significantly high.

| Analyte | Existing reference range | Established reference range | Mean | Standard deviation |
|---|---|---|---|---|
| Total protein (g/dL) | 6.0 - 8.5 | 6.4 - 8.0 | 7.2 | 0.4 |
| Albumin (g/dL) | 3.5 - 5.4 | 3.6 - 4.8 | 4.2 | 0.3 |
| ALT (U/L) | 0 - 40 | 0 - 66 | 26 | 20 |
| AST (U/L) | 0 - 40 | 0 - 58 | 30 | 14 |
| Urea (mg/dL) | 10 - 50 | 11 - 31 | 21 | 5 |
| Creatinine (µmol/L) | 60 - 115 | 56 - 116 | 86 | 15 |
| Sodium (mmol/L) | 137 - 145 | 136 - 148 | 142 | 3 |
| Potassium (mmol/L) | 3.5 - 5.1 | 3.0 - 4.6 | 3.8 | 0.4 |

Table 1: Summary of the Study

| Analyte | P value | Statistical significance |
|---|---|---|
| Total Protein | $p < 0.001$ | Significant |
| Albumin | $p = 0.22$ | Not significant |
| ALT | $p < 0.001$ | Significant |
| AST | $p < 0.001$ | Significant |
| Urea | $p < 0.001$ | Significant |
| Creatinine | $p = 0.10$ | Not significant |
| Na | $p = 0.001$ | Not Significant |
| K | $p < 0.001$ | Significant |

Table 2: Statistical Significance of the Established Reference Ranges

**Conclusion**

According to the above results, it is an essential requirement to establish our own reference ranges for a better interpretation of results and patient management. This initial local study should be expanded to cover entire country in future.

# To Determine the Interference by Oral Thyroxine in Serum FT4 Assay in Indoor and Outdoor Hypothyroid Patients in Teaching Hospital Colombo South

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## Introduction

Oral thyroxine is the treatment of choice for hypothyroididsm. Measurement of serum FT4 and TSH levels are the primary tools for the diagnosis and assessment of effectiveness of the treatment for hypothyroidism. Interference of oral thyroxine in FT4 assay can cause misinterpretation of the FT4 level and mismanagement of the patient.

## Objective

To determine the interference of oral thyroxine in serum FT4 assay among outdoor and indoor hypothyroid patients treated at Colombo South Teaching Hospital.

## Method

Case series study of indoor and outdoor hypothyroid patients in Colombo South Teaching Hospital from 1st of February to 30th of April 2016. One hundred and one patients were recruited after reviewing clinical notes and obtaining informed written consent. Blood samples were collected prior to and two hours after taking the oral thyroxine dose. Serum FT4 was analyzed by two-stepped competitive chemiluminescence immunoassay in e-411 Cobas fully automated analyzer.

## Results

Out of 101 patients who have participated in the study, 26 were males. Selected 101 cases were distributed with mean age of 48.4 years (SD = ±11.16 years). The highest number of patients belonged to the age group 55 - 60 years. The difference between second and first values, was analyzed by using paired sample test and p value was <0.05 in the complete sample (p = 0.013) and even when extreme cases were omitted from the analysis (p = 0.001).

| Difference between 2nd value & 1st value | Paired difference | | | | | t | df | p value |
|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Standard Error of Mean | 95% confidence interval of the difference | | | | |
| | | | | Lower | Upper | | | |
| In the complete sample | -11.618 | 46.0934 | 4.5864 | -20.7171 | -2.5182 | -2.533 | 100 | 0.013 |
| Without extreme cases | -0.3535 | 0.1662 | 0.01742 | -0.3881 | -0.3189 | -20.290 | 90 | 0.001 |

Table 1: The Results of Paired Sample Test

**Discussion & Conclusion**

Serum FT4 level peaks 4 hours after taking oral thyroxine. It remains above the normal levels for 6 hours in patients taking oral thyroxine daily. In this study, there was a significant difference in serum FT4 level before and two hours after ingestion of oral thyroxine dose indicating that oral thyroxine has an interference in serum FT4 assay. As serum FT4 and TSH are used in monitoring response to oral thyroxine in hypothyroid patients, accurate FT4 and TSH values are of paramount importance in the management of hypothyroidism. This warrants need for further studies to determine the degree of interference of oral thyroxine in FT4 assay with regard to time interval needed for blood drawing for serum FT4 from the time of ingestion of the last dose of thyroxine.

# UPCOMING EVENTS

## CCPSL Annual Academic Sessions 2018 & Lab Expo

CCPSL AAS 2018 is the major event in the academic colander of CCPSL for the year 2018. The grand event will take place at Hotel Galadari - Colombo, Sri Lanka from 15th to 17th March 2018 in collaboration with internationally renowned speakers.

## CCPSL Regional Workshops Galle, Kandy & Jaffna

In collaboration with Ministry Health Services, CCPSL has organized a series of regional workshops for the Medical Laboratory Technologists in order to strengthen their knowledge. The 1st workshop was held on 21st February 2018 at Galle targeting Medical Laboratory Technologists in Southern Province.

## Global Laboratory Quality Improvement 2018

A 2-day workshop for Asia-Pacific region organised by CCPSL & ABCSL in collaboration with AACC, WHCF & APFCB for GLQIP 2018 will be held on 26th & 27th August 2018 at the Main Auditorium of Nawaloka Hospital Colombo with the aim of "Adding Value to Patient Care Using Quality Control".

## Asia-Pacific Congress of Clinical Biochemistry 2019

APFCB Congress 2019, organized by APFCB, ACBI & IFCC, will be held from 17th to 20th November 2019 in Jaipur - India, under the theme of "Laboratory Medicine - .Innovation & Integration". It will encompass many exiting events on different issues related to laboratory medicine by world renowned experts.