



THE BULLETIN OF THE SRI LANKA COLLEGE OF MICROBIOLOGISTS

50TH ANNIVERSARY CONFERENCE INFECTIOUS DISEASES AND INFECTION PREVENTION & CONTROL

**“BREAKING BARRIERS FOR SUSTAINABLE
EXCELLENCE IN PATIENT CARE”**

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A BRIEF HISTORY OF THE SRI LANKA COLLEGE OF MICROBIOLOGISTS 1969 – 2019

Compiled by Dr. Ranjith Perera and Dr. Kumudu Karunaratne

The Sri Lanka College of Microbiologists evolved from the Ceylon Association of Microbiologists as its parent organisation which was founded in 1969. The founder members were Dr. T. J. P. Ratnayake, Dr. Emil Wijewantha, Dr. D. L. J. Kahawita, Dr. Charles St. John, Dr. N. N. De Silva, Dr. S. N. Arsecularatne, Dr. P. D. P. Gunatilleke, Dr. A. Sathasivam, Dr. L. B. T. Jayasundara, Dr. V. Sivalingam, Dr. I. Balasooriya, Dr. E. E. Jeyaraj, Dr. P. M. Jayatissa, Dr. (Ms.) N. K. Kappagoda and Dr. (Ms.) H. S. Vitharanam.

The name of Ceylon Association of Microbiologists was subsequently changed to The Sri Lanka Association of Microbiologists in 1974.

At the Annual General Meeting held in July 1979, a unanimous decision was taken that the Association should evolve into the Sri Lanka College of Microbiologists (SLCM). With that decision Sri Lanka College of Microbiologists was incepted and a new constitution also was drafted.

The membership of the parent organization, Ceylon Association of Microbiologists, was 15 in 1969. The current membership of the Sri Lanka College of Microbiologists has risen to 255 in 2019.

A novel step was taken in the year 2000, during the presidency of Professor Manel Wijesundara – Dr. Karven Cooray, the then Treasurer of the College took the initiative to issue a Membership number and a membership card to all members of the college.

The objectives of the college as embodied in its constitution are as follows:

1. To promote the advancement of Medical Microbiology and propagate information and disseminate knowledge among its members and other groups regarding this subject by means of lectures, demonstrations, discussions and such other means.
2. To emphasize the importance of Medical Microbiology in Sri Lanka in relation to the control of infectious diseases and advise public and private sector on microbiological problems that may arise in the country and to initiate appropriate action for their resolution.
3. To support the representation of its members in International Conferences, Meetings and Seminars in connection with Medical Microbiology.
4. To promote publishing of original work in Medical Microbiology.
5. To promote research and actively assist in such work.
6. To promote collaboration with National and International Associations with similar interests.
7. To take steps as are required for the attainment of the above objects.

As stipulated in the Article 8.1 of the constitution, the criteria to become a member of the Sri Lanka College of Microbiologists are as follows.

“All Ordinary Members, Ordinary Life Members and Overseas Life Members should possess a basic degree in Medical, Dental or Veterinary Science registerable with either the Sri Lanka Medical Council or Veterinary Council of Sri Lanka.

In addition they should possess a postgraduate qualification in Microbiology recognised by the Ministry of Health or by the Faculties of Medicine, Dental Science and Veterinary Science in Sri Lanka or other post graduate qualification approved by the Council.”

From the inception, the Medical Research Institute (MRI), Colombo, was regarded as the unofficial headquarters of the College, without any office space. The address of the Sri Lanka Medical Association, (No. 6, Wijerama Mawatha, Colombo 7) was used as the official postal address of the College. The council meetings were held at the Medical Research Institute initially for several years which later shifted to Faculty of Medicine, University of Colombo or at any other suitable premises depending on the office bearers of the councils.

It was a long felt need that the College should have a separate office, at a suitable location. The activities of the College gradually expanded, with many members contributing to improve the specialty of Medical Microbiology.

In 2002, the then President of the College, Professor Jennifer Perera started a “Building fund” of Rs.400,000/= with two fixed deposits. The funds were generated by organizing a course on antimicrobials for medical representatives and workshops for MLTs in private sector. Although action was taken to acquire office space for the College at the SLMA premises, it did not materialize at that time.

The College obtained its own office at the SLMA building from 2005 during the presidency of Dr. Gaya Colombage and received the assistance of an office secretary from 2006, Mrs. Priyanga Opatha is the first office secretary employed by the college and a small converted room in the loft of Sri Lanka Medical Association served as the college office for many years. In 2015 SLCM office was shifted to a more spacious room in the ground floor of SLMA where it is currently functioning. With the increase load of work handled by the college the services of a second office secretary was obtained in 2017.

The college was registered as a Company Limited by Guarantee under the Companies Act. No. 7 of 2007 on 16th March 2010, when Dr. Omala Wimalaratne was the President. It was Dr. Ranjith Perera who carried out this task on behalf of the College.

In 2015, during the presidency of Professor Nilanthi de Silva, the Sri Lanka College of Microbiologists was registered as a charitable organization. All activities in this regard were carried out by Professor Nilanthi de Silva.

According to the constitution of the College, a new president and a new council were elected every year. The new president was inducted by handing over the President's medal, initially at the Annual General Meeting and later at a separate induction ceremony. The first induction ceremony was initiated by Dr. Maya Attapattu but there was a gap of several years again until it became a routine annual event in the calendar of the college.

The list of Presidents of the Sri Lanka College of Microbiologists from 1969 to 2019 is given in Table I.

President's medal was introduced in 1995 by the then president, Dr. Maya Attapattu. A new tradition of awarding a replica of the President's medal to the out-going President was introduced during the presidency of Dr. Maya Atapattu, on a proposal made by Dr. Ranjith Perera. A Ceremonial Mace for the College, to be carried at ceremonial occasions, was also made during the tenure of Dr. Maya Atapattu as the president of the college.

It was planned to have Annual Academic Sessions as far back as 1971 but this plan materialized 20 years later in 1991 when Dr. Tissa Vitharana was the President of the College. Since then, Annual Academic Sessions of the College were held every year, except in 1997.

In 1991, immediately before the 1st Annual Academic Sessions, a Pre-congress workshop on Arbovirus infections was organized as a joint activity of the SLCM, Medical Research Institute, Colombo and JICA, during the presidency of Professor Tissa Vitharana.

The first ever Pre-congress seminar solely organized by the College, titled "Infection Control" was held to coincide with the Annual Academic Sessions - 2005, when Dr. Ranjith Perera was the President.

In 2017, during the presidency of Dr. Enoke Corea, the College actively collaborated in organizing the 2nd South Asian Melioidosis Congress, along with the Annual Academic Sessions – 2017.

In 2018, during the presidency of Dr. Kushlani Jayatilleke, College organized its first ever International Conference on "Infectious Diseases and Antimicrobial Resistance (ICAMR)" which was organized to coincide with the Annual Academic Sessions – 2018.

The first post-congress workshop was held at the Annual Academic Sessions in 2018 during the presidency of Dr. Kushkani Jayatilleke.

Dr. C. Palasutharam prize for the best oral presentation based on a study related to Sri Lanka was awarded for the first time in 2018 at the annual academic sessions.

Initially, the academic sessions were held at the Aldo Castellani Auditorium, Medical Research Institute, Colombo on a single day, with the inauguration being held on the previous day evening. In 1996, when Professor Lalitha Mendis was the President of the College, the academic sessions were extended to two days. In addition, for the first time in the College history, the inauguration of Annual Academic Sessions was held at the Sri Lanka Foundation Institute (SLFI), going with the trend of the other professional colleges at that time, with more facilities than the previous venue. Later, on many occasions, the inauguration and academic sessions were held at other more glamorous venues.

Details of the Annual Academic Sessions held from 1991 to 2019, including dates and venue are given in Table II.

Consequent to a decision taken at the Annual General Meeting held on the 28th of December 1996, a sub-committee was appointed to draft a new constitution for the college. This was felt necessary to clarify ambiguities and to incorporate amendments, which have been approved from 1980 onwards.

After studying constitutions of other professional associations including the Sri Lanka Medical Association, the Ceylon College of Physicians, the Sri Lanka Veterinary Association and the Sri Lanka Association for the

Advancement of Science, Dr. Ranjith Perera made the initial draft on behalf of the sub-committee and the council. After a lengthy discussion in the sub-committee and in the council, it was unanimously adopted at the General Meeting held on 07th May 1999, during the presidency of Dr. Nalini Withana.

Dr. R. S. B. Wickremesinghe, a past president, an eminent microbiologist, a dedicated teacher and a much loved member of the Sri Lanka College of Microbiologists passed away in 2003. In 2004, during the presidency of Dr. Sujatha Mananwatta, the College started the Siri Wickremesinghe oration as an annual event in memory of him. Wife of Dr. R. S. B. Wickremesinghe made an endowment to the college for the oration.

At the beginning, the oration was held in April each year, but later it was shifted to the inauguration ceremony of the Annual Academic Sessions. Back again since 2015 during the tenure of Prof. Nilanthi de Silva as the president, it has been held in early half of each year, together with the induction ceremony of the new President.

Initially, the Council invited a colleague of Dr. Siri Wickremesinghe or a senior member of the College, usually a past president, to deliver the oration. In 2015, the council decided that instead of inviting a Past President to deliver the Siri Wickremesinghe Oration, it should be awarded to the best manuscript submitted in response to an open call for submissions from members of the College.

The names of the orators and the titles of the orations from 2004 – 2019 are given in Table III.

Another milestone of the college was to award fellowships. In 2015, during the presidency of Professor Nilanthi de Siva, the College decided to award Fellowships according to the criteria that were laid down by a special committee.

A list of Fellowships awarded from 2015 to 2019 is given in Table IV.

As a tradition of the College, the Vice President was nominated as the President Elect at the subsequent Annual General Meeting. In 2015 new criteria were identified to select the next Vice President through a search committee. The criteria included in addition to the seniority the services rendered to the college and eminency in the field of microbiology.

From 1998, the Sri Lanka College of Microbiologists started circulating the college news-letter among its members. Professor Nelun de Silva, the then Editor of the College, took the initiative in this regard. From 2011, this was circulated as an e-newsletter.

In 2003, during the presidency of Professor Nelun de Silva, the Bulletin of the Sri Lanka College of Microbiologists was started with ISSN No. 1391-930X as an annual publication, to coincide with Annual Academic Sessions. Dr. Nadira Karunaweera was the editor of the College during this period. This bulletin replaced the book referred to as “Proceedings of the Annual Academic Sessions” or simply the “Abstract Book” earlier, where abstracts of all presentations at the academic sessions were published.

In 2006 SLCM launched its official website by Dr. Rohan Chinniah and this was re-launched with a new face in January 2011 by Prof. Nelun de Silva, as sl-microbiology.org with the web master Dr. Varuna Navaratne.

A new website of the SLCM was launched in May 2014, to upload abstracts in Bulletin, the newsletters, CME lectures and notices to the website; Dr. Roshan Jayasuriya was instrumental in developing the website and served as the web-master. In addition, a Facebook account was also created in 2017 for the College under the name of 'the Sri Lanka College of Microbiologists'.

In line with the objectives of the college members were involved in development of manuals and many guidelines to help improve patient services.

The work on the Laboratory Manual in Microbiology was started during the Presidency of Professor Vasanthi Thevanesam. In 2002, during the presidency of Professor Jennifer Perera, the work on laboratory manual was completed and handed over to the Ministry of Health. Professor Vasanthi Thevanesam took the initiative in carrying out this task successfully. Second edition of the Laboratory Manual in Microbiology was launched in November 2011.

In the same year, the book titled “Collection and transport of clinical specimens” prepared by Professor Sirimalee Fernando, was printed with the funds provided by the Ministry of Health. These were handed over to the Ministry to be distributed to hospitals.

The first meeting with regard to the development of the “Hospital Infection Control Manual” was also held in 2004, during the presidency of Dr. Sujatha Mananwatte. In 2005, during the presidency of Dr. Ranjith Perera, the “Hospital Infection Control Manual” was completed by an Editorial Board, headed by Dr. Kumudu Karunaratne. This manual, which is a publication of the College, was printed with the funds provided by the Ministry of Health and distributed to all hospitals in Sri Lanka.

Around 2006 the college developed the microbiology request and report forms (H1222, H1223 and H1224) currently used in hospital microbiology laboratories. Dr. Kumudu Karunaratne was instrumental in developing these forms.

Development of “Empirical and Prophylactic Use of Antimicrobials – National Guidelines” was started in 2012 as the brain child of Dr. Philomina Chandrasiri. Twenty one guidelines were compiled by the antibiotic guideline subcommittee which was chaired by Dr. Kumudu Karunaratne and published as a book and launched in 2016.

First Bio-safety Manual which was developed by Medical Research Institute in 2004 was decided to be reviewed during the tenure of Dr. Pranitha Somaratne as the president in 2011. The second edition was launched in October 2014. Dr. Jananie Kottahachchi held the responsibility in revision.

During the last three decades, the members of the Sri Lanka College of Microbiologists have actively participated in developing publications and guidelines.

A list of these publications and guidelines are given in Table V.

Members contributed to many projects conducted by the college. Some of the projects are given below.

SLCM got actively involved with the Health Sector Development Project (HSDP) from the World Bank funds in 2005 / 2006 during Dr. Gaya Colombage's presidency, and continued until 2009.

Project on situational analysis of waste management in chest clinics and STD clinics was carried around 2005-2006 by Dr. Sujatha Mananwatte, Dr. Philomena Chandrasiri, Dr. Jayanthi Elwitigala, Dr. Kushlani Jayatilleke and Dr. Geethika Patabendige.

Antibiotic Resistance Surveillance (ARSP) project was launched in 2009 in few selected hospitals which was funded by GlaxoSmithkline company. This was initially planned as a four year project which analyzed

antibiotic resistance patterns among Gram negative isolates in blood cultures. The steering committee of this project comprised of Dr. Sagarika Samarasinghe, Dr. Philomena Chandrasiri, Dr. Geethika Patabendige, Dr. Shirani Chandrasiri, Dr. Jayanthi Elwitigala and Dr. Pranitha Somaratne. The initiation of this project was done by Prof. Jennifer Perera which was subsequently handed over to the college. In 2012 as the second phase of this project, antibiotic resistance surveillance of Gram positive pathogens in blood cultures was added and this expansion included all hospitals where a consultant microbiologist's service was available.

National Laboratory Based Surveillance of Antimicrobial Resistance Project (NLBSA) was started in 2012 to analyse the antibiotic susceptibility pattern of significant midstream urine cultures and enter data to WHONET in hospitals where microbiologists served. Dr. Kumudu Karunaratne and Dr. Kushlani Jayatilleke were appointed as the chairperson and the secretary of this committee respectively.

In addition to the above mentioned initial projects, the members of the college have actively participated in the following projects in recent years also.

Strengthening the development and implementation of the national action plan for combating antimicrobial resistance and played a key role in development of National Strategic Plan (NSP) to combat antimicrobial resistance in Sri Lanka by Dr. Kumudu Karunaratne, Dr. Jayanthi Elwitigala, Dr. Geethika Patabendige, Dr. Kushlani Jayatilleke and Dr. Shirani Chandrasiri.

Project on AMR as a social dilemma: Approach to reducing broad spectrum antibiotic use in acute medical patients internationally which was done in collaboration with UK was lead locally by Dr. Geethika Patabendige with a group of other members.

External review of the National Programme for Tuberculosis Control and Chest Diseases: assessment of microscopic centres was done by Dr. Jayanthi Elwitigala.

Currently a gigantic project on AMR work for Ministry of Health through Fleming fund country grant is being undertaken by the college.

Further college members represented many expert committees. The expert committee on Microbiology by The Sri Lanka Accreditation Board (SLAB) to prepare specific criteria issued for the accreditation of medical / clinical laboratories by SLAB in 2010 and drafting a document on MD Medical Microbiology and Medical Virology training courses to facilitate registration and overseas training for post MD trainees for the Board of Study in Microbiology are some of them.

Although at the beginning, the involvements of the College members with the activities of the Ministry of Health was limited, during the past 25 years it gradually increased and expanded tremendously during the recent past. The membership of the college gave an invaluable contribution to the Ministry of Health to upgrade services in the specialty of microbiology.

In 2001, the Task Force in Microbiology was established with the Ministry of Health, initiated by Professor Vasanthi Thevanesam, the then President of the College. College members were actively involved in the Task Force in Microbiology which was chaired by the Director General of Health Services in many instances.

Some of the Activities of Ministry of Health where the College members were actively involved and represented are

1. Task Force in Microbiology of the Ministry of Health
2. Project of Laboratory Information Management System lead by Dr. Roshan Jayasuriya
3. NLQAC (National Laboratory Quality Assurance Committee)
4. Evaluation of CDDA files
5. Health care quality and patient safety conducted by MoH
6. Offsite services as consultants to hospitals without services of a microbiologist
7. Preparation of priority list for appointing consultant microbiologists
8. Formulation private and state laboratory act
9. Healthcare quality and patient safety
10. Quality indicators for health care associated infections
11. Finalizing the Hospital Facility Survey Profile – Medical Equipment
12. Guideline for the indication of colistin
13. National Advisory Committee on Communicable Diseases
14. Review of Cadre positions up to 2020
15. National Advisory Committee on Infection Control
16. National Council on Accreditation of Health Care Services in Sri Lanka
17. National Formulary Committee
18. National Drugs & Therapeutics Committee
19. Drug Evaluation Sub Committee (DESC)
20. National Advisory Committee on Communicable Diseases
21. Technical Committee for Control and Prevention of Hepatitis B & C
22. Advisory committee on tuberculosis control
23. National Steering Committee on Antimicrobial Resistance (NSCAMR)
24. Evaluate files / dossiers submitted to NMRA
25. Estimated requirement of commercial alcohol hand rub for special units

With the establishment of Postgraduate Institute of Medicine (PGIM) in the University of Colombo in 1980, Medical Microbiology was introduced as one of the disciplines for the training of specialists. Members from the field of medical microbiology represented the Board of Study in Microbiology. From 1980, members of the college have served in the Board of Study in Microbiology and have been involved in postgraduate training. Since then, college played a major role in introducing programmes suitable for PGIM training in Medical Microbiology. Under these programmes, Dr. Jennifer Perera was the first to obtain the MD in Medical Microbiology from the PGIM. The first Diploma in Medical Microbiology programme of the PGIM commenced in December 1986. Currently two members from the College are nominated to represent the Board of Study in Microbiology.

Members are participating in many activities of other professional colleges as well such as continuing professional development committee of SLMA and career guidance for young doctors organized by SLMA. The college has a representation in the committee of faculty of critical care and took part in formulation of general guideline for antibiotic therapy in newborns. Members are also providing their expertise by representing the college in anti-leprosy campaign, National Council on Accreditation of Health Care Services in Sri Lanka and at the specialist transfer board of GMOA etc.

In addition to the above activities with other organizations, the members of the Sri Lanka College of Microbiologists are frequently involved with following activities also.

1. Training for Infection Control Nurses and Medical Officers
2. Training for Medical Officers in Microbiology
3. Organising workshops for MLTs and private sector nurses, paramedical staff, Medical officers.
4. Public awareness programmes
5. Continuing Medical Education (CME)

The above shows the diversity of tasks undertaken by the college and it is interesting to dwell on aims of the college and achievements at the inception and 50 years later.

Table I
Presidents of the Sri Lanka College of Microbiologists and the parent organization
1969 – 2019

Year	Name of the President	Year	Name of the President
1969	Dr. D. L. J. Kahawita	1970 - 1973	Dr. V. Sivalingam
1974 - 1976	Dr. D. L. J. Kahawita	1977	Dr. T. J. P. Ratanayake
1978	Dr. C. D. De S. Kulasiri	1979	Dr. M. M. Ismail
1980	Dr. P. D. P. Gunathilake	1981	Dr. A. Sathasivam
1982 - 1984	Dr. T. J. P. Ratanayake	1985	Dr. A. Sathasivam
1986	Prof. C. I. de Fonseka	1987	Prof. M. M. Ismail
1988	Dr. Lalith Mendis	1989	Dr. Nihal Perera
1990	Dr. Maya Attapattu	1991	Dr. U. T. Vitharana
1992	Prof. Emil Wijewantha	1993	Dr. A. Sathasivam
1994	Dr. R. S. B. Wickremesinghe	1995	Dr. Maya Attapattu
1996	Prof. Lalitha Mendis	1997 / 98	Dr. Joyce Gunawardana
1998 / 99	Dr. Nalini Withana	1999 / 2000	Prof. Manel Wijesundara
2000 / 2001	Professor V. Thevanesam	2001/ 2002	Prof. Jennifer Perera
2002 / 2003	Prof. Nelun de Silva	2003 / 2004	Dr. Sujatha Mananwatta
2004 / 2005	Dr. Ranjith Perera	2005 / 2006	Dr. Gaya Colombage
2006 / 2007	Prof. N. P. Sunil-Chandra	2007 / 2008	Dr. Sagarika Samarasinghe
2008 / 2009	Dr. Preethi Perera	2009 / 2010	Dr. Omala Wimalaratne
2010 / 2011	Dr. Pranitha Somaratne	2011 / 2012	Dr. Philomena Chandrasiri
2012 / 2013	Dr. Sunethra Gunasena	2013 / 2014	Dr. Kumudu Karunaratne
2014 / 2015	Prof. Nilanthi de Silva	2015 / 2016	Dr. Kanthi Nanayakkara
2016 / 2017	Dr. Enoka Corea	2017 / 2018	Dr. Kushlani Jayathilleke
2018 / 2019	Prof. Ajith Nagahawatte		

Table II
Details of the Annual Scientific Sessions from 1991 – 2019

Year	Inauguration Date	Venue	Sessions Date	Venue
1990/1991	21 th June 1991	Aldo Castellani Auditorium – MRI (Hereinafter referred to as MRI)	22 th June 1991	Aldo Castellani Auditorium, MRI (Hereinafter referred to as MRI)
1991/1992	16 th July 1992	MRI	17 th July 1992	MRI
1992/1993	16 th July 1993	MRI	17 th July 1992	MRI
1993/1994	16 th September 1994	MRI	17 th September 1994	MRI
1994/1995	1 st December 1995	MRI	02 nd December 1995	MRI
1995/1996	13 th December 1996	Sri Lanka Foundation Institute (Hereinafter referred to as SLFI)	14 th and 15 th December 1996	MRI
1997/1998	22 th May 1998	SLFI	23 rd and 24 th May 1998	MRI
1998/1999	21 st May 1999	SLFI	22 nd May 1999	MRI
1999/2000	02 nd June 2000	MRI	3 rd June 2000	MRI
2000/2001	11 th May 2001	MRI	12 th May 2001	MRI
2001/2002	07 th June 2002	SLFI	08 th and 9 th June	MRI
2002/2003	19 th June 2003	MRI	20 th and 21 st June 2003	MRI
2003/2004	12 th August 2004	SLFI	13 th and 14 th August 2004	MRI
2004/2005	4 th August 2005	SLFI	5 th and 6 th August 2005	MRI
2005/2006	21 st September 2006	MRI	22 nd and 23 rd September 2006	MRI
2006/2007	12 th September 2007	Galle Face Hotel, Col 3	13 th and 14 th September 2007	MRI
2007/2008	03 rd September 2008	MRI	4 th and 5 th September 2008	MRI
2008/2009	09 th September 2009	Hotel Sapphire, Colombo 6	10 th and 11 th September 2009	MRI
2009/2010	15 th September 2010	Hotel Taj Samudra Colombo	16 th and 17 th September 2010	MRI

(Continued)

Year	Inauguration Date	Venue	Sessions Date	Venue
2010/2011	14 th September 2011	Berjaya Mount Royal Hotel Mount Lavinia	15 th and 16 th September 2011	MRI
2011/2012	28 th August 2012	Cinnamon Lakeside Hotel Colombo	29 th and 30 th August 2012	SLFI
2012/2013	24 th July 2013	SLFI	25 th and 26 th July 2013	MRI
2013/2014	13 th August 2014	SLFI	14 th and 15 th August 2014	SLFI
2014/2015	12 th August 2015	SLFI	13 th and 14 th August 2015	SLFI
2015/2016	10 th August 2016	SLFI	11 th and 12 th August 2016	SLFI
2016/2017	30 th August 2017	Cinnamon Lakeside Hotel Colombo	31 st August and 1 st September 2017	SLFI
2017/2018	08 th August 2018	Taj Samudra Hotel Colombo	09 th and 10 th August 2018	Taj Samudra Hotel Colombo
2018/2019	13 th August 2019	Ramada Colombo	14 th and 15 th August 2019	Ramada Colombo

Table III
Siri Wickremesinghe Oration 2004 – 2019

Year	Name of the Orator	Title of the Oration
2004	Dr. Norbert Ryan	The evolving role of a public health laboratory in Melbourne, Australia
2005	Dr. Nalini Withana	Building bridges and breaking barriers for polio eradication
2006	Dr. Maya Attapattu	Conclusions of a scientific wanderer
2007	Prof. Lalitha Mendis	Epidemiology and control of rotavirus diarrhoea
2008	Prof. Manel Wijesundara	Towards responsible pet ownership
2009	Prof. Vasanthi Thevanesam	My thoughts on microbes and microbiologists – an evolving saga
2010	Prof. Jennifer Perera	Reflections of women's contribution to medical microbiology
2011	Prof. Nelun de Silva	Fungi and fungal infections – The good, the bad and the ugly
2012	Dr. Sujatha Mananwatte	Gonococcus: The story of old villain
2013	Dr. Geethani Wickremasinghe	Challenges and achievements faced as a virologist
2014	Dr. Ranjith Perera	Notes of a Medical Microbiologist – A journey through history, religion, mythology and evolution
2015	Dr. Harsha Perera	Do we know enough of our own backyard? Influenza surveillances in Sri Lanka over the last decade
2016	Dr. Rajiva de Silva	Primary immune deficiency in Sri Lanka – The long march
2017	Prof. Faseeha Noordeen	Dengue in Sri Lanka – past and the present trends
2018	Prof. N. P. Sunil-Chandra	One health approach to studies on plagues in Sri Lanka – past and present
2019	Prof. Nilanthi de Silva	Worms and diseases demonstrating the impact of soil transmitted helminthes on health and well being

Table IV
Fellowships awarded by the Sri Lanka College of Microbiologists 2015 – 2019

Year	Name of the recipient
2015	Prof. Emil Wijewantha Prof. M.M. Ismail Prof. Ivy de Fonseka Prof. Tissa Vitharana Dr. Maya Attapattu Prof. Lalitha Medis Dr. Nalini Withana Prof. Manel Wijesundara Prof. Vasanthi Thevanesam
2016	Prof. S. N. Arsecularatne Dr. S. D. Atukorala Prof. Jennifer Perera Prof. Nelun de Silva
2017	Dr. Sujatha Mananwatta Dr. Ranjith Perera Prof. N.P. Sunil-Chandra
2018	Dr. C. Palasundaram Prof. Malik Peiris Dr. Gaya Colombage

Table V
Books published and guidelines developed by Sri Lanka College of Microbiologists

Year	Book / Guideline
2002	Laboratory Manual in Microbiology – 1 st Edition
2002	Collection and transport of clinical specimens
2004	Bio safety Manual – 1 st Edition
2005	Hospital Infection Control Manual
2005/2006	Hand book on waste management of chest and STD clinics
2005/2006	Code of practices on waste management of chest and STD clinics
2006/2008	National guidelines on 10 topics in Microbiology as 3 books, under Health Sector Development Project
2011	Laboratory Manual in Microbiology – 2 nd Edition
2014	Bio safety Manual – 2 nd Edition
2016	Empirical and prophylactic use of antimicrobials – National guidelines 2016. In collaboration with other Professional Colleges in healthcare and the Ministry of Health
2017	Guidelines on Microbiological investigations, antimicrobials and infection preventive and control practices in stem cell transplantation
2017	National strategic plan for combating antimicrobial resistance in Sri Lanka 2017 – 2022, in collaboration with the Ministry of Health and WHO

(It is gratefully acknowledged that some information included in the article titled “Sri Lanka College of Microbiologists – A brief history” Compiled by Professor Lalitha Mendis, Dr. Kumudu Karunaratne and Dr. Ranjith Perera which was published in the Proceedings of the Sixth Annual Academic Sessions of the Sri Lanka College of Microbiologists – December 1996, and a document titled “Sri Lanka College of Microbiologists – A brief history – 2004 – 2015” compiled by Dr. Primali Jayasekera, Dr. Pavithri Bandara and Dr. Surani Udugama)



**28th Annual Scientific Sessions of the
Sri Lanka College of Microbiologists and
50th Anniversary Conference on Infectious Diseases and
Infection Prevention and Control**

The Sri Lanka College of Microbiologists

“Breaking barriers for sustainable excellence in patient care”

Inauguration Ceremony

13th August 2019 at 6.15pm

“Liberty Ballroom”

Ramada Colombo

Pre-Congress Workshop

Infection Prevention and Control

13th August 2019

Scientific Programme

14th & 15th August 2019

Ramada Colombo

MESSAGE FROM THE CHIEF GUEST



Congratulations on the 50th Anniversary of the Sri Lanka College of Microbiologists and on organising the 28th Annual Scientific Sessions with the theme “Breaking barriers for sustainable excellence in patient care”. The Sri Lanka College of Microbiologists has played a pivotal role in enhancing the quality of clinical microbiology and infectious disease prevention and control in Sri Lanka. These efforts are of seminal relevance given the current threats posed by antimicrobial resistance. As the World Health Organization report on antimicrobial resistance points out, this is a “a problem so serious that it threatens the achievements of modern medicine”. The report further states that “a post-antibiotic era, in which common infections and minor injuries can kill – far from being an apocalyptic fantasy – is instead a very real possibility for the 21st century.” These realities make the roles of clinical microbiologists in guiding therapy, in antibiotic stewardship and in infection prevention and control, central to providing good quality patient care. Furthermore, threats posed by epidemics such as those caused by dengue or influenza, as well as the unexpected challenges posed by emerging microbial infections in today's globalised world, highlight the need for excellence in clinical microbiology. In this context, events such as the Annual Scientific Sessions of the College which brings together microbiologists to share knowledge and experience become ever more important. It is a great privilege and pleasure to be part of these Annual Scientific Sessions in 2019.

Prof. J.S.M. Peiris
Chair Professor in Virology,
The School of Public Health,
University of Hong Kong

MESSAGE FROM THE PRESIDENT



I am privileged to write this message to the Bulletin of the Sri Lanka College of Microbiologists on the occasion of the 28th Annual Scientific Sessions and the 50th Anniversary Celebrations of the College. Having originated as the Ceylon Association of Microbiologists in 1969 and changed its name to The Sri Lanka Association of Microbiologists in 1974, it evolved to be the Sri Lanka College of Microbiologists in July 1979. Starting from its founder members in 1969 the Sri Lanka College of Microbiologists has been carefully built into its current stature by the membership and the respective councils over the past 50 years.

The theme chosen for this year is “Breaking barriers for sustainable excellence in patient care” and the annual scientific sessions and the pre congress workshop has been aligned accordingly. On behalf of the Sri Lanka College of Microbiologists, I welcome you all to this 28th Annual Scientific Sessions which is enriched with many plenary lectures, symposia, case based discussions and free papers and I hope it will provide a platform for many fruitful collaborations to foster among resource persons, participants and researchers both local and overseas.

I take this opportunity to thank Prof Malik Peiris, Chair Professor in Virology, The School of Public Health, University of Hong Kong for accepting our invitation to be the chief guest at the inauguration ceremony. I also thank all our guest speakers, both local and overseas, for having accepted our invitation willingly to share their knowledge and expertise with us in spite of their busy schedules. I extend a special word of thanks to all the college members and the council members who have helped and contributed in the numerous college activities during this year.

I appreciate very much the efforts of the two secretaries, Dr. Kishani Dinapala and Dr. Gaya Wijayaratne, the editor Prof. Neluka Fernando, all council members and the two college office secretaries Ms. Priyanga Opatha and Ms. Imashi Abeysinghe for their untiring effort to make this event a success.

An event of this magnitude would not have been possible without the generous contribution of our sponsors. On behalf of the council of the Sri Lanka College of Microbiologists, I would like to thank all the sponsors for their valuable contribution.

Prof. Ajith Nagahawatte
President,
Sri Lanka College of Microbiologists

INAUGURATION PROGRAMME

13th August 2019 at 6.15 pm

**Liberty Ballroom,
Ramada Colombo**

- | | |
|---------|---|
| 6.00 pm | Invitees take their seats |
| 6.15 pm | Arrival of the Chief Guest
Introduction of Members of the Council |
| 6.30 pm | Ceremonial Procession |
| 6.35 pm | National Anthem |
| 6.40 pm | Traditional lighting of the Oil Lamp |
| 6.50 pm | Welcome Address
Dr. Gaya Bandara Wijayaratne
<i>Hon. Joint Secretary</i> |
| 6.55 pm | Address by the President
Prof. Ajith Nagahawatte |
| 7.10 pm | Address by the Chief Guest
Prof. J. S. M. Peiris
<i>Chair Professor in Virology, The School of Public Health
University of Hong Kong</i> |
| 7.35 pm | Award of SLCM Fellowships |
| 8.15 pm | Vote of Thanks
Dr. Kishani Dinapala
<i>Hon. Joint Secretary</i> |
| 8.20 pm | Ceremonial Procession leaves |
| 8.20 pm | Reception |

PROGRAMME AT A GLANCE

Time	13 th August 2019	14 th August 2019	15 th August 2019
8.00am		Registration and tea	Registration and tea
8.30am	Registration	Free Paper Session 1	Free paper session 3
8.50am	Welcome address – President SLCM		
9.00am	Importance of infection prevention and control in healthcare settings		
9.30am		Plenary 1 Management of Carbapenemase producing Enterobacteriaceae	Plenary 6 <i>Candida auris</i> : an impending worldwide public health emergency
9.45am	How to improve hand hygiene practices in healthcare settings		
10.00am		Symposium 1 Viral Infections of recent interest	Symposium 4 Immunity and Immune deficiency
10.30am	Tea		
10.45am	Implementation and monitoring of cleaning and disinfection in healthcare settings		
11.00am		Free paper session 2	Free paper session 4
11.30am	Problems identified in Sri Lankan hospitals related to Infection prevention and control		
12.00noon		Plenary 2 Harnessing the host response in infectious disease diagnostic development	Plenary 7 Rabies and prophylaxis
12.15pm	Lunch		
12.30pm		Lunch & Poster viewing	Lunch & Poster viewing
1.30pm		Plenary 3 Emerging viral disease threats	Symposium 5 Pneumonia and its management
2.00pm		Symposium 2 Changing trends in parasitic diseases in Sri Lanka: Successes and challenges	
2.30pm			Plenary 8 Building designs and engineering aspects in control of airborne infections
3.00pm		Plenary 4 Update on antimicrobial stewardship	Interactive session on clinical microbiology and infectious diseases
3.30pm		Symposium 3 Fungal infections and resistance to therapy	
4.30pm		Plenary 5 Advances in sepsis diagnosis	Award Ceremony & Close of Conference
5.00pm		Tea	Tea

PRE-CONGRESS WORKSHOP PROGRAMME

Pre-Congress Workshop on Infection Prevention and Control Programme - 13th August 2019

Chairpersons Dr. Malka Dassanayake and Dr. Shirani Chandrasiri

Resource Persons

Prof. Dale Fisher
Senior Consultant in Infectious Diseases
National University Hospital, Singapore

Dr. Sharon Salmon
Assistant Director of Nursing, Infection Prevention
National University Hospital, Singapore

Dr. Kushlani Jayatilleke
Consultant Clinical Microbiologist
Sri Jayewardenepura General Hospital, Sri Lanka

8.30am - 8.50am Registration

8.50am - 9.00am **Welcome address**
Prof. Ajith Nagahawatte
President SLCM

9.00am - 9.45am **Importance of infection prevention and control in healthcare settings**
Prof. Dale Fisher

9.45am - 10.30am **How to improve hand hygiene practices in healthcare settings**
Dr. Sharon Salmon

10.30am - 10.45am Tea

10.45am - 11.30am **Implementation and monitoring of cleaning and disinfection in healthcare settings**
Prof. Dale Fisher/ Dr. Sharon Salmon

11.30am - 12.15pm **Problems identified in Sri Lankan hospitals related to infection prevention and control**
Dr. Kushlani Jayatilleke

12.15pm - 12.30pm **General discussion**

12.30pm **Lunch**

SCIENTIFIC PROGRAMME

Day 1 – 14th August 2019

8.00am - 8.30am Registration and Tea

8.30am - 9.30am Free Paper Session 1
Chairpersons – Dr. Thushari Dissanayake and Dr. Nilanthi Dissanayake

OP 1

Antimicrobial resistance genes, plasmids and virulence determinants in six isolates of beta-lactamase producing uropathogenic *Klebsiella pneumoniae* in Sri Lanka

PDVM Perera¹, S Gamage¹, HSM de Silva², SK Jayatilleke², EM Corea¹, N de Silva³, VI Enne⁴

¹Department of Microbiology, Faculty of Medicine, University of Colombo, Colombo

²Sri Jayewardenapura General Hospital, Nugegoda, ³Neville Fernando Teaching Hospital, Malabe, ⁴Centre for Clinical Microbiology, Division of Infection and Immunity, University College London, Royal Free Campus, Roland Hill Street, London, United Kingdom

OP 2

Laboratory diagnostic methods comparison, antibiotic susceptibility pattern and serotyping of invasive and colonizing group B *Streptococcus* isolates in a selected group of hospitals in Sri Lanka

Chinthamani PR¹, Chandrasiri NS², Pathirage S³

¹Postgraduate Institute of Medicine, University of Colombo, ²Colombo South Teaching Hospital, Kalubowila, ³Medical Research Institute, Colombo

OP 3

Phenotypic and genotypic characterization of clinically significant carbapenem resistant *Klebsiella pneumoniae* isolates in a tertiary care hospital

Jayasundera MCT, Piyasiri DLB

Department of Microbiology, Teaching Hospital Karapitiya

OP 4

Molecular characterization and laboratory detection of carbapenemase producing Enterobacteriaceae

Kumudunie WGM¹, Wijayasinghe YS¹, Wijesooriya WRPLI¹, Namalie KD², Sunil-Chandra NP¹

¹Faculty of Medicine, University of Kelaniya, ²Colombo North Teaching Hospital, Ragama

9.30am - 10.00am Plenary 1
Chairperson – Dr. Kushlani Jayatilleke

Management of carbapenemase producing Enterobacteriaceae

Prof. Dale Fisher

Senior Consultant in Infectious Diseases, National University Hospital, Singapore

10.00am - 11.00am

Symposium 1

Viral infections of recent interest

Chairpersons – Dr. Nayomi Danthanarayana and Dr. J.S. Nadeeka

Influenza

Prof. Malik Peiris

Chair Professor in Virology, The School of Public Health, University of Hong Kong

Dengue: the old foe

Dr. Sunethra Gunasena

Senior Lecturer and Consultant Virologist, Faculty of Medicine, University of Ruhuna

Hantavirus infection in Sri Lanka

Dr. Rohitha Muthugala

Consultant Medical Virologist, Teaching Hospital Kandy

11.00am - 12.00noon

Free paper session – 2

Chairpersons – Dr. Janaki Abeynayake and Dr. Dulmini Kumarasinghe

OP 5

Adenovirus detection among children with severe acute respiratory symptoms admitted to a tertiary care hospital

Jayamaha CJS¹, Harshani HBC¹, Ratnayake NR²

¹National Influenza Centre, Department of Virology, Medical Research Institute, Colombo, ²Lady Ridgeway Hospital, Colombo

OP 6

Alpha herpes virus infections in a group of clinically suspected patients with central nervous system infections

Dheerasekara WKH, Attanayake WPDS, Raziya MS, Jayawardhana BDS, Rajamanthri RGLS, Muthugala MARV

Department of Virology, Teaching Hospital, Kandy

OP 7

Predictors of severity to guide management of acute dengue in Southern Province, Sri Lanka

Weerasinghe NP¹, Wijayaratne WMDGB¹, Fonseka CL¹, Bodinayake CK¹, Dahanayake NJ¹, Nagahawatte AdeS¹, Devasiri V¹, Ubeseekara H³, Munugoda Hewage MP¹, Kurukulasooriya MPR¹, de Silva AD⁴, Nicholson BP², Ostbye T², Woods CW², Sheng T, Tillekaratne LG²

¹Faculty of Medicine, University of Ruhuna, Galle, ²Duke University School of Medicine, Durham, NC, United States, ³Provincial Director of Health Office, Galle, ⁴General Sir John Kothalawala Defence University, Ratmalana

OP 8

Outbreak of respiratory tract infection among children in Southern Province, May – July 2018

Danthanarayana NS¹, Lakmali JPR¹, Jayamaha J², Piyasiri DLB¹, Sooriyaarachchi PGPR¹, Kumara MKR¹, Akuragoda AKSHK¹, Sunil NHNT¹, Deniyagedara SK¹, Subashini MLA¹, Liyanaarachchi S¹, Hewapathirana CD¹

¹Teaching Hospital Karapitiya, Galle, ²National Influenza Centre, Department of Virology, Medical Research Institute

12.00noon - 12.30pm	Plenary 2 Chairperson – Dr. Shirani Chandrasiri Harnessing the host response in infectious disease diagnostic development <i>Prof. Christopher W. Woods</i> Professor of Medicine and Pathology, Co-Director, Hubert-Yeargan Center for Global Health, Duke University, Durham, United States of America
12.30pm - 1.30pm	Lunch Poster viewing
1.30pm - 2.00pm	Plenary 3 Chairperson – Prof. Vasanthi Thevanesam Emerging viral disease threats Prof. Malik Peiris Chair Professor in Virology, The School of Public Health, University of Hong Kong
2.00pm - 3.00pm	Symposium 2 Changing trends in parasitic diseases in Sri Lanka: Successes and challenges Chairpersons – Dr. Sagarika Samarasinghe and Prof. Nilmini Chandrasena Leishmaniasis and malaria <i>Prof. Nadira Karunaweera</i> Senior Professor and Chair and Visiting Scientist, Harvard School of Public Health, Department of Parasitology, Faculty of Medicine, University of Colombo, Colombo Hepatic amoebiasis <i>Prof. S. Kannathasan</i> Professor of Parasitology, Faculty of Medicine, University of Jaffna, Jaffna Elimination of filariasis in Sri Lanka: Successes and challenges <i>Prof. Mirani Weerasooriya</i> Senior Professor of Parasitology, Dean, Faculty of Graduate Studies, University of Ruhuna, Galle
3.00pm - 3.30pm	Plenary 4 Chairperson – Dr. Kumudu Karunaratne Update on antimicrobial stewardship <i>Prof. Balaji Veeraraghavan</i> Professor and Head, Clinical Microbiology, Christian Medical College and Hospital, Vellore, India

3.30pm - 4.30pm

Symposium 3

Fungal infections and resistance to therapy

Chairpersons – Prof. Jennifer Perera and Prof. Neluka Fernando

Fungal infections of the sinuses

Dr. Preethi Perera

Consultant Medical Mycologist, Nawaloka and Asiri Groups of Hospitals, Sri Lanka

Emergence of azole resistant *Aspergillus* and one health

Prof. Jacques F. Meis

Consultant Microbiologist, Department of Medical Microbiology and Infectious Diseases, Canisius Wilhelmina Hospital, Nijmegen, Netherlands

4.30pm - 5.00pm

Plenary 5

Chairperson – Dr. Enoka Corea

Advances in sepsis diagnosis

Prof. Nelun Perera

Consultant Microbiologist and Honorary Associate Professor University Hospitals of Leicester, Training Programme Director, Microbiology, Health Education England / East Midlands, United Kingdom

5.00pm

Tea

Day 2 – 15th August 2019

8.00am - 8.30am Registration and Tea

8.30am - 9.30am Free Paper Session 3

Chairpersons – Dr. Geetha Nanayakkara and Dr. Dhammika Vidanagama

OP 9

Vancomycin: Do our patients achieve therapeutically adequate trough serum levels? A multi-center descriptive cross sectional study

Liyanage IA¹, Pathirage S¹, Chandrasiri NS², Piyasiri DLB³, De Silva D¹

¹Medical Research Institute, Colombo, ²Colombo South Teaching Hospital, Kalubowila, ³Teaching Hospital Karapitiya, Galle

OP 10

Incidence of *Clostridium difficile* infection among paediatric patients with diarrhoea in Lady Ridgeway Hospital Colombo

Thyushari HL¹, Karunaratne M², Pathirage S²

¹Lady Ridgeway Hospital, Colombo, ²Medical Research Institute, Colombo

OP 11

Methicillin resistant *Staphylococcus aureus* from a District General Hospital: evidence for community circulation of strains of diverse origins

Hapuarachchi CT¹, Abeysekera ECW¹, Harasgama P², Abeynayake BMNPK¹, Keerthiwansa GWJ¹, Marasinghe MMGSN¹, Padeniya AGTU¹, Samaranayake KU¹, Tayaalan V¹, Liyanapathirana V²

¹District General Hospital, Nawalapitiya, ²Department of Microbiology, Faculty of Medicine, University of Peradeniya

OP 12

Pneumococcal colonization in two groups of Sri Lankan children between 2 months to 2 years

Vidanapathirana G¹, Angulmaduwa ALSK², Munasinghe TS³, Ekanayake EWMA², Harasgama P², Kudagammana ST³, Dissanayake BN², Liyanapathirana LVC²

¹Faculty of Allied, Health Sciences, University of Peradeniya, ²Department of Microbiology, Faculty of Medicine, University of Peradeniya, ³Department of Paediatrics, Faculty of Medicine, University of Peradeniya

9.30am - 10.00am

Plenary 6

Chairperson – Dr. Samanmalee Gunasekara

Candida auris: an impending worldwide public health emergency

Prof. Jacques F. Meis

Consultant Microbiologist, Department of Medical Microbiology and Infectious Diseases, Canisius Wilhelmina Hospital, Nijmegen, Netherlands

10.00am - 11.00am

Symposium 4

Immunity and Immune Deficiency

Chairpersons – Dr. Malika Karunaratne and Dr. Nadisha Badanasinghe

Innate immune disorders – an update

Prof. Suranjith Seneviratne

Consultant and Professor in Clinical Immunology and Allergy, Institute of Immunity and Transplantation, University College London and Faculty of Medicine, University of Colombo

Vaccine Allergy

Dr. Danushka Dasanayake

Consultant Immunologist, Teaching Hospital, Kandy

11.00am – 12.00noon

Free paper session – 4

Chairpersons – Dr. Rohini Wadanamby and Dr. Hasini Banneheke

OP 13

A novel strain of *Brugia malayi* with a close nucleotide homology to *Brugia pahangi* from Sri Lanka

Mallawarachchi CH¹, Chandrasena NTGAN², Premaratna R³, Gunawardane NYIS⁴, Mallawarachchi SMNSM¹, de Silva NR²

¹Postgraduate Institute of Medicine, University of Colombo, Colombo, Sri Lanka,

²Department of Parasitology, Faculty of Medicine, University of Kelaniya,

³Department of Medicine, Faculty of Medicine, University of Kelaniya,

⁴Molecular Medicine Unit, Faculty of Medicine, University of Kelaniya

OP 14

Immunity to measles among a cohort of pregnant women attending a tertiary care maternity hospital in Western Province

Premathilake MIP, Aluthbaduge P, Jayalatharachchi R, Gamage S, Senanayake CP
Faculty of Medicine, University of Colombo

OP 15

Degree of adherence to recommended decontamination procedure of bronchoscopes and microbial status of the reprocessed equipment at the bronchoscopy unit of National Hospital of Sri Lanka

Manchanayaka MAN¹, Patabendige CGUA¹, Vidanagama D²

¹National Hospital of Sri Lanka, Colombo, ²National Tuberculosis Research Laboratory, Welisara

OP 16

Sero-prevalence and genotype distribution of Hepatitis C infection, among patients with Haemophilia A and B, in four selected tertiary care hospitals

Fernando MAY, Abeynayake JJ

Department of Virology, Medical Research Institute, Colombo

12.00noon – 12.30pm	Plenary 7 Chairperson – Dr. Nalini Withana Rabies and Prophylaxis <i>Dr. Kanthi Nanayakkara</i> Consultant Virologist and Vaccinologist, Head / Department of Rabies & Vaccine Quality Control, National Control Laboratory, Medical Research Institute, Colombo
12.30pm -1.30pm	Lunch Poster viewing
1.30pm - 2.30pm	Symposium 5 Pneumonia and its Management Chairpersons – Dr. Geethani Galagoda and Dr. Jananie Kottahachchi Community Acquired Pneumonia – dilemmas of physicians <i>Dr. Ananda Wijewickrama</i> Consultant Physician, National Institute of Infectious Diseases, Angoda Ventilator Associated Pneumonia – challenges and controversies <i>Dr. Geethika Patabendige</i> Consultant Clinical Microbiologist, National Hospital of Sri Lanka, Colombo Adult Learning in infection prevention and control <i>Dr. Sharon Salmon</i> Assistant Director of Nursing, Infection Prevention, National University Hospital, Singapore
2.30pm - 3.00pm	Plenary 8 Chairperson – Dr. Varuna Navaratne Building designs and engineering aspects in control of airborne infections <i>Dr. Rohan Chinniah</i> Consultant Clinical Microbiologist, Raja Isteri Pengiran Anak Saleha Hospital, Ministry of Health, Bandar Seri Begawan, Negara Brunei Darussalam
3.00pm - 4.30pm	Interactive Session on clinical microbiology and infectious diseases <i>Prof. Nelun Perera</i> Consultant Microbiologist and Honorary Associate Professor, University Hospitals of Leicester, Training Programme Director, Microbiology, Health Education England / East Midlands, United Kingdom
4.30pm - 5.00pm	Award ceremony and close of conference
5.00pm	Tea

PROGRAMME FOR THE POSTERS

Day 1 – 14.08.2019

Day	Session	Panel	Time	PP No	Abstract
1	1	A	8.30am-12.00noon 11.00-12.00	PP1	Epidemiology and clinical presentation of culture positive melioidosis in the Southern Province of Sri Lanka
				PP2	Microbiological profile of ear swabs in neonates at birth in a unit at a Tertiary Care Hospital
				PP3	<i>Rhizobium radiobacter</i> neonatal sepsis: An outbreak investigation in a special care baby unit
				PP4	Preliminary study on carriage of Group B Streptococcus among pregnant women in selected hospitals in Western Province of Sri Lanka
1	1	B	8.30am-12.00noon 11.00-12.00	PP5	Molecular epidemiology of antimicrobial resistance of <i>Salmonella enterica</i> isolated from different parts of Sri Lanka
				PP6	Bacterial profile and antibiotic susceptibility pattern of eye swabs of neonates in a unit at a Tertiary Care Hospital
				PP7	Epidemiology and antibiotic susceptibility patterns of coagulase negative staphylococcal isolates from skin swabs in a surgical unit at the National Hospital of Sri Lanka
				PP8	Comparison of broth micro dilution and E-test for vancomycin susceptibility testing in coagulase-negative staphylococcal isolates
1	1	C	8.30am-12.00noon 11.00-12.00	PP9	Evaluation of rapid immunochromatographic assays for the detection of selected respiratory viruses during an outbreak
				PP10	Co circulation of multiple dengue serotypes during non-outbreak period in Sri Lanka
				PP11	Measles laboratory surveillance towards measles elimination in Sri Lanka

Day	Session	Panel	Time	PP No	Abstract
1	2	A	12.30PM-4.00PM 1.30-2.30	PP12	Colonization with selected antibiotic resistant bacteria among healthy young adults in University of Peradeniya
				PP13	Phenotypic and molecular characterization of outbreak strains of <i>Enterobacter cloacae</i> in a special care baby unit in a teaching hospital
				PP14	Analysis of causative agents and antimicrobial use in children hospitalized with community acquired pneumonia
				PP15	Awareness among doctors on national guidelines on empirical and prophylactic use of antimicrobials: An audit at Teaching Hospitals in Galle
1	2	B	12.30PM-4.00PM 1.30-2.30	PP16	In vitro efficacy of fosfomycin, pivmecillinam and ertapenem for multi-drug resistant enterobacteriaceae uropathogens in a provincial tertiary care hospital
				PP17	Phenotypic and molecular characterization of potential extended spectrum beta lactamase and metallo-beta lactamases producing bacteria from selected tertiary care microbiology laboratories in Colombo District
				PP18	Phenotypic and molecular characterization of extended spectrum beta-lactamase producing bacteria in a tertiary care microbiology laboratory in Sri Lanka
				PP19	Awareness, attitudes and practices on the strategy of prescribing “red light” antibiotics to in-ward patients among medical officers at a selected tertiary care hospital
1	2	C	12.30PM-4.00PM 1.30-2.30	PP20	Genetic polymorphisms associated with G6PD enzyme deficiency in the Sri Lankan population
				PP21	A report on detection rates of Hepatitis C virus at three teaching hospitals of Sri Lanka
				PP22	Association of <i>Chlamydia pneumoniae</i> IgG seropositivity and acute myocardial infarction
				PP23	Outbreak of severe acute respiratory infection at Prajapathi Children's Orphanage at Panadura

Day 2 – 15.08.2019

Day	Session	Panel	Time	PP No	Abstract
2	1	A	8.30am-12.00noon 11.00-12.00	PP24	Comparison of double disc synergy test with modified double disc synergy test in detection of extended spectrum beta lactamase in selected urinary isolates.
				PP25	Determination of antimicrobial activity of <i>Rhizopus</i> <i>baccifera</i> and <i>Pyricularia</i> <i>heterophylla</i> against Methicillin-resistant <i>Staphylococcus aureus</i> and <i>Acinetobacter baumannii</i>
				PP26	Comparison of antibiotic sensitivity pattern of clinically significant <i>Enterobacteriaceae</i> between a tertiary healthcare setting and a secondary healthcare setting of Sri Lanka
				PP27	Community associated methicillin resistant <i>Staphylococcus aureus</i> is the predominant type of colonizing methicillin resistant <i>Staphylococcus aureus</i> among patients admitted to Teaching Hospital, Karapitiya
2	1	B	8.30am-12.00noon 11.00-12.00	PP28	Microbiological assessment of the current decolonization procedure using rotational antiseptics among burn patients admitted to a tertiary care centre in Sri Lanka
				PP29	Work related health hazards among cleaning workers at North Colombo Teaching Hospital, Ragama
				PP30	Dress code of healthcare workers: Does it have a role in hospital infection control?
				PP31	An audit on the prescription pattern, usage and the cost of oral antibiotics in the out-patient department in a tertiary care hospital in Sri Lanka
2	1	C	8.30am-12.00noon 11.00-12.00	PP32	Economic burden of dengue over southern Sri Lankan community
				PP33	Seroprevalence of anti-Zika virus antibodies among the students of Allied Health Sciences Unit, Faculty of Medicine, University of Jaffna
				PP34	The respiratory virus outbreak in Southern Sri Lanka in 2018: Results of the active surveillance
2	1	C	8.30am-12.00noon 11.00-12.00	PP32	Economic burden of dengue over southern Sri Lankan community
				PP33	Seroprevalence of anti-Zika virus antibodies among the students of Allied Health Sciences Unit, Faculty of Medicine, University of Jaffna
				PP34	The respiratory virus outbreak in Southern Sri Lanka in 2018: Results of the active surveillance

Day	Session	Panel	Time	PP No	Abstract
2	2	A	12.30PM-4.00PM 1.30-2.30	PP35	A complicated case of <i>Candida tropicalis</i> prosthetic valve infective endocarditis.
2	2	B	12.30PM-4.00PM 1.30-2.30	PP36 PP37	Malaria amongst foreign labourers, a threat to sustaining malaria elimination in Sri Lanka <i>Ancylostoma ceylanicum</i> , first report of human infection in Sri Lanka
2	2	C	12.30PM-4.00PM 1.30-2.30	PP38 PP39	A severe case of toxic shock syndrome with acute respiratory distress recovered after adjunctive intravenous immunoglobulin therapy Three cases of cerebral abscesses by <i>Streptococcus anginosus</i> group in patients with congenital heart disease

LIST OF GUEST SPEAKERS

Prof. Dale Fisher

Senior Consultant in Infectious Diseases
National University Hospital, Singapore



Dr. Sharon Salmon

Assistant Director of Nursing, Infection Prevention
National University Hospital, Singapore



Prof. Christopher W. Woods

Professor of Medicine and Pathology, Co-Director, Hubert-Yeargan Center for
Global Health, Duke University, Durham, United States of America



Prof. J. S. M. Peiris

Chair Professor in Virology, The School of Public Health
University of Hong Kong



Prof. Nadira Karunaweera

Senior Professor and Chair and Visiting Scientist, Harvard School of Public Health,
Department of Parasitology, Faculty of Medicine,
University of Colombo, Sri Lanka



Prof. S. Kannathasan

Professor in Parasitology, Department of Parasitology,
Faculty of Medicine, Jaffna, Sri Lanka



Prof. Mirani Weerasooriya

Senior Professor of Parasitology
Dean, Faculty of Graduate Studies, University of Ruhuna, Galle, Sri Lanka



Prof. Nelun Perera

Consultant Microbiologist, University Hospitals of Leicester
Honorary Associate Professor, Department of Infection, Immunity and
Inflammation, University of Leicester, Training Programme Director, Microbiology,
Health Education England / East Midlands, United Kingdom

**Prof. Jacques F. Meis**

Consultant Microbiologist, Department of Medical Microbiology and Infectious
Diseases, Canisius Wilhelmina Hospital, Nijmegen; Center of Expertise in
Mycology, Radboudumc/Canisius Wilhelmina Hospital, Nijmegen, Netherlands

**Prof. Suranjith Seneviratne**

Consultant and Professor in Clinical Immunology and Allergy
Institute of Immunity and Transplantation
University College London and Faculty of Medicine, University of Colombo

**Dr. Ananda Wijewickrama**

Consultant Physician
National Institute of Infectious Diseases, Angoda, Sri Lanka

**Dr. Geethika Patabendige**

Consultant Clinical Microbiologist
National Hospital of Sri Lanka, Colombo, Sri Lanka

**Dr. Kushlani Jayatilleke**

Consultant Clinical Microbiologist
Sri Jayewardenepura General Hospital, Sri Lanka

**Dr. Rohan Chinniah**

Consultant Clinical Microbiologist
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ABSTRACTS OF THE PLENARY LECTURES AND SYMPOSIA

Plenary Lectures

Plenary presentations 1

Management of carbapenemase-producing *Enterobacteriaceae*

Prof. Dale Fisher

Carbapenemase-producing *Enterobacteriaceae* (CPE or CP-CRE) have drawn considerable attention over the last 2 decades due to their variable and complex antimicrobial resistance patterns, their global spread and their capacity to cause outbreaks in health care facilities supported by asymptomatic carriage in patients. This presentation will focus on prevention of CPE at a national and a facility level as well as antibiotic choices for treatment of those infected.

Plenary presentations 4

Update on antimicrobial stewardship

Prof. Balaji Veeraraghavan

Antibiotic resistance continues to rise, whereas development of new agents to counter this situation has slowed down. An integrated stewardship involving antimicrobial stewardship (ASP), diagnostic stewardship (DSP) and infection prevention and control (IPC) strategy are crucial in limiting, the emergence of antibiotic resistance; prolong the effectiveness of currently available agents; improve patient outcomes; and reduce healthcare costs.

DSP involves implementation of appropriate diagnostic tests for the clinical setting, which improves the clinical care and conserve health care resources. DSP is required to select the right test for the right patient, generating accurate, clinically relevant results at the right time. There is a heightened need for ASP, which is considered an integral component of patient safety and an important strategy for preserving the effectiveness of currently available antibiotics. DSP reinforced ASP, promote right antimicrobial therapy to improve clinical outcomes and to decrease unnecessary antimicrobial use.

Interestingly, an emerging clinical meta-genomics promotes the identification of pathogens and antimicrobial resistance direct-from-specimen. Detecting host response to infection is crucial and reduces the antibiotic use in hospitals. Biomarkers including procalcitonin, CRP,

and lactate levels are used to assess the necessary of antibiotics in critically ill patients. A recently developing RNA biosignature profiles is successful in differentiating bacterial infections, viral infections, and other non-infectious processes.

Plenary presentations 5

Advances in sepsis diagnosis

Prof. Nelun Perera

Sepsis is the world's second biggest killer. Blood culture analysis remains the gold standard for diagnosing sepsis. The Surviving Sepsis Campaign (2018) advocates the implementation of antibiotic therapy within 1 hour of clinical recognition of sepsis and collection of blood for culture prior to the administration of antibiotics. Integrating diagnostic tests that are capable of identifying clinically relevant organisms along with antimicrobial resistance profiling or ruling out bacterial infection as a cause of sepsis in the initial 1 to 3 hours of the clinical timeline is vital to influence the appropriate use of antibiotics and patient outcomes.

The limitations of routine blood culture and the role of emerging technologies will be presented.

Plenary presentations 6

***Candida auris*: an impending worldwide public health emergency**

Prof. Jacques F. Meis

Candida auris has been named as the new “fungal superbug” which poses a significant threat to public health when outbreaks are occurring. *C. auris* was first identified and described only 10 years ago in Japan. Follow-up genomic analysis has revealed that *C. auris* has emerged almost simultaneously in this short period on 3 different continents. At present 4 major clades have been identified and recently a fifth clade was discovered. At first *C. auris* was often mistaken for other species when using phenotypic assimilation/fermentation identification tests. Wide introduction of MALDI-TOF technology has significantly improved accurate identification in the past few years and is now the gold standard in addition to

molecular sequencing. *C. auris* has also shown resistance to several different antifungal drugs and classes of drugs. While its resistance profile varies geographically, this new yeast pathogen is almost universally resistant to fluconazole, a key drug in the azole class of antifungal drugs. *C. auris* spreads in healthcare facilities while the occurrence in the environment is elusive. Infections have been reported in a range of countries across continents, but current estimates are probably inaccurate. Impervious to both antiseptics and the three major classes of antifungal medications, *C. auris* has been quietly transmitted within hospitals and nursing homes in at least 35 countries such as the UK, Spain, India, Pakistan, Middle East, South Africa, Latin America and parts of the USA. Patients can be colonised with *C. auris* without becoming sick, but the pathogen seems to prefer to colonise patients who are already sick or immune-compromised (eg, cancer or transplant patients) and the very young or very old among hospitalised inpatients. Among at-risk patients who have *C. auris* candidemia or invasive candidiasis, high mortality rates (~ 30-60%) have been observed. However because infection typically occurs when a person is already very sick, it may be difficult to disentangle the attributable mortality. It is important to realize that *C. auris* is predominantly a healthcare-associated (or nosocomial) infection. Prior broad-spectrum antibiotics and antifungal use can influence the risk of infection. Finally an important question could be post, is Sri Lanka so far really free from *Candida auris*?

Plenary presentations 7

Rabies post exposure prophylaxis: What is new?

Dr. Kanthi Nanayakkara

Rabies is a zoonotic viral infection which causes an invariably fatal encephalomyelitis affecting mammals. Humans are infected as accidental hosts, where proper wound care and anti-rabies post exposure therapy (PET) without a delay, can nearly 100% prevent fatality.

In Sri Lanka rabies post exposure therapy is offered free of charge for persons who are exposed to proven/probable rabies infection, from most government hospitals throughout the country. Rabies PET is delivered according to a treatment protocol authorized and issued through the Director General of Health Services. For category III (major) exposures, both rabies immunoglobulin (RIG) and a course of anti-rabies vaccine (ARV) are recommended whereas for category II (minor) exposures, only a course of ARV is indicated according to WHO guidelines. By adhering to this protocol, all exposed patients would

receive the correct management without a delay in a uniform manner throughout the country. This also would minimize the unnecessary usage of PET and reduce vaccine wastage as both RIG and ARV are expensive biologicals with limited availability.

Earlier PET guidelines were based on former WHO recommendations (WHO position paper on Rabies Vaccines: No. 32, August 2010) where for major exposures a sensitivity testing (ST) was performed for equine rabies immunoglobulin (ERIG) before administering it according to body weight. After calculating the volume (ERIG 40 IU/Kg or HRIG 20 IU/Kg) it was recommended to infiltrate all wounds as much as anatomically feasible and the remainder to be given at a distance usually on the thighs. Accordingly, the former guidelines used in Sri Lanka recommended the use of human rabies immunoglobulin (HRIG) if available, when the ST was positive for ERIG for patients with major exposures who required immunoglobulin therapy. With time the demand and the consumption of HRIG escalated which is very much more costly compared to ERIG, causing a huge economic burden.

The latest WHO position paper on rabies vaccines (No.16, 2018, 93, 201-220, 20 April 2018) which was published in the WHO Weekly Epidemiological Record and the WHO Expert consultation on Rabies, third report, WHO Technical Report Series 1012, 2018, give new recommendations for the use of RIG and ARV for rabies pre and post exposure prophylaxis.

The present WHO guideline does not recommend skin testing (ST) before administration of ERIG, as such tests poorly predict severe adverse events and their results should not be the basis for non-administration of ERIG when indicated. However the treating medical officers should be prepared to manage anaphylaxis, which although rare, could occur during the administration of ERIG which is a heterologous serum.

There is no minimum dose for RIG, but should not exceed the maximum which is calculated according to the body weight. The entire immunoglobulin dose or as much as anatomically feasible, should be infiltrated carefully into or as close as possible to all wounds. WHO no longer recommends injecting the remainder of the calculated RIG dose IM at a distance from the wound/s, as evidence suggest that there is no or little additional protection against rabies as compared with infiltration of the wounds/alone.

With these latest recommendations, an amendment was done for rabies PET in Sri Lanka in July 2018 and a circular was issued by the DGHS. There had not been a single treatment failure in Sri Lanka during the past one year after using this new guideline.

The new WHO guidelines recommend the use of ARV through intradermal (ID) route not only for cost effectiveness, but also to reduce the vaccine consumption as there is a global shortage of ARV. In Sri Lanka over 95% of ARV consumption in government hospitals is through ID route.

The new WHO position paper clearly gives recommendations for management of patients presenting with re-exposures, who have previously received a course of ARV. They never require RIG even following a major exposure to a proven rabid animal, irrespective of the time duration. These patients only need two doses of ARV as boosters on D0 and D3.

These new WHO recommendations and our country experiences are included in to the Protocol for Anti Rabies Post Exposure Therapy (PET) – 2019, which has been prepared and reviewed by an expert committee, which was presented to the advisory committee on communicable diseases (ACCD) and is now ready to be authorized and circulated by the Director General Health Services.

Plenary presentations 8

Building designs in prevention of airborne infections

Dr. Rohan Chinniah

Airborne infections are building associated illnesses. They do occur in hospitals, clinics, laboratories. They can occur in other indoor environments like prisons, jails, homeless shelters, residential facilities, refugee camps. In addition, crowded outdoor environments namely airliner, shipboard can also transmit airborne infections.

In airborne infection pathogen must be dispersed as fine particles (1 - 5 μ m size) which remain suspended in air and reach the alveolar level.

To prevent the occurrence and spread of airborne infection proper design of the buildings and ventilation to that building are of paramount importance.

General principles of ventilation is to ensure comfort to those using the buildings and importantly in contamination control containing the infection. Thus to provide and maintain healthy working environment.

This can be purpose provided (intentional) ventilation, a process by which 'clean' air (normally outdoor air) is intentionally provided to a space and stale air is removed.

This may be accomplished by either natural or mechanical means.

Effectiveness of mechanical ventilation depends on

- 1) air change rate, which ensures adequate average flow and minimum flow specifications are met and remain approximate measurements under all weather and building operational conditions.
- 2) air distribution which ensures direction of air flow, remain consistent under all ventilation regimes.
- 3) control of humidity and temperature inside the building.

Though natural ventilation could achieve these targets, control of the environment and consistency will be difficult to measure and maintain.

To assure proper ventilation and airflow in both natural ventilation or mechanical ventilation clinical microbiology and infection control input on building design and ventilation has to be sorted at pre-design phase, design phase, construction phase, acceptance phase and post-acceptance phase. This has to be done for any renovation, expansion, upgrading or new construction of any health-care buildings to ensure patient, healthcare worker and visitor safety.

Symposium 1

Influenza

Prof. Malik Peiris

Seasonal influenza epidemics are estimated to infect 10-20% of the global population causing 3-5 million severe cases of influenza disease and 0.3 - 0.67 million deaths (largely in the elderly) every year. These outbreaks occur almost on an annual basis in most parts of the world, no region being exempt. However, the seasonality of influenza outbreaks vary in different geographic locations. Groups at risk of increased morbidity and mortality include young children and the elderly, pregnant women, those with underlying heart, lung, kidney, liver or endocrine (e.g. diabetes) diseases. Since influenza like illness may be caused by a number of other viruses as well as influenza, laboratory diagnosis and surveillance is important for public health responses and to guide therapy. Antiviral (oseltamivir) therapy given early in the course of illness reduces the duration and severity of illness and is recommended in patients at high-risk. Novel antivirals such as baloxavir marboxyl are currently in clinical trials and have been licenced for use in some countries. Vaccination provides protection against infection and disease, provided the vaccine is well matched against

the currently circulating strain of virus. Vaccine takes at least a month to provide protection and the duration of vaccine immunity is relatively short-lived. Therefore, the timing of vaccine administration needs to be optimised for each region, based on the known seasonal peak of virus activity.

Dengue: the old foe

Dr. Sunethra Gunasena

Dengue has been reported in Sri Lanka from the turn of the last century. However, the first serologically confirmed dengue case was reported in 1962. During the next few decades from 1960 to 1980s, Sri Lanka reported dengue with few cases of dengue haemorrhagic fever (DHF) even though the rest of South East region was reporting major outbreaks of DHF. This relatively silent period was disrupted with the DHF outbreak occurred in 1989 - 1990. Since then Sri Lanka has experienced regular dengue outbreaks with increasing number of DHF cases. While 2009 and 2012 reported significant outbreaks, largest ever was reported in 2017 with 186,101 cases.

Multiple factors are associated with the changing the dengue scenario in Sri Lanka. Introduction of new genotype or changing pattern of circulating dengue serotypes are considered as one of the factors associated with this changing scenario.

Change from “silent dengue to dengue with DHF” in 1989 was associated with the changing genotype from Dengue 3 genotype IIIA to Dengue 3 genotype IIIB.

Though all four serotypes were circulating, Dengue 2 and Dengue 3 remained as the predominant serotypes in Sri Lanka during the period 1990s onwards. Introduction of new Dengue 1 genotype 1 changed this scenario and was associated with the 2009 outbreak. Dengue 1 remained as the predominant serotypes for nearly a decade till Dengue 2 re-emerged as the predominant serotype in late 2016. This replacement with Dengue 2 may have been responsible for the massive outbreak in 2017.

Serotype surveillance data from late 2018 indicated Dengue 1 and Dengue 3 are coming up though Dengue 2 still remains as the predominant serotype. Importance of this finding remains to be seen.

Multiple strategies are implemented in the Control and Prevention of Dengue. Effective, affordable, safe dengue vaccine is the best choice of these strategies. The first dengue vaccine, Dengvaxia (CYD-TDV) was registered

in Mexico in December 2015. Next contender Dengue vaccine candidate Denvax a live attenuated dengue-dengue chimera is undergoing phase 3 trials.

Dengvaxia (CYD-TDV), a live attenuated Yellow fever virus (17D strain) – dengue chimera containing vaccine was recommended by World Health Organization (WHO) for consideration for the introduction to high burden countries (WHO position paper on dengue vaccines 2016). Target population was to be identified based on seroprevalence rate of $\geq 70\%$ in the selected age group and was not recommended for < 9 years. WHO position paper on dengue vaccines 2018 recommended pre-vaccination screening in the target group. In the absence of screening it recommended identifying areas with seroprevalence rate of $\geq 80\%$ in the selected age group. Dengvaxia in Sri Lankan context, a hyper endemic country for dengue should be explored.

Hantavirus infection in Sri Lanka

Dr. Rohitha Muthugala

Hantavirus disease is an emerging zoonotic viral infection with a high fatality in most parts of world. The causative agent, hantavirus is a rodent-borne enveloped RNA virus belonging to the family *Bunyaviridae*. Transmission of the infection to humans is by inhalation of the viruses via aerosols generated from virus contaminated rodent faeces, urine or saliva. Infections may be sub-clinical or vary from mild flu like illness to fatal haemorrhagic fever with acute renal failure or cardio-respiratory failure. There are two major clinical forms of hantavirus infections, Haemorrhagic Fever with Renal Syndrome (HFRS) in Euro-Asia, the Old World and Hantavirus Pulmonary Syndrome (HPS) in America, the New World.

In Sri Lanka, hantavirus disease was first diagnosed in human patients in 1986. Since then, only few studies had been carried out to evaluate the disease situation in Sri Lanka. There were serological evidence of Seoul, Hantaan, Thailand-like and Puumala-like virus infections in different parts of the country. Serological evidence of co-infection with *Leptospira* was also reported.

Clinical features of HFRS often mimics Leptospirosis. During paddy cultivation and harvesting seasons, outbreaks of fever with renal involvement had been reported in many occasions in the last decade. Though those cases were presumed to be Leptospirosis, a significant number of them had been laboratory confirmed as infected with hantavirus. Majority of cases reported were from western part of the country.

Recently there were clusters of hantavirus cases reported from north central part of the country with predominantly causing non-cardiogenic pulmonary oedema with mild renal involvement. These cases were associated with paddy harvesting season and serological investigation suggestive of Puumala-like virus infection.

Hantavirus infection has been postulated as a possible risk factor for chronic kidney disease of uncertain origin (CKDu) in Sri Lanka. Surveillance on rodent hosts is conducting in the areas with high prevalence of CKDu to determine possible association.

Unplanned urbanization, abandoned paddy fields and disorganized garbage disposal has contributed to increase rodent population and increase risk of hantavirus infections in Sri Lanka.

Further investigations are required for exact identification of virus species circulating in the country and to understand their biology, ecology, epidemiology, pathogenesis and details about natural hosts.

Symposium 2

Hepatic amoebiasis: a public health problem in northern Sri Lanka

Prof. Selvam Kannathasan

Since 1985, clinically diagnosed amoebic liver abscess (ALA) has been one of the public health problems in Jaffna district. Clinicians, arrive at a diagnosis based on the clinical findings and with the aid of ultrasonography which cannot differentiate pyogenic liver abscess (PLA). As the treatment and outcome of the ALA and PLA differs, determining the causative organism is crucial.

This study was designed to describe the clinical presentation, laboratory investigations, epidemiology, associated risk factors and knowledge, attitude and practice (KAP) towards ALA among the above patients. All clinically diagnosed ALA patients at TH Jaffna during the study period were included and the data was collected using an interviewer administered questionnaire. Clinical features, haematological parameters, ultrasound scanning findings were extracted into a data sheet.

Aspirated pus, blood and faecal samples from the patients and toddy samples from taverns were also collected.

Climatic data and the total toddy sales in the district during the study period were obtained from Meteorological and Excise Departments respectively.

Microscopic method and Robinson's medium were used to demonstrate the parasite. Pus sample was cultured in MacConkey and blood agar for the growth of bacteria. Further, commercially purchased ELISA kits (Accu Diag™) were used for immunological diagnosis of *Entamoeba histolytica* in pus and serum.

Moreover, using nested PCR, extracted parasitic DNA from selected pus samples was amplified and the purified product was sequenced and a Phylogenetic tree was constructed.

During July 2012 to July 2015, among the admitted 367 clinically diagnosed ALA patients, only 346 were enrolled in this study. Almost all patients (98.6%) were males consuming heavy alcohol (100%), especially palmyrah toddy. Main clinical features were fever (100%), right hypochondrial pain (100%) with or without abdominal pain (46.8%), tender hepatomegaly (90%) and intercostal tenderness (60%).

Majority of the patients (86.7%) had leukocytosis, elevated ESR (85.8%) and markedly elevated alkaline phosphatase (72.3%). Abscesses were mainly in the right lobe (85.3%) of the liver and solitary (76.3%) in nature. Of 346 abscess, 221 (63.87%) were drained and 93.2% of aspirated pus were chocolate brown in colour with a mean volume of 41.22 ± 1.16 ml.

Only 4 pus samples (2%) were positive for amoeba in culture medium and rest of the pus and faecal samples were negative microscopically and in the culture medium. All pus samples were negative for bacterial growth. Antibody against *E. histolytica* and the antigen were highly positive (Ab- 99.7%; Ag- 99.4%) in serum and pus sample which immunologically confirms that the causative organism was *E. histolytica*. PCR results and the sequence strongly confirm that clinically diagnosed ALA in northern Sri Lanka was due to *E. histolytica*.

Phylogenetic tree showed a common ancestor with an Indian isolate (KF356010) from ALA.

Further, the disease showed peaks in dry season which matched with total toddy sales in the district.

Age, type of alcohol, and frequency of drinking were the significant risk factors whereas frequency of alcohol drinking and type of alcohol (consuming toddy and arrack) are identified as the independent risk factors.

Moreover, KAP towards ALA among the patients was nil, thus, health education among risk group is inevitable to prevent or minimize the disease in future.

Elimination of lymphatic filariasis in Sri Lanka: Successes and challenges

Prof. Mirani V. Weerasooriya

The World Health Association (WHO) in July 2016 validated Sri Lanka as having eliminated Lymphatic Filariasis (LF) as a public health problem. LF is a disabling mosquito borne disease caused by nematode parasitic worms *Wuchereria bancrofti* and *Brugia malayi* in Sri Lanka. However latter was eradicated in nineteen sixties.

The WHO established the Global Programme for the Elimination of Lymphatic Filariasis (GPELF) in 2000 aiming to achieve total elimination by 2020. The programme had two principal goals (1) to interrupt the transmission of infection in the entire 'at risk' population by treating every individual annually with a single dose of two drug regimen (2) to alleviate the suffering and decrease the disability of those already with the clinical disease.

The Ministry of Health, Sri Lanka initiated the national programme for the elimination of lymphatic filariasis (PELF) in 2002 covering the three endemic provinces. Five rounds of mass drug administration were completed by 2006. Having completed thirteen years of surveillance after the last MDA, Sri Lanka has now reached the elimination goal. The country needs to maintain the success and to prevent resurgence of the disease.

The geographical distribution of the disease, having only one species of anthropophilic vector mosquito, no multiplication within the hosts, weak transmission process requiring repeated infective mosquito bites, a prolonged stay in endemic areas were considered as strengths for the elimination of the disease. The Anti Filariasis Campaign and its trained work force, already surveyed and identified areas and assistance from donors and WHO were other strengths for the elimination.

Diagnostic tests are not needed, Gold Standard diagnosis does not cover all stages of the disease, entire population covered, use of two drug combination with well known drugs, bonus effect on intestinal helminths, integration with other programmes, funds and manpower, volunteers were other strengths of the elimination programme.

The challenges for the MDA were the less acceptance by public and poor compliance, dose related adverse effects of the drugs, false propaganda, noncompliance of patients for blood drawing and drug consumption. Reemergence of *Brugia malayi* cases, vector control measures of *Mansonia* mosquitoes, no continuation of adequate funds and personnel for the AFC and less attention for filariasis compared with other diseases etc are the other challenges.

In addition, screening and testing of sentinel sites, hot spots, borderline and non-endemic districts, migrants and value of independent surveys too will be discussed. The remaining hot spots of high endemicity like in Galle, value of triple therapy, finding of *Brugia malayi* resurgence in the country and less attention paid for a disease after elimination are the challenges at present.

Another important aspect is the surveillance of the Morbidity Management and Disability Prevention (MMDP) approach to alleviate the suffering caused by LF. The newer techniques used for this and continuation of disability alleviation services on a larger scale will be discussed. All related work published in Sri Lanka after declaration of elimination will too be discussed.

Symposium 3

Emergence of azole resistant *Aspergillus* and one health

Prof. Jacques F. Meis

Aspergillus fumigatus, a ubiquitously distributed opportunistic pathogen, is the global leading cause of aspergillosis. Azole antifungals play an important role in the management of aspergillosis. However, over a decade azole resistance in *A. fumigatus* isolates have been increasingly reported which is potentially challenging the effective management of aspergillosis. The high mortality rates observed in patients with invasive aspergillosis caused by azole resistant *A. fumigatus* isolates pose serious challenges to the clinical microbiologist for timely identification of resistance and appropriate therapeutic interventions. The 'TR34/L98H' mutation in the *cyp51A* gene of *Aspergillus fumigatus* is responsible for most multi-azole resistance seen in many European countries, the Middle East, China and India. Azole-resistant isolates carrying this mutation have been reported from both patients and the environment. In addition, a new resistance mechanism, TR46/Y121F/T289A, in *A. fumigatus* conferring high voriconazole and variable itraconazole MICs was lately described in many countries including Asia. Considering that azole antifungals are mainstay of therapy, especially for chronic invasive and allergic aspergillosis, the emergence of resistance especially in resource limited countries will have profound impact on healthcare. This presentation highlights the emergence in development of azole resistance in *A. fumigatus* and the possible relation with environmental fungicide use.

Fungal infection of the sinuses

Dr. Preethi Perera

Human exposure to fungal elements is inevitable, with normal respiration routinely depositing fungal hyphae within the nose and paranasal sinuses. Fungal species can cause sinonasal disease, with clinical outcomes ranging from mild symptoms to intracranial invasion and death.

Fungal rhinosinusitis has been categorized primarily based on whether the fungus invades local tissues or not, a characteristic intimately associated with the status of the host's immune system. Noninvasive fungal rhinosinusitis includes fungal colonization, fungal ball, and allergic fungal rhinosinusitis (AFRS). Spread of fungus into local tissues characterizes acute invasive, chronic invasive, and chronic granulomatous forms of fungal rhinosinusitis.

Each form of fungal rhinosinusitis has a characteristic presentation and clinical course, with the immune status of the host playing a critical pathophysiological role. Accurate diagnosis and targeted treatment strategies are necessary to achieve optimal outcomes.

Symposium 4

Innate immune disorders – an update

Prof. Suranjith Seneviratne

Innate immunity includes neutrophils, dendritic cells, macrophages, natural killer cells, acting in concert with natural barriers (skin, respirator and gastrointestinal mucosa), antimicrobial agents, opsonins (e.g., complement) and cytokines. Primary immunodeficiency disorders are a heterogeneous group of genetically inherited diseases affecting the innate and adaptive immune systems. Autoinflammatory disorders result from dysregulation of cellular and molecular cascades intrinsic to innate immunity and manifest as recurrent fevers, high acute phase responses and inflammation of skin, joints and serosal surfaces. My talk would outline recent advances in the pathogenesis, diagnosis and management of immunodeficiency disorders due to innate immune defects and the autoinflammatory disorders.

Vaccine Allergy

Dr. WMDK Dasanayake

Immunisation is an essential public health measure that has saved millions of people from infections. However, with the reduction of number of disease cases "vaccine hesitancy" is becoming a major concern. Therefore, it is crucial that the confidence on vaccination is sustained among the public.

One of the reasons for vaccine refusal is anxiety over adverse reactions to vaccines. Allergy or hypersensitivity reaction is one such complication that should be prevented when it is predictable or managed effectively to avoid fatalities.

In a study carried out in allergy clinics in Sri Lanka, it was uncovered that anaphylaxis to vaccines was the third leading cause of anaphylaxis among children. Majority of the reported immediate hypersensitivity reactions have been to MMR vaccine. For instance, in 2015, 119 cases of allergic reactions after MMR (Measles, Mumps, Rubella) vaccine were reported for the second quarter of the year. Other implicated vaccines are MR, measles, live JE vaccine, rabies PCEC vaccine, pentavalent, DT and AdT.

Most of the children who developed vaccine induced anaphylaxis in Sri Lanka had cows' milk allergy or allergy to red meat, such as pork or beef. In another study, it was revealed that 76.5% of the children investigated for immediate hypersensitivity reactions following vaccination were sensitised to bovine serum albumin (BSA). BSA is a minor protein component of cow's milk. This is in contrast to what has been observed in children with cow's milk allergy in other countries, who rarely have BSA specific IgE. Although, sensitisation to gelatine was a cause of hypersensitivity reactions to vaccines in other countries such as USA and Japan, IgE to gelatine appears to be rare among those who develop vaccine induced anaphylaxis in our country.

Subsequent to the deaths of two girls following rubella vaccination in 2008, there had not been any fatalities resulting from anaphylaxis to vaccines in Sri Lanka. This is largely due to increased awareness among healthcare workers, improved resuscitation facilities in vaccine centres as well as early detection of potential risk factors for reactions.

It is clear that more effort is necessary to identify risk factors for hypersensitivity reactions to vaccines. In addition, consensus is required to decide on the steps that should be taken towards vaccination upon identification of vaccine sensitised individuals.

Symposium 5

Ventilator associated pneumonia – challenges and controversies

Dr. Geethika Patabendige

Diagnosis and management of Ventilator-Associated Pneumonia (VAP) remains one of the most controversial and challenging topics in management of critically ill patients. Ventilator-associated pneumonia is a recognized marker of quality of care in an intensive care unit.

The Center for Disease Control and Prevention (CDC) and Critical Care Societies have recently developed a new approach, potentially automatable and based on objective criterion, to diagnose ventilator-associated events (VAE) instead of VAP. New concepts of ventilator associated complications (VAC), infection related ventilator associated complications (IVACs) have been proposed as outcome indicators for prevention strategies. Ventilator-associated pneumonia increases the duration of hospitalization by 7 days and healthcare costs. Late onset VAP is often reported to associated with higher mortality rates than early onset VAP.

An array of microorganisms has been encountered as pathogens in VAP and MDR pathogens are more common among late onset cases. Prior use of broad spectrum antibiotics and mechanical ventilation > 7 days were independent risk factors for infections due to MDR organisms. However, more recent reports have identified similar rates of aetiologies in patients with early vs late onset VAP. This may be related to the worldwide rise in MDR pathogens.

Local ICU ecology is the most important risk factor for acquiring MDR pathogens irrespective of the length of intubation.

Though ventilator related factors and patient related factors are responsible for VAP, only ventilator related factors are accessible for prevention.

The barriers to the prevention of VAP in intensive care units are very diverse and complex and include a wide range of interrelated personal, environmental, and organizational barriers. Importance of sufficient resources, adequate staffing level, and contextually-appropriate evidence-based guidelines for effective VAP prevention have been emphasized.

Improving the safety culture by a multifaceted infection control programme and its effective implementation and monitoring is essential for the success. This has to be achieved by practice of standard precautions, transmission based precautions, regular and appropriate cleaning of critical care environment, adherence to policies on single use and reusable devices and equipment, use of appropriate and recommended cleaning, disinfection and sterilization methods for respiratory devices, use of appropriate filters, practicing VAP bundle etc. which are really challenging in different settings. Although studies demonstrated great success in reducing VAP rates using bundle of care in recent years, metaanalyses showed that most of the preventive measures failed to demonstrate a sustained effect. Continuing training and education and providing feedback on VAP rates will enhance the performance for improved outcome but may not happen in all settings due to multiple reasons. Though other aspects such as use of silver or antimicrobial coated tubes, SDD and SOD have been studied, behavioural strategies for prevention have to be given a great emphasis.

Reducing the exposure to risk factors for VAP is the most efficient way to prevent VAP onset.

Therefore intubation should be avoided whenever possible and strategies such as non invasive positive pressure ventilation, sedation and weaning protocols should be used to replace or shorten mechanical ventilation.

Great controversies persist about the bacteriological samples that should be used for diagnosing VAP between US and European guidelines. Despite the discrepancy, both guidelines agree that a bacteriological sample should be performed before any antibiotic treatment in order to reduce antibiotic pressure.

Another challenge is to start an antimicrobial therapy that will be immediately effective while avoiding any overuse of extended spectrum antimicrobials. The optimization of pharmacokinetic/pharmacodynamic parameters is now considered a key factor to ensure adequate and successful therapy. The use of adjunctive aerosolized therapy is also more and more debated. Critical care patients exhibit high clearance and distribution volume, which contribute to low blood levels of antimicrobials thus requiring higher doses. Especially for infections due to MDR Gram-negative bacteria, combination therapy increases the likelihood to immediately achieve an adequate therapy. Assessing the effectiveness of the antimicrobials through surveillance is another need and a challenge.

Observational studies have shown that early discontinuation was associated with a non-significant decrease in mortality and significantly lower risks of overall superinfections, respiratory superinfections and superinfections due to MDR pathogens.

A number of new antibiotics with activity against MDR pathogens have been approved for treatment of VAP recently and other agents are under investigation.

Inhaled antimicrobial therapy may be considered with caution as this route of administration enables very high concentrations of antimicrobials to be locally delivered. However, there are no solutions specifically formulated for inhalation, and limited number of devices are designed for the nebulization of antibiotics.

Further research studies are needed to address the challenges and controversies in VAP.

Adult learning in infection prevention and control

Dr. Sharon Salmon

Conventional didactic infection prevention and control (IPC) training based on approaches presented in international guidelines, developed for mainstream consumption, need to be thoughtfully reconfigured and adapted to meet the training needs of busy healthcare workers. Learning environments that effectively meet the needs of adult students build upon the wealth of knowledge in the classroom, are student-driven, and have direct application to the workplace. This presentation describes the need to conduct situational assessments to facilitate the adaptation of standard approaches to IPC based on the presenting context and how to enhance IPC learning experience through hands-on engagement, simulation exercises and interactive workshops.

ORAL PRESENTATIONS

OP 1

Antimicrobial resistance genes, plasmids and virulence determinants in six isolates of beta-lactamase producing uropathogenic *Klebsiella pneumoniae* in Sri Lanka

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Introduction

Data on antimicrobial resistance genes, their associated plasmids and virulence determinants of *Klebsiella pneumoniae* in Sri Lanka is limited.

Objective

To identify the antimicrobial resistant genes, plasmid and genes that code for virulence in six isolates of beta-lactamase producing uropathogenic *Klebsiella pneumoniae* in Sri Lanka.

Method

Six isolates of beta-lactamase producing uropathogenic *Klebsiella pneumoniae* were characterized by Next Generation Sequencing. Plasmid Finder 2.0 available from the Center for Genomic Epidemiology web platforms and the Comprehensive Antibiotic Resistance Database (CARD) were used to search for the presence of plasmids and genes conferring antibiotic resistance. The existence of virulence genes was investigated by using the virulence allele library from the Institute Pasteur BIGSdb database for *K. pneumoniae*.

Results

The multilocus sequence typing (MLST) type was extracted from the assembly data of the six genomes and three different sequence types (STs) were identified. ST-147 (n=3), ST-16 (n=2) and ST-15 (n=1). The analysis of antimicrobial resistance genes via the CARD which identified 35 genes in total in the investigated *K. pneumoniae* isolates (n=6), revealed resistances genes to beta-lactams (*blaSHV-1*, *blaSHV-11*, *blaSHV-28*, *TEM-1B*, *blaOXA-1*, *blaCTX-M-15*, *blaDHA-1*, *blaOXA-*

181, *blaOXA-232*), quinolones (*oqxB*, *oqxA*, *QnrS1*, *QnrB4*), fluoroquinolones (*aac(6')Ib-cr*), fosfomycin (*fosA*), macrolide (*mph(A)*, *erm(B)*), chloramphenicol (*catA1*, *catB3*, *catB4*), sulphonamides (*sul1*), trimethoprim (*dfrA1*, *dfrA14*), aminoglycosides (*rmtf*, *aacA4*, *aadA5*, *aac(3)-IIa*, *aac(3)-IId*, *aph(3')-Ia*, *strA*, *strB*), rifampicin (*ARR-2*, *ARR-3*) and tetracycline (*tet(A)*, *tet(B)*).

Total of 11 plasmids were identified: IncFII(K), IncR, IncX3, ColKP3, ColRNAI, Col(MG828), IncFIA, IncFIB(K), IncFIB(pKPHS1), IncFIB(pKPHS1) and IncFII(pKPX1). The OXA-181 and OXA-232 carbapenemase genes were carried by ColKP3 plasmids.

Twenty six virulence genes were identified in the following categories: Iron uptake (*fyuA*, *kfuA*, *kfuB*, *kfuC*), siderophores (*irp1*, *irp2*, *iucA*, *iucD*, *iutA*, *ybtA*, *ybtE*, *ybtP*, *ybtQ*, *ybtS*, *ybtT*, *ybtU*, *ybtX*) and fimbrial adherence determinants (*mrkA*, *mrkB*, *mrkC*, *mrkD*, *mrkF*, *mrkH*, *mrkI*, *mrkJ*).

Conclusion

A broad range of antimicrobial resistance genes, plasmids and virulence genes were identified.

OP 2

Laboratory diagnostic methods comparison, antibiotic susceptibility pattern and serotyping of invasive and colonizing group B *Streptococcus* isolates in a selected group of hospitals in Sri Lanka

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Introduction

Group B *Streptococcus* (GBS) cause significant morbidity and mortality in neonates, pregnant women and patients with underlying co-morbidities. Intra-partum antibiotic prophylaxis (IAP) is currently the mainstay of prevention of neonatal GBS disease and effective vaccine against invasive GBS disease is under clinical trial.

Objectives

To validate GBS laboratory diagnostic methods and to describe antibiotic susceptibility pattern (ABST) and serotypes of GBS.

Method

Study was a descriptive cross sectional study and isolates which were identified as GBS from high vaginal swabs (HVS) and sterile body sites were collected from selected hospitals. Collected isolates were subjected to phenotypic identification tests including CAMP which is described by Christie, Atkins and Munch-Peterson, bile aesculin hydrolysis (BE) and Lancefield grouping test. ABST (CLSI-disk diffusion) and serotyping by latex agglutination (ImmuLex™ Strep B) were performed on confirmed GBS isolates by Lancefield grouping test.

Results

Of 145 collected isolates 137 isolates were confirmed as GBS by Lancefield grouping test. Compared to the Lancefield grouping test, CAMP test showed 100% sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV). Sensitivity, specificity, PPV and NPV of the negative BE test were 99.27%, 25%, 95.77% and 66.66% respectively. Penicillin and cefotaxime were 100% sensitive against tested GBS isolates. Sensitivity of clindamycin and erythromycin were 74.4% and 76.6% respectively. Serotype III was the most predominant in invasive GBS isolates followed by serotype Ia, Ib, VI, II and V. Serotype VI was the most predominant in HVS isolates followed by serotype III, V, Ia, II, Ib and IV.

Conclusion

CAMP test has 100% sensitivity, specificity, PPV and NPV in GBS identification. Surveillance on clindamycin susceptibility is important to predict the empiric antibiotic in IAP. Serotype distribution is closer to other countries and is an advantage in future vaccine introduction. GBS vaccine currently under clinical trial (Ia, Ib and III) is potentially effective for preventing 73% of the invasive GBS disease of infants in the study population.

OP 3

Phenotypic and genotypic characterization of clinically significant carbapenem resistant *Klebsiella pneumoniae* isolates in a tertiary care hospital

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Introduction

Klebsiella pneumoniae is a common organism to produce carbapenemases and such infections may have increased morbidity and mortality. It is important to identify those carbapenemases to optimize the treatment regime, to establish infection control measures, and to assess

epidemiology. In Sri Lanka, only limited studies have complete molecular analysis.

Objectives

To describe the, phenotypic and genotypic characterization of clinically significant carbapenem resistant (CR) *Klebsiella pneumoniae* isolates in a tertiary care hospital.

Associated factors for CR *Klebsiella pneumoniae* infections.

Method

This descriptive cross sectional study was carried out for four months (2018) at microbiology laboratory of a tertiary care hospital.

According to the calculated sample size, 226 *Klebsiella pneumoniae* isolates from clinically significant samples (blood, sterile fluids and urine) were identified by RapID-ONE system and included. Antibiotic sensitivity was tested by disk diffusion method according to CLSI M100 (27th edition) guidelines. CR isolates were tested with Modified Hodge test (MHT) and EDTA inhibition test. Gene-Xpert™ Carba-R multiplex PCR was used for molecular analysis of CR isolates. Associated factors were assessed using an interviewer administered questionnaire.

Results

There were 44 (19% of total *Klebsiella*) CR isolates. In bacteraemic patients 40% of the blood culture isolates were carbapenem resistant. Amikacin was the most sensitive antibiotic (52.3%) in CR group.

MHT was positive in 32 (72.7%) and EDTA inhibition test was positive in 19 (43.2%) isolates. Carbapenemases production was confirmed in 43 isolates (97.7%). Single carbapenemase was detected in 39 isolates (24 OXA-48, 12 NDM and 3 KPC). Four were positive for both NDM and OXA-48. Recent hospital stays (37.4%), ICU stay (58.3%), presence of invasive devices (51.4%), exposure to carbapenems (84.6%), 3rd generation cephalosporins (59.3%), presence of renal insufficiency (42.3%) and being a post-surgical patient (42.9%) were significantly associated ($P < 0.005$) with carbapenem resistance.

Conclusion

OXA-48 was the commonest carbapenemase detected followed by NDM and KPC. MHT was positive in 75% of OXA-48 positive isolates. Recent hospital and ICU stays, exposure to carbapenems and 3rd generation cephalosporins were important factors significantly associated with carbapenem resistance.

OP 4

Molecular characterization and laboratory detection of carbapenemase producing Enterobacteriaceae

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Introduction

Global dissemination of carbapenem resistant enterobacteria (CRE) is a critical public health issue due to the existence of several transmissible carbapenemases that can inactivate all the available β -lactam antibiotics. Thus, timely detection of carbapenemase-producing Enterobacteriaceae (CPE) is becoming increasingly important to rationalize empiric antibiotic therapy and to guide infection control.

Objectives

To characterize the carbapenemases present in CPE in Sri Lanka and to compare different CPE detection methods namely, modified Hodge test (MHT), modified carbapenem inhibition test (MCIM) and Carba-NP test (CNPt).

Method

A cross-sectional study was conducted at Colombo North Teaching Hospital during December 2017 - February 2018. A total of 57 CRE were isolated from a variety of clinical samples. Enterobacteria, resistant to at least one carbapenem were considered as CRE. Organisms were identified using the RapID™ system. Presence of genes encoding the most common carbapenemases (NDM, KPC, OXA-48-like, IMP, and VIM) was explored by multiplex PCR. MHT, MCIM and CNPt were performed according to Clinical and Laboratory Standards Institute guidelines.

Results

Fifty four of 57 (94.7%) CRE were found to be CPE by PCR. Of them, 81.5% (44/54), 7.4% (4/54), and 3.7% (2/54) were OXA-48-like, NDM and KPC producers, respectively. Four (7.4%) isolates co-produced both NDM and OXA-48 enzymes. CRE identified were *Klebsiella pneumoniae* (80.7%, 46/57), *Escherichia coli* (5.3%, 3/57), *Citrobacter freundii* (7.0%, 4/57), other enterobacteria (7.0%, 4/57). All CPE were detected by MCIM and MHT, whereas only 81.5% (44/54) were detected by CNPt. Although MCIM and MHT required overnight incubation, CNPt took less than 3 hours to produce results.

Conclusion

K. pneumoniae was the predominant CRE species and carbapenemase production was the major resistance mechanism with OXA-48-like enzyme being the prevalent carbapenemase type. CNPt had reasonable sensitivity for the detection of CPE. Therefore, when a rapid decision is needed, CNPt can be a viable option. MCIM and MHT had higher sensitivity; however, MCIM results could be easily interpreted than that of MHT.

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OP 5

Adenovirus detection among children with severe acute respiratory symptoms admitted to a tertiary care hospital

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Introduction

Human adenovirus (HAdV) causes 5-10% of lower respiratory tract infection (LRTI) in children.

Objective

To determine the prevalence of adenovirus infection in selected group of children admitted to Lady Ridgeway Hospital with severe acute RTI and correlate with severity and other available demographic and clinical history.

Method

Nasopharyngeal aspirates were collected from January to April, 2014 and nucleic acid extracted using QIAmpRNA Mini-kit. Elutes were subjected to Altona (GmbH) real-time commercial PCR assay for the detection of adenovirus and four other respiratory virus types.

Results

Of 75 specimens from 2 months to 11 years old children (mean 3.8 ± 7.04 years), 70.67% (53/75) were positive for HAdV. 22/75 (29.3%) were positive only for adenovirus. Viral mixed infections with other respiratory viruses (RSVA-26.7%, RSVB-08%, parainfluenza-08%, influenza A-08%, influenza B=0) were detected in 41.3% (n=31). The incidence of HAdV infection peaked in children aged 5-10 years. The most common clinical diagnosis was acute respiratory infection. From adenovirus only detected

cohort, presenting features were a) productive cough (95.5%), b) fever (81.8%), c) shortness of breath (59%), d) pneumonia (59.3%). The percentages of these features in adenovirus detected with other viruses respectively are, a) 84.9% b) 69.8%, c) 35.8%, d) 35.8% (statistically not significant). Due to financial constraints, sequencing and typing of HAdV could not be performed.

Conclusion

Adenovirus was prevalent in a significant number of children either alone and in combination with main respiratory viruses in this cohort. Adenovirus was associated with morbidity. In further studies, bacteriological results and radiograph findings should also be considered in methodology for better clarification of morbidity caused by adenovirus infection.

OP 6

Alpha herpes virus infections in a group of clinically suspected patients with central nervous system infections

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Introduction

Alpha herpes viruses are DNA viruses with three main human pathogens, herpes simplex virus type one (HSV-1), herpes simplex virus type two (HSV-2) and varicella zoster virus. These viruses can cause infection in central nervous system (CNS) as a primary infection or after reactivation from the latent form.

Objectives

To determine positivity rate of human HSV and VZV infections among clinically suspected patients with central nervous system infections.

To describe clinical features and demographic data of HSV and VZV infection in the study group.

Method

Retrospective analysis of laboratory and clinical data of all cerebrospinal fluid (CSF) samples of the patients with suspected CNS infection received at Virology Laboratory, Teaching Hospital, Kandy from March, 2017 to March, 2019 were analyzed. Detection of HSV/VZV in fresh CSF samples was carried out using a validated commercial real time PCR kit.

Results

Three hundred fifty-two (352) patients' data (167 children, 185 adults) were analyzed and out of them, 08 patients (2.27%) were positive for VZV and 03 patients (0.85%) were positive for HSV.

Among VZV positive patients, 05 (62.5%) were children. Out of VZV positive patients, 02 patients (25%) did not develop any rash. None of the VZV positive patients had a past history of varicella infection. Five patients had VZV encephalitis, one had VZV meningitis, one had VZV myelitis, and one had VZV haemorrhagic cerebellitis. There were 02 fatalities and the other 06 patients recovered from acute infections with the treatment.

Out of the 03 positives for HSV, 02 had (0.56%) HSV-1 and one (0.28%) had HSV-2. One of the HSV-1 positive patients had encephalitis while the other patient had neonatal HSV-1. HSV-2 patient presented with meningitis. Neonate with HSV-1 had developed recurrent CNS infections while the other two recovered from acute infection.

Conclusion

VZV CNS infection was predominant in our study. Molecular diagnosis of alpha herpes viruses in patients with suspected CNS infections is encouraged to optimize treatment.

OP 7

Predictors of severity to guide management of acute dengue in Southern Province, Sri Lanka

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Introduction

Dengue is an acute febrile illness in which clinical status deteriorates rapidly. Early identification of patients vulnerable to develop severe disease is critical for prompt management, preventing life-threatening complications.

Method

A prospective, cohort study from June 2017- January 2018 at three major hospitals in Southern Sri Lanka enrolled consecutive febrile patients aged ≥ 1 -yr if they developed platelet count $< 100 \times 10^9/L$ and two clinical symptoms consistent with dengue with/ without warning signs, within 7 days of onset of symptoms. Socio-demographic and clinical data were collected. Acute dengue was confirmed if NS1 rapid antigen was positive (fever < 6 days) or if dengue IgM was positive (fever ≥ 5 days & NS1 negative). Severe dengue was defined per 2009 WHO criteria. Features associated with severe dengue were determined using Fisher-exact and Kruskal-Wallis tests.

Results

Of 796 patients, all had laboratory-confirmed acute dengue. Median age was 33 years (IQR 25-47 years) and 436 (54.8%) were male. Overall, 104 (13.1%) developed severe dengue: 23 (2.9%) shock, 67 (8.4%) plasma leakage with respiratory distress, 17 (2.1%) severe organ failure, and 19 (2.4%) with severe bleeding. Patients who developed severe dengue versus non-severe dengue were more likely to be female (47.2% versus 30.5% ($p=.001$)). Patients with severe dengue presented with more physical signs; tender abdomen (26.2% versus 11.9%, ($p<.001$)), rash/flushing (16.4% versus 9.9% ($p=.046$)), and altered consciousness (13.9% versus 2.2% ($p<.001$)) and was associated with a higher median leukocyte count ($4.5 \times 10^9/L$ in severe dengue versus $4.1 \times 10^9/L$ in non-severe dengue ($p=.030$)), lower median platelet count ($43,500 \times 10^9/L$ versus $87,000 \times 10^9/L$ ($p<.001$)) within 24-hours of admission, and median level of either of transaminase (AST/ALT $> 120 U/L$, 11.6% versus 2.9% ($p=0.007$)) and ultrasound evidence of pleural effusions (11.0% versus 2.3% ($p<.001$)), fluid in Morrison's pouch (25.0% versus 11.2% ($p=.001$)), and pelvis (8.8% versus 0.4% ($p<.001$)) on admission.

Conclusion

A large proportion of laboratory confirmed dengue cases developed severe disease. We identified several clinical, laboratory, and radiographic predictors of severe dengue that may help guide more effective management.

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OP 8

Outbreak of respiratory tract infection among children in Southern Province, May-July 2018

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Introduction

Outbreaks due to respiratory viruses are common but generally self-limiting. We report an outbreak of respiratory tract infections among children in Southern Province with adenovirus detected in a significant number of deceased children.

Objective

To find the aetiology of the respiratory tract infection outbreak in the Southern Province during May-July 2018.

Method

Respiratory samples were collected from children with clinically suspected respiratory tract infections admitted to Teaching Hospital Karapitiya (THK) in to virus transport medium. Influenza A/B immunochromatographic test (ICT) was performed at THK. A duplicate sample was sent to Medical Research Institute for respiratory multiplex real time PCR. Twenty-four adenovirus PCR positive samples were sent to Hong Kong for sequencing. Bacterial cultures were also performed. Patients' socio-demographic data was obtained using the request forms.

Results

Total of 1116 respiratory samples were tested for influenza A/B ICT, out of which 174 (16%) were positive for influenza [A 136 (12%), B 38 (3%)]. Respiratory multiplex PCR was performed for 261 samples sent to MRI, out of which RSV, adenovirus and influenza were positive in 106 (41%), 95 (36%), 56 (A 47, B 9) (21%) respectively. Mixed infections were detected in 44 (17%) patients.

Twenty-one paediatric deaths were attributed to respiratory tract infections during the outbreak, out of which 20 were in patients < 2 years (range 3-31 months, mean 10.7 months). Children were from all 3 districts with no clustering. Fifty percent had comorbidity. Adenovirus was positive in 15 (71%) of them alone or in combination with RSV and influenza. RSV and influenza was positive in 8 (38%) and 5 (A 4, B 1) (24%) respectively. Adenovirus was also positive in 3/3 blood samples tested. Half of these children had bacteraemia or candidaemia with *Klebsiella* predominantly. Sequencing revealed that all adenoviruses were group B-type 3, a recognized type which can cause outbreaks and severe disease.

Conclusion

Aetiology for the outbreak of respiratory tract infections was multifactorial. Adenovirus was detected in a significant number of fatal cases. Typing results of adenovirus indicate that group B-type 3 was circulating during the outbreak period.

OP 9

Vancomycin: Do our patients achieve therapeutically adequate trough serum levels? A multi-center descriptive cross sectional study

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Introduction

Vancomycin is a first line antibiotic used to treat infections with methicillin-resistant *Staphylococcus aureus* (MRSA). To achieve the maximum benefit of the drug and to prevent the toxicity and resistance development, therapeutic drug monitoring is recommended where trough serum level is considered the best predictor of efficacy. For complicated infections with MRSA, a trough of 15-20 mg/L is recommended.

Objectives

To determine the trough serum levels and proportion of patients who achieved therapeutically adequate trough serum level of vancomycin.

Method

This study is a descriptive cross sectional study with non-probability sampling for four months duration starting from December 2017 at Teaching Hospital Karapitiya, Colombo South Teaching Hospital and Teaching Hospital Ratnapura. Trough serum vancomycin levels were measured using a chemiluminescent microparticle immunoassay at the Medical Research Institute, Colombo in patients who were on vancomycin immediately before the fourth dose.

Results

Out of the 39 patients who had complicated infections with MRSA, only 25.6% achieved a desirable trough level of 15-20 mg/L. Resistance driving trough levels were achieved by 23.1% and 38.5% had toxic trough levels. Out of the 21 patients who had non-complicated infections

44.5% achieved a desirable trough level of 10-20 mg/L. Resistance driving trough levels were achieved by 33.3% of the patients with non-complicated infections and 22.2% had toxic trough levels. Trough serum vancomycin levels showed a statistically significant negative correlation with creatinine clearance ($p = 0.000$) and a positive correlation with age ($p = 0.002$)

Conclusion

Trough serum vancomycin levels are frequently sub therapeutic even if the patients receive an adequate dose of vancomycin according to the body weight and serum creatinine. This possesses a threat of therapeutic failure, development of undesired effects of the drug and development of resistance to the drug.

OP 10

Incidence of *Clostridium difficile* infection among paediatric patients with diarrhoea in Lady Ridgeway Hospital Colombo

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Introduction

Recent studies have revealed that the incidence of *Clostridium difficile* infection is increasing in children including those without traditional risk factors, and it is emerging as an important enteric pathogen in children worldwide. Proportion of 3.6% of *Clostridium difficile* associated diarrhoea (CDAD) was found in adult population in Sri Lanka. No studies have been done in the paediatric population in Sri Lanka and limited studies in other Asian countries. Knowledge on incidence, associated risk factors, identifying optimal therapeutic options and preventive strategies of CDAD is becoming important in Sri Lanka.

Objectives

To determine the incidence, describe socio-demographic profile and associated risk factors of *Clostridium difficile* infection among paediatric patients with diarrhoea in Lady Ridgeway Hospital (LRH) Colombo.

Method

A descriptive cross-sectional study was carried out for four months from 1st December 2016 to 30th March 2017 at Lady Ridgeway Hospital (LRH) Colombo among 200 paediatric patients above one year with diarrhoea. Detection of *Clostridium difficile* in faeces was performed

using a Glutamate Dehydrogenase Enzyme Linked Immunosorbent Assay and stool culture. Positive stool samples were tested for toxin A and B using the Immuno-chromatography Assay. Patient's socio demographic and clinical data were collected using an interviewer administered questionnaire. Data were analyzed using SPSS (version 22) software.

Results

Eleven out of two hundred specimens were positive for the toxin A, B and both A&B. Incidence of *C. difficile* associated diarrhoea was 18.7/1000 diarrheal cases at LRH while, incidence of community acquired CDAD was 3.4/1000 patients with diarrhoea. There was a significant relationship between with hospitalization ($p=0.00$) and antibiotic treatment within three months ($p=0.03$) and CDAD.

Conclusion

This study shows that the *Clostridium difficile* associated diarrhoea is seen in the paediatric population of Sri Lanka. Community acquired *Clostridium difficile* associated diarrhoea among paediatric population is also seen in Sri Lanka even though the incidence is low compared to other Asian and Western countries.

OP 11

Methicillin resistant *Staphylococcus aureus* from a District General Hospital: evidence for community circulation of strains of diverse origins

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Introduction

It was noted that methicillin resistant *Staphylococcus aureus* (MRSA) infections at our district general hospital were increasing in the second quarter of 2018, prompting concerns of a possible outbreak.

Objectives

To assess the genetic relatedness of the MRSA isolates causing infections at the study site.

Method

MRSA infection incidence for each month was calculated and the trend throughout 2018 was assessed to determine whether a true increase in infections had occurred.

MRSA isolates obtained over a three month period were stored and sent for random amplification of polymorphic DNA (RAPD) typing. Only isolates from patients admitted to the prenatal/ post natal ward, gynaecology ward, PBU and the surgical wards were included. DNA was isolated using the boil lysis method from 33 isolates and RAPD based typing was attempted with three primers; the primers named OLP 6 and OLP 13 did not yield sufficient bands/ patterns to type the isolates; OLP 11 primer gave sufficient banding in 14 of the 33 isolates.

Related isolates were identified and clinical details of those patients were obtained. A line list and timeline were drawn to identify whether a common source/ possible mechanism of cross infection could be identified.

Results

Three clusters could be identified with similarity of >70% in Jaccard index; cluster 1 and 2 had two isolates each, cluster 3 had 7 isolates and two sub-clusters (3A, 3B). Three isolates were singletons.

Both patients of cluster 2 and two patients from cluster 3B had community acquired MRSA infections (CA-MRSA). Both patients of cluster 1 may also have acquired their isolates from the community.

Two patients of cluster 3A may have acquired MRSA by cross transmission whilst in the hospital, as they were both in the same wards and labour room simultaneously. Cross infection may have occurred at these units due to lapses in infection control measures.

Conclusion

The epidemiology of CA-MRSA in the hospital catchment area appears complex with a likelihood of endemic circulation of multiple strains.

OP 12

Pneumococcal colonization in two groups of Sri Lankan children between 2 months to 2 years

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Introduction

Colonization with *Streptococcus pneumoniae* is considered a pre-requisite for pneumococcal diseases. Evaluating the pneumococcal isolates that colonize children will give surrogate data on the circulating serotypes in the country.

Objectives

To identify the pneumococcal colonization rates among healthy children between 2 months to 2 years of age and children of the same age group who are hospitalized with respiratory symptoms with or without fever and to identify the serotypes and sensitivities of the pneumococcal isolates.

Method

This prospective descriptive study was conducted among two cohorts of children aged between 2 months to 2 years. A) Healthy children attending immunization clinics and B) children hospitalized with respiratory symptoms with or without fever. A nasopharyngeal swab (NPS) was collected from all participants. The NPS was cultured on sheep blood agar and pneumococcal isolates were identified with Optochin sensitivity and bile solubility testing. Microbroth dilution was used to determine sensitivity for cefotaxime and penicillin while disc diffusion was used to determine sensitivity for erythromycin and tetracycline. Multiplex PCR was used to detect serotypes 14, 23F, 19F, 9A/V, serogroup 6 (to serogroup level, not types), 19F, 3, 15B/C, 18C/F/B/A.

Results

Two hundred children each were recruited from the healthy cohort (HC) and inward cohort (IC). Pneumococcal colonization rate for the HC was 28.0% (n=56) while it was 37.5% (n=75) among the IC (p=0.043, Chi-square test). Considering all 131 pneumococcal isolates together, penicillin MIC ranged from 0.015 to 4 µg/mL while the cefotaxime MIC ranged from 0.015 to 16 µg/mL. MIC₅₀ and MIC₉₀ for penicillin and cefotaxime were 1 and 2 µg/mL. Sensitivity to erythromycin and tetracycline were 19.1% and 22.9%. The commonest serogroups/ types identified were serogroup 6 (n=32, 24.4%), 19F (n=28, 21.4%), 23F (n=12, 9.2%) and 14 (n=10, 7.6%).

Conclusion

Pneumococcal colonization rates found were considerably higher and the commonest serogroups/ types identified were serogroup 6 and serotype 19F.

Research grant W1216479 through Pfizer for financial assistance is acknowledged.

OP 13

A novel strain of *Brugia malayi* with a close nucleotide homology to *Brugia pahangi* from Sri Lanka

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Introduction

Brugian filariasis has re-emerged in Sri Lanka, after a quiescent period of four decades. The re-emergent strain is a sub-periodic strain of probable zoonotic origin. Cats and dogs are known to harbor sub-periodic *Brugia* species parasites. Ascertaining the species identity of the re-emergent *Brugia* filarial parasites required molecular analysis, since microscopy alone was inadequate.

Objective

Molecular speciation of the re-emergent *Brugia* species microfilariae in humans and those circulating among dogs and cats in the vicinity of human infections.

Method

A community-based night blood survey was carried out in selected areas of Gampaha district for *Brugian* filariasis using thick blood smears (TBS) to detect latent infections. Cats and dogs within the residential areas of human cases were surveyed for microfilariae using TBS. *Brugia* sp. microfilariae positive samples (human and animal) were analysed by Polymerase Chain Reaction (PCR) and DNA sequencing. Microfilariae in 1ml of anticoagulated human blood were concentrated by Nuclepore® membrane filtration and genomic DNA was extracted from filter membranes. A representative sample of *Brugia* microfilariae positive animal blood spotted on filter paper was selected and DNA was extracted using ReliaPrep™ Blood DNA Miniprep System (modified). PCR was performed with pan-filarial primers specific for internal transcribed spacer region 2 (ITS2) of the ribosomal DNA. PCR products were analyzed by gel-electrophoresis on 2% agarose with positive and negative controls (*B. malayi* and distilled water respectively).

Results

PCR analysis of human (n=8), canine (n=53) and feline (n=24) samples elicited bands in the region of 615bp, which confirmed *B. malayi* infection. Nucleotide sequence analysis of the ITS-2 region of PCR products of two human, three canine and six feline *B. malayi* microfilariae revealed a higher sequence homology with *B. pahangi* than *B. malayi* but phylogenetically, the sequences were closer to *B. malayi* than *B. pahangi*.

Conclusion

The re-emergent *Brugia* species is a strain of *B. malayi* that has closer nucleotide homology to *B. pahangi* than *B. malayi*, indicating the possibility of a novel or hybrid *B. malayi* / *B. pahangi* strain. The high prevalence of this novel strain of *B. malayi* among cats and dogs implicates them as reservoir hosts.

OP 14

Immunity to measles among a cohort of pregnant women attending a tertiary care maternity hospital in Western Province

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Introduction

Measles immunity in pregnant mothers is important to prevent measles related mortality and morbidity in the pregnant mother herself, the fetus and in the newborn. The first dose of a measles containing vaccine is given at nine months of age in Sri Lanka. After three decades of vaccination against measles, the population immunity in Sri Lanka is considered to be high. However, measles outbreaks are currently surging in other parts of the world and demonstration of sufficient immunity in different populations is important in making the measles elimination goal a reality.

Objectives

To determine the measles IgG seroprevalence among the study group and to determine factors associated with seropositivity.

Method

A descriptive cross sectional study was carried out at antenatal clinics of De Soysa Maternity Hospital, Colombo from June to December, 2016.

Socio-demographic data and blood samples were collected. Serum was separated and tested for measles specific IgG with quantification using a validated commercial assay. Laboratory work was carried out at the Department of Microbiology, Faculty of Medicine, Colombo.

Results

Participants included those who were not vaccinated (born before 1983- aged 32 and above) and single dose (1984 to 2001). However, the exact vaccination details could not be collected due to unavailability of vaccination records.

Of 391 participants, measles IgG was positive in 91.3% (357/391) (95% CI 89.5-95.0%). Eleven (2.8%) had equivocal results. Geometric mean titre was 0.48 IU/ml (SD 0.28). A significantly decreasing rate of sero-positivity was observed among the age groups, which fell from 100% (6/6) in the oldest age group (41-45 years) to 71.4% (15/21) in the youngest age group (15-19 years). No difference in mean antibody titres in seropositive subjects was observed. Having ≥ 4 household members during childhood was the only other factor associated with sero-positivity apart from age.

Conclusion

High overall measles sero-positivity rate was observed among the study population. However, the sero-positivity rates were lower in younger age groups compared to the older age groups.

OP 15

Degree of adherence to recommended decontamination procedure of bronchoscopes and microbial status of the reprocessed equipment at the bronchoscopy unit of National Hospital Sri Lanka

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Introduction

Infections by bronchoscopes are described as a consequence of insufficient cleaning and disinfection.

Objectives

To determine level of adherence to recommended steps of decontamination procedure of flexible bronchoscopes.

To assess microbial status of the bronchoscope before and after reprocessing.

To describe adherence to infection control measures in the bronchoscopy unit.

Method

A descriptive, cross sectional study was conducted in the bronchoscopy unit of National Hospital, Sri Lanka from 4th December 2017 to 31st March 2018. A total of 93 bronchoscopy reprocessing cycles were observed. Sample collection and processing was done following European Society of Gastrointestinal Endoscopy and European Society of Gastroenterology Nurses and Associates (ESGE-ESGENA) guideline for quality assurance in reprocessing: 'Microbiological surveillance testing in endoscopy'. A washout sample from bronchoscopy channel and two swabs before and after reprocessing from tip of the bronchoscope were collected.

Washout samples were subjected to estimation of total microbial count. Washout and swabs were cultured aerobically to detect indicator organisms i.e. *Escherichia coli*, other enterobacteriaceae, enterococci, *Pseudomonas aeruginosa*, other Gram negative non-fermenters, *Staphylococcus aureus*, *Staphylococcus epidermidis*, mycobacteria and Legionella. Washouts having a colony count of ≥ 20 /channel and/or having indicator organism/s were considered as 'contaminated'. Swabs were considered 'contaminated' with the presence of indicator organisms.

Results

Cleaning valves and tips, decontamination of trays, fresh use of detergent and using sterile water had adherence rates of 100%, 50%, 54% and 52% respectively. Number of 'contaminated' samples was 67 (72%). Organisms isolated from washout were *Pseudomonas aeruginosa* (98%) and *Mycobacterium tuberculosis* (2%). Swabs taken from tip after reprocessing were contaminated in 16% of cycles, predominant organism being *Pseudomonas aeruginosa* (93%). Compliance rates of wearing gloves and gowns were 100% and N95 masks was 75%.

Conclusion

Deficiencies were noted in adherence to steps of reprocessing of bronchoscopes recommended by infection control unit. Contaminations were observed in working channel and tip of reprocessed bronchoscopes, *Pseudomonas aeruginosa* and *Mycobacterium tuberculosis* being the predominant organisms. Infrastructure facilities of the unit and adherence to infection control measures needed further attention and improvement.

OP 16

Sero-prevalence and genotype distribution of Hepatitis C infection, among patients with Haemophilia A and B, in four selected tertiary care hospitals

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Introduction

Hepatitis C virus (HCV) infection leads to chronicity in majority infected (55-85%), with complications like cirrhosis and hepatocellular carcinoma. However, early identification and treatment has cure rates of more than 95%. Thus, it is highly recommended to screen at risk populations. Haemophiliacs belong to one of the at risk groups for HCV infection, due to repeated transfusion of blood and blood products. Evidence on the impact of HCV infection among haemophiliacs in Sri Lanka is lacking in the current context. Further, treatment can be tailor-made depending on the infecting genotype of the virus.

Objective

To describe the sero-prevalence, genotype distribution and associated factors of HCV infection, among patients with haemophilia, at four tertiary care hospitals in the Western Province of Sri Lanka.

Method

This descriptive cross-sectional study used samples of plasma of 133 haemophiliacs, recruited from December 2017 to March 2018. Testing was performed using commercially validated fourth generation antigen-antibody ELISA, Quantitative real-time RT-PCR assay for HCV RNA and HCV Genotyping PCR. Socio-demographic and disease characteristics of the participants were obtained from an interviewer administered questionnaire and clinical records. Results were analyzed using descriptive statistics and chi-square tests (significance level at 0.05).

Results

All 133 patients were males, with majority (37.6%) below ten years of age. Severe (43.6%) and moderate haemophilia (42.1%) patients dominated the study population.

HCV sero-positivity was detected among 3.8% (5/133), of whom 3 patients were between 31-40 years and 2 patients between 41-50 years of age. Out of these seropositives, HCV RNA was detected in 2 (40%), where the detected Genotypes were 1 and 3. The age of the

participants was statistically significant with HCV seropositivity ($P < 0.05$). However, duration, type, number or place of transfusion, number of hospital admissions or surgeries undergone did not show any such significant association.

Conclusion

A low HCV sero-prevalence compared to previous studies in Sri Lanka may be attributed to implementation of donor screening. Identification of the prevalent genotypes will be useful in decision making during treatment.

POSTER PRESENTATIONS

PP 1

Epidemiology and clinical presentation of culture positive melioidosis in the Southern Province of Sri Lanka

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Introduction

Melioidosis, a multi-spectrum disease caused by *Burkholderia pseudomallei*, has emerged in Sri Lanka recently. Many commercial identification systems fail to speciate *B. pseudomallei* correctly and the suspicion at the bench usually comes with the expertise and compatible clinical history.

Objective

To analyse the identification, epidemiology and clinical presentation of culture positive melioidosis patients presenting to a major tertiary care center in the Southern Province.

Method

A prospective descriptive study was carried out from December 2014 to December 2018 on culture positive melioidosis patients. Isolates suspected to be *B. pseudomallei* by colony morphology and typical antibiotic sensitivity, were sent to the Faculty of Medicine, Colombo, for confirmation by latex agglutination for exopolysaccharide antigen. While this test may be slightly positive with *Staphylococcus aureus*, *Acinetobacter baumannii* and *Burkholderia cepacia*, these bacteria can be easily excluded by Gram stain, oxidase test and co-amoxycylav resistance. Melioidosis antibody testing was done whenever possible.

Results

There were 37 confirmed cases out of 40 suspected, with male predominance (n=29, 78%). Majority were between 40 and 60 years (n=22, 59%). Patients from Galle and Matara were 15 (38%) and 12 (30%) respectively. Prolonged exposure to soil due to occupation or gardening was seen in 23 (62%) cases while 5 were direct flood victims.

B. pseudomallei was isolated from blood in 23 patients (62%), pus in 7, broncho-alveolar lavages in two and one each of urine and joint fluid while 3 had multiple cultures. Main mode of presentation was respiratory illness; pneumonia or lung abscesses (14, 38%). Twenty three were diabetics.

Antibodies were done in 31 patients and 16 had titres >10240. High titres were seen with the deep-seated abscess or prolonged history and shorter history were usually associated with low titres indicating acute infection. Eight (22%) died while 3 relapsed.

Conclusion

Laboratory expertise is important in the presumptive identification. Melioidosis should be suspected in severe community acquired pneumonia and deep-seated abscesses. Middle aged diabetic men are at high risk. Blood and pus cultures are encouraged as they have a high positive yield.

PP 2

Microbiological profile of ear swabs in neonates at birth in a unit at a Tertiary Care Hospital

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Introduction

Deep ear swabs are used as screening swabs for microbial colonization of neonates at birth. As ear swabbing is not an invasive procedure it can be easily done in the neonates to get an idea of colonizing pathogens in suspected sepsis. As colonization proceeds infection and it may help in the choice of empiric antibiotics.

Objectives

The objectives of the present study were to determine the microbial profile of ear swabs in neonates in a unit at a tertiary care hospital.

Method

A total 156 neonatal ear swabs taken at birth and received at the Department of Microbiology, Faculty of Medicine, University of Colombo from the De Soysa Maternity Hospital from July 2017 to August 2018 were included in the study. Ear swabs were plated on blood, chocolate

and MacConkey agar and were incubated at 35-37°C for 18 hours. Clinical isolates were identified by Gram stain, colony morphology, catalase test, oxidase test and slide/tube coagulase tests.

Results

Of the 156 ear swab samples 96 (61.53%) were from males and 60 (38.46%) were from females. There were 57 (36.53%) pure growths, 21 (13.46%) mixed growths and 78 (50%) no growths. The total number of culture positives were 78 (50%). Of the 78 culture positives 50 (64%) were males and 28 (35.9%) were females. Of the 78 culture positives there were 75 (96.15%) Gram positive organisms and 3 (3.84%) Gram negative organisms. Of the 75 Gram positive organisms coagulase negative staphylococci, Group B haemolytic streptococci, *Staphylococcus aureus*, diphtheroides, micrococci, and non-haemolytic streptococci were identified in 39 (52%), 17 (22.66%), 9 (12%) 5 (6.66%), 3 (4%) and 2 (2.66%) isolates respectively. Of the 3 Gram negative organisms all were identified as coliforms (100%). Of the 9 *S. aureus* isolates 3 (33.33%) were methicillin resistant *S. aureus* (MRSA).

Conclusion

Coagulase negative staphylococci, Group B haemolytic streptococci and *S. aureus* were the most common organisms isolated from deep ear swabs in neonates in this particular unit.

PP 3

***Rhizobium radiobacter* neonatal sepsis: An outbreak investigation in a special care baby unit**

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Introduction

Rhizobium radiobacter is an asaprophyte, reported to cause opportunistic infections in humans. There were seven neonates with sepsis due to *Rhizobium radiobacter* between 3rd and 30th of October 2017, at the special care baby unit (SCBU) of Colombo South Teaching Hospital (CSTH), which triggered an in depth investigation.

Objectives

To identify the source and route of transmission of the organism.

To control the transmission of the organism and the outbreak.

Method

Blood cultures from two neonates signalled initially, on 9th October with Gram negative bacteria. Subsequently five neonates developed sepsis due to similar organism within two weeks. The blood culture isolates were identified as *Rhizobium radiobacter* using BD Phoenix™ system. Possible sources were tested for bacterial contamination at the Microbiology laboratory of CSTH as well as in the reference laboratory at MRI, including medical devices, parenteral preparations and environmental samples.

Results

Initial blood cultures were sterile in all of the neonates on admission to SCBU and developed sepsis after 5 to 14 days of stay in the unit. Bacteraemia was persistent despite administration of broad spectrum antibiotics including carbapenems. All the neonates were preterm and had low birth weight and the mortality was 4 out of 7. Bacteriological cultures of the possible sources did not isolate *Rhizobium radiobacter*. However *Pseudomonas* spp. and coagulase negative *Staphylococcus* spp. were isolated from the infusion sets. It was noted that cannulae and infusion sets used during the period of outbreak, have been purchased from a local manufacturer and the particular brand has not been used in the hospital before. Infected neonates were isolated and the SCBU was closed temporarily for admissions. Cannulae and infusion sets were replaced with previously used products with proven sterility. SCBU was thoroughly cleaned and reopened for admission after 30 days.

Conclusion

Rhizobium radiobacter was not isolated during the microbiological testing of patient care items. However contamination with other environmental microorganisms (*Pseudomonas* spp. and Coagulase negative *Staphylococcus* spp.) shows the inadequate sterility of the items. The outbreak was controlled by several measures which were taken simultaneously.

PP 4

Preliminary study on carriage of Group B Streptococcus among pregnant women in selected hospitals in Western Province of Sri Lanka

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Introduction

Group B Streptococcus (GBS) is a major cause of neonatal morbidity and mortality throughout the world. Prevalence of GBS colonization in vagina and rectum of pregnant women in developing countries ranges from 8.5% – 22%.

Objective

To determine the colonization rate of GBS by conventional culture method, describe antibiotic susceptibility and risk factors in pregnant women in selected hospitals in Western Province of Sri Lanka.

Method

Low vaginal and low rectal swabs were collected from 53 pregnant women of more than 35 weeks of gestation. One set of swabs were transported in Todd – Hewitt broth supplemented with nalidixic acid and gentamicin and processed in the laboratory, Department of Microbiology, University of Sri Jayawardenepura. Identification was done by conventional methods (catalase, bile aesculin, Christie, Atkinson, Munch-Peterson test) and Lancefield grouping. Antibiotic susceptibilities were performed for penicillin, clindamycin and erythromycin according to the Clinical and Laboratory Standard Institute (CLSI) guidelines, 2018. Data for risk factors obtained using questionnaire was analyzed by SPSS 20.

Results

Mean age of participants was 29 years with a range of 17-42 years. Fifty percent of women were in their first pregnancy. Vaginal carriage rate of GBS among pregnant women was 22.6% (12) and rectal carriage was not detected. All isolates were susceptible to penicillin (MICs ranged 0.03-0.12 µg/ml) and clindamycin (MIC, 0.06-0.25 µg/ml). Two of the isolates (18.2%) were resistant to erythromycin (MIC, 0.5 µg/ml). Inducible clindamycin resistance was not reported.

Fifteen percent (8) of participants were underweight while 15% were overweight. Educational level of 13.2% (7) was less than O/L and 77.4% were unemployed. Maternal weight, age, educational level and employment which are known risk factors for colonization of GBS were not significant in this population. Out of mothers with positive GBS (12), 75% (9) had an abnormal vaginal discharge, with a P value of 0.046.

Conclusion

Prevalence of GBS colonization among pregnant women attending selected hospitals in Western Province is high and abnormal vaginal discharge was the only significant factor identified associated with GBS colonization.

PP 5

Molecular epidemiology of antimicrobial resistance of *Salmonella enterica* isolated from different parts of Sri Lanka

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Introduction

Increasing trend of antimicrobial resistance among *Salmonella enterica* subspecies *enterica* is a global health problem. Prevalence of typhoid fever due to multi drug resistance *Salmonella* Typhi was increasing. Emergence and spread of multidrug resistance salmonella clones were described in recent past from many parts of the world.

Objective

To determine the antibiotic resistance of *Salmonella* Typhi and non typhoidal salmonella (NTS) isolates received to Enteric Reference Laboratory, Medical Research Institute.

Method

Forty six salmonella isolates received during 2016/17 to Enteric Reference Laboratory were included in the analysis. Isolates were serotyped according to Kauffman White classification and Antibiotic Sensitivity Testing was performed as per Clinical and Laboratory Standard Institute method. Gene sequencing and analysis was done at Nanyang Technological University Singapore.

Genomic DNA extraction, library construction and sequencing were performed. Whole genome sequencing (WGS) of 46 isolates and bioinformatics analysis identified the multilocus sequence type, plasmid replicon and antimicrobial resistance gene. Phenotypic and genotypic data were correlated.

Results

Twenty six isolates were from blood cultures and remaining 20 isolates were from stool samples. Out of

the 46 isolates 6 were *Salmonella* Typhi and remaining 40 were NTS. Majority (60% (24/40)) of NTS was from stool samples and remaining 40% were from blood samples. Sixty eight percent (11/16) of NTS isolated from blood were *Salmonella* Enteritidis ST11 and in addition *Salmonella* Enteritidis ST11 was the commonest serotype among total NTS. Kauffman White serotyping and WGS serotyping prediction results was 100% compatible. Out of the six *Salmonella* Typhi isolates one isolate was a XDR *Salmonella* Typhi and it carried resistance against third generation cephalosporin, chloramphenicol, sulphamethoxazole and trimethoprim and fluoroquinolones. Of the NTS, one isolate, *Salmonella* Typhimurium was an ESBL producer and carried blaCTX M-15 gene. Two *Salmonella* Chester isolates carried five AMR determinants belonging to five different antibiotic classes.

Conclusion

Both multidrug resistant *Salmonella* Typhi and NTS are seen in Sri Lanka. Extensively drug resistant *Salmonella* Typhi isolated is, different haplotype from recent outbreak causing *Salmonella* Typhi in Asia.

PP 6

Bacterial profile and antibiotic susceptibility pattern of eye swabs of neonates in a unit at a Tertiary Care Hospital

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Introduction

Bacteria are the major cause of ocular infections and the causative organisms have developed increased resistance to antibiotics.

Objectives

To determine the bacterial profile and antibiotic susceptibility pattern of eye swabs of neonates.

Method

A total 223 eye swabs received at the Department of Microbiology, Faculty of Medicine, Colombo from De Soysa Maternity Hospital during January-2016 to August-2018 were included. Eye swabs were plated on blood, chocolate, MacConkey agar and were incubated at 35-37°C for 18 hours. Isolates were identified by Gram

stain, colony morphology, catalase, oxidase and slide/tube coagulase tests. Antibiotic susceptibility testing was carried out as per Clinical and Laboratory Standards Institute (CLSI) guidelines.

Results

Of the 299 eye swabs there were 208 (69.56%) pure growths, 76 (25.41%) mixed growths and 15 (5.01%) no growths. Of the 208 pure culture growths, Coagulase negative staphylococci (CoNS), Methicillin Sensitive *Staphylococcus aureus* (MSSA), Methicillin Resistant *Staphylococcus aureus* (MRSA), Coliforms, Group B Streptococci (GBS), Enterococci and Viridans Streptococci were identified in 130 (62.50%), 18 (8.65%), 23 (11.05%), 21 (10.09%), 10 (4.80%), 4 (1.92%) and 2 (0.96%) isolates respectively. Of the 130 CoNS isolates the sensitivity to cefoxitin, erythromycin, clindamycin, gentamicin, ciprofloxacin and chloramphenicol were 14.16%, 16.15%, 49.92%, 40.76%, 54.23% and 82.30% respectively. Of the 18 MSSA isolates the sensitivity to erythromycin, clindamycin, gentamicin, ciprofloxacin and chloramphenicol were 66.66%, 88.88%, 88.88%, 89.21% and 94.41% respectively. Of the 23 MRSA isolates the sensitivity to erythromycin, clindamycin, gentamicin, ciprofloxacin, chloramphenicol, vancomycin, teicoplanin and linezolid were 26.08%, 91.30%, 78.26%, 82.24%, 86.95%, 100%, 100% and 100% respectively. All the GBS were sensitive to penicillin and all the enterococci were resistant to ampicillin. Of the 21 isolates of coliforms the sensitivity to co-amoxiclav, cefuroxime, cefotaxime, amikacin and meropenem were 61.90%, 33.33%, 76.19%, 85.71% and 95.23% respectively.

Conclusion

The predominant bacterial isolates of the neonatal eye swabs were CoNS, *staphylococcus aureus* and coliform species. Most of the bacterial isolates were resistant to frequently used antibiotics. Therefore, antibiotic susceptibility tests will be necessary before prescribing antibiotics.

PP 7

Epidemiology and antibiotic susceptibility patterns of coagulase negative staphylococcal isolates from skin swabs in a surgical unit at the National Hospital of Sri Lanka

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Introduction

Coagulase negative staphylococci (CoNS) are among the most frequent constituents of normal skin flora. Coagulase negative staphylococci are recognized as important pathogens for hospital acquired infections.

Objectives

The objective of the present study was to identify the epidemiology and the antibiotic susceptibility pattern of CoNS from skin swabs of patients awaiting surgery at a surgical unit of National Hospital of Sri Lanka.

Method

A total of 102 skin swabs, from the anterior aspect of the non-inflamed skin of forearm in patients awaiting surgery, collected from February to April 2018 were included in the study. The average stay of the patients was 4 weeks. Skin swabs were plated on blood and MacConkey agar and were incubated at 35-37°C for 18-hours. Isolates were identified by Gram stain, colony morphology, catalase, and slide/tube coagulase tests. Antibiotic susceptibility testing was carried out as per Clinical and Laboratory Standards Institute (CLSI) guidelines. Species level identification of CoNS was done by commercially prepared KB004-Himedia bio-chemical kit.

Results

Of the 102 skin swabs, staphylococci were identified in 85 (83.33%) of swabs. Of the 85 staphylococci 53 (62.35%) were CoNS and 32 (32.64%) were *Staphylococcus aureus*. Of the 53 CoNS clinical isolates *Staphylococcus haemolyticus*, *Staphylococcus epidermidis*, *Staphylococcus hominis*, *Staphylococcus lugdunensis* and *Staphylococcus cohnii* ssp. *cohnii* were identified in 21 (39.62%), 17 (32.07%), 8 (15.09%), 4 (7.54%) and 3 (5.66%) isolates respectively.

The sensitivity of CoNS isolates to cefoxitin, fusidic acid, amoxicillin clavulanic acid, ciprofloxacin, kanamycin, doxycycline, linezolid and vancomycin were 31 (58.49%), 20 (37.73%), 35 (66.03%), 35 (66.03%), 36 (67.92%), 48 (90.56%), 51 (96.22%) and 53 (100%) respectively.

Conclusion

Coagulase negative staphylococci were identified in 62% of the skin swabs and the most commonly identified species were *S. haemolyticus* and *S. epidermidis*. CoNS have significant level of resistance against most of the commonly used antibiotic agents.

PP 8

Comparison of broth microdilution and Epsilometer test for vancomycin susceptibility testing in coagulase negative staphylococcal isolates

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Introduction

Coagulase negative staphylococci (CoNS) are normal flora of the skin but are known to cause hospital acquired infections. Methicillin resistance in CoNS is common among hospitalized individuals. Considering the increasing incidence of Vancomycin resistance in methicillin resistant CoNS (MR-CoNS) there is a need for vancomycin MIC determination in these isolates.

Objectives

The objective of this study was to compare broth microdilution (BMD) and Epsilometer test (E-test) for vancomycin susceptibility testing of MR-CoNS species.

Method

A total 53 isolates of CoNS from patients awaiting surgery at a surgical unit, National Hospital of Sri Lanka were included in the study. CoNS isolates were identified by Gram stain, colony morphology, catalase, slide/tube coagulase tests. Antibiotic susceptibility testing was carried as per Clinical Laboratory Standards Institute (CLSI) guidelines. Methicillin resistance was detected using the cefoxitin (30µg) disc-diffusion test. The vancomycin powder was obtained from a commercial source (Vancocin Lilly pharma, Germany) and the MICs of vancomycin were determined in duplicate by reference BMD, as recommended by CLSI, using in-house-prepared panels. The following dilutions of vancomycin were tested: 16, 8, 4, 2, 1, 0.5, 0.25, and 0.125 µg/ml. The standard E-test procedure was performed using Mueller-Hinton agar with an inoculum density equivalent to a 0.5 McFarland standard. Vancomycin E-test strips (Himedia) were placed onto the agar with sterile forceps. The cultures were incubated for 24 hours at 35°C. *S. aureus* ATCC 29213 was used for quality control.

Results

Of the 53 CoNS isolates, 25 were MR-CoNS. The MIC for vancomycin ranged from 0.5µg/ml to 2µg/ml by two test methods, BMD and E-test. No discrepancies were observed in duplicates performed by BMD. The highest

number of isolates reported in MIC of 2 µg/ ml by BMD method. In E-test method, highest number of isolates reported in MIC of 1.5 µg/ml. There was high discrepancy in MIC of 1.5 µg/mL, was seen in 11 isolates reported in E-test and none of the isolates reported in BMD method.

Conclusion

The MIC values by Broth Microdilution Method are higher than by E-test method. All vancomycin MIC results should indicate the test method.

PP 9

Evaluation of rapid immunochromatographic assays for the detection of selected respiratory viruses during an outbreak

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Introduction

Immunochromatographic tests (ICT) for the detection of respiratory viruses have become increasingly popular due to many advantages, but their major drawback is the inconsistent accuracy.

Objective

To determine the sensitivity and specificity of commercial ICTs to detect influenza A, influenza B, adenovirus and respiratory syncytial virus (RSV) during an outbreak situation.

Method

Respiratory samples were collected from children with clinically suspected respiratory tract infections admitted to Teaching Hospital Karapitiya (THK) and were sent to Medical Research Institute for respiratory multiplex PCR. A duplicate sample was tested at THK using 2 commercial ICT, one for influenza A/B (ICT 1) and one for adenovirus and RSV (ICT 2). ICT results were compared with the PCR results taking PCR as the gold standard.

Results

Total of 118 samples were tested with both influenza A/B ICT and PCR and 22 were tested with adeno/RSV ICT and PCR. Out of 118 samples tested, 15/24 positive for influenza A and 2/4 positive for influenza B samples were detected by ICT kit 1. Out of 22 samples tested 2/12

positive for adenovirus and 4/12 positive for RSV samples were detected by ICT kit 2. The sensitivity, specificity, Positive Predictive Value (PPV) and Negative Predictive Value (NPV) of the ICT kit 1 for influenza A were 63%, 98%, 88% and 91% respectively. The sensitivity, specificity, PPV and NPV of the ICT kit 1 for influenza B were 50%, 100%, 100% and 98% respectively. For adenovirus the sensitivity, specificity, PPV and NPV of ICT 2 were 17%, 100%, 100% and 50% respectively. The sensitivity, specificity, PPV and NPV of ICT kit 2 for RSV were 33%, 100%, 100% and 56% respectively.

Conclusion

Performance of ICT kit 1 for influenza A has a high specificity with modest sensitivity and will be useful in detecting an outbreak and overall monitoring of disease pattern. Influenza B positive sample number is inadequate to comment on the kit performance. ICT kit 2 has a poor sensitivity for the detection of adenovirus and RSV, therefore cannot be recommended for the rapid detection of these viruses. Small samples size is a limitation in this study.

PP 10

Co circulation of multiple dengue serotypes during non-outbreak period in Sri Lanka

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Introduction

Co circulation of multiple dengue serotypes has been reported from many parts of the world including Sri Lanka. Last outbreak in the country was reported in 2017. Sri Lanka is a dengue hyper endemic country and high number of cases were reported in 2017 and 2018. It will be useful to know the circulating dengue virus serotypes to predict a future outbreak.

Objective

To describe the co circulation of multiple dengue serotypes during a non-outbreak period.

Method

This retrospective study analyzed blood, serum and CSF samples, which were sent to the Medical Research Institute (MRI) for routine dengue serotype detection, during three months from December 2018 to February 2019. These samples were tested for dengue serotypes at dengue laboratory, MRI, with a commercially validated multiplex real time RT-PCR (rRT-PCR) assay.

Results

Out of 225 samples tested for dengue virus infection 157 (69.7%) samples gave positive results with dengue rRT-PCR. Of the 157 dengue positive samples 67 (42.6%) samples were DENV-2, 67 (42.6%) samples were DENV-3 and 42 (26.7%) samples were DENV-1. Co-infection with multiple dengue serotypes was identified in which, 14 (8.9%) samples were DENV-1 and DENV-3, 3 (1.9%) samples were DENV-1 and DENV-2, and 2 (1.2%) samples were DENV-2 and DENV-3.

Conclusion

Co circulation was identified with dengue serotypes DENV-1, DENV-2 and DENV-3 during this study period. The results showed that both serotype DENV-2 and DENV-3 circulate at an equal level. No samples were positive for DENV-4. Co-infection observed mostly with serotypes DENV-1 and DENV-3. No samples were co-infected with three or four dengue serotypes.

PP 11

Measles laboratory surveillance towards measles elimination in Sri Lanka

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Introduction

The WHO Global Strategic Plan to eliminate measles in at least five WHO regions by 2020 includes a sensitive case based surveillance system, with laboratory testing at an accredited laboratory within the Global Measles and Rubella Laboratory network to monitor progress towards elimination. Sri Lanka, being a member country of laboratory network towards measles elimination, is approaching this goal.

Objective

To describe measles laboratory surveillance towards measles elimination in Sri Lanka.

Method

This study retrospectively analyzed all samples received under fever and rash surveillance to the National Measles Reference Laboratory (NMRL) at Medical Research Institute (MRI), from January to December 2018. Serum samples were tested using WHO recommended, commercially validated anti-measles nucleoprotein IgM

ELISA kit. Test results, clinical details and socio-demographic data obtained from request forms were analyzed using descriptive statistics. IgM positive samples were further assessed epidemiologically and laboratory confirmed according to the testing algorithm which includes measles-virus RNA PCR, IgG and avidity assays. Laboratory confirmed positive samples were shipped to the Regional Reference Laboratory (RRL) Thailand for sequencing. Genotyping and phylogenetic analysis were done at NMRL.

Results

A total of 143 samples were received and tested for measles IgM, of which 5.5% (8/143) were positive. Out of the eight positives, only one case was confirmed by molecular methods using measles PCR. Sequencing of this case followed by genotyping and phylogenetic analysis revealed H1 genotype and phylogenetic origin to China. This result confirms the patient's epidemiological link of the disease to China.

Conclusion

Presence of only one confirmed case of measles in 2018 supports successful heading towards measles elimination goal. Sequencing and phylogenetic analysis revealed that the index case is of non-indigenous origin.

PP 12

Colonization with selected antibiotic resistant bacteria among healthy young adults in University of Peradeniya

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Introduction

While infections caused by methicillin resistant *Staphylococcus aureus* (MRSA), extended spectrum β -lactamase (ESBL) producing *Enterobacteriaceae* and carbapenem resistant *Enterobacteriaceae* in hospital

settings have been studied well in Sri Lanka; data on colonization with these resistant bacteria among healthy young adults is limited. Colonized individuals may act as reservoirs for spread of these bacteria in the community.

Objectives

To identify asymptomatic colonization rates for MRSA, ESBL producing and carbapenem resistant *Escherichia coli* and *Klebsiella* species among university students.

Method

A self collected nasal swab and rectal swab were obtained from the study participants along with a self administered questionnaire. Standard microbiological methods were used for the isolation of *S. aureus*, *E.coli* and *Klebsiella* species. Identification and confirmation of MRSA, ESBL producers and potential carbapenemase producers were performed as recommended by the Clinical and Laboratory Standard Institute (CLSI) by cefoxitin sensitivity, combined disc test and imipenem, meropenem sensitivity testing respectively.

Results

The 322 participants had 156 males and 166 females between 21-28 years representing 5 different faculties. Seventy one (22%) were colonized with *S.aureus* and 14 among them with MRSA, making the MRSA colonization rate 4.3%. None of the factors studied were significantly related to colonization with MRSA. The asymptomatic colonization rate for ESBL producing *E.coli* and *Klebsiella* spp was 14% (n=45). Those with chronic diseases, defined as any medical condition needing regular follow up, had a significantly higher rate of colonization (33.3%) with these organisms than those who did not (13%) (p=0.04, Fisher's exact test). In vitro sensitivity of the ESBL producers to ciprofloxacin, levofloxacin and gentamicin were 38.0%, 48.0% and 94.0% respectively. None were colonized with carbapenem resistant *E.coli* or *Klebsiella* spp.

Conclusions

The colonization rate for MRSA was 4.3%, while that for ESBL producing *E.coli* and *Klebsiella* spp. were 14%. None were colonized with carbapenem resistant *E.coli* and *Klebsiella* spp.

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PP 13

Phenotypic and molecular characterization of outbreak strains of *Enterobacter cloacae* in a special care baby unit in a teaching hospital

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Introduction

Enterobacter cloacae has emerged as an important nosocomial pathogen in neonatal intensive care units. We report six cases of blood culture proven neonatal sepsis in special care baby unit (SCBU) caused by a carbapenemase producing *E. cloacae*.

Objectives

To screen and identify all colonized babies and possible sources.

To characterize the outbreak strains.

To critically analyze the interventions taken during the outbreak.

Method

The first blood culture flagged positive on 11th June 2018 and subculture yielded a pan resistant coliform. The organism was identified as *E. cloacae* susceptible only to levofloxacin, amikacin and colistin by broth micro dilution using BD Phoenix™ system. Second culture of a preterm baby flagged positive fifteen days later. Within next seven days, blood cultures of another four babies flagged with the same coliform. With the third blood culture isolate, SCBU was informed of an outbreak and outbreak investigation commenced.

Results

Outbreak investigation included isolation of infected babies, screening of unaffected babies to identify uninfected colonizers and screening of environment, equipment and medications, optimization of hand hygiene and stopping new admissions.

All screening samples became negative, except for an opened 3% saline solution which yielded an isolate similar to the blood culture isolates in phenotypic charac-

terization and sensitivity. It was found that the opened saline was kept for 24 hours. The culture from a newly opened 3% saline did not yield any organisms. Isolate recovered from saline was not stored and therefore not further analyzed.

Outbreak strains were further identified by MALDITOF and VITEK. They all harbored NDM type of MBL, CTX-M, OXA-1 and TEM types of extended spectrum beta lactamases when tested by Ausdiagnostic multiplex PCR and Gene Xpert Carba-R assay. They were all positive for carbapenemases by the modified carbapenem inactivation method (CIM) test.

Conclusion

E. cloacae strains harboured multiple resistance genes which may have resulted from high exposure to antibiotics. Multiple measures implemented resulted in control of the outbreak.

PP 14

Analysis of causative agents and antimicrobial use in children hospitalized with community acquired pneumonia

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Introduction

Community-acquired pneumonia (CAP) is a major cause of morbidity and mortality among children. Diagnosis of CAP is based on clinical, radiological and laboratory tests. Rapid testing for viruses is not readily available in state sector hospitals in Sri Lanka and treatment is prescribed on clinical suspicion.

Objective

This study was carried out to identify the organisms causing CAP in children and to analyse the use of antimicrobials.

Method

Patients between 3 months-14years admitted to a tertiary care unit with a clinical and radiological diagnosis of CAP were included. Multiplex Real-Time PCR assay detecting 18 viruses and 05 bacteria; *Staphylococcus aureus*, *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Chlamydia pneumoniae* and *Mycoplasma pneumoniae* was performed on nasopharyngeal aspirate. C-reactive

protein, complete blood count, blood culture and chest X-ray were done. Sputum culture was performed whenever possible.

Results

During 3 months, 54 patients were included. Median age was 44.5 months (range: 06-156) and 29 (54%) were females. PCR assay revealed at least one virus in 48 (88.9%) specimens. The viruses detected were influenza (06), adeno (12), boca (03), parainfluenza (07), respiratory syncytial (06), corona (13), influenza B (02) and rhino (14). Mixed infections were detected in 46.3% (25/54) with 2 or more viruses. Viruses were not detected in 11.1% (6/54) samples. PCR assay was positive for bacteria in 66.7% (36/54) with *S. aureus* (10), *S. pneumoniae* (28) and *C. pneumoniae* (2). Both viruses and bacteria were positive in 55.5% (30/54). Blood culture was done for 51/54 patients and all were negative. Sputum samples could be obtained only in 2 patients and *H. influenzae* was isolated from one. However, colonization by these bacteria cannot be excluded.

Majority (64.8%) had received an antibiotic before admission. All received at least one antibiotic during hospitalization and 90.7% (49/54) intravenously. Antiviral was prescribed for 20.3% (11/54) and all were treated with both oseltamivir and antibiotics. Nine out of eleven patients who received oseltamivir were negative for influenza A/B viruses.

Conclusion

Viruses are predominant in CAP in children and non-influenza viruses are common. Aetiological diagnosis is necessary to prevent unnecessary use of antivirals and antibiotics, development of antimicrobial resistance and adverse events to medications.

PP 15

Awareness among doctors on national guidelines on empirical and prophylactic use of antimicrobials: An audit at Teaching Hospitals in Galle

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Introduction

Sri Lanka College of Microbiologists have taken the initial step of antimicrobial stewardship by publishing National Guidelines on Empirical and Prophylactic use of Anti-

microbials (NGEPA) with the collaboration of other professional colleges in healthcare in Sri Lanka in 2016.

Objectives

The aim of this study was to assess the awareness and the utilization of NGEPA among doctors at the Teaching Hospitals Karapitiya and Mahamodara.

Method

A cross sectional assessment of the awareness and the usage of the NGEPA obtained from all the doctors and consultants (excluding intern medical officers) of the selected units using a self-administered questionnaire.

Results

Seventy-one doctors completed the questionnaire including Medical Officers (70.4%), Registrars (16.9%), Senior Registrars (2.8%) and Consultants (9.9%). They were from Medicine (4.3%), Paediatrics (19.7%), Surgery (5.6%), Obstetrics and Gynaecology (8.5%), OPD (14.1%), ETU (16.9%) and other sub specialties (30.9%). Of the 71 doctors, 66 had answered the question on "NGEPA-hard copy" of which 57.6% (38/66) knew it is available as a hard copy in hospitals and 76.3% (29/38) were using it. Of the 71 doctors, 40 had answered the question on "NGEPA-soft copy" of which 42.5% (17/40) knew it is downloadable from the web and 23.5% (4/17) were actually using it.

The percentage of doctors referring NGEPA to select empirical and prophylactic antimicrobials was 42.4% (14/33) and 21.2% (7/33) respectively. Of them, majority have commented that it was useful for the intended query (Empirical 78.6% and prophylactic 71.4%). However 7.0% (5/71) stated that they refer to more frequently updated sources for such information.

Only 23.9% (17/71) have heard about antibiotic stewardship, however 97.2% (69/71) have heard about rational use of antibiotics. Majority of doctors believe that early and appropriate antimicrobial therapy helps to improve the outcome of infectious disease (67.6%, 48/71), adhering to antimicrobial guidelines minimize the emergence of antimicrobial resistance (64.8%, 46/71) and modification of empirical antimicrobial agents according to the microbiological diagnosis and antibiotic susceptibility results (64.8%, 46/71).

Conclusion

Majority of doctors appreciate the concepts of rational use of antibiotics. About half of the doctors knew the availability of NGEPA but even lesser number referred it. It needs to be more frequently updated and user friendly to improve the acceptance.

PP 16

In vitro efficacy of fosfomycin, pivmecillinam and ertapenem for multi drug resistant *Enterobacteriaceae* uropathogens in a provincial tertiary care hospital

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Introduction

The global increase of multi drug resistant *Enterobacteriaceae* (MDRE) has emphasized the necessity of alternative first-line therapy for urinary tract infections (UTI). Fosfomycin, pivmecillinam and once daily parenteral ertapenem are effective for UTI caused by most MDRE. This study evaluated the susceptibility of MDRE uropathogens to fosfomycin, pivmecillinam, and ertapenem.

Objective

To describe in vitro efficacy of fosfomycin, pivmecillinam, and ertapenem for MDRE uropathogens.

Method

Urine samples of symptomatic in and outpatients with UTIs received to microbiology laboratory of Teaching Hospital, Ratnapura for culture, during a period of four months were processed according to laboratory manual in microbiology by Sri Lanka College of Microbiologists. Presumptive coliforms with a pure growth of >10⁵ CFU/ml were tested for sensitivity to commonly used antibiotics according to Clinical and Laboratory Standards Institute (CLSI) 2017 guidelines. Organisms with resistance to at least a single drug of three or more classes of antibiotics were identified to species level using the RapID ONE system. Antibiotic sensitivity testing and interpretation for fosfomycin, pivmecillinam, and ertapenem were performed according to CLSI 2017 extrapolating *Escherichia coli* break points to include all *Enterobacteriaceae*.

Results

Out of 145 MDRE isolates, *Escherichia coli* accounted for 109 (75%), 29 (21%) were *Klebsiella pneumoniae*, and there were 6 (4%) other species. Most were from males 75 (51.7%). The sensitivity of all MDRE for nalidixic acid, ciprofloxacin, and co-trimoxazole was 5%, 15%, and 20% respectively but nitrofurantoin had 68% sensitivity.

The sensitivity of all MDRE for fosfomycin, pivmecillinam, and ertapenem was 98%, 91%, and 84.8% respectively. *Escherichia coli* 99% and 93% *Klebsiella pneumoniae* were sensitive to fosfomycin. Pivmecillinam sensitivity of *Escherichia coli* and *Klebsiella pneumoniae* was 93% and 79%, while ertapenem sensitivity to *Escherichia coli* and *Klebsiella pneumoniae* was 91% and 58.6% respectively.

Conclusion

Most MDRE uropathogens showed >80% resistance to oral empirical antibiotics for UTIs but >90% sensitivity to fosfomycin and pivmecillinam which, therefore, are promising alternatives for UTI treatment. As a first line carbapenem, 15% resistance to ertapenem was an alarming sign.

PP 17

Phenotypic and molecular characterization of potential extended spectrum beta lactamase and metallo betalactamases producing bacteria from selected tertiary care microbiology laboratories in Colombo District

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Introduction

Extremely high prevalence of clinically significant multi resistant Gram negative bacteria harbouring extended spectrum beta lactamase (ESBL) and metallo betalactamases (MBL) pose significant therapeutic challenge to clinicians. Only a handful of molecular studies have characterized the current local epidemiology.

Objectives

This descriptive study looks at phenotypic and molecular characterization of ESBLs and MBLs encountered at clinical microbiology laboratories.

Method

One hundred and fourteen (114) multi resistant Gram negative (MRGNR) clinical isolates sourced from a broad range of clinical specimens were selected for the study. Initial basis for selection was resistance to 3rd/4th gene-

ration cephalosporins and/ or carbapenem resistance in the primary testing facility. Isolates were sourced from 5 clinical microbiology laboratories in the Colombo District. To ensure uniformity of selection criteria, the isolates have undergone a second level of testing at a reference laboratory by MALDITOF identification and Vitek-2 breakpoints MIC. Ninety seven (97) isolates showing resistance to two or more 3rd/4th generation cephalosporins and/ or carbapenem resistance based on CLSI MIC breakpoints criteria were selected for further testing by molecular methods using AusDiagnostics ESBL (16 well) Assay and Gene Expert Carba-R assay. Three (3) control isolates were also included to improve specificity.

Results

MRGNR isolates in this study harboured an incredible variety of ESBL and other beta-lactamase types, CTX-M group 1 and 9, TEM, SHV and OXA-1 and carbapenemase types, NDM and OXA-48 in the majority of isolates. Over 71% of the isolates harboured multiple ESBL/MBL genes within the same strain. Two commercial molecular platforms failed to identify any unusual molecular markers within multi resistant *Acinetobacter baumannii*.

Conclusion

This collaborative study demonstrates genetic diversity among ESBL and MBL producing MRGNR in Sri Lanka.

PP 18

Phenotypic and molecular characterization of extended spectrum beta lactamase producing bacteria in a tertiary care microbiology laboratory in Sri Lanka

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Introduction

Extremely high prevalence of clinically significant multi-resistant Gram-negative bacteria harbouring extended spectrum betalactamase (ESBL) and metallo-beta-lactamases (MBL) pose significant therapeutic challenge to clinicians in Sri Lanka. Only a handful of studies have characterized locally prevalent ESBLs.

Objective

This descriptive study looks at phenotypic and molecular characterization of ESBL producing *Enterobacteriaceae* encountered at a routine microbiology laboratory.

Method

Thirty isolates of *Enterobacteriaceae* causing bacteraemia and 2 control isolates were included in the study. Three ESBL screening methods, (disk diffusion method, Vitek Micro-broth dilution method, Chromogenic ESBL Agar) and ESBL confirmation using a combination disk method was performed.

A multiplex PCR targeting a range of ESBL genes including TEM, SHV, OXA, different CTX-M group ESBLs, followed by gel electrophoresis was performed for molecular characterization.

Following analysis of results of initial multiplex assay, study isolates were sent to an overseas molecular laboratory for further testing by a real time PCR multiplex PCR targeting a broader range of genetic targets.

Results

Combined disk method confirmed presence of ESBL in 30/30 isolates. All isolates grew in chromogenic ESBL agar plates. Gel based real time PCR demonstrated the presence of SHV, TEM, OXA 1/4/30 and CTX-M type of ESBLs in majority of isolates. Majority of isolates harboured multiple ESBL genes. Further broader multiplex real time PCR assay demonstrated additional molecular targets and explanations for discrepant phenotypic results.

Conclusion

According to the results of our study comprehensive CLSI disk diffusion screening panel and CLSI confirmatory combined disk method and chromogenic split agar plates gave valuable information to identify ESBL bacteraemias in 48 hours. The multiplex PCR assay detected locally prevalent ESBL genes in a majority of isolates. Further real time PCR assay was helpful to identify additional molecular targets.

PP 19

Awareness, attitudes and practices on the strategy of prescribing “red light” antibiotics to inward patients among medical officers at a selected tertiary care hospital

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Introduction

Antibiotic authorization levels were introduced by circular no. 01-56/2016 titled “Introduction of authorization of

prescribing ‘red-light’ antibiotics” by the Ministry of Health, Sri Lanka.

Objectives

To assess awareness, attitudes and practices on the strategy of prescribing “red light” antibiotics to inward patients among medical officers at a selected tertiary care hospital.

Method

A self administered questionnaire was completed by 114 Senior Registrars, Registrars, Senior House Officers and House Officers from different units, selected by stratified random sampling.

Results

A majority (89.5%) was aware of the circular while only a few (9.6%) knew which antibiotics were listed in it. Almost all recognized antimicrobial resistance as a threat, and sensible use of antimicrobials as a measure to slow its development and spread. All Senior Registrars accepted that there is antimicrobial overuse in their units (100%) as compared to Registrars, Senior House Officers and House Officers ($p < 0.05$). Most participants agreed on the necessity for a national antibiotic policy (98.2%) and inclusion of a multidisciplinary team to combat antimicrobial resistance (84.5%). All House officers considered this strategy to be cost effective (100%) compared to Senior Registrars, Registrars and Senior House Officers (30.8%, 55.8% and 66.7%) ($p < 0.05$). Most (74.5%) preferred educational interventions over restrictive policies that limit freedom to prescribe. Majority (60.7%) did not consider this strategy to be a waste of time and a majority (52.8%) had a neutral attitude on the statement that this strategy negatively affects their autonomy and undermines their experience. A minority (34.2%) had experienced a significant delay in administering “red-light” antibiotics that were prescribed which were commonly due to unavailability of the drug in the hospital (32/39), unavailability of forms for requesting prior authorization (23/39) and prescriptions occurring outside working hours of the hospital pharmacy (25/39).

Conclusion

The strategy was considered effective in optimising use of “red-light” antimicrobials but awareness on the strategy should be improved. Administrative support of the hospital should be utilised to prevent delays experienced in the wards during implementation of the strategy.

PP 20

Genetic polymorphisms associated with G6PD enzyme deficiency in the Sri Lankan population

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Introduction

Radical treatment of imported malaria is vital for prevention of reintroduction of the disease in Sri Lanka. Individuals with G6PD deficiency are subject to haemolytic anemia with the antimalarial drug primaquine, which could interfere with radical treatment. We report for the first time the association of genetic factors and G6PD deficiency in Sri Lanka.

Method

Patients who were bled for other investigations during November 2013-June 2014 from Kurunegala/Anuradhapura hospitals (n=2059) were screened for G6PD deficiency using WST-8/1-methoxy PMS method. A sub-sample of 130 G6PD deficient cases and 170 controls with normal G6PD activity (total=300) were selected for genotyping. Twelve single nucleotide polymorphisms in the G6PD gene were genotyped. Association between the genotypes/alleles and G6PD deficiency was assessed.

Results

Ages ranged from 3-83 years (mean 52.23 years) in females and 2-79 years (mean 52.13 years) in males. Distribution of allele A of rs915941 and G of rs915942 was significantly different between cases and controls in males ($\chi^2=4.009$, $p=0.0453$; $\chi^2=4.009$, $p=0.0453$).

None of the single nucleotide polymorphisms (SNP) were significantly different between cases and controls in females. The percentages of heterozygotes for rs7053878, rs915941 and rs915942 were low compared to the other 7 SNPs. The minor allele frequencies varied from 0.00 to 0.49, with the highest reporting for rs5986877 in female cases. The frequency of T allele of rs7053878 was significantly greater in female cases compared to controls in Anuradhapura District. Differences could be observed both in linkage disequilibrium (LD) and haplotypes of the tested markers between cases and controls. In controls a strong linkage could be observed between 5 of the tested SNPs, which formed a single haplotype

block. In addition a strong LD could be observed between rs915941 and rs915942, which formed a second block in cases.

Conclusion

SNPs in the G6PD gene appear to be associated with G6PD enzyme deficiency in both males and females. Therefore, screening for G6PD deficiency in both males and females is important before administration of antimalarials or other oxidative agents.

PP 21

A report on detection rates of Hepatitis C virus at three teaching hospitals of Sri Lanka

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Introduction

Epidemiology of Hepatitis C virus infection (HCV) is not well documented in Sri Lanka. Therefore this retrospective analysis was conducted using hospital diagnostic laboratory data to infer the detection rates of HCV at three teaching hospitals (TH) from three different provinces in the country, where each hospital receives samples from their respective province.

Method

All the samples received for HCV diagnostics at TH Kandy, TH Karapitiya and TH Anuradhapura for year 2018 were included in this analysis. These samples were screened initially for HCV antigens and antibodies using the same commercial ELISA method at all three respective institutions. A signal/cut-off ratio of ≥ 0.9 for each sample was taken as a reactive result.

Plasma samples from screening assay reactive patients were subsequently tested with commercially available real-time HCV PCR diagnostic assays for detection and quantification of HCV RNA levels. TH Kandy and TH Anuradhapura used two different PCR assays onsite while TH Karapitiya samples were tested at Medical Research Institute, Colombo using the same PCR assay used at TH Kandy. The analytical sensitivity of the least sensitive PCR assay among these two was 4.0 IU/ml for all HCV genotypes.

Results

A total amount of 3060, 1320 and 1240 samples were screened at Kandy, Anuradhapura and Karapitiya

hospitals respectively. Out of those, 51, 122 and 14 patients had HCV reactive results from each respective hospital.

The PCR positivity for samples tested was 2 out of 49, 22 out of 110 and 2 out of 14 for TH Kandy, TH Anuradhapura and TH Karapitiya respectively. At TH Anuradhapura, an ongoing outbreak of HCV among a cohort of thalassaemia patients was observed and contributed to 19 of the PCR positives.

Once the thalassaemia patients at TH Anuradhapura were disregarded to correct the anomaly of bias, the detection rates of HCV for 2018 were 0.65/1000, 2.27/1000 and 1.6/1000 for TH Kandy, TH Anuradhapura and TH Karapitiya respectively.

Conclusion

Hepatitis C virus positivity rate of these three teaching hospitals range from 0.65 to 2.27 per 1000 samples tested with a mean value of 1.51/1000.

PP 22

Association of *Chlamydia pneumoniae* IgG seropositivity and acute myocardial infarction

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Introduction

Non communicable diseases kill 38 million people each year, among whom acute myocardial infarction (AMI) is identified as an important cause. In addition to the traditional risk factors for AMI such as diabetes mellitus, hypertension, smoking, genetic factors, microorganisms like *Helicobacter pylori* and *Chlamydia pneumoniae* are postulated to play a role in pathogenesis of atherosclerosis and AMI.

Objective

To determine the association between *C. pneumoniae* IgG seropositivity and AMI.

Method

An institution based, descriptive cross sectional study was carried out over 4 months using two groups of patients. Group 1 consisted of 100 participants with diagnosed AMI and Group 2 consisted of age and sex matched 100 patients without AMI but having some other

illness. *Chlamydia pneumoniae* IgG antibodies were checked using a commercially available ELISA kit. Demographic data and risk factors for AMI were gathered using an interviewer administered questionnaire.

Results

Among the total number, 118 had positive IgG for *C. pneumoniae*, (59%). In Group 1, 62% (n=62) had positive IgG levels. While 87% (n=87) of them had at least one traditional risk factor, the remaining 13% (n=13) did not have any. In Group 2, 57% had traditional risk factors. Fifty six (56%) out of the 100 patients of Group 2 showed positive IgG values for *C. pneumoniae*.

A statistically significant association between *C. pneumoniae* IgG seropositivity and AMI (p=0.388) was not found. There are 13 patients without having any risk factors in Group 1, out of which *C. pneumoniae* seropositivity is 8 (61.5%). There are 43 patients without any risk factors in Group 2, out of which, 28 were sero-positive for *C. pneumoniae* (65.9%). There is no association of *C. pneumoniae* IgG seropositivity in patients of Group 1 without known risk factors and Group 2 without risk factors (p=0.9).

Conclusion

The seroprevalence of *C. pneumoniae* IgG in the studied population was high. *C. pneumoniae* IgG seropositivity was not associated with AMI even in patients without traditional risk factors. To identify a possible relationship between *C. pneumoniae* and AMI further studies should be performed.

PP 23

Outbreak of severe acute respiratory infection at Prajapathi Children's Orphanage at Panadura

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Introduction

On 30th July 2018, Base Hospital Panadura (BHP) notified a cluster of severe acute respiratory infection among children of Prajapathi children's orphanage. A team of experts from BHP and Medical Officer of Health (MOH) Panadura investigated the outbreak to identify the cause and propose control measures.

Method

The regional epidemiologist and the national influenza focal point at the epidemiology unit were informed. Under the directives of epidemiology unit, an investigation team was formed with the participation of both hospital and MOH staff. A working case definition severe acute respiratory infection (SARI) was developed and outbreak investigation was carried out. Nasopharyngeal specimens from the affected children were collected and subjected to inhouse real-time multiplex PCR (Pune, India) and Medical Research Institute. Health staff frequently visited the orphanage to assess the clinical condition of the children along with the availability of basic hygienic facilities. A multi disciplinary approach was adopted to implement preventive measures.

Results

There were thirty children in the orphanage with the age range starting from one month to one year and five months. Nine out of thirty children whose clinical picture became compatible with working case definition were admitted to the BHP. Two children were transferred to Lady Ridgeway Hospital due to severe respiratory distress. Laboratory investigations conducted in five children (age range, one to six months) revealed the presence of respiratory syncytial virus (RSV) in all and RSV and adenovirus in one child. All five of them had fever, cough, cold, shortness of breath and few bilateral crepts in lungs. Influenza A and B viruses were not detected. Frequent supervisory visits by the public health and hospital staff ensure the maintenance of sanitary facilities, early case detection and proper care for children. Eleven children without having symptoms were transferred to other nearby orphanages without the knowledge of health staff. All children recovered and no secondary cases were reported from other orphanages.

Conclusions

The probable causative agents for the outbreak were identified as RSV and adenovirus. Multi-disciplinary approach facilitated the rapid detection and control of respiratory infection in Prajapathi children's orphanage.

PP 24

Comparison of double disc synergy test with modified double disc synergy test in detection of extended spectrum beta lactamase in selected urinary isolates

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Introduction

Urinary tract infections are the most prevalent infections worldwide. Emerging antibiotic resistance due to extended spectrum beta lactamase (ESBL) among urinary isolates is a major problem in treatment. The Double Disc Synergy Test (DDST) which uses cefotaxime, ceftazidime and co-amoxycylav is a reliable method. However, it may give false negative results when detecting ESBL in organisms producing both ESBL and AmpC beta lactamases. In such cases, ESBL detection may be improved by using cefepime (disc in the panel). This is known as modified double disc test (MDST).

Objective

To compare the effectiveness of DDST and MDST in the detection of ESBL producing *Escherichia coli*, *Klebsiella* and *Proteus* isolated from urine cultures in selected hospitals in Western Province.

Method

Cross sectional prospective study was carried out on 150 urinary isolates of *Escherichia coli*, *Klebsiella* and *Proteus* which showed resistant to cephalixin in routine antibiotic sensitivity tests during November 2017 to January 2018. ESBL detection was done by combined disc diffusion confirmatory test CLSI 2017), DDST and MDST. All samples were tested for AmpC beta lactamase production by Tris- EDTA disc test.

Results

Out of 150 isolates, ESBL production was seen in 74.1% (n=66) of *E. coli* and in 70% (n=28) of *Klebsiella* and in 28.5% (06) of *Proteus* isolates. CLSI combined disc confirmatory test detected ESBL in 66.7% (100/150) isolates, MDST detected ESBL in 65.3% (98/150) isolates, and double disc synergy test could detect only in 58.7% (88/150) of isolates. Among 100 ESBL producers, pure ESBL production was seen in 91 isolates and co-existence with AmpC beta lactamase was seen in 9 isolates. MDST could detect ESBL in all 9 isolates which were coexistence with AmpC beta lactamase, whereas DDST could not detect ESBL in any isolate producing AmpC beta lactamase. Out of 100 ESBL producers, cefepime has shown synergism in 98 isolates.

Conclusion

MDST is more effective than DDST to detect ESBL in isolates producing AmpC beta lactamases. Further, cefepime seems to be a good indicator to detect ESBL.

PP 25

Determination of antimicrobial activity of *Rhipsalis baccifera* and *Pyrrosia heterophylla* against methicillin resistant *Staphylococcus aureus* and *Acinetobacter baumannii*

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Introduction

Finding alternative antimicrobials for the emerging antimicrobial resistance is a global challenge. Traditional dressings made of *Rhipsalis baccifera* (Navahandi) and *Pyrrosia heterophylla* (Kasipethi) have been used in traditional practice to treat wounds in Sri Lanka. However, their antimicrobial properties have not been scientifically investigated. This study investigates the antimicrobial activity of these two plant extracts against methicillin resistant *Staphylococcus aureus* (MRSA) and *Acinetobacter baumannii* responsible for acute and chronic wound infections.

Objective

To determine the antibacterial activity of *Rhipsalis baccifera* and *Pyrrosia heterophylla* against MRSA and Multi drug resistant *Acinetobacter baumannii*.

Method

A descriptive study was conducted at the student laboratory, KIU. Clinical isolates of MRSA and *Acinetobacter baumannii* were obtained from the Department of Microbiology, Faculty of Medical Sciences, University of Sri Jayewardanapura. Entire plant of *Rhipsalis baccifera* and leaves of *Pyrrosia heterophylla* were obtained from Beruwala, Sri Lanka. Aqueous extractions of both plants were done by maceration of 120g of wet plant material with 1440ml of distilled water and filter sterilized using a 0.22µm filter. This was then boiled to 240ml and was taken as ×1, ×2, ×3, ×5, ×10 concentrations respectively. Antimicrobial activity of the extracts against MRSA and *Acinetobacter baumannii* were determined by well diffusion method.

Results

Rhipsalis baccifera demonstrated mean zones of inhibition of diameter 9mm, 11mm, 13mm, 14mm, 16mm for the concentrations ×1, ×2, ×3, ×5, ×10 respectively when tested against MRSA. No zones of inhibition were observed against *Acinetobacter baumannii*. *Pyrrosia heterophylla* did not demonstrate any inhibitory zones against both MRSA and *Acinetobacter baumannii*.

Conclusion

Rhipsalis baccifera leaf extract has potential antimicrobial activity against MRSA. Further studies should be carried out to identify the phytochemicals responsible for this activity and to determine antimicrobial activity against other common wound pathogens.

PP 26

Comparison of antibiotic sensitivity pattern of clinically significant *Enterobacteriaceae* between a tertiary healthcare setting and a secondary healthcare setting of Sri Lanka

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Introduction

Antibiotics are widely used in healthcare system globally and locally. In parallel, antibiotic resistance (AR) has emerged at an alarming rate. As per Sri Lankan healthcare system, level of care is categorized as primary, secondary and tertiary. Teaching hospitals cater to tertiary care while base hospitals cater to secondary care. However, AR may vary as per the level of care.

Objective

To compare antibiotic sensitivity (ABST) pattern of clinically significant *Enterobacteriaceae* recovered from a tertiary healthcare hospital with that of a base hospital of Sri Lanka.

Method

ABST (as per CLSI guidelines) pattern of 400 clinically significant *Enterobacteriaceae* against 21 antibiotics (amikacin, co-amoxiclav, ampicillin, cefepime, cefoperazone-sulbactam, cefotaxime, ceftazidime, ceftriaxone, cefuroxime, ciprofloxacin, co-trimoxazole, ertapenem, gentamicin, levofloxacin, meropenem, nalidixic acid, netilmicin, nitrofurantoin, norfloxacin, ofloxacin and piperacillin-tazobactam) were studied as 200 each from Colombo North Teaching Hospital (CNTH) and Base Hospital, Wathupitiwala (BHW). Extended spectrum beta lactamase (ESBL) producers were identified by routine detection via the keyhole method. Resistance to meropenem and or imipenem disc was used to identify carbapenem-resistant *Enterobacteriaceae* (CRE). Level of significance was considered as P<0.05.

Results

Of the antibiotics tested, AR of *Enterobacteriaceae* was significantly higher in CNTH compared to BHW against cefepime (34%, 20%, $p=0.026$), ciprofloxacin (61.5%, 39%, $p=0.001$), ertapenem (17.5%, 1.5%, $p=0.000$), gentamicin (28.5%, 12%, $p=0.003$), meropenem (8%, 0%, $p=0.004$), netilmicin (19%, 2%, $p=0.000$) and nitrofurantoin (38%, 20%, $p=0.005$). There was no significant difference in the resistance pattern for rest of the antibiotics tested. No CRE were detected in BHW while it was 8% in CNTH ($P=0.000$). However, there was no significant difference in the rates of ESBL produces in both hospitals (30% in each).

Conclusion

A significantly higher level of AR was detected in *Enterobacteriaceae* of tertiary care level compared to secondary care level, against a number of antibiotics. Though reported ESBL are almost equal in tertiary and secondary care level, reported CREs are not equal. Therefore, it is important to have local antibiotic sensitivity data to streamline the rational antibiotic use.

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PP 27

Community associated methicillin resistant *Staphylococcus aureus* is the predominant type of colonizing methicillin resistant *Staphylococcus aureus* among patients admitted to Teaching Hospital, Karapitiya

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Introduction

Methicillin resistant *Staphylococcus aureus* (MRSA) causes a substantial burden of community acquired and nosocomial infection. Prior colonization with MRSA is a recognized risk factor for MRSA infection. Based on genotypic and phenotypic characters, MRSA is classified as community associated (CA) or healthcare associated (HA). CA MRSA is more virulent and has rapidly spread in healthcare settings.

Objective

This study aimed to describe prevalence, risk factors and predominant types of colonizing MRSA among patients admitted to Teaching Hospital, Karapitiya (THK).

Method

Consecutive admissions to orthopaedic and every fifth admission to medical and surgical wards were enrolled for six months from September 2016. A nasal swab was collected from anterior nares within 24 hours of admission. Standard antibiotic susceptibility testing (ABST) and Staphylococcal Cassette Chromosome mec (SCCmec) typing were performed. Based on the results, isolates were identified as CA MRSA and HA MRSA as per the guidelines of Centers for Disease Control and Prevention, USA. Clinical and demographic data were collected and analyzed (STATA-13.0).

Results

A total of 502 (surgical-201, medical-152 and orthopaedic-149) patients were enrolled. On admission, 6.2% ($n=31$) (3.5% surgical, 4% medical and 12.1% orthopaedic) were colonized with MRSA. Patients colonized with MRSA were more likely to be children <18 years (29% vs 8.7%, $p=0.0003$) and male (80.6% vs 56.5%, $p=0.008$). Use of public swimming pools (12.9% vs 2.9%, $p=0.004$), history of incarceration (3.2% vs 0.0%, $p<0.001$) and use of illicit drugs (4.0% vs 0.2%, $p=0.005$) were significantly associated risk factors for MRSA colonization. ABST profiles identified 61.3% ($n=19$) and 38.7% ($n=12$) of the isolates as CA MRSA and HA MRSA respectively. SCCmec typing specified, 87% ($n=27$) of the isolates as CA MRSA with 59% ($n=18$) SCCmecIV and 29% ($n=9$) SCCmecV. No isolates carried HA MRSA associated SCCmecI, II or III.

Conclusion

Molecular and antibiotic profiles confirmed, more than half of patients were colonized with CA MRSA on admission. Based on antibiogram, patients identified as HA MRSA were not carrying SCCmecI, II, III as previously reported. Likewise, the risk factors which were significantly associated with MRSA colonization were community related factors. The results indicate majority of patients admitted to THK carry CA MRSA which can cause more virulent infections.

PP 28

Microbiological assessment of the current decolonization procedure using rotational antiseptics among burn patients admitted to a tertiary care centre in Sri Lanka

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Introduction

Knowledge of microorganisms which commonly colonize/infect burn wounds is important in burn wound management. Burn wound infection, as well as microbial wound contamination and colonization has been recognized as causes of skin graft failure. Decolonization using rotational antiseptics is being practiced as a low-cost method in preventing/treating burn wound colonization/ infection.

Objectives

This study was designed to identify aerobic microorganisms that infect/colonize burn wounds and to assess the current decolonization procedure using rotational antiseptics microbiologically.

Method

A cross sectional study was carried out in the Burns Unit of the National Hospital of Sri Lanka from December 2016 to March 2017. Thirty two patients were recruited using convenience sampling excluding those managed in other centres, underwent skin excision and grafting, had been on parenteral antibiotics and in whom other antiseptics were used. When burn wound infection/colonization was evident clinically, wound swabs were collected and antiseptic cycles were started. One cycle comprised of 3 pre-determined antiseptics namely 0.05% acetic acid, 0.05% Milton and 10% povidone iodine. They were used in the same order and not changed according to the isolated organism. Swabs were collected after completion of each cycle until clearance of organism from the site. All swabs were processed according to standard operating procedure.

Results

Out of 148 swabs collected from 51 sites of 32 eligible patients, 58 bacterial isolates were detected. *Pseudomonas* spp. was the commonest (31.05%) followed by equal numbers (22.4%) of *Staphylococcus* spp, Coliforms and *Acinetobacter* spp. *Pseudomonas* spp was difficult to clear requiring 3 cycles of antiseptics while 2 cycles were adequate for the other 3 bacterial pathogens.

Conclusion

Pseudomonas species, *Staphylococcus* species, coliforms and *Acinetobacter* species were common in burn wounds of this setting. *Pseudomonas* species is difficult to clear from burn wounds by current decolonization procedure than other species. Wound swabs can be repeated after completion of 2 or 3 cycles of rotational antiseptics according to the organism rather than routinely obtaining swabs after each antiseptic cycle.

PP 29

Work related health hazards among cleaning workers at North Colombo Teaching Hospital, Ragama

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Introduction

Cleaning workers play a vital role in cleaning the hospital environment and are at risk of various occupational hazards. The previous data suggests that the prevalence of work related health problems in the cleaners' are high.

Objective

To determine the prevalence of occupational hazards (biological, physical, chemical) and the factors associated with these hazards in the cleaning staff in North Colombo Teaching Hospital (NCTH).

Method

A descriptive study was conducted among all cleaning workers (n=116) at NCTH, from March-December 2018 using an interviewer based questionnaire.

Results

Majority of cleaners were above the age of 50 years (78%) with 86.3% being female. More than 80% have attended school, 67.2% having studied only up to grade 8. They were involved in cleaning floors (90.5%), toilets (89.6%), garden (49.1%) and handling waste (97.4%), patients' body fluid/secretions (80.2%).

While 29.2% of workers were vaccinated for hepatitis B, only 5.8% had checked the antibody levels and none knew if their antibody levels were adequate. While everyone had access to safe drinking water, toilets and canteen, 85.3% did not have access to separate dining area and 58.6% to washing/bathing area. Only 40% of workers had a pre-employment training out of whom 63.6% were taught about health and safety.

Majority (62.9%) of workers had been exposed to at least one work related injury; 37.1% were exposed to needle-stick injuries, 4.3% had contacted body fluids to mucous membranes/non-intact skin, 9.5% had chemical injuries to eyes. Physical hazards included burns (5.2%), falls (27.6%), fractures/dislocations (8.6%) and animal bites (6.9%). Less than 5 years of work experience was significantly associated with injuries ($p=0.025$).

They used gloves (99.1%), masks (50.9%) and boots (12.3%) as personal protective equipment. Only 20.7% workers followed the correct procedure of hand hygiene and 25% did not wash hands after each cleaning activity and after cleaning spills (21.6%). Only 52.6% followed the correct procedure for spill management and 19.1% did not use absorbent materials and 17% did not apply disinfectants.

Conclusion

Significant number (62.9%) of cleaners had been exposed to occupational hazards with needle prick injuries being the highest.

PP 30

Dress code of healthcare workers: Does it have a role in hospital infection control?

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Introduction

Bare below the elbows (BBE) policy in clinical areas is practiced in developed countries as an infection control measure to reduce hospital acquired infections (HAI). In Sri Lanka despite rigorous hand hygiene practices, HAI rates are ever increasing, resulting in higher morbidity and mortality. Doctors' neckties, a mark of dignity has also been challenged as a vehicle transmitting pathogens. This study was aimed at finding whether dress code of health-care workers (HCWs) has a role in spreading infections in hospitals.

Objectives

To compare the efficacy of hand washing procedure between BBE and non-bare below the elbows (NBE) group.

To compare the bacterial contamination of neckties worn by staff working in clinical and non clinical areas.

Methods

A cross sectional study conducted from February to May 2017. Seventy two HCWs from different units of Teaching Hospital Karapitiya were inquired using a questionnaire on technique of hand washing. BBE and NBE status was noted. Imprints of hands were taken on blood agar plates before and after hand washing.

Neckties of 56 doctors in wards and 44 staff in offices other than hospital were swabbed and cultured.

Reductions of colony counts in BBE/ NBE groups following hand washing were compared using t-test. Isolates from hand imprints and neckties were subcultured and antibiotic sensitivity tests were done.

Results

Sixty percent of HCWs (43/72) were BBE. There was no significant difference between colony counts in BBE and NBE groups, prior to hand-wash ($P > 0.05$). In both groups hand washing had significantly reduced colony counts ($P < 0.01$). But difference of reductions between the groups was not significant ($P > 0.05$). In doctors' neckties, 50% and 12% CoNS isolates were resistant to cefoxitin and clindamycin respectively. In non clinical staff, 25% and 6% CoNS were resistant respectively. In doctors extended spectrum β -lactamase producers were found, whereas in others not.

Conclusion

Hand washing significantly reduced bacterial counts on hands. Being NBE did not impede hand washing efficacy. Neckties are better avoided in clinical areas, since they are colonized with potentially resistant bugs.

Galle Medical Association is acknowledged for the financial grant.

PP 31

An audit on the prescription pattern, usage and the cost of oral antibiotics in the outpatient department in a tertiary care hospital in Sri Lanka

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Introduction

Prescription auditing is beneficial in the clinical practice to reduce the medication errors and the wastage of drugs.

Objectives

To identify the frequently prescribed antibiotics in the outpatient department (OPD) in a tertiary care hospital, To analyse the cost of antibiotics in the OPD setup.

Method

A prospective cross-sectional study was done based on the information from prescriptions issued in the OPD of a major tertiary care hospital. Consecutive prescriptions containing antibiotics from 8 am to 4 pm daily were recruited up to total 500. Ethical clearance was obtained from the University of Ruhuna.

Results

Out of 500, majority were from adults aged 21 to 60 years (54%) followed by children <12 years (17.5%). Only one antibiotic had been prescribed in 99.4% prescriptions. Age of the patient was not mentioned in 14 (2.8%) prescriptions and none had gender or the diagnosis. Only one mentioned prescriber details.

Amoxicillin 250 mg was the most commonly prescribed antibiotic (39.51%) and norfloxacin 400mg (0.62%), doxycycline 100 mg (0.21%) and oral penicillin 250 mg (0.21%) were the least prescribed ones. Percentage of prescriptions containing amoxicillin 250 mg and co-amoxiclav 625 mg was 62.76% in total. Amoxicillin 250 mg was the mostly prescribed antibiotic among all age groups (<12 years - 32 times, 13-20 years 28 times, 20-60 years 103 times and >60 years 29 times).

The average cost of prescribed antibiotics per prescription was 58.87 LKR. Co-amoxiclav 625 mg had the highest cost (49.34% of total cost) though it was prescribed less frequently (23.25%) than amoxicillin. Doxycycline 100 mg (0.05%) and penicillin 250 mg (0.15%) were the least expensive antibiotics. In paediatric age group syrup cephalexin was the most expensive drug (806.25 LKR) while it was prescribed in 2.5% of prescriptions.

Conclusion

Present prescription pattern in this outpatient department is not satisfactory. It should be improved with identification details of the patient, probable diagnosis and the name and the designation of the prescriber. Only one antibiotic had been prescribed per prescription. Amoxicillin 250 mg and co-amoxiclav 625 mg were the most commonly prescribed antibiotics. Co-amoxiclav had the highest cumulative cost.

PP 32

Economic burden of dengue over Southern Sri Lankan community

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Introduction

Dengue is an important cause of hospitalization in Southern Sri Lanka, of which economic impact is not well defined. This study aims filling the gap in understanding expenditures associated with patients hospitalized with dengue in Southern Sri Lanka.

Method

A prospective cohort study was conducted at one tertiary and two secondary care hospitals in Southern Province. Consecutive patients aged ≥1 year with fever, platelet count <100x10⁹/L and two clinical symptoms consistent with dengue with or without warning signs, within 7 days of illness were enrolled from June to October 2017. Direct patient expenditures (travel, medical visits, medications, investigations) and indirect costs (loss of productivity) were gathered using interviews and telephone calls 2-4 weeks after discharge.

Results

Among 323 patients with dengue, 200 (61.9%) were male and median age was 33 years (IQR 25-46). Median duration of hospitalization was 4 days. Overall, 249 (77.1%) patients reported 1-4 prior outpatient visits for same illness: 70.3%- general practitioner, 4.0%- Outpatient Department, and 4.6%- specialist. Among 300 adults, 217 (72.3%) missed work (median 3 days, IQR 2-5) and among 23 children, 9 (39.1%) missed school (median 4 days, IQR 2-4) before admission. Of 77.1% who received a post-discharge call, 14 (16.5%) reported another outpatient visit and 8 (3.2%) reported readmission. One hundred and eighty four adults (80.0%) missed work (median 14 days, IQR 7-21) and 8 (42.1%) children missed school following discharge (median 14 days, IQR 5-17.5). Patients reported total median expenditure of 2050 Sri Lankan Rupees (IQR 1000-3500) for the illness: 1350 LKR (IQR 450- 2050) for medical care before admission, 0 LKR (IQR 0-0) during admission, and 800 (500- 1500) after discharge. Most expenditure was for medical visits. Given a national daily average income of 1147 LKR/ person and median values for days of work loss, 24,087 LKR in wages were lost by an adult due to illness.

Conclusion

Dengue resulted in a significant economic burden to Southern Sri Lankan community. These data highlight

the need for preventative public health actions for dengue and may help decisions on vaccination or vector control activities.

National Science Foundation is acknowledged for financial grant. RPHS/2016/D04

PP 33

Seroprevalence of anti Zika virus antibodies among the students of Allied Health Sciences Unit, Faculty of Medicine, University of Jaffna

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Introduction

Zika virus (ZIKV) is a mosquito borne virus belonging to *Flavivirus* genus that causes clinical symptoms similar to dengue and chikungunya virus infections. It causes complications during pregnancy. Sri Lanka is a high risk country for ZIKV infection.

Objectives

The purpose of this study was to determine the past exposure rate and the factors contributing to ZIKV infections among the students enrolled in Allied Health Sciences (AHS) programs in the Faculty of Medicine at University of Jaffna.

Method

This is a descriptive cross sectional study performed among the students enrolled in AHS programs. Data on contributing factors were obtained from the participants using self administered pre tested questionnaire. Anti-ZIKV IgG antibodies were qualitatively measured in the serum samples using the anti Zika virus IgG ELISA kit (ab221844, Abcam, Inc., USA) with the sensitivity and specificity 96% and 99.6% respectively. The association between ZIKV infections and contributing factors were assessed by Chi square test using the SPSS statistics software (version 23).

Results

Of the 184 samples screened, three samples were found positive for anti ZIKV IgG by ELISA. Thus, 1.6% of the students of AHS had the past exposure to ZIKA virus. All three positive individuals were females from Northern Province with a history of exposure to family members/relatives or neighbors who travelled to ZIKV prevalent countries. One seropositive individual had a history of

travel outside Sri Lanka. There was significant association between ZIKV infections and history of exposure to relatives/neighbors who travelled to ZIKV prevalent countries. There was no significant association between ZIKV infection and sociodemographic factors, clinical variables, course followed, state of hospital posting, and travel history.

Conclusion

Since neutralization assays were not performed we conclude these three cases as possible exposure ZIKV infections. Further studies are needed to confirm the ZIKV seropositivity.

ELISA kits were obtained from Department of Microbiology, Faculty of Medicine, University of Jaffna.

PP 34

The respiratory virus outbreak in Southern Sri Lanka in 2018: Results of the active surveillance

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Introduction

A spike in respiratory infections occurred in the Southern Province of Sri Lanka from April to June 2018, during which influenza outbreaks are not uncommon. Paediatricians noted that there was a spike in admissions of children with serious, and in some cases fatal, respiratory illnesses. Consequently, active surveillance of cases was initiated at Teaching Hospital Karapitiya (THK) to better characterization and management of the cases.

Method

All pediatric wards and intensive care units (ICUs) at THK were systematically screened daily from 28/05/2018 to 25/06/2018 using a case definition of fever with one or more features of respiratory tract infection. Demographic and clinical data were collected from each patient meeting case definitions. Nasopharyngeal (NP) and oropharyngeal (OP) swabs were collected from each case for polymerase chain reaction (PCR) identification of adenovirus, influenza A, and respiratory syncytial virus (RSV) at Faculty of Medicine, Galle. Blood samples were collected from a subset of patients to determine viremia.

Results

During the period of active surveillance, 170 pediatric and 12 adult cases were identified, of which 9 (5.3%) paediatric cases and 3 (25%) adult cases were fatal. Fifty three (31.2%) paediatric patients needed respiratory support by means of oxygen, intubation, ICU care or a combination of these. Adenovirus was detected in 46.5% (79/170), RSV in 29.4% (50/170), and influenza A in 25.4% (43/170) of pediatric NP/OP swab samples tested by PCR. In 31 (18.2%) of these samples, ≥ 2 viruses were detected. Of 11 adult NP/OP swab samples tested, adenovirus was detected in 41.7% (5/12), influenza A in 25.0% (3/12), and all negative for RSV. Adenovirus was detected in blood samples of all paediatric cases (N=3) tested, corresponding to adenovirus detection in NP/OP samples from the same individuals. Of paediatric deaths adenovirus was detected in 33.3% (3/9), RSV in 11.1% (1/9), and influenza A in 33.3% (3/9). Further sub typing of adenovirus positive subset of paediatric samples revealed that these isolates belong to adenovirus type B.

Conclusion

In this outbreak of respiratory viral infection in the Southern Province, adenovirus was detected in the majority of samples from pediatric and adult cases, although influenza A and RSV were also detected in over a quarter of pediatric cases.

PP 35

A complicated case of *Candida tropicalis* prosthetic valve infective endocarditis

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Introduction

Prosthetic valve *Candida* endocarditis, whilst relatively uncommon, is a well recognized entity. Presence of central venous catheters or prosthetic cardiac valves, previous broad spectrum antibiotic therapy, recent cardiothoracic surgery and IV drug abuse are risk factors for fungal endocarditis. It gives rise to large, bulky vegetations which can easily embolize. Treatment is difficult, usually requiring valve replacement and long term fungicidal therapy. We report a case of *Candida tropicalis* prosthetic valve endocarditis necessitating valve replacement complicated by multiple septic emboli.

Case report

A 43 year old lady who underwent mitral valve replacement 9 years ago, presented with a 3 week history of fever. Her physical examination showed features of a previous right sided stroke. There were no peripheral stigmata of infective endocarditis. However, transthoracic echocardiography (TTE) showed a 1.8 x 1.8 cm oscillating vegetation attached to the mitral valve prosthesis and 3 blood cultures became positive for *Candida tropicalis*. Isolates were sent to the Medical Research Institute (MRI), for speciation and anti fungal sensitivity testing (AFST) which showed them to be sensitive to Amphotericin B and fluconazole.

Within the previous two months, she had been hospitalized twice at another centre; once to investigate for fever and lower limb numbness and thereafter for a cerebral infarction and sub arachnoid haemorrhage. TTEs done on both these occasions were negative; trans-oesophageal echocardiography had not been performed as the machine was temporarily broken.

She underwent a redo mitral valve replacement following which she was treated with amphotericin B deoxycholate for 6 weeks. The day following valve replacement, the patient developed acute lower limb ischaemia, necessitating a femoral artery exploration and left femoral-popliteal artery embolectomy. Both the excised embolus and the prosthetic valve vegetations subsequently grew *Candida tropicalis*. A blood culture taken after completing six weeks of Amphotericin B therapy was negative. After obtaining a baseline TTE, she was discharged on oral fluconazole with a plan for monthly follow up and microbiology referral if needed.

Discussion

This case illustrates the subtle clinical presentations of *Candida* prosthetic valve endocarditis which can be easily missed leading to delayed diagnosis. Exclusion of fungal endocarditis is important in patients with neurological dysfunction or embolism, especially if risk factors are present.

It also emphasises the diagnostic value of trans-oesophageal echocardiogram in such patients in spite of multiple negative trans-thoracic echocardiograms, as may have occurred in this patient.

We acknowledge the staff of the Mycology Laboratory, MRI for the speciation and AFST of the isolates.

PP 36

Malaria amongst foreign labourers, a threat to sustaining malaria elimination in Sri Lanka

de Silva NL¹, Ranaweera D², Fernando SD³

¹Department of Parasitology, Faculty of Medicine, University of Ruhuna, Galle, ²Anti-Malaria Campaign, Public Health Building, Narahenpita, ³Department of Parasitology, Faculty of Medicine, Colombo

Introduction

Sri Lanka was certified as malaria free by the World Health Organization and is currently in the prevention of re-introduction of malaria stage. With high vulnerability and receptivity, imported malaria has emerged as a major threat. Massive inflow of imported labour has become one of the threats to sustaining its malaria free status. We report two such cases of malaria which occurred among foreign labourers.

Case report

Two male construction workers aged 24 and 33, from Mumbai, India, presented with fever after arriving in Sri Lanka. The first patient presented with 5 days of fever, 9 months after arrival. He was initially managed as dengue fever but on the 6th day, his blood smear and Rapid Diagnostic Test (RDT) were positive for *Plasmodium vivax*. The second patient presented with fever, 1 week after arrival and was initially managed as dengue fever for 3 days and discharged but readmitted 4 days later. On day 8 he was diagnosed of having *Plasmodium vivax* malaria by microscopy of thin blood smear and RDT. Only the first patient gave a past history of malaria 5 years ago in India. Both were treated inward at the National Hospital of Sri Lanka with 3 days of chloroquine followed by 14 days of primaquine but both left the country prior to completion of the primaquine course. Diagnosis and follow up was done by the Anti-Malaria Campaign.

Discussion

Malaria occurs in the Southeast Asian countries providing foreign labour to Sri Lanka. Of the estimated 200,000 foreign labourers working locally in 2017 in Sri Lanka, majority were from India, Bangladesh, Maldives, Pakistan and China where malaria still exists. Accordingly, the challenge of importation of malaria through labour inflow is evident. Over the years India has remained a major source and *Plasmodium vivax* was the most frequently imported parasitic species. We reiterate the importance of continued vigilance, surveillance and multi-sectorial collaborations enabling identification and screening of groups of foreign labourers in the face of imported malaria.

PP 37

Ancylostoma ceylanicum, first report of human infection in Sri Lanka

Samarasinghe S¹, Mallawarachchi CH²

¹Medical Research Institute, Colombo, ²Postgraduate Institute of Medicine, University of Colombo, Colombo

Introduction

Hookworm infections in humans are usually acquired by the penetration of skin by *Ancylostoma duodenale* and *Necator americanus*. *N. americanus* is the recognized causative agent for this infection in Sri Lanka, but the hookworms of cats and dogs such as *A. ceylanicum*, *Ancylostoma braziliense* and *Ancylostoma caninum* are also responsible of causing human infections. *A. ceylanicum* is capable of causing patent human infections while *A. braziliense* and *A. caninum* cause cutaneous larvae migrans only. Recent molecular studies have shown that *A. ceylanicum* is the second most prevalent hookworm species in humans in South East Asia.

Case report

A live worm, incidentally extracted from the duodenum of a 70 year old female from Veyangoda, while investigating for dyspepsia, was sent to the Department of Parasitology, Medical Research Institute, for identification. The worm was 9mm long. Maximum middle width was 48µm. The mucron was 7µm. The width of the cuticle was 12µm. Two teeth were visible on each side of the buccal cavity. The lateral teeth were larger than the medial ones. The width of the transverse striations was 5µm. Stool samples of the patient and family members were negative for ova.

Discussion

The specimen was identified as a female *Ancylostoma* spp. worm due to the presence of teeth in the buccal cavity and the mucron at the posterior end. *A. duodenale*, *A. braziliense* and *A. ceylanicum* have two teeth on either side of the buccal capsule. The mucron of the *A. duodenale* is slender and length is about 21µm which excludes *A. duodenale*. Identification of *A. ceylanicum* was confirmed by the distance between the transverse striations (8-9 µm in *A. braziliense*) and the absence of a small tubercular process at the margin of the buccal capsule (seen in *A. braziliense*). Inability to get stool samples before treating with antihelminthics from the patient and family was a limitation.

A. ceylanicum infections have shown a wide range of clinical manifestations from dyspepsia to anaemia. The prevalence of *A. ceylanicum* hookworms in cats and dogs being 24% to 92% in the Asia-Pacific region together with high population of dogs in Sri Lanka make this a possible threat of emerging zoonotic infection.

PP 38

A severe case of toxic shock syndrome with acute respiratory distress recovered after adjunctive intravenous immunoglobulin therapy

Asanthi MAI, Yapa YHBA

Department of Microbiology, District General Hospital Negombo

Introduction

Staphylococci and streptococci, the main culprits of skin and soft tissue infections are able to produce super antigens including toxic shock syndrome (TSS) toxin -1, enterotoxin B, and pyrogenic exotoxin A, B and C, which can lead to TSS by releasing cytokines in massive amounts.

Case history

A 30 year old man admitted with fever, vomiting and right leg cellulitis, two days after a prick injury to the foot. Blood pressure was 60/40mmHg with clear lung fields. White cells, platelets and CRP were 27000/ μ l, 252000/ μ l and 280mg/L respectively. Intravenous (IV) meropenem and clindamycin 900mg were started. After 4 hours, bilateral lung crepitations were developed with dropping oxygen saturation. Blood pressure was maintained on maximum inotropic support. IV linezolid was added at 24 hours. Gradual development of respiratory distress (ARDS) required maximum invasive ventilation by 48 hours. Temperature was 104 F°. Platelets were dropped. Bilateral conjunctival erythema was noted. At 72 hours, intravenous immunoglobulin (IV IG) 1g/Kg was started followed by 0.5g/Kg/day for next two days. Ventilator support requirements started to reduce gradually and inotropes were tailed off. Chest radiographic ARDS changes were improved after the IVIG therapy. Blood culture collected after the 1st meropenem dose was negative. Serous fluid aspirated from the right leg at day seven grew methicillin resistant *Staphylococcus aureus* (MRSA). At day five, meropenem was changed to piperacillin-tazobactam and IV linezolid to oral. Fourteen days of linezolid was completed. Patient recovered fully.

Discussion

In this case the causative pathogen can not be confirmed as TSS can be caused by both haemolytic streptococci and *S. aureus*, would respond to above management and the MRSA grew from serous fluid at day seven could

arise from skin flora. Together with antibiotic and other supportive management, IVIG is an important adjunctive therapy in improving morbidity and mortality in TSS. IVIG contains antibodies, which act by resolving the toxemia and infection mainly by neutralizing the toxins, enhancing the opsonization of pathogens and inhibition of TNF-alpha. Correct selection of patients is required due to high cost of the product.

PP 39

Three Cases of Cerebral abscesses by *Streptococcus anginosus* group in patients with congenital heart disease

Ranasinghe RATK, Patabendige CGUA

National Hospital of Sri Lanka

Introduction

Streptococcus anginosus (milleri) group consists of three different *Streptococcal* species, *S. anginosus*, *S. intermedius* and *S. constellatus*. The distinct feature from the other *Streptococcus* species is their ability to form deep abscesses. We present three cases of cerebral abscesses in patients with congenital heart diseases found within a period of three months. The identification and MIC values were taken from the BD Phoenix™ Automated Identification System.

Case reports

A 23 year old lady diagnosed to have complex congenital heart disease with Eisenmenger's syndrome presented with fever and seizures found to have right sided parietal abscess and aspirated pus revealed *Streptococcus intermedius*.

A 44 year old lady diagnosed to have a ventricular septal defect, double outlet right ventricle and balanced shunt presented with fever, headache and vomiting, found to have left occipital abscess. The aspirated pus revealed *Streptococcus constellatus*.

An eight year old girl diagnosed to have severe right ventricular outflow tract obstruction, hypoplastic tricuspid valve and hypertrophic right ventricle presented with headache and vomiting found to have right frontal multiple cerebral abscesses. The pus drained revealed *Streptococcus anginosus*.

The patients did not have signs of infective endocarditis, vegetations or positive blood cultures at the time of

presentation and had no history of dental or other surgical procedures.

Two of the above isolates grew only on chocolate agar and not on quality controlled sheep blood agar. All three had sensitive penicillin and ceftriaxone minimum inhibitory concentration and were treated with intra-venous ceftriaxone. Patients were monitored for the clinical, radiological and biochemical responses with six weeks intravenous antibiotic therapy and two underwent reaspiration. Following recovery and during the clinic reviews the importance of infective endocarditis prophylaxis was emphasized.

Discussion

Streptococcus anginosus group can give rise to cerebral abscess following bacterial dissemination to the blood leading to hematogenous spread. It is a common pathogen of cerebral abscess in patients with congenital heart disease.

Importance of directing the pus samples from sterile sites for microbiological investigations, use of chocolate agar in laboratory processing, sample enrichment and 48 hour incubation are emphasized.

FELLOWSHIP OF THE SRI LANKA COLLEGE OF MICROBIOLOGISTS 2018

Fellowships of the Sri Lanka College of Microbiologists were awarded to Dr. C. Palasuntheram, Prof. J.S.M. Peiris and Dr. Gaya Sharma Sriyantha Kumarihamy Colombage on 08th August 2018 at the Hotel Taj Samudra, Colombo.



Dr. C. Palasuntheram

MBBS (Ceylon), Diploma in Bacteriology and Virology (Manchester UK),
MSc in Bacteriology (Manchester UK), MD Microbiology (Colombo)

Dr. C. Palasuntheram obtained his MBBS degree from the University of Ceylon in 1958. Subsequently, he travelled to the United Kingdom where he completed his Diploma in Bacteriology and Virology at Manchester University in 1971, followed by an MSc in Bacteriology in 1975 from the same University. His Master's thesis was on the feasibility of thin layer chromatography (TLC) as an inexpensive, simple and rapid alternative to gas liquid chromatography (GLC) in the identification of some anaerobic, Gram positive, non sporing rods. He gained his MD Microbiology from the PGIM, Colombo.

He was attached to the Enteric Bacteriology and Food and Water Bacteriology Departments of the Medical Research Institute from 1968 to 1983, serving as Director MRI in 1983. During this period he conducted many cutting edge research studies in enteric bacteriology and food microbiology during the course of which he published the first reports of *Vibrio parahaemolyticus* and *Campylobacter fetus* subspecies *jejuni* in Sri Lanka. His interest in the clinical and environmental aspects of *Vibrio parahaemolyticus* spurred him to do further research on its halophilic

properties where he was able to clearly demonstrate that it had no specific requirement for Na⁺ or Cl⁻. Environmental studies showed that *V. parahaemolyticus* was prevalent in the marine environment around Colombo and in sea fish, prawns and crabs. Other areas of his research interests included enterotoxigenic staphylococci, *Salmonella* in processed meats, acute diarrhoea in children and *Vibrio cholerae* non-O1. During this period he was chosen to participate in specialized educational programmes of the WHO and FAO.

His expertise in the field of food and water bacteriology has been recognized nationally and internationally. Locally, he was involved in formulating standards for the microbiological testing of food and water for the Bureau of Sri Lanka Standards. He was Secretary of the Standing Committee on Health and Medical Research of the National Health Development Committee and a member of the Food Hygiene Subcommittee of the National Food Advisory Committee and a member of the National Advisory Committee on Diarrhoeal Diseases. Internationally, he was offered the position of Consultant in

Food Microbiology at the Food and Agriculture Organisation of the United Nations (FAO) but left Sri Lanka in 1983 before he could take up this assignment. In addition, he was a member of the Advisory Board of the Information and Documentation Centre of the prestigious International Diarrhoeal Disease Research Centre in Dacca, Bangladesh.

From 1983 to 1995 he was domiciled abroad, where he broadened his clinical experience by serving in overseas medical centres, namely at the Queen Elizabeth Hospital, Kings Lynn, East Anglia and at the King Fahd Specialist Hospital, Saudi Arabia. He returned to Sri Lanka in 1995 to take up the post of Consultant Microbiologist at the Sri Jayawardenepura General Hospital.

During his tenure at SJGH, he built the Microbiology Department into a centre of excellence that served as a model for other laboratories to emulate. I remember doing a study on "Assessment of safety standards in state sector health institutions in the Western Province" where the laboratory at SJGH was the only one that fulfilled all the requirements on the checklist. He was a hands-on clinician, who would spend quality time on the bench, ensuring the precision and reliability of the microbiology results and correlating them accurately with the relevant clinical scenarios. He was a dedicated microbiologist and gave his best to the hospital and to patient care.

He willingly took up duties as a postgraduate trainer, serving on the Board of Study in Microbiology of the Postgraduate Institute of Medicine (PGIM), delivering lectures, conducting practicals, supervising MD research projects and serving as an examiner in the Diploma in Microbiology and the MD in Microbiology. We, his

students, remember him most vividly and gratefully as a conscientious and dedicated teacher. He set an example in discipline, hard work and punctuality. His encyclopedic knowledge of bacteriology is legendary. He would have the latest textbooks on his desk and the information contained in them was always at his fingertips. He could turn unerringly to the exact page and paragraph to illustrate the facts he taught us. He was an authority on Enterobacteriaceae. His bench skills were of the highest order and the daily laboratory rounds were educational for both doctors and technical staff. He was a very strict but fair examiner at the qualifying examinations, ensuring that our theoretical knowledge and practical skills were up to the mark. He set a very high standard of performance for himself and did not accept anything less from his students.

He was a loyal member of the Sri Lanka College of Microbiologists, serving as Vice President, and has donated an award, the C. Palasuntheram award for the Best Paper in Microbiology at the Annual Scientific Sessions that will be conferred from this year onwards.

In short, Dr C Palasuntheram has been an exemplary role model as teacher, clinician and researcher and generously shared his expertise with his colleagues and his students. He serves as a benchmark for generations of microbiologists who follow him. Madam President, it is my honour and privilege to present Dr C Palasuntheram to receive an Honorary Fellowship of the Sri Lanka College of Microbiologists.

Citation read by Dr. Enoka Corea
*Senior Lecturer, Faculty of Medicine,
University of Colombo*



Prof. J.S.M. Peiris

MMBBS, D.Phil (Oxford), MD (University of Colombo), MRC Path (Royal College of Pathologists, U.K.),
Fellow of the Royal Society (FRS), UK; Légion d'Honneur; Silver Bauhinia Star (SBS), Hong Kong

Madam President, colleagues, Family members, distinguished guests. An Honorary Fellowship is the highest honour that the Sri Lanka College of Microbiologists can confer. It is therefore a privilege and a great honour for me to have been invited to read the citation for Prof JSM Peiris, a long-standing friend, colleague and scientist of great distinction today.

Sryal, better known as Malik Peiris in the international arena, graduated from the Faculty of Medicine, University of Ceylon (now known as the University of Peradeniya) in 1972. His early interest in microbiology led him to join the Department of Microbiology, University of Peradeniya in 1974. He proceeded to Oxford on a Commonwealth Scholarship in 1976 and completed his D.Phil in 1981 and MRC Pathology (Virology) in 1982. He returned to the Department of Microbiology in 1982 and served for a period of 7 years, setting up the virology and cell culture laboratory. His research activities during this period included the investigation of arbovirus infections (in collaboration with the late Prof. Felix Amerasinghe and Prof. Manel de S Wijesundera), diarrhoeal pathogens including entero haemorrhagic *E. coli* and the immunology of malaria (in collaboration with Prof Kamini Mendis). He says that this period of his research is still the phase of his career he values most highly and is proudest of.

Prof Peiris moved to Hong Kong in 1995 as Associate Professor, Department of Microbiology, University of Hong Kong where he founded the clinical diagnostic and public health virology laboratory at Queen Mary Hospital, which is part of the University of Hong Kong. He rapidly progressed to become Chair Professor in the same Department and Chief of Virology at the Queen Mary Hospital, Hong Kong. He obtained the Fellow of the Hong Kong Academy of Medicine (Path) in 1998. Prof Peiris has served as Scientific Director, HKU-Pasteur Research Centre, Director, WHO H5 Reference Centre, HKU and is currently the Tam Wah-Ching Professor in Medical Science at the Division of Public Health Laboratory Sciences, University of Hong Kong.

Prof Sryal Peiris has a track record in research second to none. His research interests in Hong Kong initially focussed on the ecology, epidemiology, clinical disease burden, evolution and pathogenesis of animal and human influenza. Working with relevant Government Departments and other colleagues at the University of Hong Kong, he contributed to the efforts that resulted in Hong Kong being protected from the wave of avian flu (H5N1) sweeping the region at the time. In March 2003, he played a key role in the discovery that a novel coronavirus was the aetiological agent of SARS. He has contributed significantly to the

understanding of the emergence, spread and pathogenesis of avian flu - H5N1 and the 2009 pandemic H1N1.

He has over 700 research publications with over 11,000 citations and is ranked by Essential Science Indicator (ESI) as a “top 1% most-cited international scientist” worldwide. He has contributed chapters to text books, including the Oxford text book of Medicine and published a book on SARS.

He is the first Sri Lankan to be elected to the Royal Society of London, the highest scientific honour in the Commonwealth. He was decorated as Knight of the Légion d'Honneur of France on 15 October 2007, awarded the Silver Bauhinia Star (SBS) in 2008 from the government

of Hong Kong for “outstanding achievements in the field of virology and pathology, in particular his contribution to the prevention and control of infectious diseases”. In May 2017, he was elected as a foreign associate of the US National Academy of Sciences.

Madam President, I present to you Professor Joseph Sryal Malik Peiris, an exemplary scientist, researcher, academic, leader and communicator, and request you to confer him with the highest honour of the College and admit him as an Honorary Fellow.

Citation read by Prof. Vasanthi Thevanesam
*Emeritus Professor of Microbiology,
University of Peradeniya*



Dr. Gaya Sharma Sriyantha Kumarihamy Colombage

MBBS (Sri Lanka), Dip Medical Microbiology (Colombo), MD Medical Microbiology (Colombo)

Madam President, I am privileged to have been requested to introduce a renowned consultant in the specialty of medical virology Dr Gaya Colombage.

Gaya Sharma Sriyantha Kumarihamy Colombage nee Mailewa received her primary and major portion of secondary education at the Holy Family Convent, Kurunegala and completed her secondary education at Aquinas College, Colombo. She obtained MBBS from the Faculty of Medicine, Colombo in 1978 and completed internship at General Hospital Anuradhapura.

Having undergone preliminary training at the NIHS, Kalutara, she was appointed as the Medical Officer in Charge of then anti-VD Clinic, General Hospital, Anuradhapura in 1979. In 1983 she moved to General Hospital Colombo where she served as Medical Officer at ENT, thoracic and rheumatology units until 1986 when she selected her future career as microbiology.

She began her career in Microbiology as a Medical Officer at the Department of Virology, MRI. In 1987 she proceeded to Japan and received extensive training on Respiratory and Herpes viruses at the Department of Virology, Osaka University. Subsequently she had training on developing and running a reference laboratory at the

Victoria Institute of Infectious Diseases Melbourne, Australia.

Having completed the postgraduate Diploma and MD in Medical Microbiology of PGIM in 1994, her post MD training was on research on viral immunology using DNA vaccines against Flaviviruses at the John Curtin School of Medical Research of Australian National University for two years from 1996. She was appointed as a Consultant Virologist and the Director of the MRI in 1998.

Some of the significant achievements during her tenure as the Director, Medial Research Institute (MRI) include establishment of a National Vaccine Quality Control Laboratory, introducing new laboratory techniques, data base for monitoring adverse reactions, national nutritional data base and quality control activities in the laboratory services in collaboration with the Ministry of Health with funding from JICA, WHO, UNICEF and World Bank. Despite many challenges she was instrumental in setting up committees that were required to uplift the research capabilities of the MRI.

As the Director of the MRI she took a leadership role during several major disease outbreaks of international significance including measles outbreak in 1999,

identification of first reported human case of Trypanosomiasis in Kalmunai, Anthrax scare in 2001 and crow deaths in the city of Colombo in 2002.

Decentralization of laboratory services was a novel concept initiated by her with the support of all categories of staff. She was able to take the mobile laboratory service to “Suwaudana”, “Janasuwaya” and “Gamudana” programs of the Ministry of Health. Regular continuing education for all categories of staff was given priority during her tenure as the Director of the MRI. She was instrumental in organizing social activities through the MRI welfare Society.

She represented the Ministry of Health on several National Advisory committees. She was a member of the National Health Research Council. She has served as a member of the Directors forum of the National Science and Technology Commission. She has been a visiting lecturer for the Faculties of Medicine in Colombo, Ruhuna and Ragama. She was a post graduate trainer for Diplomas in Microbiology, Transfusion Medicine, Pathology, MSc in Community Medicine and medical administration, research supervisor and examiner for MD examination in Virology conducted by the PGIM.

She has represented Sri Lanka at several international seminars and meetings, on Japanese encephalitis, global parasite control, quality assurance, accreditation, safe blood transfusion, meetings of virologists of SEAR polio laboratory network and Bio ethics conferences. She has presented scientific papers on virology at national conferences and co-authored scientific papers that were published in international journals.

She has served as a Council member and Joint Secretary of the Sri Lanka College of Microbiologists and was its President in 2005/6. During her Presidency I had the good fortune to be one of her Joint Secretaries which I remember with respect and high esteem appreciating her leadership and great services. During her tenure as the President, the College undertook a pioneering project on Health Sector Development funded by IDA/World Bank, which was continued for several years. Very valuable information was collected, documented and forwarded to the MoH with recommendations for the necessary improvements. In addition as a result of this project the College was able to raise much needed funds for its activities.

During the latter part of her career she devoted her time to uplift her spiritual well being. She enrolled herself as a postgraduate student at the Postgraduate Institute of Pali and Buddhist Studies of the University of Kelaniya. She obtained a Postgraduate Diploma in Buddhist Studies, a Masters in Buddhist studies and a Postgraduate Diploma in Pali Language.

She retired prematurely in 2008 to join her husband who was serving in the Ministry of Health in Brunei.

Madam President, It is my pleasure and privilege to present Dr Gaya Sharma Sriyantha Kumarihamy Colombage for the award of the Honorary Fellowship of the Sri Lanka College of Microbiologists.

Citation read by Dr. Geethika Patabendige
Consultant Clinical Microbiologist,
National Hospital of Sri Lanka



Dr. Sagarika Samarasinghe



Dr. Preethi Perera



Dr. Omala Wimalaratne

ERRATUM

The bulletin of the SLCM 2018 under the Prize winners at the 26th Annual Scientific Sessions held in 2017 has erroneously printed the 2nd place for the poster presentation as follows:

PP 3

Filarial parasites in selected cats and dogs in Madampe, Sri Lanka, and their public health implications

Mallawarachchi CH¹, Chandrasena TGAN², Wickramasinghe S³, Samarasekara SD⁴, Mallawarachchi SMNSM¹, de Silva NR²

¹Post Graduate Institute of Medicine, University of Colombo, Sri Lanka, ²Department of Parasitology, Faculty of Medicine, University of Kelaniya, Sri Lanka, ³Department of Parasitology, Faculty of Medicine, University of Peradeniya, Sri Lanka, ⁴Quarantine Unit, Ministry of Health, Sri Lanka

However, it should be corrected to read as follows:

Prize winners at the 26th Annual Scientific Sessions 2017

Poster Presentation

2nd prize

PP 1

Validation of Gram stain guided testing of tube coagulase, bile aesculin and germ tube tests from the positive automated blood culture broths

Liyanagama TM, Piyasiri DLB, Jayasekara K, Perera B

Teaching Hospital Karapitiya, Galle

Editorial Board of SLCM regrets any inconvenience caused by this error.

PRIZE WINNERS AT THE INTERNATIONAL CONFERENCE ON INFECTIOUS
DISEASES AND ANTIMICROBIAL RESISTANCE AND
THE 27TH ANNUAL SCIENTIFIC SESSIONS 2018

Following oral presentations were awarded first, second and third places at the International Conference on Infectious Diseases and Antimicrobial Resistance and the 27th Annual Scientific Sessions of the Sri Lanka College of Microbiologists held on 09th and 10th August 2018.

Oral presentations

1st prize

OP 8

Hantavirus infection with pulmonary symptoms in North Central part of Sri Lanka

Muthugala MARV^{1,3, 5}, Harischandra N², Wickramasinghe D², Abeykoon MM², Dasanayake WMDK^{1,5}, Senanayake KOMDT³, Manamperi AAPS⁴, Gunasena S⁵, Galagoda GCS⁵

¹Teaching Hospital Kandy, ²District General Hospital Polonnaruwa, ³Teaching Hospital Anuradhapura, ⁴Molecular Medicine Unit, Faculty of Medicine, University of Kelaniya, ⁵Medical Research Institute, Colombo 08

2nd prize

OP 4

Molecular diversity of beta-lactamase genes in uropathogenic *Enterobacteriaceae* in two hospitals in Sri Lanka

Perera PDVM¹, de Silva SH², Jayatilleke SK², Corea EM¹, de Silva N³

¹Department of Microbiology, Faculty of Medicine, University of Colombo, ²Sri Jayewardenapura General Hospital, Nugegoda, ³Neville Fernando Teaching Hospital, Malabe

3rd prize

OP 15

First point-prevalence study of inpatient antimicrobial use in five public hospitals in Southern Sri Lanka

Sheng T¹, Wijayaratne G², Dabrera T³, Bodinayake CK², Kurukulasooriya R², Nagaro K⁴, Sudarshana AT³, Anderson D⁴, Drew R⁴, Ostbye T¹, Woods CW^{1,4}, Nagahawatte A², Tillekeratne LG^{1,4}

¹Duke Global Health Institute, Durham, NC, USA, ²Faculty of Medicine, University of Ruhuna, Karapitiya, Galle, Sri Lanka, ³Sri Lanka Ministry of Health, Colombo, Sri Lanka, ⁴Duke University School of Medicine, Durham, NC, USA

Following poster presentations were awarded first, second and third places at the International Conference on Infectious Diseases and Antimicrobial Resistance and the 27th Annual Scientific Sessions of the Sri Lanka College of Microbiologists held on 09th and 10th August 2018.

Poster presentations

1st prize

OP 32

Acute respiratory viral infections: an important cause of admissions for febrile illness in the Southern Province, Sri Lanka

Tillekeratne LG^{1,2}, Bodinayake CK³, Nagahawatte Ajith³, Devasiri Vasantha³, Nicholson Bradly², Sky Vanderburg², Ruvini Kurukulasooriya³, Truls Ostbye^{1,2}, Megan E. Reller^{1,2}, Christopher W. Woods^{1,2}

¹Duke Global Health Institute, Durham, NC, USA, ²Duke University School of Medicine, Durham, NC, USA, ³Faculty of Medicine, University of Ruhuna, Karapitiya, Galle, Sri Lanka

2nd prize

PP 28

Prevalence of *Campylobacter* species and their antibiotic sensitivity pattern among patients with diarrhoea in a paediatric tertiary care hospital in Sri Lanka

Vidyarathne GGK^{1,3}, Pathirage S², Silva TJ³, Perera KCR⁴

¹Postgraduate Institute of Science, University of Peradeniya, Peradeniya, Sri Lanka, ²Department of Bacteriology, Medical Research Institute, Colombo 08, ³School of Medical Laboratory Technology, Medical Research Institute, Colombo 08, ⁴Department of Enteric Bacteriology Medical Research Institute, Colombo 08

3rd prize

PP 43

An outbreak investigation of bacteraemia due to *Burkholderia cepacia* complex at the National Hospital of Sri Lanka

Vathshalan S¹, Abeydeera WPH¹, Perera WPDP¹, Liyanage N¹, CalderaTSKRD¹, Patabendige CGUA¹

¹National Hospital of Sri Lanka

Dr. C. Palasuntheram Prize

OP 8

Hantavirus infection with pulmonary symptoms in north central part of Sri Lanka

Muthugala MARV^{1,3,5}, Harischandra N², Wickramasinghe D², Abeykoon MM², Dasanayake WMDK^{1,5}, Senanayake KOMDT³, Manamperi AAPPS⁴, Gunasena S⁵, Galagoda GCS⁵

¹Teaching Hospital Kandy, ²District General Hospital Polonnaruwa, ³Teaching Hospital Anuradhapura, ⁴Molecular Medicine Unit, Faculty of Medicine, University of Kelaniya, ⁵Medical Research Institute, Colombo 08

**Presidential address delivered at the Induction of President and
Dr. Siri Wickremesinghe Memorial Oration 2019 of the
Sri Lanka College of Microbiologists on 16th February 2019**



Ethical Considerations in Laboratory Medicine

Prof. Ajith Nagahawatte

*Professor of Microbiology, Department of Microbiology,
Faculty of Medicine, University of Ruhuna, Galle*

The Board of Directors, Council 2019, Immediate Past President and all Past Presidents present and members of the Sri Lanka College of Microbiologists, Mrs. Ranganie Wickremesinghe and the Friends and Family of Dr. Siri Wickremesinghe, Professor Nilanthi De Silva, the Orator of Siri Wickremesinghe Memorial Oration 2019, Officials of the Ministry of Health, Presidents and Secretaries of other Professional Colleges and Associations, Distinguished Invitees, Ladies and Gentlemen,

I consider it an honour and a privilege to be elected as the President of the Sri Lanka College of Microbiologists and I thank the members of the College for their trust placed on me and selecting me to lead the college for the year 2019. I pledge to serve the College to the best of my ability and do my best to uplift the field of Microbiology

in the country while continuing the good work already commenced by the previous councils.

The Sri Lanka College of Microbiologists is an organization of professionals working in Medical Microbiology in Sri Lanka. The parent organization of the College was the Ceylon Association of Microbiologists which was founded in 1969. In 1974 the name was changed to the Sri Lanka Association of Microbiologists and in 1979 the members unanimously decided that the Association should evolve into the Sri Lanka College of Microbiologists. So this year we celebrate the 50th year since the inception of the college.

The college started with a few members and at present has grown to a membership of over 250. Our members

serve the Ministry of Health as well as the Universities and the Private Sector. We have specialists in Microbiology, Mycology, Virology, Parasitology and Immunology and they serve in many hospitals throughout the country.

The College has the following objectives embodied in its constitution.

1. Promote the study of microbiology.
2. Disseminate knowledge in microbiology among the members and other healthcare personnel and the public.
3. Highlight the importance of microbiology in relation to the development and requirements of the country.
4. Advice and initiate action on issues related to microbiology which may arise in the country.
5. Discuss matters of scientific and professional interest pertaining to microbiology.
6. Promote research and actively assist in such work and publish original work in microbiology.

In keeping with the objectives the council 2019 decided to work on the theme “**Breaking barriers for sustainable excellence in patient care**” during this year.

I take this opportunity to speak on a topic outside Microbiology but which I consider is important to achieve excellence in patient care and titled it as **Ethical Considerations in Laboratory Medicine**.

The evolution of medical and bio-ethics over the years is well documented and includes the Nuremberg Code in 1947, the Declaration of Geneva in 1948, the Declaration of Helsinki in 1964 and the Belmont report in 1978.

While many of these documents focus on medical research, concepts in the Declaration of Geneva and the Belmont report are also applicable to the practice of clinical medicine.

The “Belmont Report” is one of the key works concerning ethics and healthcare research. It outlines ethical principles and guidelines for the protection of human subjects. The report identifies four core principles.

- a) **Autonomy** – respect for the patient’s right to self-determination: Acknowledgement of autonomy and protection of those with diminished autonomy.
- b) **Beneficence** – the duty to ‘do good’: The duty to act in the best interests of patients or research subjects. The goal of maximizing benefits.
- c) **Non-Maleficence** – the duty to ‘not do bad or harm’.

- d) **Justice** – to treat all people equally and equitably – The duty or obligation to treat patients equally and to distribute, by allocating fairly, what is rightly due in terms of benefits, risks and cost.

These principles can be applied to both research and clinical settings. I will consider the two principles Beneficence and Non-maleficence together and the core principles will be cited to explain the ethical issues in laboratory medicine.

Laboratory medicine, just as other areas of medicine, should adhere to high ethical standards. The International Organization for Standardization (ISO) has created ISO 15189:2012 “Medical laboratories – Requirements for quality and competence”. The document summarizes the ethical conduct expected in laboratories.

It states that laboratories should have in place measures to ensure that:

- a) “there is no involvement in any activities that would diminish confidence in the laboratory’s competence, impartiality, judgment or operational integrity;
- b) management and personnel are free from any undue commercial, financial, or other pressure and influences that may adversely affect the quality of work;
- c) where potential conflicts in competing interests exist, they shall be openly and appropriately declared;
- d) there are appropriate procedures to ensure that staff treat human samples, tissues or remains according to relevant legal requirements;
- e) confidentiality of information is maintained.”

I will focus on the ethical issues encountered during the daily routine work of laboratory medicine specialists and will consider them under pre-analytical, analytical and post-analytical phases.

Ethical Issues in the Pre-Analytical Phase

The maintenance of ethical standards in the pre-analytical phase is the collaborative responsibility of the laboratory, the health care provider, phlebotomist, nurse, or whoever collects the specimen.

Their roles include:

- Proper identification of the patient or subject.
- Collection of the appropriate sample using the appropriate technique.
- Appropriate identification and labeling of the sample so that the right tests are performed.
- Appropriate handling of the specimen until testing is performed.

In particular, the application of the ethical principles is as follows:

a) Respect for persons: Consent should be obtained prior to sample collection. Consent should be informed. Consent is expressed if the subject is asked for written or verbal agreement. Consent may be implied when a patient provides a requisition and willingly sits in a collection chair and allows a sample to be taken.

Informed consent may pose an ethical problem if the patient is incompetent to make a decision due to age, mental status, or critical illness. Who may be allowed to give consent on behalf of the patient may vary among regions, may be influenced by different cultural practices, and may depend on the policies of the institution.

The patient's right to refuse to be tested should be respected. However, there are certain situations in which patient autonomy is not absolute. For instance, a patient may be deemed incompetent to make a decision about their health, as when the patient is unconscious, mentally ill, or under the influence of drugs. Children are generally deemed not competent to make decisions for themselves. Children and adolescents under 18 years of age remains an area of controversy and is viewed differently in different parts of the world. There are cases of compulsory testing in certain groups such as intravenous drug users and prisoners. In these exceptional cases, healthcare professionals have an obligation to consult the guidelines provided by the institution in which they practice, and they must weigh the risks of loss of a patient's autonomy versus the benefits of the testing.

Confidential information about patient demographics, the visit of a patient to a testing facility, which tests were ordered, and the reasons for those tests, should be given only to appropriate personnel. Confidentiality must be maintained at every step of the process including specimen transportation and data entry.

b) Beneficence & Non-Maleficence: All tests should benefit the patient based on the best medical evidence.

In addition, sample collection should not cause harm. Therefore, standard operating procedures and trained personnel should be in place to prevent or mitigate any adverse events in the collection procedure. The collection procedure should be carried out using universal precautions to protect the patient and the healthcare worker, and should be performed with the least amount of patient discomfort possible by properly trained personnel. Additional specimens shall not be

collected for research procedures without informed consent from the patient and approval from the appropriate ethics review committees.

c) Justice: The clinical laboratory should, as far as possible, provide access to a wide variety of laboratory tests at reasonable cost. The laboratory should evaluate the need to introduce new tests and the opportunities to discontinue older tests when better tests are available. There should be no preference given to individuals to facilitate or expedite the collection process at the expense of other patients.

Ethical Issues in the Analytical Phase

Confidentiality, quality and competence are vital for all laboratories. The difficulty of achieving each of these goals may vary among laboratories. Confidentiality during the analytical phase may be almost a by-product of automation in a laboratory that uses automated bar code readers, automated analysis, and auto-verification and where the patient names for most samples are usually unseen by those in the laboratory. Challenges of maintaining confidentiality during the analytical phase are often greater in small laboratories that perform manual testing and in operations that conduct near-patient (point-of-care) testing.

Applying the ethical principles:

a) Respect for persons: Patient have the right to decline to have their specimens analyzed even after the specimens have been collected and processed. Confidentiality should be respected and maintained. In point-of-care testing, special care should be taken to maintain confidentiality as much as possible. Point-of-care settings can be difficult because testing is often conducted in a common room with access by trained and non-trained personnel.

b) Beneficence & Non-Maleficence: The aim of the laboratory in the analytical phase is to provide the best possible analytical result. This is achieved through good laboratory practice and maintenance of professional standards. Good laboratory practice should involve the establishment of a rigorous quality assurance program encompassing quality control testing, proficiency testing and laboratory accreditation.

"A wrong result is worse than no result" is a guiding principle in this regard. Good laboratory practice includes refusal to analyze or report a result when there is evidence of poor sample integrity, incorrect or poor labeling or other deficiencies that may compromise the test result. Acceptability of samples that are classified as "difficult to obtain" (such as cerebrospinal fluid) may be considered a special case, and individual facilities should develop an appropriate policy on analysis and documentation of these specimens when specimen integrity or identification is compromised.

Laboratories should maintain proper certification as required by their country or region. Only qualified, properly trained and regularly reaccredited personnel should perform point-of-care testing.

c) Justice: Discrimination in the analysis of patient samples based on gender, age or racial origin is an injustice. All patient samples are to be treated equally. It is recognized, however, that specimens designated as STAT or priority must be analyzed promptly to meet the medical need as early as possible. Laboratories should develop appropriate operating procedures for this type of testing, and state which tests are included and the expected turnaround times. It is expected that all specimens are analyzed accurately and in a timely manner.

Ethical Issues in the Post Analytical Phase

The post analytical phase includes reporting and interpretation of results, residual specimen storage, and data access. Laboratories should have a policy for specimen storage. Archiving of results in either electronic or hard copy format is an important aspect of good laboratory practice. Archived documents may include: (1) request forms, (2) raw analytical and quality control data, (3) results and (4) reports. Policies on retention and destruction of medical records and specimen retention and discard should be put in place. Identification of authorized personnel allowed to access medical records such as doctors, patients, and laboratory staff should be documented in the policy manual. In addition, the patient should be allowed to give consent for access by others (such as family members) as required.

Applying the ethical principles:

a) Respect for persons: There are substantial differences in the world regarding the confidentiality of results. In some areas, the patient and the referring clinician are the sole legitimate recipients of laboratory data. Exceptions are made if the patient is a juvenile or is incapable of receiving or understanding laboratory results. In other areas, the patient's family is regarded as legitimate recipients of a patient's laboratory results. Respect for local customs as to legitimate recipients of laboratory data should be taken into account as laboratories develop a policy on dissemination of results. In some areas, there may be exceptions regarding who may access results; access is affected by legal requirements, insurance rules, and government regulations. Reliable transmission methods should be used, and security in relaying the results should be protected regardless of the channel of communications.

Patients have a reasonable expectation that their samples will be used solely for the laboratory testing requested by the clinician. Individuals have the right to decide when and if their records or specimens shall be used outside the normal medical care to which they have consented. Any further testing of residual samples (except for method validation or in cases where samples are completely anonymized) should be approved by an ethics review committee, and patient consent may be required.

b) Beneficence & Non-Maleficence: Misinterpretation of results can lead to patient harm; to minimize this harm, only personnel who are qualified should interpret reports. The reporting of results should be performed in a manner such that the patient's clinician receives the right result within an appropriate time with information that allows for the correct interpretation of the results. Turn-around time (TAT) should be as short as possible based on laboratory conditions for that test, and achieving this TAT should not compromise validity of the results. Timely access to results is important, and withholding of results because of non-payment might lead to harming the patient especially in emergency situations.

Delays in reporting, for whatever reason, should be avoided. Incorrect results can lead to mismanagement. Ordering clinicians should be notified of errors as soon as they are identified, and test results should be corrected as soon as possible. The change should be marked on the report, and the incorrect result or results should remain accessible and be clearly identified as erroneous.

c) Justice: The reporting of results should be consistent for all patients. Rapid reporting may be required for some results, such as for "critical" and "significant-risk" results, but the rules for rapid reporting must apply regardless of the source of the sample and the patient's ability to pay. Withholding of laboratory results because the patient has not paid should be avoided.

A policy on the use of residual samples should be developed. Residual samples are often used without the patient's knowledge. There is much discussion in the literature about who owns patient specimens and whether patients should share in profits if financial gains are derived from leftover samples.

Ladies and gentlemen,

I have briefly introduced an important aspect in laboratory medicine which I believe needs to be addressed in order to achieve sustainable excellence in patient care.

Thank you



Worms and disease: demonstrating the impact of soil-transmitted helminths on health and well-being

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Dr R S B Wickremesinghe

It is a great honour to deliver this year's Siri Wickremesinghe Memorial Oration, and I thank the President and Council members most sincerely for having invited me to do so. It is a particular pleasure to deliver an oration in memory of Dr Wickremesinghe, for whom I had great respect, and liked very much. Dr Wickremesinghe was one of the earliest members of our College and its' President in 1993 / 1994. He was a Consultant Medical Microbiologist at the Medical Research Institute for many years, the first Secretary to the Board of Study in Microbiology of the Postgraduate Institute of Medicine of the University of Colombo, and a much revered and loved teacher and mentor of many postgraduate trainees in Microbiology. I was not fortunate enough to have been taught by him, except very briefly, as a medical student. However, I do know that he was very much of a nature lover, with much enthusiasm for wild life in all its varied forms. He was also a very sociable person, with a great sense of humour.

Soil-transmitted helminths

The WHO has estimated that in 2010, worldwide, about 820 million persons were infected with the common round worm *Ascaris lumbricoides*; about 460 million with the whipworm, which is also known as *Trichuris trichiura*; and about 440 million with the hookworms, *Ancylostoma duodenale* or *Necator americanus* [1]. All of these, except *A. duodenale*, have been recognized as endemic in Sri Lanka for well over a century.

During the course of my research career, which now spans three decades, I have worked on many different aspects of soil-transmitted helminth infections, looking at them from both Sri Lankan and global perspectives. In this Oration, I will first briefly describe the salient biology of the STH infections and the historical aspects pertinent to Sri Lanka, and then focus on those of my studies that have examined the clinical impact of STH infections. Finally, I will briefly touch on how scientific evidence can and should underpin health policies for the control of STH infections.

Relevant biological aspects

The adult stages of all the soil-transmitted helminths live in our gut. The female worms produce microscopic eggs that are passed out in faeces, and require a period of development in the soil in order to develop to the next stage – which is the reason why they are known as soil-transmitted helminths. Humans acquire new infections by either ingesting infective eggs with food or water or soil, or in the case of hookworms, when the larval stages in the soil come into contact with bare skin. Each egg that is swallowed, or each larva that enters the body, will grow into an adult worm, which lives out its given life span in the small or large intestine. The adult worms cannot multiply inside the human host, unlike bacteria and viruses. However, roundworm and whipworm eggs can remain infective for many years, if the environmental conditions are suitable (as is the case in most of Sri Lanka), and re-infection is common among those whose behaviour puts them at risk of infection. The number of worms harboured by an individual is an important determinant of how likely they are to suffer from ill health as a result of the infection.

There are two other points of importance. The first point is that in any endemic community, most people will have very few worms, and a few people will have a lot of worms, as shown in Figure 1.

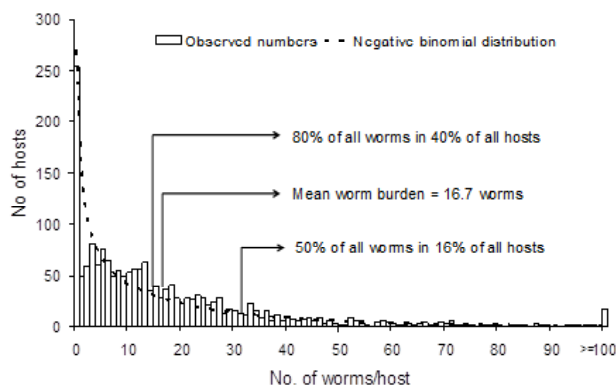


Figure 1. The distribution of the numbers of *Ascaris lumbricoides* in 1,765 people in an urban community in Bangladesh [from Reference 2]

The second point is about the non-linear relationship between prevalence, i.e. the proportion of individuals who are infected, and intensity of infection in endemic communities, as shown in Figure 2. It plots the mean worm burden on the x-axis and prevalence of roundworm infection on the y-axis. When the prevalence is very high, i.e., over 80% of the community is infected, the average number of roundworms per individual can vary a great deal. However, at lower prevalences, widely different rates are associated with minimally different mean worm burdens.

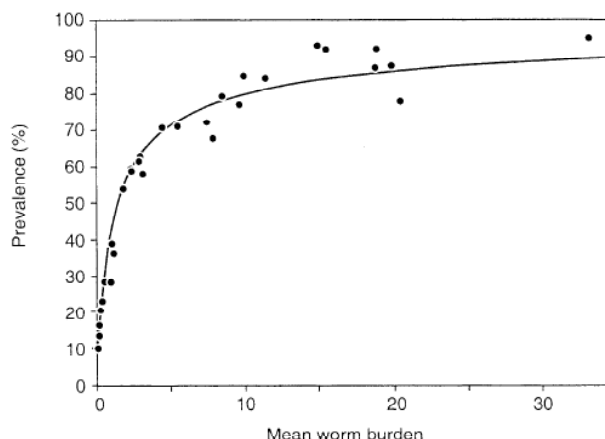


Figure 2. Relationship between prevalence and mean intensity of *Ascaris lumbricoides* (worm burden obtained by expulsion chemotherapy) [from Reference 3]

Historical aspects

Hookworm was first identified in this country in the 1880s by Dr P S Brito, a lecturer at the Ceylon Medical College, about 50 years after it was first described by an Italian physician in 1838. By the early 20th century, the medical officers of the colonial administration had repeatedly voiced their concerns that hookworm was a major political and public health issue in the country, owing to their belief that it was brought over from India by the indentured labourers that the British planters put to work on the plantations, and their recognition of the profound anaemia caused by untreated hookworm infections [4].

In 1938, P B Fernando, who was the first professor of Medicine in the Ceylon Medical College, wrote that over a 3-year period, about 7.8% of about 10,000 patients admitted under his care at the General Hospital Colombo, required treatment for hookworm; and about 3.4% of these had congestive heart failure due to severe hookworm anaemia [5]. The same year, S F Chellappah wrote on public health aspects of hookworm infections in Sri Lanka. In this paper, he cited figures from an island-wide survey carried out in the 1920s, which found that 90% of over 32,000 persons examined, were hookworm positive [6]. A few years later, Fernando and Balasingham attributed a mortality rate of 8.0% due to ascariasis in the Government hospitals and dispensaries, much higher than the mortality rate of 3.3% due to hookworm infection [7]. In 1950, Sivaratnam also drew attention to ascariasis, as “a very common disease among children in this country, which causes great anguish to the mother, and distress and acute suffering to the child, and in a multiplicity of ways assumes catastrophic proportions, and yet is dangerously neglected as a condition of no importance”.

He noted that among 200 children aged 1-3 years in his wards, 55 were diagnosed with ascariasis, and eight had died of it [8].

These observations were made in an era when physicians had to depend on anthelmintics like chenopodium and tetrachloroethylene, which were really not very effective. We moved through the use of anthelmintics like piperazine, pyrantel and levamisole to the drugs that are widely used now: mebendazole and albendazole [9]. These benzimidazole anthelmintics have hardly any side effects, but are very effective in killing the worms. In the early 1980s, Vermox, which was the patented form of mebendazole, was a relatively expensive new drug. When it was prescribed by a physician or paediatrician in the state hospitals, it had to be specially procured on Local Purchase. However, when the patent on Vermox expired, and generic forms of the drug became available, the cost fell dramatically. Regular deworming, which was already widely practiced in Sri Lanka, became much more effective in keeping worm burdens low. By the last decade of the 20th century, the situation was greatly improved from that in the first half of the century. This was probably due to a combination of improved housing and sanitation, and the widespread availability of effective, low cost anthelmintics. Infections are now mostly seen urban slums and in the plantation sector, in underprivileged communities with little access to decent sanitation [9].

Ascaris-induced morbidity and mortality from a global perspective

With regard to my own research on the impact of STH infections on human health and well-being, I will first present some work done during my post-MD training under Dr D A P Bundy in the University of Oxford. Dr Bundy and his group were pioneers in quantifying the global impact of STH infections, in terms of estimating the numbers of infected persons, and the morbidity and mortality that resulted from the infections. In the year that I worked with Dr Bundy's team, I focussed mostly on ascariasis.

The first paper that resulted from this work examined the relationship between acute intestinal obstruction caused by ascariasis and the prevalence of infection in the community [10]. This was done by collating historical data from many different studies that described the occurrence of *Ascaris*-induced intestinal obstruction in specific regions of endemic countries, and studies on the community prevalence of ascariasis in the same regions at around the same time. As Figure 3 shows, the incidence of *Ascaris*-induced intestinal obstruction clearly increases as community prevalence of infection increases, but this is not a linear relationship.

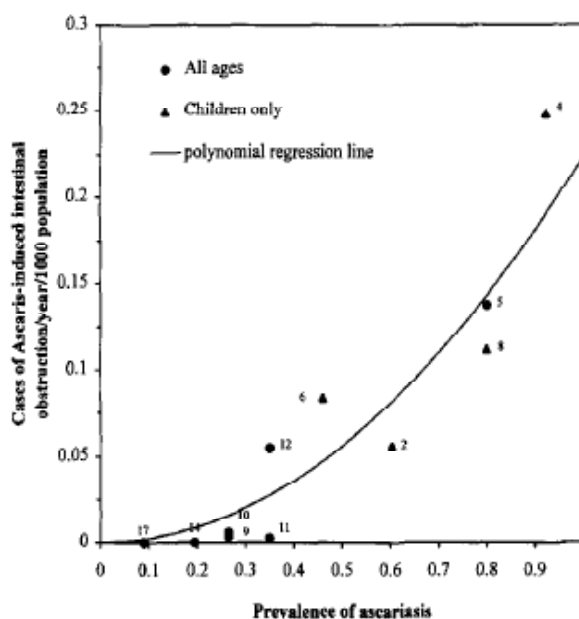


Figure 3. The relationship between community prevalence of ascariasis and incidence of *Ascaris*-induced intestinal obstruction [from Reference 10]

The next paper went into more depth regarding the actual worm burdens associated with acute intestinal obstruction [11]. Using a similar approach, it was possible to show (see Figure 4) that patients with acute intestinal obstruction due to ascariasis usually had >60 worms; that fatal cases usually had a 10-fold higher worm burden; and that children under the age of 5 years developed obstruction with much smaller worm burdens. This was not surprising, since roundworms are large (up to 30 cm in length) and the narrow intestinal lumen of little children can be obstructed by the presence of a relatively small, tangled mass of worms.

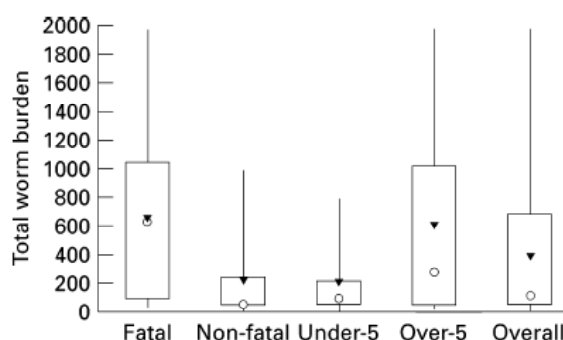


Figure 4. Comparison of worm burden in fatal ($n=9$) and non-fatal ($n=15$) cases, and in under-fives ($n=13$) and older patients ($n=11$). Vertical line indicates range, box indicates 25th and 75th percentiles. $\circ$, Median; $\blacktriangledown$, mean.

Figure 4. Worm burden in cases of acute intestinal obstruction due to ascariasis [from Reference 11]

During that same year, a third paper in which we re-estimated the global morbidity and mortality due to ascariasis was published [12]. A mathematical model developed previously by Dr Man-Suen Chan, and an extensive data set on community-based prevalence studies from around the world formed the basis of this paper. We categorized the morbidity caused by *Ascaris* infections into four types: two of which are unlikely to manifest as clinically overt illness, and another two which would cause illness of some severity, and occasionally even be fatal. We estimated that in 1990, *Ascaris* infections added up to a total of about 1.2 billion cases worldwide, while 59 million individuals (mostly children) were at risk of suffering some deficit from this infection. This included 12 million cases of acute, clinically overt illness. We also estimated that ascariasis caused about 10,000 deaths each year, which is a tiny figure compared to the extremely large number of infections.

Impact of STH infections on the health and well-being of Sri Lankans

In 2001-2002, I supervised Ms Radhyroopa Selvaratnam, who was reading for an MSc in Food and Nutrition from the University of Kelaniya. She was very keen to look at the impact of hookworm infections on the lives of women working in the tea plantations. We assessed 304 women for anthropometry, haemoglobin levels, hookworm infection status, and dietary intake, along with the weight of tea leaves that they plucked over a period of one month [13]. As Figure 5 shows, there was a very clear, statistically significant relationship between haemoglobin levels (which were indicative of the severity of anaemia) and their labour productivity, as measured in the weight of tea leaves plucked over one month.

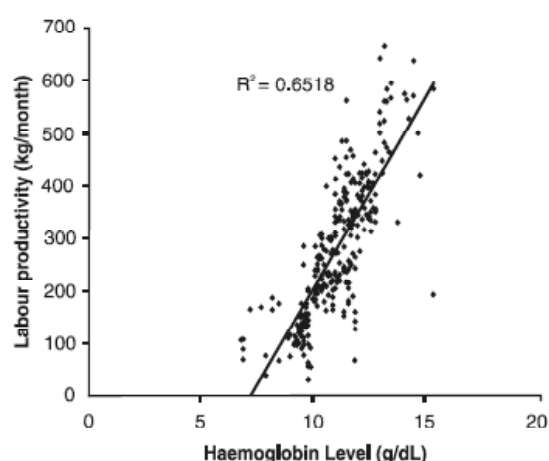


Figure 5. Relationship between haemoglobin levels and monthly labour productivity
[from Reference 13]

However, it should be noted that the prevalence of hookworm was only about 10% in this population, and all infections were of light intensity. This fact, combined with a 24-hour dietary recall history, suggested that the anaemia was probably largely due to nutritional deficiencies, compounded only in some instances, by hookworm-induced iron deficiency.

A few years later, Dr Manouri Amarasekera who was a budding Physiologist, wanted to examine the effect of helminth infections on atopy and allergy for her MPhil. She carried out her study in a population of schoolchildren attending grade 5 classes in 17 schools in the Western Province [14]. The children were assessed for allergic diseases using the International Study of Asthma and Allergies in Childhood questionnaire. Their serum total IgE and allergen specific IgE for five common aeroallergens were measured by ImmunoCAP method and stools were examined for the presence of helminth infections. A total of 640 children were recruited to the study. 33.7% of them had evidence of allergic disease and 15.5% had helminth infections. The majority of infections (68.9%) were of low intensity.

We did not find a significant relationship between allergic disease and helminth infections, but noted a trend toward protective role of helminth infections against allergic diseases. We found that allergic sensitization, or atopy, was a significant risk factor for allergic disease only among non-infected children and not in infected children. We concluded that there appeared to be a reduced risk of allergy in helminth-infected children in our study population, and that decrease in the intensity of helminth infections may have contributed to the reduced capacity of immune-modulation by helminths in this paediatric population.

The next study was conducted by a team led by my colleague Prof Kithsiri Gunawardena. They examined 1,890 children from 114 estate sector schools in five districts that had extensive tea or rubber plantations: Ratnapura, Kegalle, Kandy, Nuwara Eliya and Badulla [15]. Our findings were presented in two papers published in 2011 and 2013.

Figures 6 and 7 are two maps from the first paper, and show the locations of the schools, and the predicted prevalence of STH infections based on our survey [15]. You can see that while the predicted prevalence was less than 20% in most of Badulla and Kandy districts, there were still some hotspots in parts of Kegalle and Nuwara Eliya with predicted prevalence rates of over 50%.

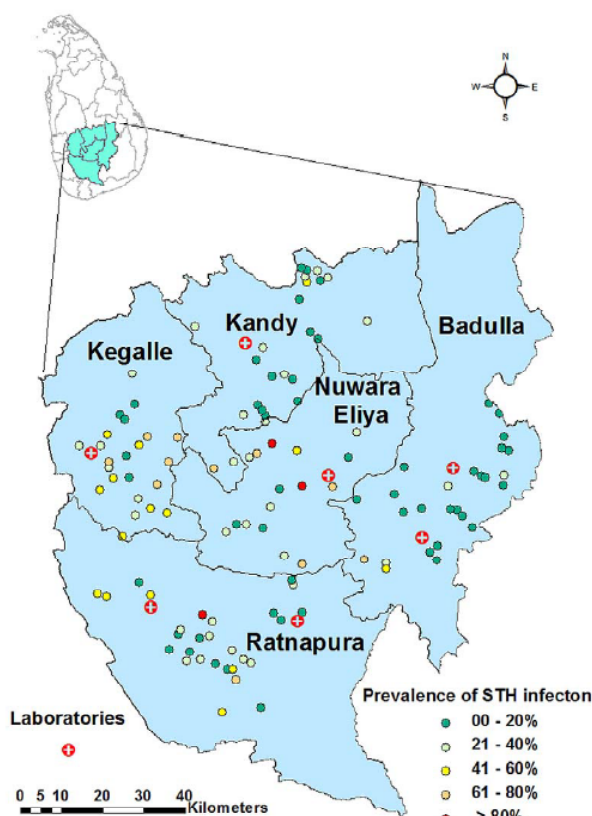


Figure 6. Location of schools and laboratories where study was conducted [15]

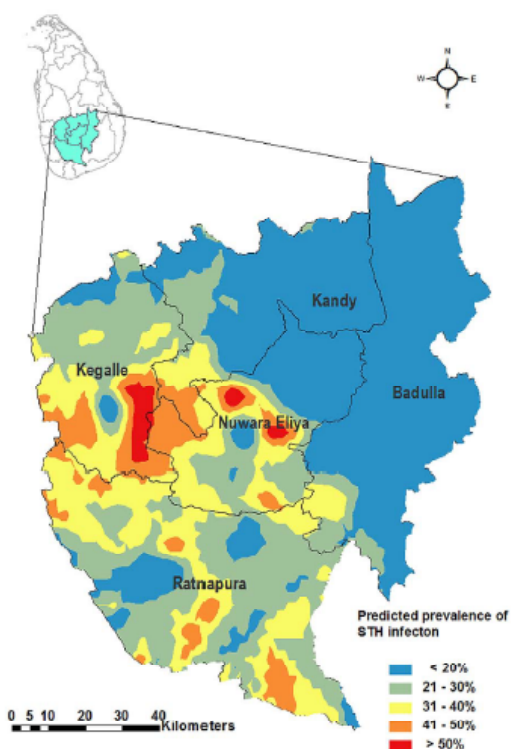


Figure 7. Predicted prevalence of STH infection in plantation sector communities [from reference 15]

We combined this assessment of prevalence with a cluster randomized study of the impact of de-worming and iron supplements on worm infections, on anaemia, and on the cognitive abilities of school children, as described in the second publication from this study [16]. Cognitive functions were assessed by an internationally validated test of concentration ability. It was included because some studies in other endemic countries have suggested that STH infections result in reduced cognitive ability in children. We randomized schools to treatment or control. The treatment group received a single dose of 500 mg mebendazole and weekly supplements of 60 mg of elemental iron for 24 weeks, while the control group received placebos. Children were assessed for STH infection, Hb levels and in tests of concentration ability, at baseline and follow up after six months.

At the six-month follow up we found that there was a significant reduction in the prevalence and intensity of roundworm and whipworm infections in the treated group, as expected, but there was no demonstrable impact on hookworm infection rates, Hb levels or cognitive abilities. The difference in impact on the three different species of worms was probably because of the well-recognized fact that single dose mebendazole is less effective in curing hookworm infections. In any event, we concluded that decline in STH prevalence alone, in the absence of improved Hb status, produced no evidence of impact on concentration levels or educational test scores [16].

Evidence-based control policies

The WHO recommends routine treatment without prior screening for vulnerable groups such as children and pregnant women in endemic areas [1]. However, a series of recent Cochrane systematic reviews have argued against mass deworming programmes, on the grounds that there is substantial evidence that mass de-worming does not produce health benefits [17-19]. As mentioned in a recent paper co-authored by Don Bundy, myself and several others, the controversy has resulted in what has been dubbed the 'worm wars' – a rather acrimonious public debate regarding the cost-benefits of mass deworming programmes for STH control [20].

Why has mass deworming become so controversial? A few minutes ago, I talked about the kind of health impact seen in Sri Lanka in the early half of the 20th century, and the kind of morbidity that I encountered in the scientific literature from other countries while working with Dr Bundy's team in Oxford. I am sure it was this kind of observation which convinced the public health policy makers of that era of the need and justification for de-worming without prior screening in endemic areas. Moreover, mass deworming has remained a public health strategy for so long not only because we believe that anthelmintics benefit infected persons when they kill worms, and do no harm to uninfected persons, but also

because prior screening by stool examination in order to treat only the infected is a lot more complicated and expensive.

However, science and society have evolved a great deal over the past century. Three changes in particular are of importance in this regard. The first is the widespread availability and use of highly effective anthelmintics for several decades now, which I have referred to previously. Second, as millions of people have been lifted out of poverty, housing and sanitation have also improved dramatically. Third, randomized, controlled trials are now thought to be the best evidence of effectiveness and impact of any intervention.

The first two changes mean that all around the world, and not just in Sri Lanka, soil-transmitted helminth infections have steadily declined. The strongest impact of regular deworming is on the intensity of infection – the worm burden carried by infected individuals. This declines much more rapidly than prevalence rates, which just record the proportion of infected persons. As a result, we no longer encounter the kind of clinical scenario described by PB Fernando, Sivaratnam and others, simply because people in endemic areas no longer harbour that kind of worm burden.

This then brings us to the type of situation we encountered in our studies in the plantation sector, in that it has become increasingly difficult to demonstrate the impact of deworming programmes on health and well-being through rigorously conducted clinical trials, even though deworming is clearly effective in reducing the proportion of infected persons and the intensity of infection.

Sri Lanka has been a leader in STH control for many decades now, with mass deworming programmes in the first half of the 20th century, followed by school-based deworming programmes and routine ante-natal deworming. We are very fortunate in that our decisions regarding deworming programmes now relate to scaling down, rather than scaling up.

The latest Health Ministry circular regarding community-based deworming, formulated by our colleagues in the Family Health Bureau and issued in December 2018 [21], was based on a national survey that we conducted for them in 2017. We examined stool samples from over 4000 children in 130 schools around the country and my colleague Dileepa Ediriweera developed a mathematical model that enabled the production of risk maps like the one shown here, which enable the categorization of MOH areas and districts into low risk, intermediate risk and high risk areas [22]. The circular recommends that routine deworming should be stopped in districts categorized as low risk, but continued for a few years more in the other areas [21].

Ladies and gentlemen, I want to leave you with a few questions. First, would it be appropriate to set a goal of complete elimination of the risk of STH infections in all of Sri Lanka? Or, would it be wiser to allow some residual transmission to persist? I ask this because, as the work by Amarasekera et al, as well as that of many others around the world suggests, intestinal helminths, which have been part of our gut microbiota from time immemorial, may actually have some beneficial effects on other aspects of human health [23]. If we agree that a goal of complete interruption of transmission is unnecessary or undesirable, then what is the level of prevalence that we might consider acceptable?

I have no answers for you today, but those of us working in the preventive health sector will probably need to figure this out in the near future.

Acknowledgements

I would like to end this Oration by acknowledging all those with whom I have had the privilege to work with on STH infections over the past 25 years.

My teachers and mentors in this field – Prof Manel Wijesundera, the late Prof Mahroof Ismail and Prof Don Bundy in particular – have been an amazing source of inspiration.

I am truly grateful to my colleagues from the Depts of Parasitology and Public Health in Ragama, several postgraduate students, colleagues from other Depts of Parasitology in our medical faculties in Sri Lanka, Community Physicians from the Family Health Bureau, and colleagues from the University of Oxford and Imperial College London, whose lives and work have enriched mine.

I especially thank the Technical Officers in our Dept of Parasitology, Hemantha Sudusinghe and Waruna Nilaweera, as well as our laboratory attendants Weedagama and Marasinghe because without them, half the work that I described today would have just been plain impossible.

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A GUIDE TO IDENTIFY NEMATODES COMMONLY FOUND IN HUMAN TISSUE SECTIONS IN SRI LANKA

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Introduction

Nematodes are round worms. They are found in almost all the habitats. Some are free living while others are parasitic on plants, animals or humans. Nematodes have an elongated non-segmented, bilaterally symmetrical, cylindrical body which taper towards the ends. They have separate sexes; male worms being smaller and shorter than females. Males have a curved posterior end which helps in easy identification of the sex. Nematodes are pseudocoelomate that distinguish them from platyhelminths (acoelomate). They possess a primitive central nervous system (circumesophageal ring of nerve ganglia, nerve trunks and branches), an excretory system, a complete digestive tract with oral and anal openings and a highly developed reproductive system which allow production of large number of eggs. Nematodes do not have a circulatory or respiratory system. Knowledge of these morphological and internal structures is useful in identification of nematodes in the laboratory.

Parasitic nematodes of humans reside either in the intestine or tissue. The tissue nematode infections can be caused by both human and non-human nematodes. Animal nematodes cannot complete the life cycle inside humans thus localizes mostly at the site of entry itself due to the host immune reaction. Nematode worm cross-sections may be encountered in tissue samples including biopsies removed at surgeries (especially from nodulectomies) or autopsies sent to histopathology laboratories. When worm cross-sections are detected in biopsy specimens histopathology slides and specimens are referred to parasitologists for species identification. Even though the therapeutic relevance of specific aetiological diagnosis is of limited value, it is important for epidemiological purposes. The knowledge derived will alert all relevant categories of doctors from clinical, diagnostic and preventive sectors to look for such infections or take necessary preventive measures. With the change of ecology and food habits even infections which were considered rare or uncommon in Sri Lanka could become more common (Eg: anisakiasis after eating

shashimi). When literature is studied, it is noted that certain uncommon parasites have been recovered during examination of histological sections.

Nematode parasites found in human tissues include a wide variety such as Ascaroidida (Eg: *Ascaris lumbricoides*, *Toxocara* species), Oxyurida (Eg: *Enterobius vermicularis*), Strongylida (Eg: *Necator* and *Ancylostoma* species), Spirurida (superfamily filarioidea Eg: *Wuchereria bancrofti*, *Brugia malayi*, *Onchocerca volvulus*, *Loa loa*, *Mansonella* species, *Dracunculus medinensis*, *Dirofilaria* species etc.), Rhabditida (Eg: *Strongyloides* species), Enoplida (Eg: *Trichuris*, *Trichinella*, *Capillaria*)¹. Both or either adult or larval stage can be found. Human is the natural host for some of these nematodes while some others who do not otherwise enter human tissue can invade accidentally (eg: *Dirofilaria* species).

Of the filarioidea, *Wuchereria bancrofti* and *Brugia malayi* has been detected in Sri Lanka². Both of them occupy the lymphatic system of humans under usual circumstances thus the larva or adult can be seen in lymph node biopsies. Yet they have also been found in aberrant sites such as in subcutaneous tissue. Possible explanation is that the infective filariform larvae deposited on the skin by the mosquito vector were unable to enter their usual anatomical location as they were trapped in the subcutaneous tissues by the host immune response resulting in granuloma formation within which the filariform larva may develop further or may die in-situ. The commonest filarioidea detected in subcutaneous lumps is the zoonotic filarial worm of dogs *Dirofilaria repens* transmitted by mosquito vectors such as *Aedes aegypti*, *Armigeres subalbatus*, *Mansonia uniformis* and *Mansonia annulifera*³. Man being an unusual host, the animal filarial worm, is unable to complete its life cycle in the human body and thus get trapped by the human granulomatous reaction. The infection in humans is detected only by laboratory identification of *Dirofilaria* species in tissue sections as microfilaria is not formed within human body. *Dirofilaria* species has also been seen located in the epididymis, spermatic cord, lung, breast, omentum and

under the conjunctiva⁴. In Sri Lanka over 170 cases of *Dirofilaria repens* were reported by 2002⁵. This includes several foreigners who have contracted the infection undoubtedly during their stay in Sri Lanka. Unlike in other affected countries dirofilariasis is frequently seen among Sri Lankan children and commonly affects the subcutaneous tissues of exposed parts of the body such as head and neck area. Another animal filarial worm *Brugia ceylonensis* of cats has also been recognized in Sri Lanka⁵. A study of dirofilariasis in a selected area in the Western Province in 2005 has reported that 45% of the screened dogs were infected with *Dirofilaria repens* or *Brugia ceylonensis*⁶. Abundance of vector mosquitoes and high prevalence of the parasites within the reservoir host makes the human population more vulnerable to these zoonotic filariasis infections.

There are also reports of tissue invading nematodes such as visceral larva migrans (Eg: *Toxocara* species), cat hookworm (*Ancylostoma tubaeforme*), *Parastrongylus* (*Angiostrongylus*), *Gnathostoma* and cestodes like subcutaneous sparganosis from Sri Lanka^{5,7,8,9}.

Intestinal nematodes prevalent in Sri Lanka include *Ascaris lumbricoides*, *Necator americanus* and *Strongyloides stercoralis* inhabiting small intestine and *Enterobius vermicularis* and *Trichuris trichiura* in large intestine. Of those intestinal nematodes *Ascaris*, *Trichuris* and *Enterobius* are also found in tissue sections.

General morphological features assisting identification of nematodes

Nematodes have a well-developed body wall covered with a cuticle. Cuticle may bear surface modification such as transverse or longitudinal marking (striations/annulations), lateral alae, blister-like inflations (bosses/plaques), spines, combs, spiral rings. Thickness of the cuticle varies in different species. Thin hypodermis/epidermis which is mostly syncytial (cellular in *Trichuris*) projects into pseudocoelom to form dorsal, ventral, lateral chords (lateral chords are more prominent). Well-developed longitudinally oriented elongated spindle-shaped smooth muscles separated by chords into quadrants. Body cavity (pseudocoelom), contains digestive and reproductive tracts. Digestive tract possesses a triradiate esophagus. Reproductive tract consists of tubular gonads (male or female). One or two gonads open at the vulva of females and into the rectum of males. Tubular male organ is divided into three parts, testes, seminal vesicles and vas deferens which enters rectum to form cloaca. Spicules (which enter to cloaca) have cuticular lining and yellow to dark brown or black. On the tail, caudal alae, rays (caudal papillae) may be present. Female: usually have two ovaries which are long and highly coiled.

Muscle cell types seen in nematodes

In platymyarin muscle cells, basal contractile portion of the cell is wide and shallow and lies close to the hypodermis. In ceolomyarin muscle cells, basal contractile portion of the cell is U shaped and extends upwards along the sides of the cell. In polymyarin muscle cells, all somatic muscle cells are arranged in a row beneath the hypodermis and are parallel to and overlapping each other. When those numbers of rows of muscle cells are more than five they are called polymyarin. Two or less are holomyarin and two to five are meromyarin. Typically polymyarin are ceolomyarin and holomyarin and meromyarin are platymyarin.

Esophageal variations seen in nematodes

Rhabditiform esophagus is divided into three parts as corpus, isthmus and bulb. Cylindroid form has an anterior muscular and posterior glandular (Eg: filariae) portions. Hookworm has a clavate or club shaped esophagus. In trichuris esophagus is tubular and embedded in a row of block-shaped cells (Stichocytes) forming a stichosome. Its lumen is not triradiate but tubular.

Tissue habitats of adult and larvae of nematodes commonly encountered in Sri Lanka

Adults of *Ascaris lumbricoides*, *Necator americanus*, *Enterobius vermicularis* and both adult and larvae of *Strongyloides stercoralis* are encountered in small intestines and appendix. Larvae of *Ascaris lumbricoides* and *Necator americanus* are seen in lung tissues. If an adult worm is seen in large intestinal tissue, it could mostly likely be *Enterobius vermicularis* or *Trichuris trichiura*. *Toxocara canis* and *Toxocara cati* are usually found in tissues of liver, gall bladder and eye. Immature and mature adults of human filarial parasites *Wuchereria bancrofti* and *Brugia malayi* are commonly seen in lymph nodes, lymphatics and subcutaneous tissues. Meanwhile animal filarial parasite *Dirofilaria repens* is usually encountered in subcutaneous tissues and eyes. In addition to these usual sites, all these nematodes can also be found in certain secondary and rare sites.

Morphological characteristics useful in identification of adult nematodes in histology slides

First clue to the diagnosis of *Ascaris lumbricoides* is the large sizes of the cut sections of the worm. *Ascaris lumbricoides* has a thick, multi-layered cuticle with a smooth surface. Its fibrous-looking hypodermis is thin but widens to form dorsal, ventral and lateral chords. Large lateral excretory canals are embedded in lateral chords. The well-developed ceolomyarin type muscles are tall and slender. Digestive tract consist of a short muscular

esophagus and an intestine with irregular contorted lumen that is lined by tall slender columnar cells with nucleus in the base. Female *Ascaris lumbricoides* has paired extensively coiled genital tubes containing developing eggs and paired uteri containing mature eggs. Male reproductive tract consists of a highly coiled tube.

Necator americanus adults are only less frequently seen in tissues but may present occasionally. It has a thick cuticle. Its hypodermis is thin but widens to form dorsal, ventral and lateral chords. Lateral chords are prominent. Muscle cells are of platymyarin type and 3-4 cells per quadrant. Esophagus is club shaped and has a triradiate lumen. Intestine has few multinucleated cells. Reproductive tract is confined to the posterior two third of the body.

Trichuris trichiura's thick cuticle has cuticular annulations. Hypodermis has a cellular appearance. Bacillary band (formed by cuticle and hypodermis together) is composed of tall columnar cells. Muscle cells are of ceolomyarin type. Esophagus is tubular and embedded in a row of block-shaped cells (Stichocytes) forming a stichosome.

Enterobius vermicularis's cuticle is thin but when dead swollen and thicker and presence of lateral alae aids the identification. Hypodermis is thin. Prominent lateral chords have a highly vacuolated appearance. Muscle cells are of platymyarin or meromyarin type and 2-3 cells per each quadrant. Esophagus is rhabditoid. Intestine may be tubular or narrow and irregular. Female reproductive tract is didelphic and amphidelphic, confined to middle half of the body. Typical eggs may be seen. Male worm has a single tube in posterior two third of the body. When found from ectopic sites, worm is usually female.

Filarial worms generally lie in coiled position thus many cross sections can be seen in tissue sections. Features of the body wall are the most important for identification of *Wuchereria bancrofti*. Cuticle is thin but thickened at lateral sides. It appears smooth but fine transverse striations are present. Hypodermis is thin except at prominent but short lateral chords which occupy two fifth of body circumference. Hypodermal nuclei are typically seen at the base. Muscle cells are of ceolomyarin type with voluminous cytoplasmic portion. Height of cells depends on the fullness of the pseudoceolom. Muscle cells of male worms tend to be taller. Anterior part of esophagus is muscular while posterior is glandular. Intestine is a simple cylindrical tube and has no histological diagnostic value.

Reproductive tract does not provide clue to species identification either. It indicates only the state of maturity and fertility. Females have paired uterine tubes at most levels and coiled ovaries at the posterior end. Reproductive tube of male is the testis found in anterior end and remainder or reproductive tract is straight and cylindrical.

Cuticle of *Brugia malayi* is thin (2µm) but thickened (twice the size) at lateral sides. Surface is smooth. Hypodermis is extremely thin but expands to form prominent lateral chords that are tall in the extremities and flatter in rest of areas. In the male, at the level of the tail, it is conoid in shape.

Lateral chords occupy one third of the circumference in middle two thirds of the body. Ventral and dorsal chords are not apparent at most levels but when present, they are tall and slender. Muscle cells are eolomyarin and tallest at extremities, shorter when pseudoceolom is full with organs. There are 4-5 cells per quadrant. In males in tail area, contractile portion is strong and cytoplasmic portion is almost non-existent. Esophagus is long, two areas as anterior muscular and posterior glandular. Triradiate lumen is always seen. Intestine is a small simple tube lined by low cuboidal cells. Intestine is mostly pushed to the wall by other organs. Vagina of female is moderately long and coiled and placed anteriorly. There are two parallel uterine tubes running most of the body length. Typically they are filled with developing eggs and microfilaria or unsegmented eggs if not inseminated or infertile. Ovaries are long and highly coiled. Male testis is located in anterior part. There is a single genital tube. Both sexes have a head bulb. There are no alae. In males at all levels cross sections show only two tubes (reproductive tube and thin walled intestine). Differentiation of *B. malayi* from *W. bancrofti* is due to its smaller size, thicker cuticle and prominent thickening of the cuticle in the lateral fields.

Dirofilaria repens has a thick, multilayered (layers are oblique to body axis) cuticle with longitudinal cuticular ridges giving cog-wheel like appearance in cross sections. Thomas C. Orihel and Mark L. Eberhard¹⁰ states that cuticular ridges are 7.5-11µm apart from each other. The space between the longitudinal ridges are separated by a space equal or greater than the width of the ridge itself; 95-105 ridges on the circumference of the body. The worm measures up to 660 µm in maximum diameter. Further they also reports that all of the described species of *Dirofilaria* inhabiting subcutaneous tissues of their natural hosts, with the exception of *Dirofilaria lutrae*, have longitudinal ridges on the surface of the cuticle. Most dirofilarias recovered from human subcutaneous tissues have also shown these cuticular features. At lateral margins, internal cuticular ridges are present. Hypodermis is thin but expands to form prominent lateral chords. Ventral and dorsal chords are

inconspicuous. Muscle cells are typical Ceolomyarin in type. Males show only two tubes (reproductive tract and intestine) in cross sections while females have two or more reproductive tracts (paired uteri and ovaries). In dead worms, muscles, hypodermis, intestine, reproductive tracts degenerate quickly. Cuticle is the most resistant to degeneration; it swells up and shows the multilayers, cuticular ridges and internal lateral cuticular ridges well.

A guide to identify larval stages of nematode infections prevalent in Sri Lanka

Ascaris lumbricoides 2nd and 3rd larval stages may be encountered occasionally in tissue sections. *Ascaris* L2 is 14-16 × 300 µm in size and has a patent gut that is composed of three cells. It has prominent lateral alae, a small well-defined excretory column which helps in identification. In comparison, *Ascaris* L3 is 26-50 × 1600 µm in size and has a patent gut of which the lumen is lined with microvilli. It also has prominent lateral alae, a large excretory column of which the width is equal or larger than the intestine.

Another larvae that may come across is *Toxocara* larvae. It is 17-21 × 400 µm in size and has a non-patent gut that is composed of 7 cells. *Toxocara* larva also has prominent lateral alae, a large excretory column of which the width is larger than the intestine.

The details given in this article are only about the nematodes prevalent in Sri Lanka. This gives an easy guide for routine diagnosis. However, it is vital to observe the features with open mind and then refer the guide for confirmation. Otherwise one trying to fit the features seen only to the ones given here will miss an important or rare case or an infection which has never been reported from Sri Lanka.

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HIDDEN PATHOLOGY BEHIND MELIOIDOSIS; DO WE NEED TO PAY MORE ATTENTION?

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Introduction

Melioidosis is a tropical disease caused by *Burkholderia pseudomallei*, which can present in a range of illnesses from acute septicaemia to a more sub-acute presentation which may mimic even malignancy or tuberculosis [1, 2]. However, detection of underlying malignancy following clinical melioidosis is neither very well described nor investigated.

Case history 1

A 59 year-old mason from Thalgaswala presented in July 2018, with productive cough, evening pyrexia, generalized body weakness, loss of appetite (LOA) and loss weight (LOW) for 3 weeks. He was a smoker. On admission he was febrile, emaciated, not pale, or icteric and but had bilateral crepitations on auscultation.

His chest x-ray revealed bilateral cavitary lesions suggestive of abscesses. His white cell count (WCC) was $11.4 \times 10^9/L$ with neutrophil leukocytosis, ESR 108mm/1st hr and CRP 27mg/l. Intravenous ceftazidime, oral doxycycline and oral cotrimoxazole were started following sputum culture positive for a non-lactose fermenting, oxidase positive, very mucoid Gram-negative bacilli confirmed as *Burkholderia pseudomallei* by latex agglutination. Melioidosis antibody level was more than 1/10240. Tuberculosis was excluded. He was treated with antibiotics for 22 days during hospital stay and following satisfactory clinical, haematological and radiological response, was discharged on the oral eradication treatment with cotrimoxazole and doxycycline. However, his ESR remained high as 87mm.

During first 2 visits in the follow-up, patient complained of persistent LOA and LOW with high ESR and then defaulted. Two months after discharge, after completing treatment for 8 weeks, he developed yellowish discoloration of the body; for which native treatment had been taken suspecting hepatitis.

When he presented after 3 months, Hepatitis A, B and C infections were excluded. His USS abdomen and CT

abdomen revealed intrahepatic malignancy. Unfortunately, patient left against medical advice for native treatment before further investigations. He died in 3 months.

Case history 2

A 37 year-old female from Weligama, with newly diagnosed bronchial asthma and previously treated for lung abscess, was admitted with fever and cough in May 2018.

She had bilateral lung signs with shadows on chest x-ray and early abscess formation was suspected. Her WCC was $9.28 \times 10^9/L$ with 54% of neutrophils while CRP was <6 mg/l with an ESR of 20 mm.

Her sputum culture yielded a coliform sensitive only to amikacin and netilmicin. Her blood culture yielded no growth. Tuberculosis was excluded and the initial biopsy reports were not conclusive of a malignancy. Upon further investigations, melioidosis antibody titre was 1: 320.

Considering the past history with lung abscess and predisposing conditions the decision of treating for melioidosis as a trial was made. She was treated with IV meropenem, oral co-trimoxazole and oral doxycycline for 28 days in the ward resulting obvious clinical response and some radiological clearance. She was followed up at the microbiology clinic and her antibody titre became 1:160 after 3 months.

After completing eradication phase, patient still complained of on-and-off cough and fatigability and due to the persistent shadow in the left lung, radiologist's opinion was sought. This time, ultrasound guided tru-cut biopsy was suggestive of invasive mucinous adenocarcinoma of the lung. She was transferred to the chest hospital Welisara for further management.

Discussion

Most of the times Melioidosis can mimic the primary carcinoma such as lung malignancy, but in above two

cases, it was other way round; melioidosis co-existed with malignancies. In many scholarly articles including Yupin et al (1999), haematological malignancies and solid tumors had been described as risk factors (4.2%) for melioidosis [3]. According to local data, we also have had patients with known malignancy having clinical melioidosis before, but these were the first 2 cases in whom malignancy was diagnosed because of the manifestations of melioidosis. In the first case, malignancy was not suspected as smoking itself had been described as a risk factor for melioidosis. Though the suspicion was there in the second case, initial biopsies had not been conclusive of malignancy and asthma was considered as the predisposing factor for melioidosis. However, in the second case there was no bacteriological confirmation of melioidosis but only the high antibody titre and the clinical response obtained with the targeted therapy. In the follow-up of both cases the expected recovery was not achieved and that led to further investigations towards diagnosis of malignancy. Therefore,

clinicians should assess risk factors or predisposing conditions carefully in the treatment of suspected melioidosis and should consider hidden pathology if the patients are not recovering symptomatically despite proper treatment. Further, these cases highlight the importance of the close follow-up of patients with melioidosis.

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NECROTIZING SOFT TISSUE INFECTION CAUSED BY *STREPTOCOCCUS PYOGENES* FOLLOWING THYROIDECTOMY

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Introduction

Streptococcus pyogenes (Group A Streptococcus) is an important human pathogen that can cause a broad spectrum of infections. It is commonly associated with pharyngitis and superficial skin and soft tissue infections while invasive infections like toxic shock syndrome, scarlet fever, necrotizing fasciitis and bacteraemia are less common. *Streptococcus pyogenes* can lead to post-streptococcal sequelae such as glomerulonephritis and rheumatic fever. Necrotizing soft tissue infections are also considered as invasive Group A Streptococcal infection [1].

Risk factors for developing invasive Group A Streptococcal infection are minor trauma, viral infections, post-partum state, burns, diabetes mellitus, other immune suppressive status and recent surgery. Most patients are immune-competent. Adults over fifty years of age and children especially infants less than one year report the highest incidence [2].

Necrotizing fasciitis is an extensive soft tissue infection associated with necrosis and gangrene formation that spreads rapidly through the deeper subcutaneous tissues and fascia [1].

Wound infections are not recognized as a common complication following an elective thyroidectomy to cause significant mortality or morbidity even though there is a risk of infection spreading to the vital organs resulting airway obstruction. One recent study shows the rate of surgical site infection following thyroidectomy as 2.5% frequently requiring only oral antibiotics [3].

There are few case reports on soft tissue infection or toxic shock syndrome by *Streptococcus pyogenes* following thyroidectomy in the literature.

We describe a case of necrotizing soft tissue infection by *Streptococcus pyogenes* that lead to tracheal perforation following elective thyroidectomy.

Case report

A fifty year old pre-school teacher presented with a neck lump for three months. It was diagnosed as multinodular thyroid enlargement suggestive of follicular neoplasm on fine needle aspiration cytology. She underwent total thyroidectomy under general anesthesia with prophylactic intravenous cefuroxime cover. On the post-operative day three she developed fever with surgical site discharge. Re-exploration revealed deep soft tissue infection.

The patient was started on intravenous meropenem and metronidazole but pus discharge from the surgical site and the extent of soft tissue damage worsened despite antibiotics. On the sixth day she lost her voice and felt leaking of air through the airway when she talked. She did not have fever but the local examination of the surgical site showed extensive tissue necrosis. Bronchoscopy showed two tracheal perforations at the sub-glottic region with left sided vocal cord palsy.

Pus sample sent from the infected surgical site yielded pure growth of *Streptococcus pyogenes*, sensitive to penicillin, ceftriaxone and clindamycin. Blood cultures remained sterile. Antibiotics were changed to intravenous ceftriaxone and clindamycin. Wound toilet was performed to excise the necrotic debris of the tracheal wall and a tracheostomy tube was inserted.

Intra-venous antibiotics were continued to complete day fourteen while local signs of infection and bio markers improved. Once the acute infection settled the surgical team performed a sternocleidomastoid flap repair to cover the tracheal defect.

Discussion

Thyroidectomy is a clean surgery with minimal risk of surgical site infection [2,4]. Therefore, international guidelines do not recommend antibiotic prophylaxis [4]. In Sri Lanka antibiotic prophylaxis with intravenous cefuroxime is routinely used.

Post thyroidectomy invasive group A Streptococcal infection is a rare but known complication, described in literature. Patients present with signs and symptoms of systemic toxicity or erythema and pain of the surgical site with high fever. There are case reports that describe necrotizing, descending, life-threatening mediastinitis.

Necrotizing fasciitis, myositis and myonecrosis caused by *Streptococcus pyogenes* could be fulminant, causing severe tissue damage [1]. One Spanish case report in 2016 describes a case with tracheal perforation during a thyroidectomy followed by Group A *Streptococcus* toxic shock syndrome [4]. In our patient the virulence of Group A Streptococcal infection could be the cause for the local invasion leading to complicated tissue and tracheal damage. There was no evidence of toxic shock.

Early diagnosis with the support of radiological evidence and bacterial culture results are important. Source control by aggressive surgical exploration and debridement, fluid resuscitation and prompt antimicrobial therapy are the mainstay of treatment [1,5]. Isolation of Group A *Streptococcus* is an indication to follow strict infection control barrier precautions to prevent the spread among other patients.

About 4-5% healthy adults and 2-20% children can harbour Group A Streptococci in their oro-pharynx. This organism can cause infections following surgical interventions involving the associated structures. Post-thyroidectomy patients must be observed for relevant clinical signs and symptoms. Due to the possibility of serious infectious complications early recognition and treatment must be considered in local protocols.

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MATRIX-ASSISTED LASER DESORPTION/IONIZATION – TIME OF FLIGHT MASS SPECTROMETRY (MALDI-TOF MS): AN INDISPENSABLE TOOL IN CLINICAL MICROBIOLOGY

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Introduction

A rapid and accurate microbiological diagnosis is associated with decreased mortality and reduced length of hospitalization, especially for severe, life threatening infections. This also allows for early streamlining of empirical antimicrobial therapies, contributing to limit the emergence and spread of antimicrobial resistance [1].

The introduction of matrix-assisted laser desorption/ionization-time of flight (MALDI-TOF) mass spectrometry (MS) for routine identification of microbial pathogens has profoundly influenced microbiological diagnostics, and is progressively replacing biochemical identification methods. The principle behind MALDI-TOF is based on mass spectrometry and “soft” ionization technique. Depending on the time of flight of each pathogen, the characteristic spectrum of microbial proteins is analyzed and displayed via the inbuilt software [2].

Identification of aerobic and anaerobic bacteria by MALDI-TOF MS

Conventional microbiological methods for bacterial identification involve culture, microscopic examination and biochemical testing. These procedures can be accurate and reliable, at least for most of classical microbial pathogens, but they are also time consuming, laborious, and require specifically trained personnel for correct interpretation of results [3].

Compared to currently used identification methods, MALDI-TOF MS has the advantage of identifying bacteria and yeasts directly from colonies grown on culture plates for primary isolation in a few minutes and with considerable material and labor savings. The reliability and accuracy of MALDI-TOF MS in identification of these microorganisms have been demonstrated by several studies showing that the performance of MALDI-TOF MS is comparable or superior to phenotypic methods currently in use in clinical microbiology laboratories, and can be further improved by regular database updates and analysis software upgrades [3]. This technique has also been used

for anaerobic bacterial identification, highlighting its value in replacing the 16S ribosomal RNA gene PCR plus sequencing-based approach as the primary method of anaerobic bacterial identification [4]. Even though the DNA sequencing can identify fastidious and uncultivable microorganisms, the requirement of trained laboratory personnel, powerful interpretation soft wares, expensive materials, makes it less suitable for routine clinical use.

Identification of mycobacteria

MALDI-TOF MS is easier, less expensive, faster, and more accessible to routine clinical microbiology laboratories than traditional strategies for mycobacterial identification, which will likely make it the method of choice for their identification in the near future [2]. However, because of complex cell wall composition in *Myco-bacterium* spp., the accuracy of identification is often sub-optimal [5], and specific pretreatment may be required for protein extraction before MALDI-TOF MS analysis can be effectively performed [6].

Identification of fungi

MALDI-TOF MS represents a robust tool for routine rapid identification of clinically relevant fungi. Since different fungal pathogens are characterized by different susceptibility profiles to antifungal agents, a rapid species identification may have an impact on the patients' outcomes [7]. Due to their thick cell wall, obtaining high-quality MALDI-TOF MS spectra of fungal pathogens is more challenging than for most bacterial species and requires optimization and standardization of culture media, growth conditions and extraction procedures. To obtain high quality MALDI-TOF mass spectra, fungal cells may need to be lysed in 70% formic acid and/or by mechanical disruption in a bead-beater [8].

Direct identification of microorganisms from blood culture broth and urine samples

MALDI-TOF MS has also been evaluated for direct identification of bacteria and yeasts in complex biological

fluids such as urine and blood culture broth. Regarding urine, implementation of this technique together with total laboratory automation significantly reduced turnaround time to identification, antibiotic sensitivity report, and preliminary negative results [9].

The short time and tiny amount of microbial biomass required for analysis make MALDI-TOF MS one of the most promising techniques for the identification of microbial pathogens directly from positive blood culture broths [10]. For this purpose, separation of microorganisms from blood cells is a critical step for successful identification of bacteria [11].

Limitations

This technique requires high initial cost for the MALDI-TOF equipment. Other limitations are the limit of resolution among closely related organisms like *Shigella* and *E.coli* [12], similarities of spectra present in the database as for viridans streptococci and pneumococci and for yeasts requiring a protein extraction procedure for correct identification as insufficient protein signal by direct colonies [13].

Future perspectives

Besides microbial identification from isolated colonies and positive blood culture broth, new perspectives are being explored for MALDI-TOF MS, such as sub-species identification and strain typing, assessment of drug susceptibility, detection of drug resistance determinants and identification of viruses [1].

Conclusion

MALDI-TOF MS is a tool for rapid, accurate, re-producible and cost-effective identification of microorganisms and applicable to a broad range of common as well as esoteric bacteria including mycobacterial spp. and fungi and has become an incontrovertibly beneficial technology in a clinical microbiology laboratory [2].

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The Bulletin of the Sri Lanka College of Microbiologists

The Bulletin of the Sri Lanka College of Microbiologists is the annual publication of the Sri Lanka College of Microbiologists issued along with the Annual Scientific Sessions of the College. The Bulletin includes the summaries of the speeches/lectures/symposia and abstracts of oral/ poster presentations to be made during the Annual Scientific Sessions in addition to reviews research articles and case reports relevant to microbiology and infectious diseases sent by the membership. The aims of the bulletin are to encourage the membership to conduct and publish good quality research to support and improve the practice of microbiology in Sri Lanka and to share experiences to enrich and upgrade the professional standards.

All manuscripts will be subjected to review before acceptance and will be accepted with the understanding that the work is not being submitted simultaneously to another journal and has not been already published / accepted for publication elsewhere.

TYPES OF CONTRIBUTIONS

Review articles

Editorial board selects one or more from the articles submitted as review articles. This should contain less than 2000 words and address a microbiologically significant topic of current interest. This article should be supported by no more than 20 key references.

Research (original) articles

These should be in the format of introduction/background including the purpose of the study, materials and methods, results, discussion and conclusions. Each manuscript must have a structured abstract of 200 words giving the background, materials and methods, results and conclusions. The text should be limited to less than 2000 words and 15 references. Discussion should be clear and limited to matters arising directly from the results.

Articles

These articles should be limited to 1500 words and 12 references. Journal will give priority to articles dealing with topics of interest and importance in microbiology and infectious diseases in Sri Lanka.

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These should not exceed 750 words and 5 references and should be structured as Introduction, Case report and Discussion. Abstract is not required. Editorial board will be paying attention to the significance of the case report to the practice of microbiology in Sri Lanka.

Abstracts of presentations to be made at Annual Scientific Sessions

These should be limited to 250 words. May be accompanied by no more than five references or suggested further reading.

Photo quiz

This should be accompanied by a clear photograph and text. Limit your references to three for the answer. (Those submitted without references may be accepted if editors decide as suitable for publication).

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Please see separate guidelines issued with the notice calling for abstracts.

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Manuscripts should be submitted with a **cover letter** stating:

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Authors should include all those who have contributed to the work described, including supervisors and if applicable, those interpreting and analysing data used in the study to be presented. Only persons who contributed to the intellectual content of the paper should be listed as authors. Authors should meet all of the following criteria, and be able to take public responsibility for the content of the paper:

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1. Dellit TH, Owens RC, McGowan JE et al. Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America guidelines for developing an institutional program to enhance antimicrobial stewardship. *Clinical Infectious Diseases* 2007; **44**: 159-77.

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