

Invited Lecture 1

19th Nov (Mon) 13:20 - 14:20 Room 503

IL1 Medical preparedness for mass gatherings: Lessons and observations from the WHO Mass Gathering Collaborating Centre network

Torrens Resilience Institute, Flinders University

Paul Arbon



Professor Arbon is a Matthew Flinders Distinguished Professor, and Director of the Torrens Resilience Institute and the World Health Organisation Collaborating Centre for Mass Gatherings and Global Health Security at Flinders University, Adelaide Australia.

The Torrens Resilience Institute was established in 2009 to improve the capacity of organisations and societies to respond to disruptive challenges that have the potential to overwhelm local emergency management capabilities and plans. Current research and development is focused on community and organisational disaster resilience, mass gathering management and emerging health security threats.

Professor Arbon is former President of the World Association for Disaster and Emergency Medicine, past Chief Commissioner of St John Ambulance Australia, a member the United Nation's International Health Regulations Roster of Experts, Editorial Board Member of the disaster journal Pre Hospital and Disaster Medicine and Fellow of the Australian College of Nursing and the American Academy of Nursing. He has published extensively on mass gathering health and leads a program of research and development work in this field.

Mass gatherings occur frequently and present a unique set of challenges with respect to attendees' health and wellbeing, and the provision of timely and appropriate healthcare. The potential for illness and injury at these events is increased because of the interplay of a range of environmental factors, including crowd density and behavior, weather, and the consumption of alcohol and other drugs. Prevailing social and political factors may also play a role in determining the level of risk and likely adverse consequences. Mass gatherings challenge the provision of effective public health services and acute medical responses. On-site medical care can deliver timely interventions and prevent undue strain on local health services.

The network of World Health Organization Collaborating Centers for Mass Gatherings has identified key lessons and emerging issues relevant to the provision of acute medical services. These include techniques to model the expected number and type of patient presentations, focus on environmental drivers of medical presentations including heat and the consumption of alcohol and other drugs, the threat of and preparedness for deliberate events including lone actor attacks and the malicious use of chemical and biological agents, and the emergence of novel infectious diseases that may threaten the safe conduct of the event.

This presentation will focus on current lessons and observations on medical preparedness for mass gatherings, discussion of emerging threats including likelihood and consequence(s), and possible responses to these issues.

Invited Lecture 2

20th Nov (Tue) 13:40 - 14:40 Room 503

IL2 Hierarchical model of modern resuscitation for improvement of cardiac arrest survival

Chairman, Emergency Medicine, Donald and Barbara Zucker School of Medicine at Hofstra

Lance B. Becker



Education:

1977-81 MD University of Illinois College of Medicine

Postgraduate Training and Fellowship Appointments:

1981-84 Resident, Michael Reese Hospital and Medical Center, Chicago, IL

Faculty Appointments:

2001-2006 Professor, Department of Emergency Medicine, University of Chicago, Chicago, IL

2006-pres Professor, Department of Emergency Medicine, the University of Pennsylvania, Philadelphia, PA

2008-13 Professor, Department of Clinical Studies-Philadelphia, the University of Pennsylvania, Philadelphia, PA

2013-15 Professor, Center for Mitochondrial and Epigenetic Medicine (CME) at The Children's Hospital of Philadelphia

2015-pres Professor and Chairman, Department of Emergency Medicine, Hofstra Northwell School of Medicine

2016-pres Professor, Center for Immunology and Inflammation, Feinstein Institute for Medical Research

Awards, Honors and Membership in Honorary Societies: 17 more awards

2010 "Giant of Resuscitation" Award from the American Heart Association's International Liaison Committee on Resuscitation (ILCOR)

2012 "Hans H. Dahll" Award from the Emergency Cardiovascular Care Citizen CPR Foundation in Orlando, FL

2012 "Lifetime Achievement Award in Cardiac Resuscitation Science" honored at the American Heart Association's Resuscitation Science Symposium's Annual Meeting in Los Angeles, CA

2012 Elected to Lifetime Honorary Member, the European Resuscitation Council (ERC) Scientific Congress, Vienna

2013 Karolinska Institute, Sweden – Elected for The Annual Clinical Science Lecture

2014 "Outstanding Contribution in Research" 2014 Award at the American College of Emergency Physicians Annual Meeting, Chicago, IL

2015 Selected as the 2015 Recipient of the "Asmund S. Laerdal Lecture Award" from the Society of Critical Care Medicine's Critical Care Congress, Phoenix, Arizona

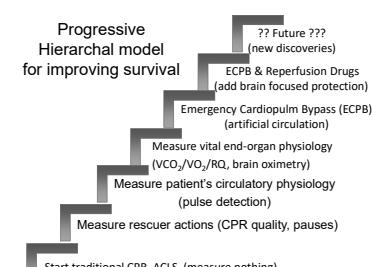
Todays lecture for the JAAM will focus on new concepts in resuscitation care under a proposed novel model of resuscitation care termed the "hierarchical model" of resuscitation.

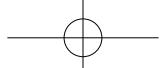
Developments in science and technology are fundamentally altering the way to improve survival of cardiac arrest. These developments have created a modern and unique style of resuscitation care. Under the "hierarchical model" , more and more resuscitation technology is delivered progressively to the patient in cardiac arrest in a logical step-wise fashion that starts at the bottom (simplest) but progresses to the top (most advanced) steps, as rescuers are able to provide more advanced therapies to the patient. The hierarchical model starts with the provision of simple hands only CPR/BLS care, but then steps up to monitoring the rescuers actions like compression, ventilation, drugs and other ACLS therapies. A key factor is the need to measure metrics of rescuer action and we are now using video monitoring at Northwell Health to accomplish this difficult goal; to really know the quality of resuscitation performed by our rescuers.

The next steps up in the hierarchy involve monitor the actual impact of the resuscitation on the patient's physiology (i.e. not the rescuers action but the impact of the rescuers actions on the patient's physiology) . Possible monitoring modalities will be discussed for monitoring of resuscitation impact. A focus of the lecture will on using oxygen consumption and CO₂ generation as a new physiological monitor. While both oxygen consumption and CO₂ generation are well known, they have not been applied to our resuscitation care. We have recently discovered (reported first by Shinozaki in 2018) a new phenotype of altered oxygen consumption and CO₂ generation in post-cardiac arrest rodents that does not fit into any currently described pattern. Hence we proposed that this is a new phenotype of oxygen consumption and CO₂ generation wherein oxygen consumption is markedly elevated while CO₂ generation remains normal. The evidence for this new phenotype will be reviewed along with the possible interpretations of this new data. Our current understanding of aerobic respiration does not explain the O₂ consumption measured in rats resuscitated from prolonged cardiac arrest. Even more intriguingly, there is a new human report from an independent group in Boston, which reports low RQ in humans after cardiac arrest, thus independently raising the possibility that we have discovered a new post-resuscitation metabolic phenotype. Many future studies are required to further explore this concept but future monitors and therapies may be based on this new finding.

The next steps up in the hierarchy model involve advanced resuscitation where tradition CPR generated blood flow is replaced by an artificial lung with a mechanical pump. This is termed ECMO resuscitation, ECPB, ECPR, or other terms- the many terms reflect that it is the relatively new nature of these advance approaches. Pioneered by several resuscitation visionaries (like K. Nagao, T Sakamoto, and many others) , Japan has led in the implementation of this life saving advanced resuscitation modality and many lives have been saved. However, we believe it is possible to significantly improve this approach by the addition of an anti-reperfusion injury "cocktail" (i.e. a combination of several drugs that work synergistically to combat reperfusion injury particularly in the brain) . The scientific evidence for this approach will be reviewed and the basic science rational behind the use of a "cocktail plus ECPB" will be presented, along with current possible components of a neuro-protective cocktail that can be used along with ECPB.

The final portion of the lecture will address the need for the resuscitation community to join together in a global resuscitation network to conduct the studies required to save more lives globally. Our enduring friendship and collaboration over the pacific will eventually involve all resuscitation caregivers in the near future. It is a time to act.





Invited Lecture 3

21st Nov (Wed) 10:40 - 11:40 Room 503

IL3 New Insights in Pathogenesis and Management of Disseminated intravascular coagulation (DIC)

University College London, United Kingdom & University of Amsterdam, the Netherlands

Marcel Levi



Marcel Levi (1964) is professor of Medicine at University College London and chief executive of University College London Hospitals (UCLH). He is also a practicing consultant in general and acute medicine at UCLH. His previous position was professor and dean of the Faculty of Medicine of the University of Amsterdam and chairman of the Executive Board of the Academic Medical Center in Amsterdam, the Netherlands. After his medical training and specialization in Internal Medicine at the University of Amsterdam he obtained his PhD with honours (1991) and was appointed as a Fellow by the Royal Netherlands Academy of Science. He worked at the University of Perugia, Italy and the Center for Transgene Technology and Genetherapy of the University of Leuven, Belgium and followed a MSc program at the University of Oxford in Evidence-based Health Care. He has published more than 700 articles in international scientific journals, has been awarded a number of international research awards (including twice the Biennial Award for Contributions to Haemostasis of the ISTH : Investigator Recognition Award (2005) and the Distinguished Career Award (2013)). He was chairman of the Netherlands Society of Thrombosis and Haemostasis between 2000-2007 and chairman of the Netherlands Organization for Medical Research (ZON-MW) between 2008 and 2016. He was elected as a member of the Royal Netherlands Academy of Science (KNAW) and is a fellow of the Royal College of Physicians in the UK. He is associate editor of JTH, senior associate editor of Seminars in Thrombosis and Hemostasis and deputy chief editor of the European Journal of Internal Medicine.

Several clinical conditions, in particular those associated with a systemic inflammatory response, can cause some degree of activation of coagulation but when the procoagulant stimulus is sufficiently severe and overcomes the natural anticoagulant mechanisms of coagulation, disseminated intravascular coagulation (DIC) may occur. The clinical manifestations of DIC encompass multiorgan dysfunction caused by fibrin-platelet clots in the microcirculation, and bleeding caused by consumption of platelets and coagulation factors. Molecular mechanisms that play a role in inflammation-induced effects on coagulation have been recognized in much detail. Exposure of blood to tissue factor is the most common trigger, whereas the intravascular coagulation is propagated due to loss of function of physiological anticoagulants and impaired fibrinolysis. New roles are described for neutrophil extracellular traps, histones, ADAMTS13, and platelets. In patients with DIC various abnormalities in routine coagulation parameters may be observed, including thrombocytopenia, prolonged global coagulation assays, or high levels of fibrin split products. In addition, more sophisticated tests for activation of individual factors or pathways of coagulation may point to specific involvement of these components in the pathogenesis of the disorder. A combination of readily available tests is usually sufficient in establishing the diagnosis of DIC and for this purpose several scoring algorithms have been developed. Some specific clinical situations may elicit coagulation responses that can be distinguished from DIC or may occur in combination with DIC, including dilutional coagulopathy, liver failure-related coagulation derangement and thrombotic microangiopathies. The foundation of the management of coagulation in DIC is the explicit and thorough treatment of the underlying disorder by antibiotic treatment and source control measures. Adjunctive strategies focused at the impairment of coagulation, including anticoagulants and restoration of physiological anticoagulant mechanisms, may supposedly be indicated and have been found advantageous in experimental and initial clinical trials. The role of supplementing natural anticoagulant pathways, such as by administration of recombinant thrombomodulin or antithrombin concentrate is evolving and new clinical studies show promising results.

Asian Special Lecture 1

19th Nov (Mon) 11:00 - 11:40 Room 501

ASL1 Robot CPR as an alternative to manual CPR : a Preliminary Study

Department of Emergency Medicine, Seoul National University Hospital

Gil Joon Suh



Current Appointments

Professor, Department of Emergency Medicine, Seoul National University College of Medicine, Seoul National University Hospital

Education

1978 – 1984 : Seoul National University College of Medicine, MD
1992 – 1996 : Seoul National University College of Medicine, MS & PhD

Position & Employment

1988 – 1992 : Residency, Department of Surgery, Seoul National University Hospital
1992 – 1997 : Director, Department of Surgery, Korea Veterans Hospital
1997 – 1998 : Visiting Scholar, Department of Emergency Medicine, Stanford Medical Center, CA, USA
1999 – 2008 : Assistant & Associate Prof. Department of Emergency Medicine, Seoul National University College of Medicine
2008 – present : Professor, Seoul National University College of Medicine
2000. 7 – 2010. 7 : Chairperson, Department of Emergency Medicine, Seoul National University College of Medicine, Seoul National University Hospital

Professional Organizations & Committees

2006-2007 : Chairperson, Organizing Committee of 6APBC
2007-2008 : Secretary General, Organizing Committee of 8APCDM
2009-2011 : Chairman, Board of Director, Korean Society of Emergency Medicine
2009- 2011 : President, the Korean Society of Disaster Medicine (KSDM)
2011- 2013 : President, the Korean Society of Traumatology
2014. 11 – present : president, the Korean Shock Society

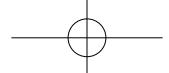
Publications : 81 SCIs

Despite the latest advances in resuscitation care, the survival rates among cardiac arrest victims remain low. Manual chest compression is a key component of CPR. Its goal is to provide oxygen-rich blood to the brain and coronary artery. High-quality manual CPR requires extreme power consumption and easily leads to physical exhaustion of rescuers. To overcome these problems in manual CPR, several mechanical CPR devices such as the Autopulse and LUCAS were introduced to provide an uninterrupted CPR without rescuer's fatigue. However, these devices are bound to the chest and compress on only one fixed position, so they must be unbound when there is a need to change the compression position. This unbinding can cause the interruption of chest compression, which decreases CPR quality.

A robot CPR system could be a good alternative to overcome the shortcomings of manual CPR and mechanical CPR devices. A robot has enough power to achieve high-quality CPR. It can also give a continuous CPR and change its compression position during CPR without stopping. Recently, we developed the automated robot CPR system to perform high quality of CPR. The robot CPR system performs CPR automatically and analyses the patient's condition and relays the information to the CPR system. If an end-tidal CO₂ monitoring device as an indicator of the quality of chest compressions during CPR is added to the robot CPR system, the system can receive real-time end-tidal CO₂ feedback from the victims which enables the robot to perform better CPR.

We also developed the algorithm of the robot CPR system which automatically finds the optimal compression position under the guidance of end-tidal CO₂ feedback in swine models of cardiac arrest. Then, 18 pigs after 11 minutes of cardiac arrest were randomly assigned to one of three groups, robot CPR, LUCAS CPR, and manual CPR groups (n = 6 each group). Return of spontaneous circulation (ROSC) and Neurological Deficit Score 48 hours after ROSC were compared. A ROSC was achieved in 5 pigs, 4 pigs, and 3 pigs in the robot CPR, LUCAS CPR, and manual CPR groups, respectively ($p = 0.47$). Robot CPR showed a significant difference in Neurological Deficit Score 48 hours after ROSC compared to manual CPR, whereas LUCAS CPR showed no significant difference over manual CPR. ($p = 0.01$; Robot versus Manual adjusted $p = 0.04$, Robot versus LUCAS adjusted $p = 0.07$, Manual versus LUCAS adjusted $p = 1.00$)

In conclusion, the end-tidal CO₂-guided automated robot CPR system did not significantly improve ROSC rate in a swine model of cardiac arrest. However, robot CPR showed significant improvement of Neurological Deficit Score 48 hours after ROSC compared to Manual CPR while LUCAS CPR showed no significant improvement compared to Manual CPR. The robot CPR system could be a promising alternative to manual CPR.



Asian Special Lecture 2

20th Nov (Tue) 14:40 - 15:20 Room 502

ASL2 Global Resuscitation Alliance; the concept and the current status

Department of Emergency Medicine, Seoul National University College of Medicine and Seoul National University Hospital

Sang Do Shin



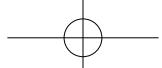
Experiences

1995	Graduated from Seoul National University College of Medicine
2000	Graduated from the MPH course on Epidemiology at Seoul National University School of Public Health
2003	Graduated from the PhD course on Epidemiology at Kangwon National University School of Medicine
1996-2000	Residency program at Department of Emergency Medicine of Seoul National University Hospital
2012-2013	Visiting Scholar and adjunctive professor at School of Public Health of Emory University, USA
2004-present	Assistant professor, associated professor, and professor at department of emergency medicine of Seoul National University College of Medicine and Hospital
2009-2011	Founding Chair, Asian Emergency Medical Service Council (AEMSC)
2009-present	Co-chair, Pan-Asian Resuscitation Outcome Study Clinical Research Network
2014-present	Chair, Pan-Asian Trauma Outcomes Study Clinical Research Network
2016-present	Chair, Board member of the Global Resuscitation Alliance, Chair of Asian Chapter, Global Resuscitation Alliance

Research interest

- Emergency Medical Services System Development
- Cardiac Arrest and Trauma
- Disaster Medical Services Medicine

The Global Resuscitation Alliance (GRA) is the new organization for improving resuscitation outcomes through implementing the Utstein 10 steps. In 2015, at the Stavanger in Norway, more than 30 experts from around the world analyzed the causes of regional variations in CPR and determined the 10 steps scientifically well known as a community implementation program essential for survival. In order to improve the survival rate of CPR, scientific research, development of educational methods based on these sciences, and community intervention to apply it to the local community are indispensable. However, community intervention has not been sufficiently emphasized. Historical background, cultural differences, deviations in resources, and diversity of legal systems have not been fully applied to individual communities, despite the development of educational methods and the results of scientific research. The Resuscitation Academy (RA) is the new program to educate and train the trainer, educator, medical directors, public officials who work in the CPR community. The RA is the core program of the GRA for implementing the Utstein 10-steps.



Asian Special Lecture 3

20th Nov (Tue) 15:20 - 16:00 Room 502

ASL3 Building World-Class EMS and Community Chain-of-Survival : Translating Science into Education and Implementation



Professor of Emergency Medicine, National Taiwan University, Taiwan
Vice Superintendent, National Taiwan University Hospital Yunlin Branch, Taiwan

Matthew Huei-Ming Ma

Dr. Ma graduated from National Taiwan University medical school in 1989, completed an internal medicine residency, a cardiology fellowship and an emergency medicine residency at NTU hospital in 1994. He then went on to receive a PhD in Health Policy and Management from the Johns Hopkins University in 1997. He is now Professor of Emergency Medicine at National Taiwan University, and Vice Superintendent of National Taiwan University Hospital, Yunlin Branch

A renowned regional expert in emergency medicine and EMS and resuscitation, Prof. Ma has played a key role in contributing to the advancement of pre-hospital care, community chain-of-survival, and resuscitation science, particularly in Taiwan, where he serves across various boards and committees. His interests in clinical research and outcomes in emergency medicine is no small feat; Prof Ma as authored over 170 publications, and speaks regularly at conferences around the world. In 2016, he received the 4th Asian EMS Lifetime Achievement Award.

Prof. Ma currently serves on the Asian Association for EMS as Chair, and the Pan Asian Resuscitation Outcomes (PAROS) CRN as Vice Chairman; is a Task Force Member (Education, implementation, and Teams) of the International Liaison Committee on Resuscitation (ILCOR). He sits in the editorial board of the journals *Resuscitation*, and *International Journal of Cardiology*.

The goals of emergency medical services (EMS) systems in the community are to decrease morbidity and mortality from acute injuries and illnesses, and to maximize patient well being. Due to the changing demographics of the population the complexity of diseases, and the parties involved in the system, the success of systems depends heavily on consensus building among major players and the integration of community resources. EMS activities in Taiwan rapidly developed in the last two decades, especially after National EMS legislation in 1995 and National Specialty Board Status for Emergency Medicine in 1998. With the joint efforts of emergency physicians, central and local health and fire departments, involved community leaders and stakeholders, ongoing activities over the years have cumulated into the current comprehensive EMS systems and community chain-of-survival. Projects initiated over the last years include : wide-spread citizen CPR training and community-wide early defibrillation programs, medical direction system, the training of EMT-paramedics and implementation of prehospital advanced life support. In addition, Taiwan has also strengthened the in-hospital chain-of-survival, including the implementation of post-resuscitation care and CPR with extracorporeal support. To optimize system implementation, medical direction, performance evaluation and research infrastructure were built early during system design. Discoveries in resuscitation science and epidemiology of cardiac arrests from local communities were made, and have been translated successfully into education and system implementation. Over the years, we have witnessed a 7-fold increase in the survival of out-of-hospital cardiac arrests as well as marked improvement in trauma survival. These would not have been achievable without the commitment and dedication of physicians and organizations.

Asian Special Lecture 4

21st Nov (Tue) 13:20 - 14:00 Room 501

ASL4 How to improve global emergency medicine?

Department of Emergency Medicine, Yonsei University, Wonju College of Medicine, South Korea
Kang-Hyun Lee



Dr. Kang Hyun Lee is a professor of emergency medicine and dean at the Yonsei University, Wonju College of Medicine, Wonju, South Korea. He is chair of organizing committee of 2019 ICEM (international conference of EM). He is president of Korean Society of Traumatology. He is past chairman of Board of Directors of the Korean Society of Emergency Medicine. He served as a medical advisor during the 2018 PyeongChang Winter Olympic Games. He has been some project leader of global emergency medicine and EMS system in Korea. He was born in South Korea on June 15, 1963. He graduated Yonsei University, Wonju College of Medicine at 1989. He is board-certified in emergency medicine at 1997 and critical care medicine at 2009. He has published over 100 papers, 7 books and given many speeches about emergency medicine, disaster medicine and traumatology at the scientific conferences in the world.

So many emergency physicians are actively engaged in the development the many spectrums of global emergency care, emergency medical services (EMS), and prevention of injury or disaster preparedness in multiple settings internationally. Global emergency medicine (EM) is a subset of global health concerned with acute and urgent aspects of illness and injury. The discipline is centred on capacity development for emergency medicine, but also includes aspects of disaster preparedness and humanitarian assistance. As the burden of non-communicable disease and injury grows in low- and middle-income countries, demand for global emergency medicine is increasing. This has catalysed the global expansion of EM as a specialist discipline, which is now recognised in over 40 countries. International emergency medicine is the one of the sub-specialty of EM concerned with global EM development and the broader field of global emergency care. Global EM is not solely about development of EMS but is instead better described as the training required for and the reality of practicing the specialty outside of one's native country. Many emergency physicians involved in global emergency care activities require skills, knowledge and attributes that may not be acquired in the course of a conventional health professional education. Global EM training programs have emerged to equip emergency physicians with the competencies required for emergency care practice in international and cross-cultural environments. Many challenges faced in global EM include a lack of adequate EMS systems including emergency transportation system or manpower for EMS, immature or non-existent training programs of EM, a shortage of resources to fund for EMS development, and an absence of research that could inform developing countries how to best spend the resources. Additionally, the standards and methods used in countries with mature EMS are not always suited for use in developing countries due to a lack of infrastructure, and shortage of resources or funds. I will discuss the effective developing way for the global EM and also talk about diverse issues on evidence-based medicine in global EM.

International Symposium

20th Nov (Tue) 17:30 - 19:00 Room 304

ISY01-1 THE ASSOCIATION BETWEEN DURATION TO OPERATION AND MORTALITY RATE IN PENETRATING TRAUMA PATIENTS

Division of Trauma, Department of Surgery, Khon Kaen Hospital, Thailand
Tawatchai Impool, Pothipong Reungui, Supaporn Tansura

In the management of severe trauma cases, shortening the interval from emergency room (ER) to operating theater is a key. Trauma Fast Track (TFT) strategy, in which trauma patients are transferred to the theater as quickly as practicable, was established in most trauma centers in Thailand. In this strategy, we have to know about patient data before their arrival by two-way communication between doctors at community hospitals and Khon Kaen Hospital. While waiting for the patients, we prepare the operating theater and activate the trauma team. When the patients arrive at the ER, we immediately pass them to the operating theater without usual resuscitation procedures. Moreover, we conducted an analysis to know the influence of the time factor on the patient outcome. We enrolled 163 trauma patients with penetrating torso injuries and hemodynamic instability, who underwent laparotomy and/or thoracotomy in Khon Kaen Hospital from October 2011 to September 2017. Of them, 128 (78.5%) had penetrated injuries at abdomen and 35 (21.5%) at chest; mean Injury Severity Score was 19.7; mean interval from ER to the theater was 41.7 minutes; 39 (23.9%) of them died. Delayed transfer to the theater (interval from ER to the theater > 30 minute) were associated with higher mortality risk than early transfer (≤ 30 min) [odds ratio, 4.11; 95% confidence interval, 1.24–13.64]. The mortality rate of penetrating torso patients with hemodynamic instability was strongly associated with the interval from ER to the theater. TFT to shorten the interval is a promising strategy to improve patient outcomes. Thus, we should avoid unnecessary procedures or interventions at ER that would prolong the interval.

ISY01-3 The training of CPR for healthcare staff working at dental office: New activity in Vietnam

¹Hanoi Medical University

²Department of Emergency Medicine, Teikyo University School of Medicine
Bui Hai Hoang¹, Kim Quan Hoang¹, Tien Dung Ngo¹, Xuan Dung Dao¹,
Minh Nong Nguyen¹, Dinh Hung Vu¹, Giang Phuc Do¹, Nakahara Shinji²

Bystander first-aid is an important factor to improve outcomes of people with out-of-hospital cardiac arrests, which is a growing health issue in low- and middle-income countries. To improve access to bystander first-aid such as chest compression, we need to increase the number of those who can perform first aid. This requires training of laypeople and also training of trainers. We present our new activity in Hanoi, in which we train healthcare staff. The program started in 2016. We have held 30 classes and trained approximately 1500 learners in various areas: Ha Noi, Bac Giang, Hai Duong, Da Nang, and Ho Chi Minh City. The trainees are dentists and dental technician; most of them are working for the private sector. A class consists of one-hour theory lecture and two-hour skill training of cardiopulmonary resuscitation (CPR). In the skill training, we use a mannequin and instruct two learners to cooperate and provide CPR as a team (one provides chest compressions and the other rescue breathing) according to the protocol of American Heart Association. After the classes, the trainees receive a certificate and exchange contact information for further updates. So far, we have not yet evaluated the effects of this project. However it has a potential to contribute to increasing access to bystander first-aid. They may encounter cardiac arrest in their dental office. In addition, they may provide chest compression to OHCA patients near their offices. More importantly, they have a potential to be trainers to general public in the future although their skills and knowledge are not enough to be trainers.

ISY01-2 A mobile app for management of animal attack victims at rural hospitals in Sri Lanka

¹Postgraduate Institute of Medicine, University of Colombo

²Faculty of Medicine and Allied Sciences, Rajarata University of Sri Lanka.
Anuradhapura, Sri Lanka

³Health Informatics Society of Sri Lanka (HISSL), Sri Lanka
Achala Upendra Jayatilleke¹, Sujewwa Priyantha Bandara Thalgaspitiya²,
Roshan Hewapathirana³

Animal attacks are common in Sri Lanka specially in remote and wilderness areas where no proper emergency care services are available. Anuradhapura is a district located in North Central province of Sri Lanka where many wild animal attacks are reported frequently. Usually the first contact is a rural hospital and majority of the patients are subsequently transferred to the Teaching Hospital Anuradhapura, which is the main tertiary care center in the province. Doctors in peripheral hospitals contact surgeons in the tertiary care center over the phone for specialized advice. We conducted this study with the objective of introducing a mobile application for medical doctors in rural hospitals to communicate with surgeons in the tertiary care settings regarding victims of wild animal attacks effectively. A data submission and management tools were developed based on the Open Data Kit (ODK) platform, which consists of an open source mobile application and a web server. The mobile app can be installed in Android smart phones as the data submission tool. Doctors in the periphery can communicate with the center using the mobile App. They can share photos, images with the expert surgeons and get their advice on management. ODK Aggregate server back end has the capability to send metadata in the XML format, known as XForms to mobile devices to generate the questionnaire dynamically. This low-cost technology can be used for effective management of animal attack victims at rural hospitals and to create a database which can be used for future research.

ISY01-4 An Innovative Pre-hospital Care Provider Training Course for Improving Emergency Medical Care System in Cambodia

Saw Swee Hock School of Public Health, National University of Singapore,
Singapore & KHANA Center for Population Health Research, Cambodia
Siyan Yi

Over recent decades, the healthcare system and civil infrastructure in Cambodia have advanced remarkably. The Kingdom now possesses many of the essential components required to establish a well-functioning emergency medical system including the widespread availability of emergency communication channels, enhanced access to emergency transportation through large-scale road development efforts, and increased access to health services for poor patients through the implementation of health financing schemes. However, many Cambodians continue to experience inadequate access to quality emergency medical services. The emergency healthcare system requires well-trained pre-hospital care providers and other supporting systems in place. In response to the need of a good model to improve pre-hospital care services, a team from Stanford University School of Medicine, in partnership with Preventive Medicine Department in Cambodia, has implemented an innovative, context-specific pre-hospital care training course for local health care providers from December 2013 to February 2016. In Cambodia, due to the limited health workforce, a provider is usually selected from the on-duty staff of the most appropriate ward when the facility is called upon to accompany a patient during transport. It was decided that the selection of attendees for the pre-hospital care training course would follow the same model, selecting attendees from the pool of actively practicing providers at ambulance-possessing government referral hospitals. Participants were therefore selected from the emergency department, maternity ward, and pediatric ward in all 42 referral hospitals in the nine provinces where the USAID Quality Health Services Project was implemented. Participants were a mix of physicians, medical assistants, nurses, and midwives. The course focuses on training on pre-hospital care skills and knowledge most applicable to the local healthcare system. The course was divided into four modules: (1) Basic pre-hospital care skills and adult medical emergencies, (2) Traumatic emergencies, (3) Obstetric emergencies, and (4) Neonatal/pediatric emergencies. In total, during the 27-month period, the course was administered to 1,083 local healthcare providers, with 947 attending the entire course and passing the course completion examination. The details of the course curriculum and materials will be further discussed.

International Symposium

20th Nov (Tue) 17:30 - 19:00 Room 304

ISY01-5 The development of EMS system Khon Kaen Province

Khon Kaen Hospital

Seathapong Thanoorat

This paper describes the development of nationwide emergency medical service (EMS) system in Thailand. The first formal EMS that started in Khon Kaen Province successfully improved the prehospital care and inspired policy makers to expand the system nationwide. In the early 1990s, various innovations in emergency care system took place in Khon Kaen Province, specifically by the involvement of Khon Kaen Regional Hospital. One is EMS established in 1991 to deal with increasing traffic injuries. Another is the injury surveillance program that started in 1992 in Khon Kaen Hospital; based on the surveillance data, reports were published. This informed many hospital administrators and policy makers of the necessity to handle injuries: e.g., through nationwide EMS and injury surveillance. In 1993, the on-scene care committee was set up in Khon Kaen to implement EMS at provincial, district, and sub-district levels. In doing this, the committee gave full consideration to resource-limited situations and community involvement. The first EMS unit was developed by a private organization, Chit-Kuson Khon Kaen Foundation; its command center was placed in a police station with the phone number of 191 (the number has been changed to nationwide single number of 1669 in 1995) and Khon Kaen Hospital established its own EMS unit in 1994. The Khon Kaen EMS system started with 3 levels of pre-hospital care providers. Community health volunteers were supposed to provide first-aid and contact the EMS system as needed; sub-district EMS provide basic life support; and the formal hospital EMS provide basic and advanced life support with quality improvement program. The sub-district EMS, which transfer most of the emergency cases, was based on simple but effective technologies and training. The key to the development of EMS system is policy commitment and hospital administrators' awareness, which would lead to support for project planning, resource allocation, and human resource development. The fact that Khon Kaen EMS system could reduce mortality and morbidity of trauma and seriously ill patients persuaded policy makers in the Ministry of Health so that they developed strategies to expand the system nationwide. Various sectors including academia, clinicians, and politicians supported the strategies. After nearly 30 years of development, there are 27 provincial level and 191 sub-district level EMS systems with 3,963 registered EMS personnel. The success in the quality management and sustainable development of EMS system has resulted from regular monitoring, supervision, and communication within the system.

INT1-1 Neuroprotection post cardiac arrest; does midazolam have positive effect?

¹Department of Emergency Medicine, Yamagata Prefectural Central Hospital,

²Department of Anesthesiology, Yamagata University

Asumi Sugiura¹, Kaneyuki Kawamae²

[Background] Targeted temperature management (TTM) is current standard neuroprotective therapy post cardiac arrest (CA). Although midazolam is considered as neuroprotective agent through reduction of dopamine release in the brain, there is scant evidence exists. Purpose of this study is to investigate predictors of outcome and midazolam effect on post CA patients' outcome. **[Method]** Retrospective chart review. Patients admitted to our intensive care unit post CA with prolonged comatose from October 2015 to February 2018 were extracted. We used 48 hours of 35.5 °C followed by 12 hours of rewarming for TTM protocol. Patient demographics, physiological data and management were analyzed. **[Results]** 19 patients were extracted. Median age of 60, 32% were women. 2 received TTM via VA-ECMO, 16 by external cooling device, one didn't receive TTM due to short ischemic time. At one month from CA, 6 survived without respiratory support, all of those had Cerebral Performance Category (CPC) of 1. 5 survived with respiratory support, 8 died. Within each groups mean CA time was 28, 31, 43 minutes respectively. With regards to midazolam dose, 50% of good outcome patients received more than 0.2mg/kg/hr for longer than 48 hours, where 60% for moderate group. All the patients in moderate outcome group continued to receive more than 0.1mg/kg/hr longer than rewarming completion. **[Conclusion]** All the patients with good outcome recovered to CPC 1 at one month. Those tended to receive less midazolam dose during TTM compared to those with moderate outcome, suggesting good outcome did not depend much on midazolam dose.

INT1-2 Can we predict return of spontaneous circulation of out-of-hospital cardiac arrest according to blood gas data ?

¹宮崎県立延岡病院救急センター・ICU, ²宮崎県立延岡病院救急センター
矢野隆郎¹, 山内弘一郎¹, 川名 遼², 遠藤穰治², 長嶺育弘²

[Purpose] Blood gas data during cardiopulmonary resuscitation (CPR) of out-of-hospital cardiac arrest (OHCA) patients at a community hospital in Nobeoka City, Japan, were retrospectively evaluated to predict return of spontaneous circulation (ROSC). **[Subjects and Methods]** Between October, 2012, and April, 2017, 150 of 453 OHCA cases were for analysis; blood gas data were available before ROSC within 30 min after emergency department (ED) arrival. The primary outcomes were ROSC at ED and survival to admission. The odds ratios (OR) were calculated by a multiple logistic-regression analysis for independent predictors of ROSC at ED and survival to admission. All statistical analyses were performed with R version 3.3.2. **[Results]** The pO₂ and serum potassium were independent predictors for ROSC [pO₂ (OR: 1.01; P < 0.01), serum potassium (OR: 0.68; P < 0.01)] and survival to admission [pO₂ (OR: 1.01; P < 0.01), serum potassium (OR: 0.61; P < 0.01)]. **[Conclusions]** The pO₂ and serum potassium may be the most useful predictors for ROSC.

INT1-3 Virtual Reality based learning platforms for ongoing Cardio Pulmonary Resuscitation training at Accident and Orthopedic Service, National Hospital of Sri Lanka

¹Accident and Orthopaedic Service, National Hospital of Sri Lanka, ²University of Colombo School of Computing, ³District General Hospital Gampaha, Sri Lanka

C.Wanigatunga Janith¹, M.A.S.C. Samarakoon¹, H.S.U. Liyanage², K.L. Jayaratne², M.A.A.K. Munasinghe³, Achala U. Jayatileke⁴

[Introduction] Training a large cohort of people is challenging due to availability of resources. For instance, manikins used in training are fragile while manikin models which can provide feedback on CPR quality are expensive. Therefore, providing alternative solutions which are more cost effective and provide immersive training experience will improve the outcomes of training programs. **[Objectives]** To implement a virtual reality (VR) based CPR program by modifying the existing low-cost manikins to provide cost effective training and enhance learning process. **[Methodology]** This project employs a VR enabled CPR training technology developed by the University of Colombo School of Computing. Funding will be allocated from Inventors Commission Sri Lanka. Firstly, existing low-cost manikins will be modified with sensors to be compatible with the new VR system. Secondly, VR environment and an avatar to replicate the manikin will be created using Unity 3D software. In order to reduce the cost of equipment, off-the-shelf effective hardware such as HTC Vive VR headsetsTM, Leap motion sensorsTM will be used. Finally, the avatar developed in VR environment is mapped to the manikin using a computer system to execute CPR training scenarios. **[Results/Products]** This low-cost VR Learning platform will be implemented at the AOS CPR Training Programs as a pilot project and further improvements will be made with user feedback to provide further improvement to the system. **[Conclusion/Implications]** This project is expected to provide realistic and interactive training experience while providing an alternative to expensive manikins.

INT1-4 Bathing-Related Out of Hospital Cardiopulmonary Arrest Investigated by Post-Mortem CT

¹宮崎県立延岡病院 救急センター・集中治療室, ²宮崎県立延岡病院 救急センター, ³宮崎大学医学部附属病院 救急センター

矢野隆郎¹, 川名 遼², 遠藤穰治², 長嶺育弘², 落合秀信³, 山内弘一郎²

[Purpose] For the recognition of the causes of ambulance runs due to accidental victims during bathing in Nobeoka City, we analyzed the databases using the Utstein style **[Subjects and methods]** 69 bathing victims of 731 Out of Hospital Cardiopulmonary Arrest (OHCA) cases were reviewed between Dec., 2010 and Feb., 2018. The postmortem CT (PMCT) was performed in all cases. **[Results]** Dissecting aortic rupture (4%), subarachnoid hemorrhage (6%), and other causes (6%) were noted and the top diagnosis was drowning (77%) with severe atherosclerotic calcification (aortic valve 36%, coronary artery 59%, internal carotid 58%, vertebral artery 64%) and brain atrophy (mean bicaudate ratio 0.19, mean sylvian fissure ratio 0.11) by the findings of PMCT. **[Conclusion]** PMCT of Bathing-Related OHCA could detect definite cause of death below one fourth cases and reveal the drowning signs above three fourth cases with cardio-cerebral atherosclerotic changes.

INT1-5 Are school hours associated with better outcomes of out-of-hospital cardiac arrest in school children? A propensity-matched cohort study

¹Department of Circulatory Emergency and Resuscitation Science, Kanazawa University Graduate School of Medicine, ²Ishikawa Prefectural Central Hospital, ³Department of Emergency Medicine, Kanazawa Medical University Hideo Inaba¹, Minoru Kubo², Keisuke Ohta², Hisanori Kurosaki¹, Yukihiko Wato³

[Aims] To investigate whether school hours are associated with better outcomes of school children with out-of-hospital cardiac arrest (OHCA). **[Methods]** From the 2005-2014 nation-wide databases, we extracted the data for 1, 660 bystander-witnessed OHCA cases of school children with ages of 6-17 years. School hours are defined as 8:00 am to 6:00 pm. School days were determined in each prefecture. **[Results]** Neurologically favourable 1-month survival during school hours was better than that during non-school hours only in school days: 18.5% (76/412) vs 10.5% (51/486) in school days (Unadjusted OR: 95% CI, 1.93; 1.32-2.83), 10.9% (43/395) vs 9.0% (33/367) in non-school days (1.24; 0.77-1.99). OHCA cases during school hours in school days more frequently received bystander CPR and public access defibrillation (PAD), and had shockable initial rhythm and presumed cardiac aetiology. However, the survival or witness-to-first CPR interval (CPR-free time) during school hours was not improved change during the study period (P for trend = 0.21). Furthermore, the rate of survival did not significantly differ between school hours in school days and others after propensity-matching: 16.2% (52/321) vs 15.6% (50/321), P = 0.83. Stepwise multivariate logistic regression analysis after propensity-matching disclosed that shockable initial rhythm (5.53; 2.10-16.4), PAD (4.89; 2.34-10.5), medical cause (3.56; 1.42-9.03), and shorter response time interval (1.12; 1.03-1.23 per 1 min) and witness-to-first CPR interval (1.06; 1.02-1.10) were major factors associated with survival. **[Conclusions]** Early bystander- and EMS-performed basic life support based on a proper preparedness is predominantly associated with better outcomes of OHCA in school children.

INT1-6 The influence of excluding patients with bystander interventions in the current Utstein-style database

¹Graduate School of Emergency Medical System, Kokushikan University, Tama-City, Tokyo, Japan, ²Japan Emergency Medical System Co. Ltd, Misato-Town, Miyazaki, Japan, ³Research Institute of Disaster Management and EMS, Kokushikan University, Tama-City, Tokyo, Japan Hiroshi Otani^{1,2}, Ryo Sagisaka¹, Hideharu Tanaka^{1,3}, Hiroshi Takyu¹, Takahiro Hara¹, Toru Shirakawa^{1,2}, Shota Tanaka³

[Background] The effect of bystander interventions has been extensively evaluated by cerebral function after post-resuscitation. However, patients who received bystander cardiopulmonary resuscitation (BCPR) and achieved the return of spontaneous circulation (ROSC) before the arrival of the emergency medical system (EMS) are routinely defined as "other" electrocardiogram (ECG) waveforms ("others") and are usually excluded before analysis. **[Aim]** To clarify the influence of excluding others group, which includes cases of bystander ROSC, from the out-of-hospital cardiac arrest (OHCA) database. **[Methods]** This nationwide population-based observational study was conducted in Japan using Utstein-style data from 2011 to 2014. In total, 92, 156 patients with bystander-witnessed OHCA of presumed cardiac origin received resuscitation attempts in the pre-hospital setting. We analysed the differences of datasets that included and excluded the others group and determined the effect on outcomes by multivariate logistic regression and odds ratios (ORs) with 95% confidence intervals (95% CIs). **[Results]** When the others group was excluded from the data, the adjusted odds ratio (AOR) of cardiopulmonary resuscitation (CPR) to favourable cerebral performance category (CPC) 1 or 2 was decreased (conventional CPR: AOR, 2.12 to 1.78; hands-only CPR: AOR, 2.22 to 1.80) compared to the others group's inclusion. Conversely, the AOR of public-access defibrillation (PAD) was significantly increased (AOR, 4.63 to 6.44). **[Conclusion]** The exclusion of others from a dataset may lose ROSC patients by bystander CPR, causing selection bias to affect outcomes. The definition of others should be redefined according to the introduction of a new Utstein-style guide line.

INT2-1 Usefulness of Coagulation Biomarkers to Detect Arterial Extravasation in Pelvic Fracture Patients with Stable Hemodynamics

¹Department of Emergency Medicine, Gunma University Graduate School of Medicine, ²Advanced Medical Emergency Department and Critical Care Center, Japan Red Cross Maebashi Hospital, ³Department of Diagnostic and Interventional Radiology, Gunma University Graduate School of Medicine

Makoto Aoki¹, Takayuki Ogura², Shuichi Hagiwara¹, Masato Murata¹, Hiroyuki Tokue³, Mitsunobu Nakamura², Kiyohiro Oshima¹

[Background] It is important whether there is active arterial hemorrhage or not in acute phase to make decision for the treatment strategy in patients with pelvic fractures. The purpose of this study is to evaluate whether coagulation biomarkers could predict the arterial extravasations especially in pelvic fracture patients with stable hemodynamics. **[Methods]** We studied pelvic fracture patients who had systolic blood pressure above 90mmHg on arrival. Patients were divided into two groups: patients with arterial extravasations on enhanced CT or angiography (Extra (+) group), and those without arterial extravasations (Extra (-) group). The levels of fibrin degradation products (FDP) and D-dimer (DD) measured on arrival were statistically compared between the two groups. Receiver operating characteristics analyses provided area under the receiver-operating characteristic curves (AUROC) and diagnostic indicators at the estimated thresholds including sensitivity, specificity, positive and negative predictive values and diagnostic odds ratio (DOR). **[Results]** Seventy-nine patients could be analyzed. FDP and DD levels were significantly higher in the Extra (+) group than in the Extra (-) group (FDP, 261.9 $\mu\text{g/mL}$ (149.9-402.5) vs. 96.2 $\mu\text{g/mL}$ (59.6-155.0); DD, 96.5 $\mu\text{g/mL}$ (45.3-173.0) vs. 39.7 $\mu\text{g/mL}$ (25.6-88.0)). The predictive ability in terms of DOR was relatively better with FDP of 179 $\mu\text{g/mL}$ (sensitivity, 0.73; specificity, 0.80; DOR, 10.81; AUROC 0.79) than DD of 52.0 $\mu\text{g/mL}$ (sensitivity, 0.73; specificity, 0.68; DOR, 5.75; AUROC, 0.72). **[Conclusion]** FDP and DD could be useful to predict the existence of arterial extravasations in pelvic fracture patients with stable hemodynamics.

INT2-2 Is the external fixation appropriate strategy in the pelvic ring fracture in elderly?

¹兵庫県立西宮病院 四肢外傷センター, ²兵庫県立西宮病院 救命救急センター

北田真平¹, 山田 聖¹, 萩田誠司², 林 伸洋², 高岡 謙², 杉野達也², 鴻野公伸^{1,2}

[Introduction] The purpose of this study is to investigate the rationale of the external fixation (Ex-Fix) for the elderly patients. **[Material and Methods]** We retrospectively analyzed 5 cases of pelvic fracture treated with Ex-Fix. The mean age was 79.6 (74-86). Injury mechanism, waiting periods for the surgery, AO classification, duration of the Ex-Fix application, clinical results and complications were reviewed. **[Results]** High energy cases were in four cases. All fractures were classified into AO type B. The mean waiting periods were 2.2 day (0-7). The mean duration of the application was 32.4 day (7-50). All fractures were healed. But the early pin loosening was seen in two cases because of the violation to the fixators by the patients with delirium. One patient died due to the aspiration pneumonia. **[Conclusion]** We observed early pin loosening in forty percent of the cases. Ex-Fix for the pelvic fracture in elderly was not appropriate strategies because of the bone fragility and mental disturbance of the patients.

INT2-3 A trauma case of renal arterial occlusion treated by endovascular intervention after damage control surgery

¹Department of Emergency and Critical Care Medicine, Tokyo Saiseikai Central Hospital, ²Department of cardiology, Tokyo Saiseikai Central Hospital

Shiho Irino¹, Yu Michiura¹, Motojiro Takebe¹, Kenji Suzuki², Yoko Sugawara¹, Yuya Masuzawa¹, Tomohiro Kamagata¹, Yoshiro Kikuoka¹, Kazuhiko Sekine¹

Here, we present the case of a polytrauma patient with right renal artery occlusion, whose renal function was finally preserved by endovascular treatment postadmission. A 43-year-old man, who had been resuscitated by substantial transfusion and resuscitative endovascular balloon occlusion (REBOA) at another hospital, was transferred to our hospital for urgent surgery. Upon arrival, he was hemodynamically unstable under REBOA; contrast-enhanced CT scans, taken at the previous hospital, revealed hemothorax, pelvic fractures, and extravasation from the mesenteric arteries. In addition, the scans also revealed a lack of contrast enhancement of the right kidney. We performed urgent laparotomy and found active bleeding in the transverse mesocolon, retroperitoneal hematoma, and sequential coagulopathy. The patient underwent damage control surgery, including an intra-abdominal gauze pack to control the arterial bleeding and vacuum pack closure, and postoperative transcatheter arterial embolization (TAE) for the pelvic fractures. During TAE for hemorrhage from the pelvic fractures, we identified right renal arterial occlusion and revascularized it by endovascular intervention with thrombus aspiration (349 min after the injury). Although the patient needed temporary dialysis for 33 days postadmission, he was discharged on day 58 without any treatment for renal function. This case showed that endovascular revascularization for renal artery occlusion after DCS could be effective for salvaging the kidneys.

INT2-4 Participatory discharge planning model for patients with severe traumatic brain injuries in trauma surgery unit, Khon Kaen Hospital

Department of Nursing, Khon Kaen Hospital, Thailand

Pimwara Akaratiensin, Potjana Tupsai, Winitra Utchoo

[Introduction] Severe traumatic brain injury (STBI) is a major problem in Khon Kaen Hospital. The length of hospital stay (LOS) and unexpected readmission among patients with STBIs are increasing. This caused a problem of high cost in medical treatments. **[Methods]** We conducted a participatory action research in the trauma surgery unit of Khon Kaen Hospital. Data were collected by observation, interview, and focus group discussion between October 1, 2015 and September 30, 2017. The study participants include physicians, nurses, pharmacists, physical therapists, nutritionists, patients and their relatives. First, to identify problems in the structure of the health personnel in the unit and the process of care and discharge planning, we conducted 9 focus group discussions among the participants. Then we held seminars for health personnel in the unit about the clinical situations of STBIs, necessity and contents of discharge planning, and the role of multidisciplinary team. Daily discharge planning and health care information started to be given to patients and their relatives. These activities were evaluated with average LOS, readmission within 28 days, and satisfactory score rated by relatives as the outcome indicators. **[Results]** After the implementation of this activity, the average LOS decreased from 21 days to 14 days. There was no unexpected re-admission within 28 days of discharge. Overall relatives' satisfaction scores increased from 86.9 in 2014, to 90.8, 92.8, 93.4 in 2015, 2016, and 2017, respectively. **[Conclusion]** The participatory action research and resulting discharge planning model for patients with STBIs in trauma surgery unit was effective and appropriate.

INT2-5 Development of a case management model for severe traumatic brain injuries

¹Department of Nursing, Khon Kaen Hospital, Thailand, ²Sri Maha Sarakham Nursing College raboromrajchanok institute, Maha Sarakham Province, Thailand, ³Department of Surgery and Neurosurgery, Khon Kaen Hospital, Thailand. Anchalee Sophon¹, Phadoongsit Chumnanborirak², Praivan Promteer¹, Surakrant Yutthakasemsunt², Oratai Pochaisan¹

[Purpose] To improve the care for patients with severe traumatic brain injuries, we developed, implemented, and evaluate a case management model. **[Method]** The study consisted of four phases: 1) situation analysis which included reviewing medical records, observing care practices, and data collection through group discussion and questionnaire survey among stakeholders; 2) development of a case management model to solve identified problems; 3) model implementation; and 4) evaluation of the model using performance indicators (waiting time, length of hospital stay, and satisfaction among stakeholders based on 5-point Likert satisfaction scale). In the evaluation, 60 stakeholders participated. **[Results]** The situation analysis indicated the average waiting time for the computerized tomography (95 minutes) and average length of hospital stay (six days) as performance indicators to be improved. Insufficient care by nurses, errors in patient referral, lack of coordination with multidisciplinary team were also identified. To improve these situations, a case management model (practice guidelines) was developed and implemented. After the implementation, the average waiting time for the computerized tomography reduced to 58 minutes and the average length of hospital stay to five days. The patients did not have any complications. Lastly, the average satisfaction scores were 4.9 ($SD = 0.34$) among the multidisciplinary team and 4.9 ($SD = 0.24$) among the patients' relatives. **[Conclusion]** The case management model based on the situation analysis improved care and outcomes for the patients with severe traumatic brain injuries practices. Such a model is useful in working with the multidisciplinary team.

INT3-1 An autopsy report analysis on common fatalities in Sri Lanka

¹Postgraduate Institute of Medicine, University of Colombo, Sri Lanka, ²Institute of Forensic Medicine and Toxicology, Colombo, Sri Lanka

Jayatilleke Achala Upendra¹, Apsara De Silva¹, Ajith Tennakoon², A.L.M. Hanas²

[Introduction] Non-communicable diseases (NCDs) and injuries are becoming a significant burden in Sri Lanka. Information obtained from autopsy reports play a vital role in developing preventive measures to control NCDs and injuries. However, information related to fatalities remain relatively under studied. A retrospective study was carried out with data extracted from autopsy reports registries at Institute of Forensic Medicine and Toxicology (IFMT), Colombo which is the leading institute that performs larger part of autopsies in Sri Lanka. **[Methods]** We analyzed autopsy data from July 2013 to December 2016 excluding cases that are incomplete. In total, 4530 autopsies were performed during the study period. We extracted data from autopsy reports and analyzed using Microsoft Excel. **[Results]** Out of 4530 deaths, 3622 (80%) were males and 900 (19.9%) were females. Deaths due to accidents, suicides, homicide, and NCDs were 1923 (42.5%), 320 (7.1%), 167 (3.7%), and 1794 (39.6%), respectively. The commonest mechanism of injury among the accident group was road traffic crashes ($n=1384$, 72%) followed by falls ($n=240$, 12.5%). Of the 2410 injury deaths, 1085 (46.8%) were sustained head injuries. Of 1794 NCD deaths, 822 (45.8%) were due to coronary artery diseases, 164 (9.1%) were due to spontaneous intracerebral haemorrhage, 156 (8.7%) were pneumonia, and 135 (7.5%) were chronic lung disease. There were 41 maternal deaths. **[Conclusion]** Significant number of deaths due to injuries and non-communicable diseases were reported and remain top killers in Sri Lanka over the years. Further studies are required to identify risk factors for the increase in fatality rates.

INT3-2 The psychiatric background of torso stab wounds

横浜市立大学附属市民総合医療センター 高度救命救急センター
高橋 航, 加藤 真, 山口敬史, 日野耕介, 安部 猛, 高橋耕平,
岩下眞之, 竹内一郎

[Background] Few studies have compared self-inflicted (SI) torso stab wounds (TSWs) to TSWs inflicted in an assault (A-TSWs). **[Patients and Methods]** We retrospectively reviewed and compared the SI-TSWs (n=46) and A-TSWs (n=11) over a 5-year period. **[Results]** The mean age and gender ratio were similar. Multiple wound locations were more frequently seen in A-TSWs (SI-TSW vs A-TSW: 5 vs 5, p=0.017), and the mean ISS was more severe (6.7 [1-25] vs 12.3 [2-29], p=0.026). Thirty-six of the patients had an accompanying psychiatric episode (32 vs 4). All patients were discharged alive, while 46 patients (42 vs 4, p < 0.01) had a concurrent psychiatric diagnosis. Although the duration of hospitalization was similar between the two groups, 24 SI-TSW patients required additional hospitalization for a psychiatric condition; in contrast, only one A-TSW patient required (p=0.015). **[Conclusion]** Patients with SI-TSWs had less severe ISS values, and more frequency had psychiatric complications; however, patients with A-TSWs also tended to demonstrate psychiatric episodes.

INT3-3 The Significance of Neurosurgical Treatment for Abusive Head Trauma

Department of Emergency and Critical Care Medicine, Saitama Medical Center,
Saitama Medical University
Takashi Araki

[Purpose] The outcome of Abusive Head Trauma (AHT) is compared with the outcome of traumatic brain injury (TBI) cases with simple accident. **[Material and Methods]** 19 patients who underwent decompressive craniectomy (DC) in 50 cases of severe TBI caused by simple accident under 16 and 16 cases who was diagnosed with AHT under 2 which required DC were included. **[Results]** Poor prognosis was commonly seen in AHT than in simple accident ($P < 0.05$) and longer hospitalization was required. The ICP value was markedly decreased by DC in both groups and DC was not associated with mortality. The period that ICP management was required (AHT group; 3.1 ± 1.7 , simple accident; 10.7 ± 5.4) was longer in the simple accident group ($P < 0.01$). Rapid progression of atrophic change of brain parenchyma was commonly seen in the AHT. **[Discussion]** In AHT group, rapid progression of atrophy in brain parenchyma was remarkable. The outcome of AHT is extremely pessimistic, however, reports on the effectiveness of rehabilitation are accepted to preserve normal remaining function.

INT3-4 A new classification of foreign body airway obstruction and its association with survival outcomes

¹Department of Critical Care Medicine, Osaka Habikino Medical Center, JP, ²Department of ER Medical Center, Osaka Police Hospital, Osaka, JP, ³Department of Emergency and Critical Care Medicine, Nippon Medical School Hospital, Tokyo, JP, ⁴Department of Emergency Medicine, University of New Mexico, Albuquerque, USA
Sung-Ho Kim^{1,2}, Yutaka Igarashi³, Shimpei Nagata², Tatsuya Norii⁴, Yasuaki Mizushima², Hiroyuki Yokota³

[Background] Foreign body airway obstruction (FBAO) is a potentially life-threatening event. No standard classification of FBAO is currently available. We classified FBAO cases into three types based on anatomical and physiological characteristics of FBAO and evaluated survival outcomes. **[Methods]** We retrospectively evaluated patients who presented to the emergency department with FBAO in two hospitals in Japan. The location of the FBAO was classified into one of three types at the time of choking: type 1 is defined as upper airway obstruction by a large foreign body (FB) that cannot be passed through the vocal cord and completely obstructs the airway; type 2 is defined as trachea and/or bilateral main bronchus obstruction by a FB; type 3 is defined as unilateral bronchus and/or distal bronchus obstruction by a FB. Following group classification, we compared survival outcomes. **[Results]** We enrolled 137 patients from January 2011 to February 2018. The median age was 79 (IQR: 71-86), and there were slightly more male patients (59.1%). Ninety patients (65.7%) presented with cardiac arrest. The most common FBAO was type 1 (78.1%), which was followed by type 2 (12.4%) and type 3 (9.5%). Mortality was significantly higher in type 2 compared to type 1 (47.7% vs. 82.4%, p<0.01). **[Conclusion]** We classified FBAO cases into three types based on the anatomical and physiological characteristics of FBAO. In our classification, type 2 was associated with higher mortality.

INT3-5 Application of NOMESCO Classification of External Causes of Injuries in burn injury research in Mongolia

¹University of Tsukuba, ²National Trauma Orthopedic Research Center, Mongolia, ³Department of Emergency Medicine, Teikyo University School of Medicine, ⁴Department of Global Public Health, University of Tsukuba
Gunsmaa Gerelmaa¹, Tumen-Ulzii Badrakh², Shinji Nakahara³, Masao Ichikawa⁴

The NOMESCO Classification of External Causes of Injury (hereinafter called the NOMESCO Classification) was developed by the Nordic Medico-Statistical Committee (NOMESCO) in 1984 to monitor emergency room patients. The NOMESCO Classification is different in its structures from the International Classification of Diseases (ICD) or its extended classification called the International Classification of External Causes of Injury (ICECI). We used the NOMESCO Classification in our recent study on child burn injuries in Mongolia where burn injury is the leading cause of mortality among young children. Briefly, this study aimed to describe the circumstances of burn injury occurrence among Mongolian children aged 15 years or younger who were admitted to the National Trauma Orthopedic Research Center. We collected data on those patients' demographics and the etiology and clinical features of their burn injuries, and analyzed the data based on the NOMESCO Classification. In the NOMESCO Classification, a simple model of etiology is proposed, which describes the sequence of events precipitating the moment of injury and the product involved in the events: the mode of injury, such as contact with hot liquids; the injury event (the event immediately preceding the injury), such as overflowing of hot liquids from a cooking pot; and the precipitating event/activity, such as pulling down a cooking pot. The NOMESCO Classification is useful to understand the etiology of injury well and provides a clue for developing effective injury prevention programs. **Keywords:** NOMESCO classification, external causes, burn injuries, etiology, children, Mongolia

INT4-1 Implementing a Medical Emergency Team (MET) system to identify a deteriorating patient in non-intensive care setting in Sri Lanka

¹Accident and Orthopaedic Service, National Hospital of Sri Lanka, ²Postgraduate Institute of Medicine, University of Colombo, Sri Lanka, ³District General Hospital Gampaha, Sri Lanka
Samarakoon Samiddhi¹, Janith C. Wanigatunga², Aruna Munasinghe³, Achala U. Jayatileke²

[Introduction] Accident and Orthopaedic Service (AOS) at the National Hospital of Sri Lanka (NHSL) is providing emergency care for more than 100,000 patients annually. On average, 36 deaths occur monthly and the events leading to these deaths occur with prior warning signs for an average of 6-8 hours. Therefore, detecting signs and delivering prompt treatment to resuscitate the patients will reduce the mortality and morbidity and improve the quality of emergency care. **Objectives:** To implement a Medical Emergency Team (MET) system to identify deteriorating patients in non-intensive care setting in AOS. **[Methods]** Current practices of managing emergencies in non-intensive care setup at AOS/NHSL will be evaluated for requirement elicitation. An early warning score system will be introduced to identify deteriorating patients, and a person/s, who will trigger an emergency calling will be identified. MET members will be identified and necessary training will be provided. Further, the guidelines and protocols will be introduced and required instruments will be provided. An evaluation tool will be developed to monitor the performance of the MET system and the outcome will be assessed. **[Results/product]** A Designated person will trigger a calling alarm once the predefined calling criteria is met. MET team will receive audible alert and SMS message to arrive at the scene. **[Conclusion/Implications]** In ward patients will have a monitoring system which can predict the monitoring frequency and set thresholds to trigger MET system according to the severity of their clinical symptoms. The patients will receive specialized emergency care rapidly and promptly.

INT4-2 Development of discharge planning model for pediatric patients with pneumonia based on caregiver empowerment

Pediatric Nursing Department, Khon Kaen Hospital, Thailand
Panueukkaew Klangka, Ampha Thawieng

[Introduction] Readmission among pediatric pneumonia patients aged 1 month to 1 year is not rare. Through situational review, we found that discharge planning was inefficient; and we developed, implemented, and evaluated a new discharge planning model for pediatric patients with pneumonia based on a concept of caregiver empowerment. **[Methods]** First, we conducted analysis of existing discharge planning retrospectively, brain storming, observation of practice of discharge planning, and care givers interviewing. The planning was found to be inefficient because of insufficient participation of the caregivers in the planning. Thus, we develop and implemented a discharge planning model enhancing caregiver role in the care planning. Then we evaluated the effectiveness of the new model by comparing readmission rates before and after its implementation. We also described knowledge and satisfaction among caregivers and nurses. **[Results]** The new discharge planning model included; 1) flow chart of care using concept of family empowerment, 2) educational and training for caregivers to prepare caring at home, 3) training for nurses to care appropriately, and 4) implementing nursing standard of caring and discharge planning. The readmission rate decreased from 7.7% to 7.1%. After implementation of the new model, 82% and 90% of the observed caregivers had enough knowledge and skills, respectively; 97.7% of the caregivers and 82.3% of were satisfied with the planning model. **[Conclusions]** The new model using the concept of caregiver empowerment can optimize the effectiveness in discharge planning. Nurses should evaluate this model regularly to know the problems which lead to continuous quality improvement.

INT4-3 Effects of a clinical nursing practice guideline among mechanically ventilated patients in critical care department, Khon Kaen Hospital

¹Department of critical care, Khon Kaen Hospital, Thailand, ²Faculty of Nursing, Khon Kaen University, ³Department of General Surgical Intensive Care Unit, Khon Kaen Hospital, ⁴Department of Trauma Surgical Intensive Care Unit 1, Khon Kaen Hospital, ⁵Department of Medical Intensive Care Unit, Khon Kaen Hospital, ⁶Department of Trauma Surgical Intensive Care Unit 2, Khon Kaen Hospital

Tiasawat Udonlak¹, Donwiwat Saensom², Acharawun Namuangchan³, Supaporn Tansura⁴, Yuwadee Boonloy⁵, Apisara Songserm⁶

[Introduction] Critically ill patients with respiratory failure require mechanical ventilation (MV). However, MV is associated with several physical complications. We developed, implemented, and evaluated effects of the clinical nursing practice guidelines (CNPNG) for MV in Khon Kaen Hospital. **[Methods]** After reviewing existing nursing care interventions, we developed and implemented CNPNG for mechanically ventilated patients in the intensive care unit (ICU). The CNPNG consisted of 6 components: providing adequate oxygen and ventilation, preventing auto-extubation, preventing VAP, preventing barotrauma, assessing and managing pain associated with MV, and assessing and promoting MV weaning. We compared selected outcomes before and after the CNPNG implementation among 62 critically ill patients during June 2016 and February 2017 (31 before and 31 after implementing CNPNG); and evaluated adherence and satisfaction among 73 nurses who cared for the patients under CNPNG. **[Results]** When compared to patients before CNPNG implementation, those cared with the CNPNG had lower VAP risk (RR 0.65, 95% CI: 0.20-2.04), were more likely to be assessed and properly managed for the pain (RR 20, 1.12-333.33), had lower risk of auto-extubation (RR 0.28, 0.06-1.21), and were more likely to be assessed and promoted for weaning (RR 34.06, 2.13-543.54). In addition, those cared by using the CNPNG had significantly shorter ICU stays by an average of 3.9 days (95% CI: 3.4-4.3). Lastly, nurses using the CNPNG had high level of adherence to the guidelines and a high level of satisfaction in using the CNPNG. **[Conclusions]** Evidence-based CNPNG for mechanically ventilated patients successfully promoted desirable care outcomes.

INT4-4 A CASE REPORT OF MULTIDRUG-RESISTANT ACINETOBACTER BAUMANNII VENTRICULITIS AND MENINGITIS

Hanoi Medical University

Hai Hoang Bui, Nguyen Anh Dung, Nguyen Tien Thanh, Hoang Kim Quan

Antibiotic resistance is a growing global concern, which is a pressing issue particularly in the intensive care units of hospitals. Administering appropriate antibiotics has been shown to reduce mortality, length of hospital stay, and lower care cost. Along with antibiotic selection, the route of administration also contributes to increasing favorable outcomes in antimicrobial therapy to infectious diseases. To further demonstrate this issue, this paper details a case at Hanoi Medical University (HMU) Hospital whose multidrug-resistant Acinetobacter baumannii ventriculitis causing meningitis was successfully treated using intraventricular injections of colistin. A 74-year-old male patient was admitted to the emergency department of HMU Hospital due to a headache. Following examination, he was diagnosed with cerebellar hemorrhage and was given hematoma evacuation. After the surgery, due to modest improvements in consciousness and persistent high fever, samples of cerebrospinal fluid (CSF) and a brain CT scan were acquired. The patient was diagnosed with multidrug-resistant Acinetobacter baumannii ventriculitis and meningitis. Treatments included a combination of intravenous meropenem in a dosage of six grams per day and intravenous colistin; however, there were no signs of improvements after a few days. Then intraventricular 100000 UI of colistin was administered to the patient per day. Following the treatments, the fever resolved after four days. CSF became clear after 14 days and antibiotics were ceased on day 18. In conclusion, the combination of intravenous meropenem and intraventricular administration of colistin is a possible course of action to treat ventriculitis and meningitis caused by multidrug-resistant Acinetobacter baumannii. **Keywords:** ventriculitis, meningitis, multidrug-resistant, Acinetobacter baumannii

INT4-5 Low dose of recombinant tissue-type plasminogen activator (rt-PA) in the treatment of acute pulmonary embolism in Vietnam

¹Hanoi Medical University and Hanoi Medical University Hospital, ²Hospital of Thu Duc District, Ho Chi Minh City, ³Bach Mai Hospital, ⁴Da Nang General Hospital

Hai Hoang Bui¹, Phuc Giang Do¹, Lac Duy Le², Thinh Nghia Bui², Chinh Quoc Luong³, Hieu Huu Hoang⁴, Nhan Duc Le⁴

[Background] Recommended dose of recombinant tissue plasminogen activator (rt-PA) to treat acute pulmonary embolism (PE) is 100mg infusion over 2 hours. However, some evidences suggest that a low dose rt-PA regimen can be equally effective but potentially safer. **[Objectives]** To evaluate the safety and efficacy of low-dose rt-PA on management of acute PE. **[Methods]** A retrospective observation of case series in 5 hospitals in Vietnam from 2010 to 2018 was described. Acute PE patients were treated with the same protocol: the total dose of 0.6 mg/kg t-PA through a peripheral line in 15 minutes was administered. The other treatments followed the standard protocol. Changing in RV diameter, pulmonary artery systolic pressure (PASP), severity index score were evaluated after 1 week, 1 month and 3 months respectively. The mortality and complications were also assessed. **[Results]** Of the 51 patients included (mean age 62 ± 19.2 years, female 70.5%), 26 had high risk and 25 had intermediate-high risk of mortality. Mean RV diameter decreased from 31.1 mm at baseline to 26.8, 23.5, and 24.0. Mean PASP declined from 52.8 mmHg to 41.0, 33.5, and 29.7; the severity score dropped from 56.8 to 29.9 at 1 month, and 4.5 at 3 months (n=11, no visible emboli after 1 month in 40 others). There were 2 deaths (not related directly to PE), no major bleeding, 6 minor bleeding, 1 acute pulmonary edema, and 1 carotid aneurism. **[Conclusions]** Low-dose rt-PA regimen improved conditions of acute PE patients effectively with low rate of mortality and complications. **Keywords:** fibrinolysis; pulmonary embolism; right ventricular failure; thrombolysis

INT4-6 Use of ketofol (combination of ketamine and propofol) for procedural sedation and analgesia in the Emergency Departments in Japan

¹Department of Emergency Medicine and Critical Care, Center Hospital of the National Center for Global Health and Medicine, ²Department of Emergency Medicine and Critical Care, Tokyo Bay Urayasu Ichikawa Medical Center, ³Department of Critical Care Medicine, Osaka Habikino Medical Center, ⁴Department of General Medicine, Dokkyo Medical University Hospital, ⁵Department of anesthesiology, Otemachi Hospital, ⁶Department of Emergency Medicine, The University of New Mexico Kentaro Fukano¹, Yousuke Honma², Sonho Kim³, Hiroshi Takase⁴, Akihikari Shimosato⁵, Tatsuya Norii⁶

[Background] Procedural sedation and analgesia (PSA) are performed outside of the operating theater including in the Emergency Departments (ED). Ketofol (combination of ketamine and propofol) has multiple theoretical advantages over ketamine or propofol alone. Although ketofol has been used for PSA in many countries, its use for PSA in the ED has not been reported in Japan. **[Methods]** We analyzed the Japanese Procedural Sedation and analgesia Registry (JPSTAR), a multi-center prospective registry of patients undergoing PSA in the ED in 4 teaching hospitals in Japan, and identified patients who received ketofol. **[Results]** Among 332 cases in the registry from May 2017 to April 2018, we identified three patients who received ketofol. Their ages were 49, 60, and 70. Hip joint reduction was the indication for all three cases. No adverse events were reported. Two patients were admitted to the hospital after PSA. The remaining patient was discharged home from the ED. **[Conclusion]** To our knowledge, this is the first report of ketofol use for PSA in the ED in Japan. Although it is difficult to make a clear conclusion based on our small sample size data, ketofol seems to be a safe option for PSA in Japanese EDs. A larger sample size is needed to confirm our results.

INT4-7 Comparison of the efficiency of oral airway and nasal airway inserted in the oral airway during mask ventilation

Department of Anesthesiology and Pain Medicine, Seoul National University Bundang Hospital

Jaesung Lee, Seongjoo Park, Jin-Woo Park, Sung-Hee Han, Jin-Hee Kim

[Backgrounds] The purpose of this study was to investigate the efficiency of nasal airway inserted in the oral airway (ON airway) in securing the airway patency during mask ventilation. **[Methods]** Fifty-eight patients undergoing general anesthesia were randomly assigned to either oral airway group (Group O) or ON airway group (Group N). In both group, 2 mg/kg of propofol was infused intravenously and mask ventilation was performed in the sniffing position without head extension or jaw thrust. The patients were ventilated with a volume-controlled ventilator with O₂ flow of 10 l/min, tidal volume of 10 ml/kg, and respiratory rate of 10 /min. Before the start of mask ventilation, airway was placed in the oral cavity. Oral airway was used in Group O and ON airway was used in Group N. Peak inspiratory pressure (PIP), tidal volume and EtCO₂ were compared between the two groups. The location of airway tip was graded by fiberoptic bronchoscope as; 0: airway obstructed by tongue, 1: epiglottis visible, 2: airway touches epiglottis tip, 3: airway passes beyond epiglottis tip. **[Results]** Compared with Group O, Group N showed significantly lesser PIP (25.0 [18.0 - 29.0] vs. 18.0 [16.0 - 19.0], P < 0.001, Group O and N, respectively) and greater tidal volume and EtCO₂ during mask ventilation. In the bronchoscopic findings, airway obstruction was more frequent in group O (P <0.001). **[Conclusions]** Compared with oral airway, ON airway facilitates the mask ventilation by promoting the patency of airway.

INT4-8 Macrophage-HMGB1 is involved in the development of cystic pain in mice

福岡大学 医学部 救急医学講座

入江悠平, 星野耕大, 村西謙太郎, 中塩舞衣子, 外間亮, 鯉江めぐみ, 石倉宏恭

[Objective] We have reported that macrophage-derived HMGB1 was involved in the pancreatic pain. In this time, we examined whether interstitial cystitis pain also involves macrophage-derived HMGB1. **[Methods]** Interstitial cystitis in mice was created by intravesical administration of Substance P (SP). And we evaluated the hyperalgesia 24 h after the final administration of SP, the bladder was isolated and weighed for determination of the severity of the evoked cystitis. **[Results]** Pretreatment with anti-HMGB1 antibody and rhsTM, known to delete HMGB1, both of them prevented the hyperalgesia significantly, but did not affect the bladder weight. Hyperalgesia was significantly suppressed in mice pretreated with AMD 3100 or FPS-ZM1. **[Conclusion]** Our results suggested that macrophage-derived HMGB1 contributes to the development of cystic pain in mice via RAGE or CXCR4 signaling and rhsTM may reduce cystic pain.

INT5-1 The trial of "ITC (Iwate Trauma Conference) " by various hospitals and various medical staffs

¹Morioka Yuai Hospital, Thoracic Surgery, ²Iwate Prefectural Chubu Hospital, Surgery, ³Iwate Prefectural Iwai Hospital, Emergency Medicine, ⁴Morioka Yuai Hospital, Rehabilitation Section, ⁵Morioka Yuai Hospital, Pharmacy, ⁶Morioka Yuai Hospital

Kojiro Shiga¹, Fumie Obara², Yuro Kinn³, Takaaki Katayama³, Megumi Sasaki⁴, Kotaro Ishikawa⁴, Shintaro Abe⁵, Yuji Fujii¹, Shigeatu Endo⁶

Iwate Prefecture has a wide area. Sometimes, The treatment for multiple trauma is required even in facilities not accustomed to such trauma. We held the Iwate Trauma Conference (ITC) involving health professionals from different medical institutions, which aimed at sharing experience regarding multiple trauma cases and collaboration among medical institutions. From the planning and preparation stage, we were working with doctors and medical professionals of different medical institutions in cooperation. On the day of the event, there were various types of occupation from various medical institutions as well as doctors. There was a constructive question-and-answer, ranging from concrete therapy including surgical techniques to rehabilitation and discharge adjustment. ITC was useful conference.

INT5-2 A little improvement of EMS in Hanoi through 2 different case studies

¹Hanoi Medical University Hospital, Hanoi Medical University, ²Department of Emergency Medicine, Teikyo University School of Medicine

Hai Hoang Bui¹, Viet Ha Vu¹, Anh Dung Nguyen¹, Tien Thanh Nguyen¹, Ngoc Ha Le¹, Giang Phuc Do¹, Dinh Hung Vu¹, Huy Binh Trinh¹, Tat Thanh Nguyen¹, Nakahara Shinji²

Out-of-hospital cardiac arrest requires prompt and appropriate care by bystanders and emergency medical services (EMS). In many low- and middle-income countries (LMIC), bystanders often do not know appropriate cardiopulmonary resuscitation (CPR) and EMS is not sufficient to meet every need. Recently in Hanoi, there were two contrasting cases from which we can learn lessons. The first case is a 40-year-old man who was handling electric current at a railway construction site and was electrocuted. His colleagues quickly transferred him to the emergency room by taxi without any CPR or calling EMS, which took 10 minutes. At the emergency department, he was found to have ventricular fibrillation, and resuscitated but unsuccessful. The second case is a 43-year-old man who had bronchial asthma under regular treatment. He stayed at home with his blind wife because of dyspnea and fatigue. His dyspnea worsened and his wife called EMS. When the EMS reached him in 10 minutes, he was in a cardiac arrest. The EMS performed CPR, oxygen squeeze, and adrenaline administration. After about 10 minutes, he got return of spontaneous circulation. He was then placed a laryngeal mask, transferred to the hospital, intubated, and treated under mechanical ventilation and the bronchodilator for asthma. He was extubated after 3 days and discharged after 1 week. These two cases highlight the importance of the chain of survival and abilities of EMS in Hanoi. It is a pressing need to raise people's awareness of what they should do for OHCA patients (CPR and EMS call).

INT5-3 The interval from patient collapse to defibrillation of emergency medical service and favorable neurological outcomes on out-of-hospital cardiac arrest

Graduate School of Emergency Medical System, Kokushikan University, Tokyo, Japan.

Toru Shirakawa, Ryo Sagisaka, Takahiro Hara, Soh Gotoh, Hideharu Tanaka

[Objective] The aim of this study was to estimate the relationship between interval from patient collapse to defibrillation by emergency medical service (EMS) and favorable neurological outcome in a nationwide out-of-hospital cardiac arrest (OHCA) registry in Japan. **[Methods]** A retrospective observational study was conducted with OHCA cases from 2006 to 2015 ($n=1,197,046$) by nationwide Utstein style OHCA registry in Japan. The subject was 26,622 OHCA cases which experienced cardiogenic cardiac arrest, witnessed by a bystander, shockable rhythm, EMS provided defibrillation and interval of collapse to EMS defibrillation between 3 and 20 minutes, and those with bystander defibrillation were excluded. The primary outcome was favorable neurological outcomes (Cerebral Performance Category 1 or 2) one month after cardiac arrest. Logistic regression was conducted to examine the relationship between outcomes and interval of collapse to EMS defibrillation. **[Results]** The mean interval of collapse to EMS defibrillation was 11.8 (standard deviation, 3.3) minutes. The longer interval of collapse to EMS defibrillation was associated with lower percentage of neurologically favorable one-month survival (crude odds ratio for each 1-minute increase, 0.87; 95% confidence interval, 0.86 to 0.87). **[Conclusion]** The shorter interval of collapse to EMS defibrillation was associated with good favorable neurological outcomes for OHCA patients. Shorten interval of collapse to EMS defibrillation by even a few minutes could potentially save lives.

INT5-4 Evaluation of referral centers in Khon Kaen Province

Nursing Department of Emergency Room (Referral Center), Khon Kaen Hospital, Thailand.

Talsab Wilawan, Watchara Sriharat

[Objectives] To explore problems, make suggestions, and evaluate the performance of referral centers in Khon Kaen province, Thailand. **[Methods]** We conducted a questionnaire survey among stakeholders of referral system in the province from July to November 2017. Open-ended questions were used to explore problems, obstacles, and suggestions; structured questions were used to evaluate the performances of the referral centers. This study included 178 participants selected randomly from four stratified groups in the province: hospital directors, members of referral committees, staff of the referral centers, and staff of hospitals referring patients to the referral centers. The questionnaires were developed for each of the four groups, in which the participants were requested to evaluate the context, inputs, and process using 5-point Likert scale (high score means very good or very agree), and to evaluate products (achieved goals) using yes-or-no questions. **[Results]** The participants showed concerns about the system and its insufficient resources but willingness to support the centers to improve their performances. The mean rating scores (SD) on the context, input, and process were 4.14 (0.57), 4.93 (0.14), and 4.01 (0.53), respectively among hospital directors; 3.80 (0.76), 3.66 (0.57), and 3.64 (0.57), respectively among referral committee members; 3.91 (0.52), 3.78 (0.54), and 3.79 (0.56), respectively among referral center staff; 3.70 (0.57), 3.25 (0.57), and 3.23 (0.76), respectively among doctors and nurses. The product evaluation was 100% in all groups except for the doctors and nurses (84%). **[Conclusions]** Although the evaluation scores were fairly good, there is still room for improvement in the referral system.

INT6-1 Keywords in initial report which predict severity of ski and snowboard injuries

手稻溪仁会病院 救急科

小野寺良太, 奈良 理, 森下由香, 大西新介, 清水隆文, 大城あき子, 岡本博之, 高橋宏之, 杉浦 岳, 和田健志郎, 近藤 純

[Background] In severe trauma, especially in rural areas, rapid response by helicopter is crucial. In Hokkaido, a number of specific keywords are screened for in the initial on-site report to decide if helicopter dispatch is warranted. However it is unclear whether these keywords accurately predict severity. **[Objective]** To analyze keywords that predict trauma severity in patients injured by skiing or snowboarding. **[Study design]** A seven-year review of ski and snowboard trauma patients transported by ambulance or helicopter **[Patients and methods]** Trauma patients with ski or snowboard injuries admitted to Teine Keijinkai Hospital by ambulance and helicopter from April 2012 to March 2018 were reviewed. We defined severe traumatic patients as ISS ≥ 16 or needing emergency intervention (intubation, chest drainage, emergency operation, transcatheter arterial embolization). We examined the keywords related to age, sex, altered conscious level and cause of injury. **[Results]** A total of 144 patients were identified. 41 (28%) were severely injured. Age over 50 years, and 'impact with tree' were associated with an increased risk of severe injury (Age over 50 years: OR2.84, 95%CI:1.07-7.51, impact with tree: OR5.01, 95%CI:2.14-11.7) **[Conclusion]** This analysis suggests that patients over 50 years of age who have 'impact with a tree' are more likely to have severe injury, and should warrant helicopter dispatch.

INT6-2 JTAS (Japan Triage and Acuity Scale) 2012 in pediatric emergency department is a valid tool for non-traumatic patients of all ages

¹Department of Emergency Medicine, Tokyo Metropolitan Children's Medical Center, Tokyo, Japan. ²Department of Intensive Care Medicine, Osaka Women's and Children's Medical Center, Osaka, Japan

Masashi Taniguchi^{1,2}, Yusuke Hagiwara¹

[Background] Pediatric emergency department triage should have the reliability for all children. **[Objectives]** The objective of this study is to show that JTAS (Japan Triage and Acuity Scale) 2012 in emergency department is reliable for non-traumatic pediatric patients regardless of their ages. **[Methods]** This was a retrospective observational study evaluating all non-traumatic children who visited a pediatric emergency department of tertiary pediatric facility in Japan during 5 years from April 2012 to March 2017. To analyze the reliability of JTAS 2012, patients were categorized as two groups, high acuity (triage level 1, 2) and low acuity (triage level 3, 4 and 5). We compared triage acuity with admission and calculated the reliability indices such as Sensitivity (Se), Specificity (Sp), Positive Likelihood Ratio (PLR) and Negative Likelihood Ratio (NLR). First, we calculated those indices in children of all ages and compare them with those of other triage systems in previous studies. And then, we calculated the indices by age. **[Results]** 147,894 non-traumatic pediatric patients (aged <16) visiting an emergency department were included. The reliability indices of JTAS 2012 of all ages were good as follows: Se of 68.1%, Sp of 92.5%, PLR of 9.0 and NLR of 0.34. In the aspect of indices, JTAS 2012 was superior to all other triage systems. Moreover, the age-related variations were slight: Se of 65.9% (IQR 62.3-69.2), Sp of 92.8% (IQR 92.4-93.2), PLR of 9.0 (IQR 8.2-10.0), and NLR of 0.36 (IQR 0.33-0.41). **[Conclusions]** This study shows that JTAS 2012 is a valid tool for non-traumatic patients of all ages.

INT6-3 Factors Related To Severe Injury From Motorcycle Accident In Teenage Whom Were Cared At The Emergency Department, Khon Kaen Hospital

¹Emergency Department, KhonKaen Hospital, Thailand, ²Faculty of Health Sciences Khonkaen University
Setcwanon Jerawit¹, Rujira Duangsong²

[Introduction] Motorcycle accident is a major health problem, especially among youths. We described factors associated with severe motorcycle-related injuries among teenagers. **[Methods]** This was an unmatched case-control study among injured motorcyclists aged <20 years. The analysis included 244 patients treated at Emergency Department of Khon Kaen Hospital from January to December 2009. They were divided into severe (n=122) and non-severe (n=122) groups based on Khon Kaen emergency severity index. Data on demographic characteristics, crash details, and road environments were derived from trauma registry database of Khon Kaen Hospital. Associations between these data and injury severity were determined using a multivariate logistic regression model. **[Results]** The study found factors correlated with the severe injury among teenage motorcyclists. The correlated personal factors included helmet non-use (OR = 17.64, 95% CI 1.16-192.55), high speed driving (OR = 0.19, 95% CI 0.06-0.56), and cut in front of another car (OR = 0.19, 95% CI 0.06-0.58). The correlated vehicle factor was crash with a pickup truck or tricycle (OR = 4.80, 95% CI 1.22-18.87). The correlated environmental factors included roads with potholes wave (OR = 0.12, 95% CI 0.01-0.76), wet roads (OR = 11.8, 95% CI 3.03-46.03), paved road (OR = 0.002, 95% CI 0.00-0.01), and road obstructions or objects (OR = 0.07, 95% CI 0.02-0.29). **[Conclusions]** The study found some personal, vehicle, and environmental factors related to severity of motorcyclists' injuries. Of these factors, helmet use is the most important target to reduce severe motorcyclists' injuries.

INT6-4 Do you have a strategy to rule out pulmonary thromboembolism? — a single-center retrospective review

¹2nd year junior resident, Osaka Police Hospital, JP, ²Department of Emergency Medicine, Osaka Police Hospital, JP, ³Department of Critical Care Medicine, Osaka Habikino Medical Center, JP
Tadakiyo Ido¹, Shinpei Nagata², Sung-Ho Kim³, Yasuaki Mizushima²

[Background] Pulmonary thromboembolism (PE) is still challenging to rule out in the emergency room. A specific electrocardiogram (ECG) findings such as "S1Q3T3" is one of the clues. However, due to its low prevalence in PE patients, "S1Q3T3" was paid little attention. We examined the efficacy of "S1Q3T3" in our hospital. **[Method]** This is a retrospective study of an urban, teaching hospital. During the study period between April 1, 2007 and March 31, 2018, we included all patients who were diagnosed PE in our hospital. Collected data were age, gender, vital signs, chief complaints, Wells criteria, and ECG. We classified the patients into two groups, PE likely group and PE unlikely group based on modified Wells criteria, and compared ECG with "S1Q3T3" ratio between the two groups. We analyzed about massive PE and non-massive PE by same method. **[Results]** During the 11 years period, we enrolled 107 patients and 13 patients were diagnosed massive PE. The ratio of patients who had "S1Q3T3" was 43.1%. There was no significant difference in the prevalence between PE likely group and PE unlikely group (Chi-square test, p=0.356). This result was followed by the relationship between massive PE and non-massive PE (Chi-square test, p=0.887). **[Conclusion]** In an 11 years, 107 patients were diagnosed PE in our hospital. Regardless of wells criteria or severity of PE, the rates of patients who met ECG findings "S1Q3T3" were higher than recent study. This result suggests that "S1Q3T3" was potentially useful and should be utilized.

INT6-5 REsident vs. Senior physicians Care of Urgent aortic dissection in the Emergency department (RESCUE study) — a retrospective study

¹Department of Cardiology, Osaka Police Hospital, JP, ²Department of Emergency Medicine, Osaka Police Hospital, JP, ³Department of Critical Care Medicine, Osaka Habikino Medical Center, JP, ⁴Department of Critical Care Medicine, University of New Mexico, US
Mikiko Matsumura¹, Sung-Ho Kim^{2,3}, Shimpei Nagata², Tatsuya Norii⁴, Yasuaki Mizushima³

[Background] Acute aortic dissection (AAD) is a potentially lethal cause in ER. However, variations in clinical presentations make the diagnosis difficult. Emergency medical care in Japan is still covered by junior physicians. We investigated the time-to-diagnosis (TTD) ; AAD based on level of training. **[Method]** This was a retrospective study of AAD patients in an urban ER from February 1, 2015 to January 31, 2018. Collected data was following: age, gender, chief complaint (CC), Stanford classification and the time required for CT scan. All ER physicians were divided into two groups: junior physicians (1st and 2nd year residents) and senior ones ($\geq 3^{\text{rd}}$ year in cardiology and attendings). We define TTD is the time required for CT scan and the primary outcome. **[Result]** Among all 38, 526 ER visits, 61 (0.16%) were diagnosed of AAD. The mean age was 68 [58-76], and 48 (77.4%) were male. 32 (52.5%) patients were Stanford A . The most common CC were back pain (n=36, 59.0%). There were significant differences in TTD between the two groups [junior=57 [37.5-91.5] min, senior=32 [28-55] min, p<0.01]. On the other hand, there were also significant differences in CC: chest pain [junior = 9 (27.2%), senior =16 (51.6%)], , others [junior = 17 (51.5%), senior =6 (18.2%)] ; all p values <0.05. **[Conclusion]** Over a three year study period, 61 patients diagnosed of AAD by junior and senior residents. There were significant difference in AAD and CC in two groups. **[Discussion]** The difference between junior and senior groups is the variation of CC. We have to consider the background and we make sense challenging of making diagnosis in ER.

INT7-1 A case of acute appendicitis secondary to a foreign body swallowed by a patient with mental disabilities and pica

姫路赤十字病院 外科
坂田寛之, 河合 納, 福本侑麻, 信久徹治, 松本祐介, 甲斐恭平, 佐藤四三

A 50-year-old-man with mental disabilities, autism, and pica visited another hospital with vomiting and high fever a day before he presented to our hospital. He had been diagnosed with ileus, and nasogastric intubation had been performed. He did not show improvement and therefore underwent computed tomography, which showed an area of high density in the right lower quadrant of his abdomen. Owing to a high index of suspicion for small bowel obstruction caused by a foreign body, he was referred to our hospital for further management. Upon admission, he was observed to have high fever and abdominal distension. Although he appeared to have abdominal pain, we could not perform a detailed examination because of a difficulty in communication. An exploratory laparotomy was performed, which showed acute appendicitis with abscess formation. Therefore, he underwent an appendectomy and abscess drainage. We report a rare case of acute appendicitis caused by a foreign body.

INT7-2 A case of tension pneumoperitoneum caused by colon cancer in which needle decompression was effective.

¹京都大学大学院 医学研究科 薬剤疫学分野, ²神戸市立医療センター中央市民病院 救命救急センター
朱 祐珍¹, 水 大介², 浅香葉子², 有吉孝一²

Tension pneumoperitoneum is an important clinical condition, which can be improved by rapid needle decompression like tension pneumothorax. We report a case of tension pneumoperitoneum caused by perforation of colon cancer. A 63-year-old man was brought to our emergency department with altered mental status. He was in shock and abdominal X-ray suggested gastrointestinal perforation. Despite rapid fluid infusion and inotropic support, his condition became deteriorated. His abdomen was distended and abdominal CT scan revealed huge intra-abdominal gas. We performed immediate needle decompression and his circulatory status improved immediately. He underwent surgery and it revealed about 10 cm colon cancer which invaded surrounding tissue and led to perforation. He received intensive care after surgery, gradually improved and was transferred to another hospital. There are few reports of tension pneumoperitoneum due to perforation of colon cancer. It should be widely recognized as one of the causes of shock or cardiopulmonary arrest, since rapid diagnosis and decompression may improve the condition.

INT7-3 Gastric emphysema and portal emphysema complicated with Superior Mesenteric Artery Syndrome

関西医科大学附属病院
村津有紗, 室谷 卓, 岸本真房, 尾上敦規, 中村文子, 中嶋麻里, 高橋弘毅, 櫻本和人, 梶野健太郎, 池側 均, 鍬方安行

A 64-year-old man with a history of vomiting, abdominal distention and consciousness disturbance was transported to our hospital. He had hypotension and tachycardia due to infection and dehydration. We diagnosed him with septic shock and performed fluid resuscitation and administered catecholamine. His vital signs stabilized. Abdominal contrast computed tomography (CT) revealed dilatation of the stomach and proximal duodenum with extensive gastric wall pneumatosis and portal emphysema. Upper gastrointestinal endoscopy showed extensive acute gastric mucosal lesions (AGMLs). We diagnosed gastric emphysema without necrosis of the gastric mucosa or pus. We treated the patient conservatively by gastric drainage with a nasogastric tube and intravenous antibiotics and his general condition improved. The same symptoms recurred whenever he started taking nutrition through the nasogastric tube. A review of his medical history revealed a 30-kg body weight decrease over 2 years and constriction of the third portion of the duodenum was detected on abdominal CT. Gastric emphysema by superior mesenteric artery syndrome (SMAS) was diagnosed. The patient was treated by gastric drainage and nutrition was provided through the jejunum with a W-ED tube. Thereafter his body weight increased. He was transferred to other hospital for rehabilitation on the 60th day of hospitalization; no recurrence was observed. SMAS most commonly occurs in young adult women and tends to be detected by chronic cyclical vomiting or epigastric pain. SMAS rarely leads septic shock. We reported the case of a man who developed septic shock caused by gastric emphysema and portal venous gas due to SMAS.

INT7-4 Acute Agitation as an Initial Manifestation of Neuro-Behcet's Disease

¹Advanced Critical Care and Emergency Center, Okayama University Hospital, ²Center for Graduate Medical Education, Okayama University Hospital
Yuki Otsuka^{1,2}, Tetsuya Yumoto¹, Hiromi Ihoriya¹, Yoshinori Kosaki¹,
Yasuaki Yamakawa¹, Atsuyoshi Iida¹, Hirotsugu Yamamoto¹, Taihei Yamada¹,
Kohei Tsukahara¹, Hiromichi Naito¹, Atsunori Nakao¹

Acute agitation is a common condition encountered in ED and requires rapid assessment and management. We report a successfully treated case of Neuro-Behcet's disease (NBD) presenting acute psychiatric symptoms as an initial manifestation. A 44-year-old male, who had been complaining about a severe headache and fever for three days, was admitted to our ED due to acutely presented incontinence and agitation. He had no familial or personal psychiatric history and no psycho-social stress factors. On admission, physical restraint and sedation with sevoflurane and propofol was required for his violent behavior. Physical/blood test showed fever of 37.8 °C and swelling of the parotid glands and scrotum associated with leukocytosis, elevation of CRP and metabolic acidosis. CSF examination revealed increased cell count. T2-weighted MRI demonstrated a small high intensity in the bilateral caudates. As meningoencephalitis was suspected, empirical therapy was immediately started with meropenem, vancomycin, acyclovir, prednisolone, and immunoglobulin. He recovered uneventfully without neurological defect in seven days. Based on positive HLA-B51 and clinical manifestations, the diagnosis of NBD was made and remitted by steroid therapy. Behcet's disease is a chronic multisystem vasculitic syndrome consisting of a triad of recurrent painful oral ulcers, relapsing uveitis, and recurrent genital ulcers. 10% of them demonstrates various lethal neurological symptoms called NBD. Although acute NBD commonly presents with focal neurological symptoms, psychiatric symptoms could be considered the first manifestation. A focused and thorough examination coupled with appropriate management strategies can assist emergency clinicians safely and effectively manage these patients.

INT7-5 Secondary aortoesophageal fistula after thoracic endovascular aortic repair for traumatic thoracic aortic rupture

Niigata University Medical and Dental Hospital Advanced Disaster Medicine and Emergency Critical Care Center
Masakazu Nitta, Hiroshi Endoh, Tadayuki Honda, Yoshifumi Hoshino,
Takashi Hazama, Natsuo Kamimura

A 72-year-old man who was hit by a car was brought to our emergency department. Both traumatic thoracic aortic rupture and intestinal perforations were diagnosed by CT scan. He underwent thoracic endovascular aortic repair (TEVAR) followed by partial resections of jejunum. After these procedures, he was admitted to the ICU with a hemodynamically stable state. On day 4, his consciousness improved and he started to go through rehabilitation. One month later, CT scan had no evidence of aortic pseudoaneurysm, mediastinitis or aortoesophageal fistula (AEF). He became able to walk with assistance but his swallowing function remained declining. About two months after the accident, he was transferred to another hospital that provides him with rehabilitation programs. One month after hospital transfer, he unexpectedly had fever and hematemesis, he underwent upper gastro-intestinal endoscopy and it revealed AEF. He was re-transferred to our hospital and CT scan showed mediastinitis with an aortic pseudoaneurysm. We recommended re-TEVAR and surgical treatment of esophagus to him and his relatives. But he strongly denied such treatment. His relatives respected the will of him and didn't want his surgical treatment. He received palliative care and died due to rerupture of aortic pseudoaneurysm three days after re-hospital transfer. Recently TEVAR has become one of the main therapies for aortic diseases even if the causes of them were trauma. However long-term effectiveness of TEVAR is still under investigation. Fatal complication after TEVAR like AEF may occur, so we need to carefully follow the patients who underwent TEVAR.

INT7-6 Acute generalized exanthematous pustulosis induced by local application of antibiotics in a dental procedure

¹Department of Emergency and Critical Care Medicine, Japanese Red Cross Fukaya Hospital, ²Department of Dermatology, Japanese Red Cross Fukaya Hospital, ³Department of Dentistry and Oral-maxillofacial Surgery, Japanese Red Cross Fukaya Hospital

Keiko Ueno¹, Naoyuki Kaneko¹, Miho Arai², Tomoyoshi Koyama³

[Introduction] Acute generalized exanthematous pustulosis (AGEP) is a severe cutaneous adverse reaction (SCAR) characterized by acute onset of high-grade fever, widespread erythema, numerous small sterile pustules, and neutrophilia from 2 to 7 days after exposure to a medication. The most common offending agents are antibiotics. To the best of our knowledge, this is the first case report of AGEP caused by dental triple antibiotic paste therapy. **[Case]** A 47-year-old male with a history of chronic myelogenous leukemia was transferred to our emergency center for suspected severe adverse drug reaction. Clinical history revealed that he had a dental procedure with triple antibiotics paste containing metronidazole, ciprofloxacin and minocycline two and half months ago, and had an additional dental procedure four days prior to the presentation. He developed rash on the forearms two hours after the second procedure. He subsequently developed fever, erythroderma, and pustules on his neck, elbows, and groins. Laboratory findings showed neutrophilia, abnormal liver and renal function tests. AGEP was considered as a diagnosis and intravenous prednisolone was started. Skin biopsy was consistent with features of AGEP. Ciprofloxacin was a suspected causative drug on the basis of clinical course and a positive result of the lymphocyte transformation test. The patient was responded well to the systemic steroids. However, his clinical course was complicated by another drug eruption and drug-induced liver injury. He was discharged home on a prednisone taper after one month. **[Conclusion]** Emergency physicians need to acknowledge AGEP as one of SCARs and initiate appropriate and timely management.

INT7-7 How should I approach a case mimics several common disease? A case from 'Down Under'

Emergency Department, Gold Coast University Hospital
安田晃一

We often have patients that we feel difficult to make diagnosis. This is one of a case I had in a rural hospital in NSW, Australia. A patient was a 40 years old female, transferred from peripheral Emergency Department (ED) by ambulance service, where does not have any diagnostic image other than X-Ray, for further investigation and management. She presented to ED with acute onset of severe headache and syncope. She noted it started with 10/10 pain and was collapsed. She herself does not have any past medical history apart from mild Migraine. After she had several investigations and fortunately, I was able to make diagnosis, which was an adrenal tumour. Pathology report noted it was Pheochromocytoma. Obviously, it was not on my differentials diagnosis list. In conclusion, this case mimics several common diseases. I am keen to present this case and would like to share any idea on the floor to improve our practice. And with talking through this case, if I could introduce some of information about ED in Australia, it will be fantastic.