



SLMA NEWS

THE OFFICIAL NEWSLETTER OF THE SRI LANKA MEDICAL ASSOCIATION

**Why this fuss over
SAITM?**

**Ethics Review Committee
of the SLMA Receives
Global Accreditation**

**Doctors vs. Lawyers –
Annual Cricket
Encounter 2016**

The Medical Dance 2016



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PRESIDENT'S MESSAGE

This is my last message to the SLMA newsletter as the President. I believe that we presented the membership with content that were important and up to date and I hope that you have enjoyed reading the newsletters of 2016. The last Council Meeting was held on 2nd December and arrangements have been made to hand over the responsibilities to the new Council before the end of the year. Only the Annual General Meeting remains to be held on the 23rd of December.

First and foremost, I wish to extend my most sincere gratitude to all the Members of the Executive Committee, Members of the Council, Members of the Expert Committees and the Members of the Working Groups who served the SLMA with dedication in carrying out their duties. I have been very fortunate to have had young, dynamic and super efficient colleagues in the Executive Committee whose enthusiasm for work was infectious. The Expert Committees and the Working Groups form the backbone of the SLMA and their commitment to the tasks undertaken was commendable. They were ably supported by the Administrative Staff of the SLMA. Many other SLMA members too helped in numerous ways to carry out the activities of the Association and I am ever so grateful for their support.

This year, continuous professional development (CPD) activities were conducted, not only for medical professionals in the public sector but also for those in the private sector. CPD activities were extended to medical faculties and this year we also included the Sir John Kotalawala Defence University in these activities. The pinnacle academic event was the 129th Anniversary International Medical Congress held in July which was concluded very successfully. While it was encouraging to note the large numbers of outstation doctors attending the CPD activities, the limited participation of Council Members in regional meetings was disappointing.

The Medical dance was held on 9th December and the opinion of many who attended the Dance was that it had been one of the best Medical Dances held so far. I wish to thank all the members of the Dance Committee, especially Dr. Christo Fernando and Dr. Pramilla Senanayake, who looked into every aspect of the dance with meticulous attention to detail. Many members of the committee played a part in securing sponsorships for the event and advertisements for the souvenir.

The Induction of the new President, Prof. Chandrika Wijeratne, has been planned for 21st of January next year. I wish her and the new Council the very

best.

The SLMA has grown in stature over the years and is now recognized and well respected by all health-related stakeholders. We also continued to engage with the Ministry of Health and were successful in getting an enhanced financial allocation from the ministry. This year the SLMA has been able to extend and further strengthen our international partnerships by signing an MOU with the Chinese Medical Association and by taking over the presidency of the Commonwealth Medical Association for the next three years.

The renovations and refurbishments carried out at Wijerama House during 2016 has given it a more attractive and user-friendly atmosphere.

It has been an honour and a privilege for me to serve the SLMA as its 119th President. I fervently hope that I have justified the trust that was placed in me by the membership. It has indeed been a memorable year and I have truly enjoyed my tenure as the head of this august institution.

Finally I wish each and every one of you the Compliments of the Season, a Joyous Christmas and a Happy New Year!

Dr. Iyanthi Abeyewickreme
President-SLMA

WHY THIS FUSS OVER SAIMT?

Prof A H Sheriff Deen,
Guest of Honour –
Foundation sessions of the
SLMA



One of the objectives of the SLMA is to play an advocacy role in medical affairs of the country. It was only 2 weeks ago that I saw these news items in the newspaper and I thought it is time to air my view on private medical colleges with the hope that the SLMA will take on the task of advising the Government on this contentious issue. In the article on Trump the correspondent had this to say "he emerged amid a constella-

tion of crises, economic hardships and unemployment, an erosion of political centre and a growing resentment against the elites. He had a penchant for long rambling speeches, presenting himself in messianic terms, promising to lead his country to a new era of greatness" – Donald Trump? Boris Johnson? Rodrigo Duterte? No, it is about Adolf Hitler!

"Why this fuss over SAIMT?" asks a reader. The answer is the same – because of the hidden dangers.

Many years ago I wrote to this very

same newspaper that I have been asked on several occasions whether I was for or against Private Medical Colleges and I had replied that I was neither for or against these but that I was against unregulated "commercial" medical colleges which were akin to mere tutorials.

Of late I have been approached by a few businessmen who have asked me

- "Doctor, will you help me set up a Private Medical College? You name your price and we will pay you."

And the conversation on each occasion has gone like this-

Contd. on page 03

Why this fuss...

- **“Have you got a Teaching Hospital?”**- Answer **“No”**.
- **“Do you have any idea of medical curriculum, teaching medicine?”** -Answer **“No”**.
- **“Have you got capital?”** -Answer **“No”**.
- **“Have you got permission to start a degree awarding Institution/ Medical School?”** -Answer **“No Doctor, but when SAITM gets the OK we can advertise, collect 5 to 10 million rupees from each applicant, start with a lecture hall and later build up the rest – just like our International Schools!”**

Following the 1920s, the training of doctors in the United States moved from commercial medical schools to **medical colleges with research facilities associated with teaching hospitals**. Emphasis on the scientific basis of medicine stimulated major breakthroughs in our understanding of human biology and disease and this fostered progress. The triumvirate of medical school, research faculty, and teaching hospital spawned the modern academic medical centers with the following objectives:

- Educate and train tomorrow's doctors and medical scientists
- **Discover new medical knowledge and conduct research to find tomorrow's cures** (almost a hundred and fifty years later, how many of our medical faculties have this in their Mission statements?)
- Develop innovative ways to prevent, diagnose, and treat disease
- Provide the most up to date medical care

We too should move forwards not backwards.

The first step in establishing a medical school is to get permission from the Ministry of Higher Education and the SLMC. There is a document issued from the SLMC titled “Guidelines and specifications and criteria for accreditation of Medical schools in Sri Lanka and courses of study provided by them” dated 2011.

These were first published in Febru-

ary 2009 under the provisions of Section 19 of the Medical Ordinance, in conformity with the Committee of Vice Chancellors, Directors of the University Grants Commission (UGC) of Sri Lanka for medical schools and foreign medical schools to be approved as centres of medical education for Sri Lankan citizens.

Since then the WHO in November 2009 published “Guideline for Accreditation of Medical Schools in countries of the South East Asia region” bearing in mind the country specific requirements and the prevailing national accreditation practice and are non-binding, flexible and facilitatory in nature and are under the jurisdiction of the medical councils.”

“It is proposed that with the following standards of medical education by every University, medical school or degree awarding institute established under the Universities Act No. 16 on 1978 shall be periodically undertaken by the SLMC in accordance with Part 111 A of the Medical Ordinance.

The process starts in the following sequence: Application for Accreditation, Scrutiny of Documents, Self Evaluation, Site Visit, Approval of Curriculum/ substantial changes.

This is followed by a set of guidelines on Standards, Educational programme, Instructional methods, Assessments. The next section is on Clinical Teaching facilities. It spells out minimum number of beds and occupancy, the specialties, professorial Units, Clinicians Operating Theatres, radiology facilities, Laboratory facilities, and rehabilitation. The next section is Finances and resources with a sum of money deposited by private medical schools as a guarantee against eventualities!

Physical facilities like lecture rooms, Auditorium and examination hall, Tutorial rooms, AV Unit, Laboratories and museums, Library, Information technology, Clinical Skills and English competency laboratories, Research

environment, Medical Education unit, Accommodation and Sports, Food service, Water supply, sanitation, Electricity, gas, Central workshop are spelt out.

Next is a section on student selection, Staffing policy, staff development and PG development.

The last section is the Accreditation Report, It says “the report must conclude with recommendations concerning the decision on accreditation to be taken by the SLMC, this decision must be conveyed to the Minister of Health, Minister of Higher Education and UGC and also made public.

Now compare this with the Guidelines put out by the Medical Council of India. There is an official Gazette titled “Establishment of Medical Colleges 1999” The first clear statement goes **“No person shall establish a medical college except after obtaining prior approval from the Central Government submitting a scheme:**

Single plot of land 25 acres in extent

Essentiality Certificate: No objection of State/ territory of administration, availability of adequate clinical material as per Council regulations, University consent, Person manages a Hospital not less than 300 beds with facilities for expansion, **that the person has not admitted students to the proposed medical college**, Bank guarantees in favour of the Medical Council of India, **opening of Medical Colleges in hired or rented buildings shall not be permitted**, Market survey and environmental analysis, Educational programme with method of recruitment, administration, Department wise and year wise curriculum of students, Functional programme – department wise and service wise, Equipment programme, Manpower programme, Building programme, Planning and layout, Revenue and expenditure assumptions, Application with 3.5 lakhs to the Medical Council of India.

Why this fuss...

This is followed by a review process by the MCI on desirability and feasibility, Report by MCI, Grant of permission with a time based programme. (www.mcindia.org/for-colleges/Estl-of-new-Med-Coll-Regulations-1999.pdf)

You may now see the process set up of a stepwise transparent process starting with a plot of land and resources, to obtaining national/ state/ territorial permission/teaching hospital/ departments, infrastructure facilities, curriculum/criteria for recruitment of staff, admission of students and that at each stage the MCI is involved in assessing adequacy before final permission is given. **Compare this with the business entrepreneurs who are waiting to make a quick buck by commencing at the reverse end by recruiting the students, collecting the money, starting preclinical courses in hired halls, stepwise hiring of staff as required, ad hoc**



appointment of Professors and Lecturers, then building a Teaching hospital and finally applying for permission from the Medical Council. Maybe some will see now the answer to the question “Why this fuss over SAIM?”

I hope the SLMC will get involved.

- Sub committee to study the problem
- Lobby with the Government for a policy on Private Medical Schools
- Accept the fact that private medical

schools are a necessary evil / inevitable phenomenon

- Re write the guidelines using the MCI format
- Close all loopholes which could enable corrupt practices
- Lobby with the Government for Gazette notification
- Ensure punitive action in case of non-conformity

Thank you.

MONTHLY CLINICAL MEETING OF THE SLMA IN NOVEMBER & DECEMBER

Dr.Kushlani Jayatilleke,
Assistant Secretary-
SLMA



November Meeting

The monthly clinical meeting of the SLMA for November 2016 was held on 15th of November from 12 noon to 1.30pm at the SLMA auditorium in collaboration with the Sri Lanka College of Psychiatrists. The topic was “The short and long term management of alcohol dependence and harmful use”. The resource persons were Prof Raveen Hanwell, Professor in Psychiatry, Faculty of Medicine, Colombo and Dr. Suhashini Ratnatunga, Senior Registrar in Psychiatry, University Psychiatry Unit, National Hospital of Sri Lanka. The meeting was chaired by Dr Dennis Aloysius, a past president of the SLMA.

December Meeting

The monthly clinical meeting for

December 2016 was held on 20th of December from 12 noon to 1.30pm at the SLMA Auditorium in collaboration with the Heart Association of Sri Lanka. The topic was “Acute Coronary Syndrome”. The resource persons were Dr. W. S. Santharaj, Consultant Cardiologist, National Hospital of Sri Lanka and Dr. Eranga Colombage, Senior Registrar, National Hospital of Sri Lanka. The meeting was chaired by Dr. M.R. Haniffa, Vice President, SLMA and Dr. Kushlani Jayatilleke, Assistant Secretary, SLMA.





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ETHICS REVIEW COMMITTEE OF THE SLMA OBTAINS SIDCER RECOGNITION FROM FERCAP

The Ethics Review Committee of the Sri Lanka Medical Association became the 5th Ethics Review Committee (ERC) in Sri Lanka to obtain Strategic Initiative for Developing Capacity in Ethical Review (SIDCER) recognition from Forum for Ethical Review Committees in Asia and the Western Pacific (FERCAP). ERC of the SLMA thus becomes the only National level ERC of a Professional Association to obtain international recognition.

The recognition plaque was received by Professor Anoja Fernando (Chairperson) and Professor Chandanie Wanigatunge (Secretary) on behalf of the SLMA ERC at the recognition ceremony held during the 16th Annual Conference of FERCAP on 23rd November 2016 in Bangkok, Thailand.

The SLMA ERC was surveyed by a team of international and local survey-

ors of the FERCAP in June 2016 in collaboration with the Forum for Ethics Review Committees in Sri Lanka (FERCSL) and was coordinated by Prof. Vajira Dissanayake, Board Member of FERCAP.

A 3 day rigorous assessment of the ERC was performed under the following criteria laid down by the Strategic Initiative for Developing Capacity in Ethical Review (SIDCER) programme.

1. Structure and Composition
2. Adherence to specific policies
3. Completeness of the Review Process
4. After Review process
5. Documentation and Archiving

The survey included perusal of all documents of the ERC, interviewing its committee members and office staff and observation of a full board meeting. The ERC SLMA successfully met

all SIDCER criteria and was cleared for recognition in September 2016.

The SLMA ERC is chaired by Professor Anoja Fernando and its members are

Dr Malik Fernando - Alternate Chair

Prof. Chandanie Wanigatunge - Secretary

Prof. Shalini Sri Ranganathan

Dr .Carukshi Arambepola

Dr. Sumal Nandasena

Dr. Jayanie Weeratna

Dr. Mayuri Thammitiyagodage

Dr. Kamal Weerapperuma

Prof. Amala de Silva

Dr.Naazima Kamardeen

Mr. Sujeewa Rajapakse

Ms. Chitra Ranasinghe



NOTICE

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DOCTORS VS. LAWYERS – ANNUAL CRICKET ENCOUNTER 2016

The annual cricket encounter between the SLMA Doctors and the Lawyers of the Bar Association of Sri Lanka (BASL) was held 13th of December 2016 at the BRC grounds and, the Doctors' team won the match.

The Hon Secretary of the BASL, Mr. Amal Randeniya joined the President of the SLMA, Dr. Iyanthi Abeyewickreme to award the winner's trophy to the captain of the Doctors' team. Prof. Indika Karunthilake awarded the medals to the members of the winning team.



JOINT REGIONAL MEETINGS IN NOVEMBER & DECEMBER

Dr. Sumithra Tissera,
Assistant secretary-
SLMA



SLMA – Ruhunu Clinical Society Joint Regional Meeting

The Sixth SLMA joint Regional clinical meeting was held at Sanaya Hotel, Matara, on 16th of November 2016 with the attendance of around 100 participants. The welcome address was delivered by Dr. Shantha Kumara, President Ruhunu Clinical Society. Dr. Iyanthi Abeyewickreme, President of SLMA was the Chief Guest and Dr. P.M.G. Punchihewa, Consultant Paediatrician was the Guest of Honor.

The Pre-lunch session had five guest lectures by Dr. Hemantha Perera, Consultant Gynecologist, Sri Jayawardanapura Hospital on "Size at Birth – Pathway to NCD", Dr. Sarath Samarage, Senior Fellow Institute of Health Policy on "Shared Leadership



in Healthcare", Dr. Prasad Katulanda, Senior Lecturer Department of Medicine, University of Colombo on "Management of Thyroid Disorders for the Generalist", Dr. Padmini Kolombage, Senior Consultant Radiologist, Teaching Hospital, Karapitiya, on "An Overview of Imaging in Muscular Skeletal System & Small Parts" and Dr. T. Satheshan, Consultant OMF Surgeon, General Hospital Chilaw on "Surgical Art & Facial Beauty".

The Post lunch session included a guest lecture by Dr. Janatha Liyanage, Consultant Paediatric Surgeon, Teaching Hospital, Karapitiya on "Management of Genitourinary Problems in Children", a Symposium on Cardiology with an eminent Panel of Consultant Cardiologists Dr. Dumin-da Samarasinghe, LRH, Colombo, on "Structural Heart Disease What can we do?",

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Joint Regional Meetings ...

Dr. Tiran Pereira, North Colombo Teaching Hospital, on “Pearls in the Heart Failure Management”, and Dr. Susith Amarasinghe, Consultant Electro physiologist, Teaching Hospital, Karapitiya, on “Sudden Cardiac Death and Risk Assessment”. There was also three free paper sessions where doctors from Hospitals around presented their research. Dr. Murali Vallupathran, Consultant Community Physician, Member SLMA, was the Judge of for these sessions.

SLMA – Awissawella Clinical Society Joint Meeting

The seventh SLMA's joint Continuing Medical Education Programme (CME) was held at the Board of Investment (BOI) auditorium, Seetawaka on 18th of November 2016 with an attendance of over 150 participants. The programme commenced with a joint welcome address by Dr. Lucian Jayasuriya Past President of the SLMA, and Dr. Priyantha Jayalath, President, Avissawella Clinical Society.

Lectures during the first session was delivered by Dr. Hasini Banneheke, Secretary, Expert Committee on Communicable Diseases on “Recent Global Epidemics and Outbreaks of Emerging and Re-emerging Infections and their relevance to Sri Lanka”, Dr. Randula Ranawaka, Consultant Paediatric Nephrologist, LRH, on “UTI in Children” and Dr. Uditha Bulugapitiya, Consultant Endocrinologist, on “Obesity”. The first session concluded with an informative Quiz.

The second session which commenced after tea also had four guest lectures delivered by Dr. Saman Hewamanna, Consultant Onco-Haematologist on “Treatment of Blood Cancer”, Dr. Wasanatha Kapuwatta, Consultant Cardiologist on “Evaluation of Chest Pain”, Dr. Kaushal Karunaratna, Consultant Orthopedic Surgeon on “Osteomyelitis and an interesting insight in to Sri Lankan Tea” was provided by Dr. Phillip Veerasingham, Consultant General Surgeon.



SLMA – Wathupitiwala Base Hospital Clinical Society Joint Meeting

The eighth joint clinical meeting of the SLMA was held jointly with Wathupitiwala Base Hospital Clinical Society at Hotel Sanol, Nittambuwa on the 19th of November 2016 with over 125 participants. The programme commenced with a joint welcome address by Dr. Malik Fernando, Past President of the SLMA, and Dr. Champa S. D. Jayamanne, President Clinical Society, Wathupitiwala Base Hospital followed by a brief address by the regional director of Health services (RDHS) Gampaha Dr. Nalin Ariyaratne and Medical Superintendent, Wathupitiwala Base Hospital Dr. Sisira Wijesundara.

The three guest lectures in the first session were given by Dr. Panduka Karunanayake on “Antibiotic Resistance”, Prof. Muditha Vidanapathirana on “Euthanasia” and Dr. Anuradha Dassanayake on “Role of physician on management of cirrhosis”.

The session after tea also had three guest lectures delivered by Dr. E. G. D. S. Rajindrajith on “Abdominal Pain in Paediatrics Practice”, Dr. D. T. Gunasena on “Photography as a Hobby” and Dr. Nissanka Jayawardhana on “Current Surgical Management of Breast Carcinoma, Is it feasible in a peripheral surgical unit?”.

The Annual Sessions concluded with a delicious lunch, music, dancing and fellowship.

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THE MEDICAL DANCE 2016

Dr. B.J.C. Perera

&

Dr. Christo Fernando,
Joint Social Secretaries-
SLMA



The Medical Dance was held on 9th December 2016 at the Oak Room, The Cinnamon Grand from 8.00 pm onwards. All appropriate arrangements, logistics and the finer details were worked out by a very capable Dance Committee of the SLMA.

There were around 400 guests who had a really wonderful time at an evening of superlative music complemented and adorned by an outstandingly opulent sit-down dinner. Music was provided by two of the acclaimed leaders amongst the bands of Sri Lanka, "Misty" and "Flame". The compère for the show was the inimitable Faizal Bongso, a connoisseur amongst them all. Very many grand prizes were also awarded to the winners of a plethora of draws and contests during the event.

The evening began with preliminary cocktails from 8 to 8.45 pm. This helped to facilitate camaraderie and bonhomie amongst the participants. The dance proper started at 9.00 pm to the scintillating music provided by "Flame". They set the tempo for the rest of the evening and the other band "Misty" joined in with an equally dazzling repertoire of their own. The bands took turns at short intervals to provide excellent and continuous fare for the participants of the dance and this led to the dancers enjoying an alluring night to remember. The fabulous and plush five-course formal dinner, augmented by coffee and chocolates, was served from around 10.00 pm. During the dinner, Seasonal Christmas Carols were presented by Drs. Selvi and Lalith Perera, who were joined on stage by some of the doctors, with the bands and the audience joining in. There were more than 50 prizes on offer including 4 Air Tickets for the Entrance, Table and Raffle Draws. There were also prizes for the first five Couples on the floor, the best

dressed Lady (Eastern & Western) and Baila Competition.

The dance concluded around 3.30 am and it was of such calibre that the guests were very reluctant to finally leave the floor. The considered opinion of many who attended the Dance was that it had been the best ever Medical Dance held so far.

This magnificent event was made possible through the exceptional efforts of all members of the Dance Committee, especially Dr. Christo Fernando and Dr. Pramilla Senanayake, who looked into every aspect of the dance with meticulous attention to detail. Some of the logistical arrangements and other details were capably attended to by Dr. Manisha Abeyewickreme and Dr. Parakrama Dharmaratne. Many members of the committee played a part in securing sponsorships for the event and advertisements for the souvenir.

The Social Secretaries also appreciatively acknowledge the valuable organisational contributions made by the Administrative Manager of SLMA, Ms. Chathurani Ilayperuma, and the Administrative Team of the SLMA.



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Contd. from page 12

The Medical Dance...



IMPORTANCE OF FIRST TRIMESTER SCAN (11-14 WEEKS) IN MANAGEMENT OF TWIN PREGNANCY

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Introduction

Twin pregnancies are at increased risk of complications than singletons. Monochorionic (MC) twins account for 20% of all spontaneous twin pregnancies, but yet carry five time higher perinatal morbidities and mortalities than dichorionic (DC) twins. This is due to the presence of placental vascular anastomoses allowing twin twin transfusion syndrome (TTTS) and severe birthweight discordances. Moreover, most of the complications in monochorionic twins are early onset (before 20 weeks) and if not treated majority of them will die before 25 weeks. First trimester scanning between 11 and 14 weeks enables accurate pregnancy dating, determination of chorionicity, labelling and possible risk prediction in Monochorionic twin pregnancies.

Determination of chorionicity

Chorionicity can be accurately determined during first trimester ultrasonography. Monochorionic twin pregnancy can be diagnosed in the presence of the T-sign and dichorionic with the Lambda-sign or when two separate placental masses are present (Figure 1).



'T' sign in monochorionic twin

Lambda sign in dichorionic twin

Figure 1: Twin pregnancy chorionicity determination at first trimester scan

Pregnancy dating

Routine dating of pregnancy from first trimester (11-14 weeks) crown-rump length (CRL) is superior to the use of menstrual dates. The main concern in twin pregnancy dating is that which twin's measurement should be considered for dating. Larger twin's CRL is more practical for gestational age assessment because of pathological largeness in early pregnancy is highly unlikely whereas smallness is possible with very early onset fetal growth restriction. After 14 weeks as for singletons, head circumference of the larger twin can be reliably used for twin pregnancy dating up to 25 weeks.

Twin pregnancy orientation

A reproducible method of antenatal labeling is important in twins for consistent accurate identification of them in subsequent examinations. The rel-

ative orientation of the fetuses to each other (Figure 2) should be defined as either lateral (left/right) or vertical (top/bottom).

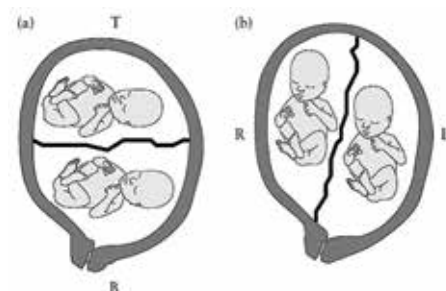


Figure 2: Diagrammatic representation of twin orientation relative to the longitudinal axis of the uterus. The twins may have a top/bottom (T/B) (vertical) (a) or right/left (R/L) (lateral) (b) orientation.

Aneuploidy screening in twin pregnancy

Risk of chromosomal aneuploidy in each fetus is determined by the zygosity. In dizygotic twins the maternal age-related risk for each fetus is the same as in singleton pregnancies. As majority of dichorionic twins are dizygotic the chance that at least one fetus is affected by a chromosomal defect is twice as high as in singleton pregnancies. Since all the Monochorionic twins are monozygotic their risk for a chromosomal abnormality affecting both fetuses is the same as in singleton pregnancies (Table 1).

Contd. on page 14

Antimicrobial Resistance...

Risk assessment for chromosomal abnormalities in twin pregnancies can be effectively done by combined test (a combination of maternal age, fetal nuchal translucency (NT) thickness, FHR and maternal serum free beta-hCG and PAPP-A) or by non-invasive prenatal testing (NIPT). Amniocentesis in twins is effective in providing a reliable karyotype for both fetuses and the procedure related fetal loss rate is about 2%. In the case of chorionic villous sampling, the procedure-related fetal loss rate is also about 2%, but in about 1% of cases there may be a diagnostic error, either due to sampling the same placenta twice or cross-contamination

Table 1. Risk of trisomy 21 at 12 weeks

Age (yrs)	Risk for trisomy 21 at 12 weeks		
	Singleton	Monozygotic	Dizygotic
20	1100	1100	550
25	1000	1000	500
30	650	650	325
31	550	550	275
32	450	450	225
33	400	400	200
34	300	300	150
35	250	250	125
36	200	200	100
37	150	150	75
38	120	120	60
39	90	90	45
40	70	70	35
41	50	50	25
42	40	40	20

Prediction of monochorionic twin complications

Monochorionic twin pregnancies in the early second trimester can be complicated with TTTS due to an imbalance in the blood flow between the twins sharing the placenta or selective fetal growth restriction (sFGR), which is a consequence of abnormal placental sharing. TTTS occurs in approximately 10–15% and the estimated prevalence of sFGR is approximately

8–10% of monochorionic pregnancies. First trimester CRL discrepancy at 11–14 weeks in monochorionic twin pregnancies is predictive for the subsequent development of sFGR, but not TTTS. First-trimester NT discrepancy in monochorionic twins does not effectively predict the later development of either TTTS or sFGR.

Screening for early fetal structural anomalies

First trimester scan can also be used in screening fetal structural anomalies in twin pregnancies. It is important that the operator needs to be familiar with the sonographic appearance of fetal structures in first trimester when evaluating fetal anatomy. Transverse

Mar;119(4):417-21.

- 2.Dias T, Ladd S, Mahsud-Dornan S, Bhide A, Papageorgiou AT, Thilaganathan B. Systematic labeling of twin pregnancies on ultrasound. *Ultrasound Obstet Gynecol.* 2011 Aug;38(2):130-3.
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- 5.Dias T, Arcangeli T, Bhide A, Napolitano R, Mahsud-Dornan S, Thilaganathan B. First-trimester ultrasound determination of chorionicity in twin pregnancy. *Ultrasound Obstet Gynecol.* 2011 Nov;38(5):530-2
- 6.Dias T, Bhide A, Thilaganathan B. Early pregnancy growth and pregnancy outcome in twin pregnancies. *Ceylon Med J.* 2010 Sep;55(3):80-4.

sweep across the fetal body from the crown to rump enables to visualize most fetal structures.

References:

- 1.Memmo A, Dias T, Mahsud-Dornan S, Papageorgiou AT, Bhide A, Thilaganathan B. Prediction of selective fetal growth restriction and twin-to-twin transfusion syndrome in monochorionic twins. *BJOG.* 2012



DR.S.C. PAUL MEMORIAL ORATION OF THE SLMA 2016

Emerging risk factors for severe dengue infection

By Dr. Chandima K. Jeewandara,
Senior Lecturer,
Centre for Dengue Research,
University of Sri Jayewardenepura



Good Afternoon. Thank you Madam for your kind introduction.

President of the SLMA Dr. Iyanthi Abeyewickreme, members of the council, respected past presidents, distinguished invitees, respected teachers, colleagues, and friends, I would like to thank the president and the council of SLMA for selecting me to deliver the prestigious SC Paul Oration at the 129th Anniversary International Medical Congress of the Sri Lanka Medical Association.

My interest over the past few years was on dengue viral infections. In 2011 December, when I joined the faculty of Medical Sciences, I had the opportunity to meet Prof. Neelika Malavige who is one of the pioneers in dengue research in Sri Lanka. I had an excellent opportunity to read for my PhD in defining protective immunity to dengue viral infections at University of Sri Jayewardenepura and University of Oxford.

One of the objectives of the study was to identify risk factors of severe dengue infections, which I will be discussing over the next 45 minutes, I feel greatly privileged to deliver this oration in honour of Dr S C Paul.

To those of you who did not know him I would like to describe him, as a surgical giant, a man of the highest academic calibre, an excellent technical and safe surgeon and very humane person who looked after all his patients with utmost dedication and care.

Samuel Chelliah Paul was born on the 28th of February 1872 in Uduvil, Jaffna. He received his education at the Central College, Jaffna and then Wesley College, Colombo. He then

proceeded to Presidency College, Madras and qualified with M.B.B.Ch. He left for London in early 1900 and entered the King's College as a post graduate student and qualified with M.R.C.S and L.R.C.P. In 1901 he became a fellow of the Royal College of Surgeons of England.

On his return to the country, Dr. Paul was appointed lecturer in Anatomy at the Ceylon Medical College and he was also appointed first acting surgeon to the hospital. He obtained M.D. Madras during that same year. As a surgical luminary in the country he contributed immensely to the field by way of many publications and introduction of new techniques in an era where surgical gloves and masks were still unused and X-rays were still in its infancy. He has the reputation of a dexterous, resolute surgeon who was also a brilliantly skilled obstetrician.

Dr. Paul married Dora Elenor. They had seven sons and three daughters.

In 1912, Dr. Paul was inducted President of the Ceylon Branch of the British Medical Association (now the Sri Lanka Medical Association). Throughout his lifetime he held many distinguished positions in the field, such as the President of the surgical section of the association in 1937, and the acting director of the bacteriological institute. Dr. Paul joined the Ceylon Medical Corps, a voluntary organization founded in 1881, as a second lieutenant and rose up its ranks to take command of the Corps as Lieutenant Colonel from 1923 to 1927.

He was a man of diverse interests and associations. He was the Chairman of the Colonial Motors Ltd., the Chairman of the Planters' Association, the Founder Chairman of the Board of the Ceylon Insurance Company and a member of the Ceylon Banking Commission.

Ladies and gentleman, This paper, I am presenting as a tribute to a man who taught us the value of profes-

sionalism and accountability. I am addressing a fitting issue as we are currently experiencing a dengue epidemic in Sri Lanka.

At present, dengue is the most important arthropod-borne viral infection of humans in Sri Lanka. Dengue infections are caused by four closely related viruses named DEN-1, DEN-2, DEN-3, and DEN-4 which are transmitted to humans, principally by infected *Aedes aegypti*, mosquitoes. The amino acid sequence of the 4 serotypes is 65-70% similar. Infection with one serotype confers lifelong immunity against that particular serotype. Subsequent infection with other serotypes may cause severe disease.

Dengue poses a substantial clinical problem, infecting millions of people per year and approximately half the world's population is estimated to be at risk. It carries a significant mortality and morbidity. As there is no specific treatment for dengue, although vaccines have been licensed, the development of an effective vaccine for all the serotypes concerned will be an important measure for controlling this disease.

Dengue poses a significant disease burden throughout the world. It is spread mainly in the tropical and subtropical regions of the world. Despite its relatively small size it carries a proportionately bigger burden of disease. Sri Lanka is experiencing dengue since 1962 and the infection became endemic since 1989.

We are experiencing an increased number of cases from the year 2000 onward. For the last five years it had peaked and follows a biannual epidemic pattern associated with monsoon rains. Mortality has reduced dramatically over the years thanks to the meticulous fluid management in inward patients. Even though the case fatality ratio (CFR) has reduced to 0.4 % the morbidity has increased dramatically over the last decade.

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Dr.S.C. Paul Memorial...

Although dengue has a wide spectrum of manifestations ranging from asymptomatic infections to more severe forms like DHF/ DSS, majority of the infections are asymptomatic. We do not know what exactly causes severe disease. On the other hand majority of the people who gets infected develops a protective immune response which we are yet to define. The pathophysiology of dengue viral infections and factors that result in severe clinical disease is poorly understood. However various factors have been proposed to contribute to the occurrence of severe disease. Dengue infection has a characteristic critical phase. It is described as a capillary leakage syndrome where most of the complications of severe dengue including death due to shock occur. Unfortunately the immunopathogenic mechanisms of this capillary leakage syndrome were not well understood until now. The fundamental features of severe infection include increased capillary permeability with lack of tissue inflammation. Interestingly, those who recover from dengue have a rapid and complete recovery usually within 48 hours.

Many epidemiological risk factors that are associated with severe dengue infections have been identified. Although secondary dengue infection is currently a well known risk factor for development of severe dengue, more recent studies have also focused on other risk factors and have shown that pre-existing antibodies to the Japanese encephalitis virus was associated with a greater risk of developing a symptomatic dengue infection. In addition, the time interval between two dengue infections is a determinant of severity of the infection. The incidence of dengue infection in a particular year and preceding years also appears to influence the incidence of symptomatic dengue. Apart from epidemiological risk factors, many existing co-morbid factors such as the presence of diabetes, asthma, hypertension and obesity have been implicated in the

development of more severe clinical disease. As non-communicable diseases are also on the rise, especially in South Asia, it would be important to determine the relationship between co-morbidities and possible risks of severe dengue.

These are a few of the unanswered questions. In short we need to know what gives protection and what causes severe disease.

- Are they the antibodies? If so what is the antibody titer? How do we measure them?
- Are they the T cells? If so what is the role of cross reactive T cells and the role of polyfunctional T cells?

In that background we carried out this research to specifically answer those questions.

- a) In the first part I will explain the following.
- b) Co-morbid factors contributing to severe disease,
- c) Age stratified seroprevalence of dengue infections,
- d) How the immune response to Japanese encephalitis modulates clinical presentation and immune response to the dengue virus and
- e) The differences in the functionality of dengue virus (DENV) specific memory T cell responses in individuals with past severe and subclinical dengue infection.

The study named 'Dengue Watch' included 1689 healthy individuals attending the Family Practice Center, which is a primary health care facility of the University of Sri Jayewardenepura, recruited following informed written consent. Following recruitment they were invited to give 15ml -25ml of blood. All individuals were tested for the presence of dengue virus specific antibodies (seropositivity) and anti Japanese encephalitis (JE) specific antibodies. Once the individuals were recruited in the study, they were asked to report if they experience a febrile, flu like illness (dengue like illness) during the study period (3 years). In such instances, a second sample of blood was obtained for dengue NS1 /PCR and if positive, another blood sample was taken on day 6-10 of illness (10ml from adults, 5ml from children). Den-

gue specific antibodies along with other tests were done and they were informed about their dengue antibody results. Details regarding their clinical features were also recorded in a separate data form. In addition another sample was obtained to detect the serotype specific peptide response on day 21. At the time of recruitment of individuals, if they were found to have no dengue specific IgG antibodies or ELISpot responses, 5ml of blood was obtained at yearly intervals to find out if they become asymptotically infected.

By following up of this cohort I have tried to answer these research questions

- Have you had dengue?
- If so which serotypes?
- How many times?
- What are your antibody responses to dengue?
- What are your antibody responses to other flaviviruses?
- How are your T cell responses to dengue and other flaviviruses?
- What factors associated with severe dengue infection

I used different techniques in assessing the immune response in this study;

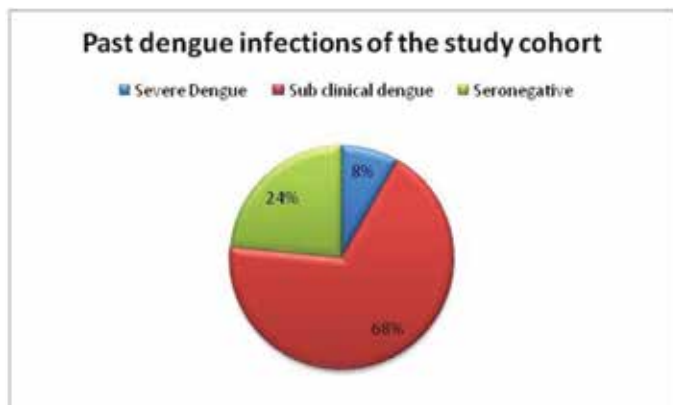
1. Ex vivo ELISpot assay- ELISPOT assay is a widely used method for monitoring immune responses. The assay is a highly sensitive method for the ex vivo quantification of cytokine after stimulation with an appropriate stimulus in vitro.
2. Enzyme-linked immunosorbent assay (ELISA), is a biochemical technique used mainly in immunology to detect the presence of an antibody

At this point I would like to give you an overview of the demography,

Basically we had two groups, adults and children which have similar characteristics.

Only 8 % a severe illness. Majority were unaware that they were seropositive for dengue which means they have had asymptomatic dengue.

Dr.S.C. Paul Memorial...



A significant positive correlation was observed for dengue antibody seropositivity and age in children (Spearman's $R = 0.84$, $p = 0.002$) and in adults (Spearman's $R = 0.96$, $p = 0.004$).

In order to investigate if JEV vaccination was likely to be associated with JEV seropositivity in children, we looked to see whether children who received the JEV were more likely to be seropositive for JEV, even many years following vaccina-

determined the association between the optic density values for DENV and JEV in those with severe dengue and those who had asymptomatic dengue. We did not find any association in either group.

severe dengue. We also found that female children were more likely to develop severe dengue compared to male children.

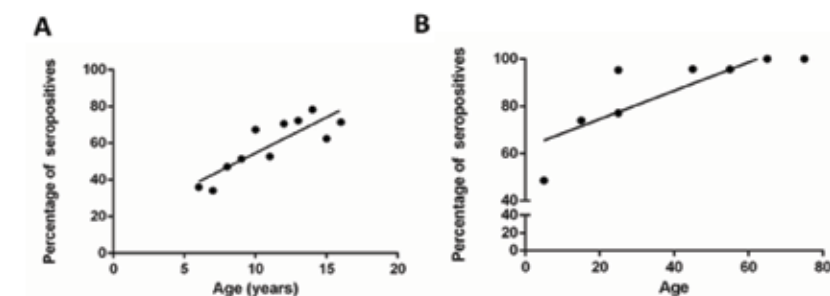
Data on T cell responses and its role in causing severe disease are as follows. We looked at three main cytotoxic cytokines i.e. IFN gamma, TNF alpha and granzyme b. We investigated whether the quantity of these cytokines produced in exposure to dengue peptides were different with the severity of the illness, that is the depth of the T cell response. There was no difference in quantity of IFN gamma, granzyme B and TNF alpha produced in those who were hospitalized due to dengue compared to non severe illness.

Jeewandara C, Adikari TN, Gomes L, Fernando S, Fernando RH, et al. (2015) Functionality of Dengue Virus Specific Memory T Cell Responses in Individuals Who Were Hospitalized or Who Had Mild or Subclinical Dengue Infection. *PLoS Negl Trop Dis* 9(4): e0003673. doi:10.1371/journal.pntd.0003673

<http://journals.plos.org/plosntds/article?id=info:doi/10.1371/journal.pntd.0003673>

However the number of the individuals who were hospitalized produced significantly higher IFN gamma or TNF alpha or in combination, On the other hand in people who has asymptomatic illness, the profile of cytokines skewed towards granzyme b.

Therefore, it appears that although the depth of production of cytotoxic cytokines was not different in those who were hospitalized and in those with mild/sub clinical dengue infection, there was a significant difference of the breadth of the T cell response. During the study period we performed cultured ELISpot assays to determine past infecting serotype. For the cultured ELISpot we used serotype specific, highly conserved regions of dengue viruses which were patented by Prof. Malavige.



Jeewandara C, Gomes L, Paranavitane SA, Tantirimudalige M, Panapitiya SS, et al. (2015) Change in Dengue and Japanese Encephalitis Seroprevalence Rates in Sri Lanka. *PLoS ONE* 10(12): e0144799. doi:10.1371/journal.pone.0144799

<http://journals.plos.org/plosone/article?id=info:doi/10.1371/journal.pone.0144799>

We observed a significant rise in the age stratified seroprevalence rates in children over a period of 12 years. These data support the higher incidence of dengue transmission in the community over the last twelve years. JEV seropositivity did not have positive correlation with age. We found that both adults ($p < 0.001$) and children ($p = 0.03$) who were hospitalized due to dengue were more likely to be seropositive for JEV antibodies.

Flavivirus antibodies are known to be highly cross-reactive in nature and are known to give false positive responses in antibody detection assays. The higher JEV seropositivity in adults who had severe dengue, could possibly be due to higher cross-reactive DENV antibody titres (and therefore JEV antibody titres). Therefore, we

As expected we found that there was a statistically significant association ($p = 0.04$) between the presence of JEV specific antibodies and JEV vaccination. However, only 143 (25.3%) of those who received the JEV vaccine were seropositive, whereas 297 (52.6%) were seronegative and 125 (22.1%) showed an equivocal response. On the other hand we saw that the seroconversion rate for killed vaccine was effective compared to the ones who received the live vaccine. Obesity, asthma, allergic rhinitis and a waist circumference of >80 cm in women was significantly associated with increased risk of hospitalization. **We found that in children, as in adults, the presence of bronchial asthma, allergic rhinitis and obesity was associated with the occurrence of**

Dr.S.C. Paul Memorial.....

Cultured ELISpot assays were carried out in all those who developed DHF in primary as well as secondary dengue and the responses were compared with the base line responses. Accordingly 7 previously seronegative individuals and 5 individuals who had only responded to one dengue serotype by this assay developed DHF. Following the episode of DHF, seronegative individuals showed new responses to one serotype and people who has secondary dengue responded to an additional dengue serotype. We found that this was a useful tool in identifying the past infecting serotype which could be used in future vaccine studies.

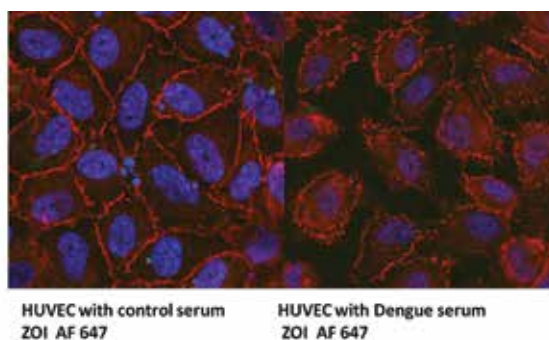
As expected, we found that multiple infections are more frequent as individuals aged. In addition, individuals who had severe dengue were more likely to be infected with multiple dengue serotypes when compared to those who had a sub clinical dengue infection. Although infection with multiple dengue serotypes increased with age, dengue specific IFN γ responses did not increase significantly with age. All four dengue serotypes are known to cause severe clinical disease. We investigated if the type of infecting dengue serotype determined the severity of dengue infection. However, we could not find any association.

Quite a lot of mediators have been implicated in association with severe dengue infection. We were also interested in certain lipid mediators. One of these was the platelet activating factor. We saw that the PAF levels were significantly higher in severe dengue. The highest level was observed with the onset of critical phase. Why did we choose PAF? As I mentioned before, we are unclear what causes vascular leakage in severe dengue. However PAF has been implicated in anaphylaxis and shock. We also wanted to see certain lipid mediators like PAF and its role in severe dengue infection. So we hypothesized a link between PAF level and the endothelial dysfunction leading to

increased vascular permeability. We went on to test this hypothesis in an in-vitro model using endothelial cells. Before describing the experiments, I would like to draw your attention to the molecular arrangement of endothelial junction molecules. There are two types of Junctions namely tight and adherens. Of them tight junctions play a major role in maintaining of the integrity. Of this ZO 1 is our main molecule of interest. So we decided to plan our experiments to identify the effect of PAF on ZO 1.

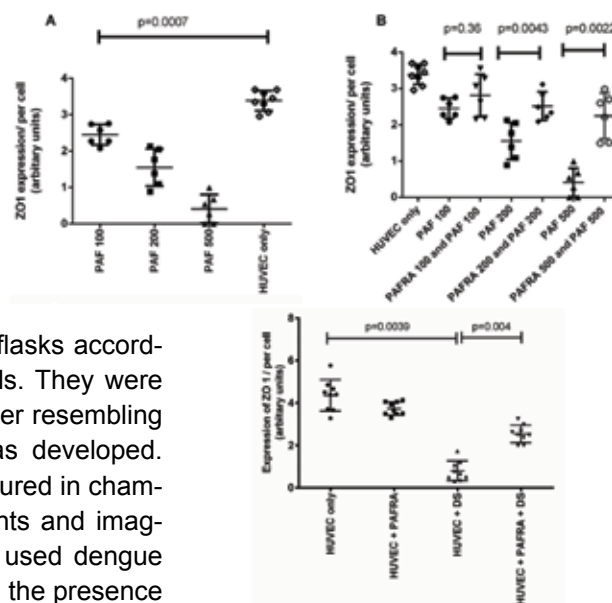
Human umbilical vein endothelial cells (HUVEC) obtained and grown in tissue culture flasks according to standard protocols. They were cultured until a monolayer resembling human endothelium was developed. Then they were sub cultured in chamber slides for experiments and imaging. In experiments we used dengue serum, control serum, in the presence or absence of PAF or antagonist as well as PAF alone with varying concentrations to assess the expression of ZO 1 by confocal imaging and the endothelial permeability by TEER measurements.

Here are some images for you



The red linear arrangement of molecules resembles the tight junctions. From these experiments, we showed that on exposure to dengue serum, the junctional architecture is disrupted. This is the quantification of the ZO 1 expression. Thanks to Dominic of the Weatherall institute of molecular med-

icine, university of Oxford, we were able to design a assay to analyze the ZO 1 expression. Here you see with PAF on exposure to the endothelial cells the ZO1 expression diminished on a dose dependant manner and we were able to demonstrate that the effect of PAF could be reversed partially with equal or higher concentration of its antagonist.



Effect of PAF and PAFR blocker on expression of ZO-1

A: ZO-1 expression in HUVECs was evaluated with different concentrations of PAF. ZO-1 expression was compared in untreated HUVECs, with HUVECs incubated with 100ng/ml PAF; 200ng/ml PAF and 500ng/ml PAF.

B: The differences in ZO-1 expression were evaluated in HUVECs treated with different concentrations of PAF. The HUVECs were pretreated with a PAFR blocker for one hour prior to been treated with different concentrations of PAF. C: ZO-1 expression was evaluated in HUVECs that were treated with media alone (untreated) compared to HUVECs treated with 500ng/ml PAFR blocker alone; treated with dengue patient serum (DS) and pre-treated with a PAFR blocker (PAFRA) prior to treatment with dengue patient serum (DS).

Contd. on page 21

Dr.S.C. Paul Memorial...

Jeewandara C, Gomes L, Wickramasinghe N, Gutowska-Owsiak D, Waithe D, et al. (2015) Platelet Activating Factor Contributes to Vascular Leak in Acute Dengue Infection. *PLoS Negl Trop Dis* 9(2): e0003459. doi:10.1371/journal.pntd.0003459

<http://journals.plos.org/plosntds/article?id=info:doi/10.1371/journal.pntd.0003459>

A similar pattern was seen with dengue serum also where we showed that the ZO expression significantly reduced on exposure to dengue serum which could be partially reversed with PAFRA. This is with the effect of dengue serum on endothelial cells. It should be emphasized here again that pre incubating PAF receptor antagonist could significantly reverse the effect of dengue serum on endothelial tight junctions. It is very clear that there is a significant reduction in ZO 1 which is a marker of permeability in the presence of PAF or dengue serum which could be reversed using its antagonist. We confirmed our finding using transendothelial resistance measurements. Basically we checked the electrical resistance across the endothelial membrane in different test conditions using electrodes. If there is less resistance it indicates widening of the gap junctions. Our findings were similar and we showed that resistance across the membrane is reduced with dengue serum and could be reversed with its antagonist.

Then I further tried to use a drug which is licensed for human use and actually in use for other conditions but not in dengue, to see the effect using similar experimental methods described above. The findings were excitingly similar. We confirmed that PAF receptor antagonism is able to reduce the permeability effect PAF.

I would like to sum up this presentation with the following conclusions.

- In Sri Lanka, dengue seroprevalence rates have risen significantly over the last 12 years.
- In both adults and children, obesity, presence of asthma

and allergic rhinitis were significantly higher in those who had severe dengue infection.

- The majority of individuals were naturally infected with the DENV, had DENV-NS3 specific T cell responses, which produce multiple cytokines.
- However, DENV-NS3 specific T cells of those who had a past mild/sub clinical dengue infection were more likely to produce only granzyme B, whereas, T cells of those with past hospitalized dengue infection were more likely to be double positive for IFN γ and TNF α .
- We have also investigated the usefulness of a novel T cell based assay, which can be used to determine the past infecting DENV serotype.
- PAF levels were significantly higher in more severe forms of dengue and were associated with a reduced expression of tight junction proteins and reduced cell layer integrity that is likely to result in an increased paracellular leak.
- Use of PAFR blockers significantly reduced these effects.

This has implications for the future management of patients such as use of PAFR blocker in acute dengue infection. We are happy to note that from these findings we have proceeded to a clinical trial in the Infectious Diseases Hospital, which is currently in progress and reached the final stages to reduce complications in dengue infection.

So ladies and gentleman, this work is impossible without the outstanding guidance and the contribution from many. I wish to express my sincere gratitude to my supervisors. I am deeply indebted to my supervisor Prof. Neelika Malavige for her elemental role in my PhD. It is a great honour being her first PhD student. I was privileged to be supervised by one of the leading dengue experts in the world. This extremely costly research would not be a reality without her outstanding assistance. I am extremely grateful to Prof. Graham Ogg, my external supervisor who kindly agreed to have me in Oxford as a student. It was a rare privilege to learn from a world renowned authority in a world class laboratory.

I wish to express my sincere grati-

tude to all the funding agencies, USJP, CDR, NSF, WIMM and also the Association of Commonwealth Universities for granting me a Commonwealth Scholarship to pursue my postgraduate studies in a prestigious university and to the University of Oxford for granting me the studentship and providing excellent facilities to carry out my research work. I would like to acknowledge the contribution made by the following members of the team leading to this oration. I wish to thank Thiruni Adikari, Laksiri Gomez, Dr. Samitha Fernando, Dr. Randika Fernando and Dr. Shiran Paranavithane for being so supportive with such enthusiasm and also my colleagues Achala Kamaladasa, Mariyam Salimi, Danuta Gutowska-Owsiak and Anthony Cheung. Further I would like to acknowledge the head and staff of the departments of Family Medicine and Microbiology and Center for dengue research for all the logistic help they provided. I wish to mention Dr. N L A Karunathne- former Vice Chancellor of the University, Prof. Mohan de Silva, former Dean of the Faculty of Medical Sciences, Prof. Sampath Amarathunga, the current Vice Chancellor and Prof. Surangi Yasawardena, the Dean of the Faculty of Medical Sciences with extreme gratitude.

I am grateful to the Head of the department and my fellow lecturers for being understanding and giving me the time I needed by sharing the duties and responsibilities among them. I would like to acknowledge our blood donors too, who voluntarily donated their blood to help this research a success. I am grateful to my mother, who has been a pillar of strength, to my late father who has been my constant source of inspiration, to my wife Subhani who has given unstinted support throughout my academic and personal life and my son Lisara for all their love and patience and finally ladies and gentlemen to all of you for your presence to grace this occasion.

Thank you

A NOTE OF THANK YOU FROM THE OUTGOING EDITOR-IN-CHIEF

Dr. Hasini Bannheke
Editor-In-Chief –
SLMA Newsletter



I would like to thank and express my heartfelt gratitude to all members of the Editorial Board for providing continuous support, authors of articles for high quality materials and member of the council including honorable President and secretary for their feedback, SLMA office staff for assisting

in various ways, publisher for timely printing and most importantly the SLMA membership for being with us.

I wish the new editorial committee all the very best. Merry Christmas and a Happy New Year to all!



The handrubbing technique for surgical hand preparation must be performed on perfectly clean, dry hands. On arrival in the operating theatre and after having donned theatre clothing (cap/hat/bonnet and mask), hands must be washed with soap and water. After the operation when removing gloves, hands must be rubbed with an alcohol-based formulation or washed with soap and water if any residual talc or biological fluids are present (e.g. the glove is punctured).

Surgical procedures may be carried out one after the other without the need for handwashing, provided that the handrubbing technique for surgical hand preparation is followed (Images 1 to 17).



Repeat the above-illustrated sequence (average duration, 60 sec) according to the number of times corresponding to the total duration recommended by the manufacturer for surgical hand preparation with an alcohol-based handrub.

Quoted from "WHO guidelines on Hand Hygiene in Health Care"



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* Thorax 2012;67:266e267. doi:10.1136/thoraxjnl-2011-201522
* Top 100 Selling Drugs of 2013. Medscape. Jan 30, 2014.

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Children should be dosed as per weight



The advertisement features a large, stylized Panadol logo on the left, with the text 'Brand of paracetamol' and 'for children' below it. In the center, there is a red prohibition sign over two white tablets, with the text 'Recommend **correct dose** variant for children*'. To the right, a red syringe is shown with a checkmark, and the text 'It's always accurate and easier with syrup'. On the far right, there are three boxes of Panadol for children liquid, labeled 'LIQUID FRUIT FLAVOURS'.

- Medications, dosages must be carefully titrated and maintained to prevent either adverse effects or therapeutic failure¹
- Patients may split the tablets unevenly and experience adverse effects from an excessively high dosage or exacerbation of the disease from a dosage that is too low¹

* Recommend to dose children below the age of 12 years by their weight as per the dosage chart * Use as directed on pack.

REFERENCE: 1 American Society of Consultant Pharmacists, Tablet Splitting for Cost Containment, <http://www.ascp.com/print/116>

Do not exceed recommended dose and frequency, as excessive dosage could be harmful to the liver. If symptoms persist, consult your doctor.

For adverse events reporting please call on 0114790400 or e-mail on lk.pharmacovigilance@gsk.com. PANADOL is a trade mark of the GSK group of companies. © 2016, GSK group of companies

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