

Annual Scientific Meeting on Intensive Care

# ASMIC 2013

20<sup>th</sup> – 22<sup>nd</sup> SEPTEMBER 2013

Shangri-La Hotel, Kuala Lumpur  
Malaysia



*Souvenir Programme  
& Abstract Book*



# CONTENTS

Message from the President, Malaysian Society of Intensive Care	2
Message from the Organising Chairperson, ASMIC 2013	3
Malaysian Society of Intensive Care – Executive Committee Organising Committee ASMIC 2013	4
Invited Faculty	5
Pre-Congress Workshop – Minimally-Invasive Haemodynamic Monitoring	6
Daily Programme	7 – 10
Floor Plan & Trade Exhibition	11 – 12
Thank You	13
Abstracts	14 – 92
<i>Plenaries &amp; Symposia</i>	14 – 47
<i>Free Papers</i>	48 – 53
<i>Poster Presentations</i>	54 – 92

## MESSAGE FROM THE PRESIDENT, MALAYSIAN SOCIETY OF INTENSIVE CARE



Welcome all of you to the 4<sup>th</sup> Annual Scientific Meeting on Intensive Care.

First of all, I would like to express my sincere gratitude to Dr Tai Li Ling and her team for again organising this meeting rich in scientific content, giving us great opportunity to enrich our knowledge and to meet one another to share experiences.

The history of intensive care dated back to the polio epidemic when Bjørn Aage Ibsen established the first intensive care unit in Copenhagen in 1953. Since then, intensive care has progressed at a tremendous pace.

In Malaysia, the first intensive care unit was established in University Hospital, Kuala Lumpur in 1968, 15 years later. Our first national intensive care conference was held in 2003 and our Society of Intensive Care was formed in 2009 only. Our progress in the field of intensive care has lagged behind the world. I take this opportunity to appeal to the delegates to consider taking up intensive care as your profession, whether you are doctors, nurses, pharmacists, physiotherapists, dietitians or occupational therapists.

In this era of evidence based medicine, we strive to treat our patients according to the best evidence available. Evidence comes from research. Therefore, I urge young sprouting doctors and allied health care workers to get yourselves trained in carrying out research in addition to updating your knowledge all this while. The Society will surely support its members all good research especially in terms of finance.

The Malaysian Society of Intensive Care has subscribed to three online international journals for its members for two years now. I hope members have found this subscription useful.

Last year, the Society produced one Guide and one Protocol. The Guide is Guide to Antimicrobial therapy in adult ICU and the Protocol is Management Protocols in ICU. Both this Guide and Protocol are available at the Society website.

I wish all of you a fruitful and pleasant meeting.

A handwritten signature in black ink, appearing to read 'Jauze', with a long horizontal line underneath.

**DR TAN CHENG CHENG**

## MESSAGE FROM THE ORGANISING CHAIRPERSON, ASMIC 2013



Dear friends and colleagues,

On behalf of the Organising Committee, it gives me great pleasure to once again welcome you to the 4<sup>th</sup> Annual Scientific Meeting on Intensive Care at Shangri-La Hotel, Kuala Lumpur, from 20<sup>th</sup> to 22<sup>nd</sup> September 2013.

Intensive care medicine continues to evolve at a rapid pace and we need to keep abreast with new scientific findings and current best practices. In this spirit, the Organising Committee has put forward a comprehensive scientific programme, with an exciting combination of plenary and symposia lectures, expert sessions and free paper presentations. In addition to the main conference, there will be a pre-conference workshop on non-invasive haemodynamic monitoring in the critically ill patients. With an impressive agenda and distinguished panel of local and international speakers, I am convinced that we will benefit from the wealth of ideas and knowledge from this conference, and also from the many

booth exhibitions displaying wide array of intensive care-related medical equipment and devices.

I hope you will find this national annual update dedicated to the care of the critically ill patients an inspiring and enjoyable one.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'Tai Li Ling'.

**DR TAI LI LING**



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**Dr Louisa Chan**

*(Scientific Chairperson)*

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Dr Lee Kang Hoe

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Prof Dr Arjen Dondorp

### UK

Dr Kevin Morris

### USA

Prof Dr Michael R Pinsky

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### MALAYSIA

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Dr Chor Yek Kee  
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# PRE-CONGRESS WORKSHOP MINIMALLY-INVASIVE HAEMODYNAMIC MONITORING

## 19<sup>TH</sup> SEPTEMBER 2013, THURSDAY

### Introduction

Resuscitation of critically ill patients in the intensive care setting is a complex process requiring the accurate measurement of haemodynamic parameters ie cardiac output, stroke volume variation and systemic vascular resistance. Haemodynamic monitoring data is used to optimise the balance between tissue oxygenation supply and demand and effectively combat global tissue hypoxia, shock, and multi-organ failure in critically ill patients. This information guides treatment and prevents morbidity and mortality. Invasive haemodynamic monitoring has been the cornerstone of the care of the critically ill and haemodynamically unstable patient. Nevertheless, several concerns have been raised regarding its invasiveness and associated complications. This has led to the development of a number of less invasive technologies for cardiac output determination.

### Objective

This workshop aims to provide knowledge on the basic principles of various minimally invasive haemodynamic monitoring modalities currently available. It also aims to demonstrate how to acquire and interpret data, so as to guide therapy in the management of critically ill patients.

### Who Should Attend

Intensivists, anaesthesiologists, trainees and medical officers involved in the management of critically ill patients.

Time	Programme
0800 - 0830	Registration
0830 - 0845	Welcome Address
0845 - 0915	USCOM
0915 - 0945	PiCCO
0945 - 1015	FloTrac
1015 - 1045	Tea
1045 - 1300	<b>Practical Station</b> Station 1: USCOM <i>Brendan Smith</i> Station 2: PiCCO <i>Mohd Basri Mat Nor</i> Station 3: FloTrac <i>Shahril Azlan Bin Ariffin</i>
1300 - 1400	Lunch

# DAILY PROGRAMME

## 20<sup>TH</sup> SEPTEMBER 2013, FRIDAY

0800 - 0845	Registration		
	SABAH ROOM		
0845 - 0930	<b>PLENARY 1</b> Chairperson: Shanti Rudra Deva Functional haemodynamic monitoring [pg 14-15] <i>Michael Pinsky</i>		
0930 - 1015	<b>OPENING CEREMONY</b>		
1015 - 1100	Tea / Trade Exhibition		
	SABAH ROOM	SARAWAK ROOM	KEDAH/SELANGOR ROOM
1100 - 1300	<b>SYMPOSIUM 1</b> <b>Cardiovascular</b> Chairpersons: Noor Airini Ibrahim / Teoh Sim Chuah	<b>SYMPOSIUM 2</b> <b>Maintaining Homeostasis</b> Chairperson: Nik Azman Nik Adib	<b>SYMPOSIUM 3</b> <b>Paediatrics I</b> Chairperson: Pon Kah Min
1100 - 1130	Making sense of recent large fluid trials <i>Nor'Azim Mohd Yunos</i>	The often forgotten electrolytes: Phosphate and chloride <i>Khoo Tien Meng</i>	Critical illness polyneuropathy and myopathy in children [pg 21] <i>Tang Swee Fong</i>
1130 - 1200	Fluid therapy - Is the non-responder an ICU myth? [pg 16] <i>Brendan Smith</i>	How useful are lactate levels [pg 19] <i>Claudia Cheng Ai Yu</i>	Management of the difficult paediatric airway [pg 21] <i>Azmil Farid Zabir</i>
1200 - 1230	The harmful effects of catecholamines <i>Suresh Venugobal</i>	Hyponatraemia - Current management strategies [pg 20] <i>Shivakumar Iyer</i>	Managing coagulopathy in PICU [pg 22] <i>Teh Keng Hwang</i>
1230 - 1300	Cardiovascular insufficiency with initiation and withdrawal of mechanical ventilation [pg 17-18] <i>Michael Pinsky</i>	Diagnosing and treating cortisol insufficiency in ICU [pg 20] <i>Mohd Basri Mat Nor</i>	Glycaemic control in critically ill children: Evidence-based practice? [pg 22] <i>Kevin Morris</i>
1300 - 1430	Lunch		
	SABAH ROOM	SARAWAK ROOM	KEDAH/SELANGOR ROOM
1430 - 1630	<b>SYMPOSIUM 4</b> <b>Respiratory</b> Chairperson: Shanthi Ratnam	<b>SYMPOSIUM 5</b> <b>Intensive Care For Nurses I</b> Chairperson: Foong Kit Weng	<b>SYMPOSIUM 6</b> <b>Miscellaneous</b> Chairpersons: Ismail Tan Mohd Ali Tan / Nahla Irtiza Ismail
1430 - 1500	When not to use NIV. Emerging patterns of NIV failure [pg 23] <i>David Tuxen</i>	Nosocomial infection: Nurses role in minimising transmission [pg 26] <i>Ahmad Shaltut Othman</i>	Venous thromboembolism in Asian Intensive Care <i>Gordon Choi</i>
1500 - 1530	The obese patient: Challenges in mechanical ventilation and extubation [pg 24] <i>Toh Khay Wee</i>	Making the intensive care safe [pg 26-27] <i>Tan Cheng Cheng</i>	Evidence-based medicine and research in the ICU [pg 30] <i>Arjen Dondorp</i>
1530 - 1600	Ventilator-associated tracheobronchitis - New insights <i>Premela Naidu Sitaram</i>	Impact of critical illness on the family [pg 28] <i>Nik Azman Nik Adib</i>	Sedation in the ICU - Less is more [pg 31] <i>Claudia Cheng Ai Yu</i>
1600 - 1630	ECMO - Role in respiratory failure [pg 25] <i>David Tuxen</i>	Updates in advanced life support [pg 29] <i>Ahmad Jamal Mokhtar</i>	Multimodal approach to pain assessment and treatment in the ICU <i>Lim Ern Ming</i>
1630 - 1700	Tea		
	KEDAH/SELANGOR ROOM		
1700 - 1800	<b>Free Papers</b> [pg 48 - 53] Chairperson: Kamal-Bashar Abu Bakar		



# DAILY PROGRAMME

## 21<sup>ST</sup> SEPTEMBER 2013, SATURDAY

0800 – 0900	<b>LET'S ASK THE EXPERT 1</b> Facilitator: Siti Rohayah Sulaiman How I diagnose and manage patients in shock <i>Michael Pinsky</i>			SARAWAK ROOM
0900 – 0945	<b>PLENARY 2</b> Chairperson: Tan Cheng Cheng Were the negative ARDS trials really negative? [pg 32] <i>David Tuxen</i>			SABAH ROOM
0945 – 1030	<b>PLENARY 3</b> Chairperson: Tan Cheng Cheng Does choice and timing of RRT affect renal recovery? <i>Gordon Choi</i>			SABAH ROOM
1030 – 1100	Tea / Trade Exhibition			
1100 – 1300	<b>SYMPOSIUM 7</b> <i>Cardiovascular</i> Chairpersons: Kamal-Bashar Abu Bakar / Siti Rohayah Sulaiman	<b>SYMPOSIUM 8</b> <i>Paediatrics II</i> Chairperson: Anis Suraya Ghani	<b>SYMPOSIUM 9</b> <i>Ethics</i> Chairperson: Tai Li Ling	SABAH ROOM SARAWAK ROOM KEDAH/SELANGOR ROOM
1100 – 1130	Atrial dysrhythmias in the ICU <i>Ismail Tan Mohd Ali Tan</i>	Challenges in non-invasive ventilation in children [pg 35] <i>Lucy Lum Chai See</i>	The ethics of withholding and withdrawing of life-sustaining treatment [pg 37] <i>Jacqueline Chin</i>	
1130 – 1200	Managing the right heart [pg 33] <i>Michael Pinsky</i>	Management of burns: Updates <i>Maznisah Mahmood</i>	Rationalising ICU care in resource-poor settings [pg 37] <i>Arjen Dondorp</i>	
1200 – 1230	Rapid bedside measurement of inotropy – No more guesswork [pg 34] <i>Brendan Smith</i>	Myocarditis and cardiomyopathy [pg 36] <i>Chor Yek Kee</i>	Conflicts in end-of-life care [pg 38] <i>Shivakumar Iyer</i>	
1230 – 1300	Management of massive pulmonary embolism <i>Laila Kamaliah Kamalul Bahrin</i>	Do we still need RCTs in ICU research? [pg 36] <i>Kevin Morris</i>	Moral distress in the ICU [pg 38] <i>Jacqueline Chin</i>	
1300 – 1430	Lunch Satellite Symposium ( <i>AstraZeneca Sdn Bhd</i> ) Chairperson: Jenny Tong May Geok Ceftaroline: A new advanced generation cephalosporin with MRSA cover <i>Benedict Sim Lim Heng</i>			SABAH ROOM

DAILY PROGRAMME  
(cont'd) 21<sup>ST</sup> SEPTEMBER 2013, SATURDAY

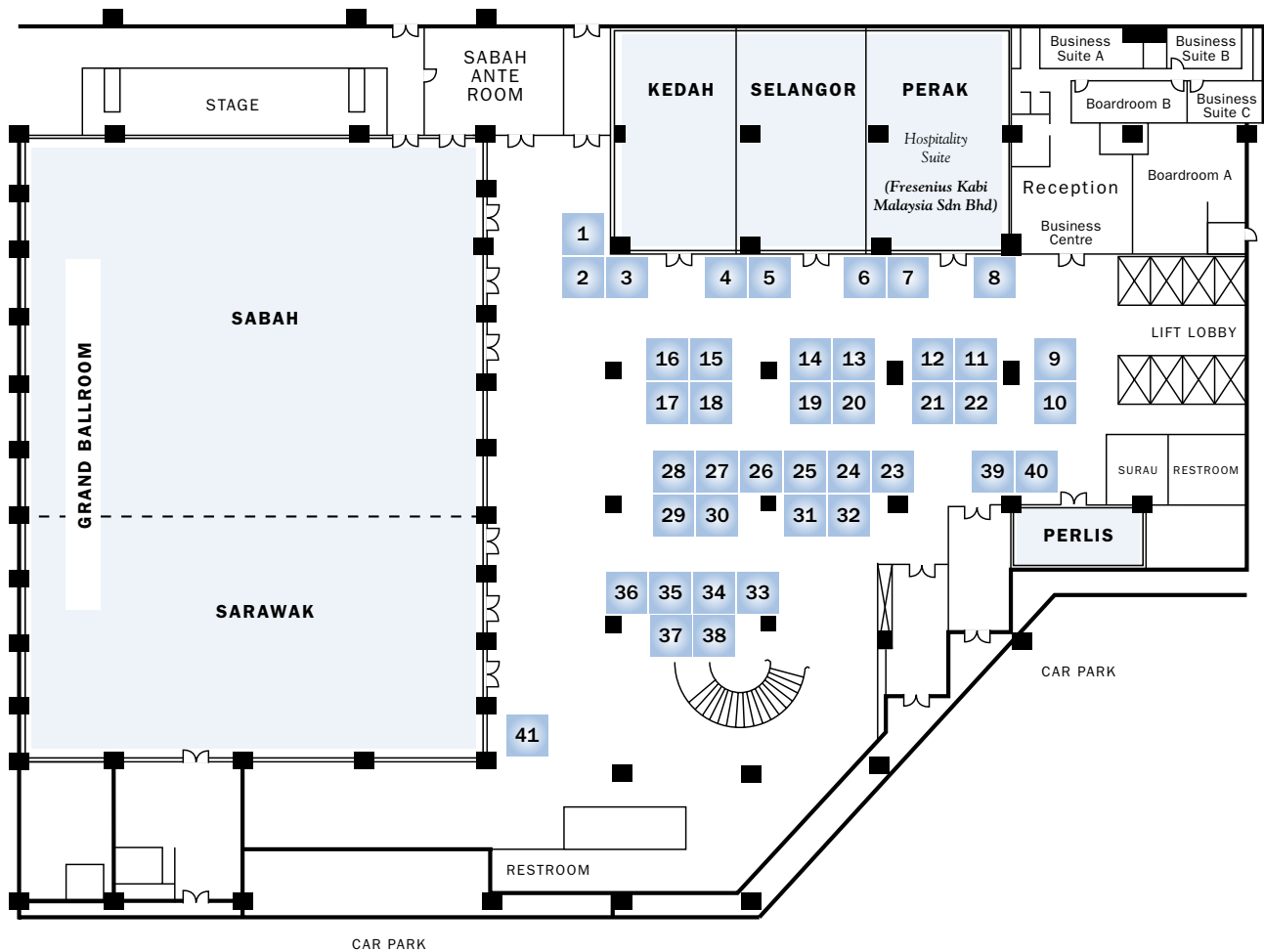
	SABAH ROOM	SARAWAK ROOM	KEDAH/SELANGOR ROOM
1430 - 1630	<b>SYMPOSIUM 10</b> <b>Sepsis</b> Chairpersons: Mohd Basri Mat Nor / Mahazir Kassim	<b>SYMPOSIUM 11</b> <b>Pharmacotherapy</b> Chairperson: Louisa Chan	<b>SYMPOSIUM 12</b> <b>Intensive Care For Nurses II</b> Chairperson: Laila Kamaliah Kamalul Bahrin
1430 - 1500	The critically ill patient with malaria [pg 39] <i>Arjen Dondorp</i>	Is vancomycin good enough for MRSA? <i>Noor Airini Ibrahim</i>	The chronic critically ill patient [pg 43] <i>Lim Chew Har</i>
1500 - 1530	Vasopressin in sepsis: Basic science to bedside [pg 40] <i>Jenny Tong May Geok</i>	Antibiotic stewardship in ICU <i>Benedict Sim Lim Heng</i>	Updates in nutrition [pg 44] <i>Nahla Irtiza Ismail</i>
1530 - 1600	The usefulness of sepsis biomarkers [pg 41] <i>Vineya Rai</i>	Monotherapy or combination antibiotic therapy in severe infections [pg 42] <i>Leong Kar Nim</i>	Caring for patients on NIV <i>Teoh Sim Chuah</i>
1600 - 1630	Evidence for immunomodulating supplements in septic patients <i>Gordon Doig</i>	Empirical antibiotics for severe pneumonia in the immunocompromised patient [pg 42] <i>Lee Kang Hoe</i>	Mobilising the ICU patient [pg 44] <i>Foong Kit Weng</i>
1630 - 1700	Tea		
1700	KEDAH/SELANGOR ROOM		
	<b>ANNUAL GENERAL MEETING OF THE MALAYSIAN SOCIETY OF INTENSIVE CARE</b>		

# DAILY PROGRAMME

## 22<sup>ND</sup> SEPTEMBER 2013, SUNDAY

0800 - 0900	<p><b>LET'S ASK THE EXPERT 2</b>  Facilitator: Mahazir Kassim  My ventilation strategies in the difficult to oxygenate/ventilate patients  <i>David Tuxen</i></p>		SARAWAK ROOM	
0900 - 0945	<p><b>PLENARY 4</b>  Chairperson: Tang Swee Fong  Fine-tuning the management in paediatric traumatic brain injury [pg 45]  <i>Kevin Morris</i></p>		SABAH ROOM	
0945 - 1030	<p><b>PLENARY 5</b>  Chairperson: Tang Swee Fong  Benchmarking your ICUs' feeding performance  <i>Gordon Doig</i></p>		SABAH ROOM	
1030 - 1100	Tea / Trade Exhibition			
1100 - 1300	<p><b>SYMPOSIUM 13</b>  <i>Gastrointestinal</i>  Chairpersons: Lim Chew Har /  Vineya Rai</p>	SABAH ROOM	<p><b>SYMPOSIUM 14</b>  <i>Renal</i>  Chairpersons: Louisa Chan /  Premela Naidu Sitaram</p>	KEDAH/SELANGOR ROOM
1100 - 1130	<p>Saving the failing liver without extracorporeal support [pg 45]  <i>Lee Kang Hoe</i></p>		<p>Nutrition in patients with renal failure [pg 46]  <i>Wan Nasrudin Wan Ismail</i></p>	
1130 - 1200	<p>Gut motility in the critically ill - How to improve it  <i>Shanthi Ratnam</i></p>		<p>RRT in the elderly - When to and outcomes  <i>Gordon Choi</i></p>	
1200 - 1230	<p>Early enteral nutrition in critical illness - Clinical evidence and pathophysiological rational  <i>Gordon Doig</i></p>		<p>SLEDD - Is it the better choice? [pg 47]  <i>Shivakumar Iyer</i></p>	
1230 - 1300	<p>The open abdomen - Indications and management [pg 46]  <i>Andrew Gunn</i></p>		<p>Use of diuretics in AKI [pg 47]  <i>Kamal-Bashar Abu Bakar</i></p>	
1300 - 1400	Lunch		SARAWAK ROOM	

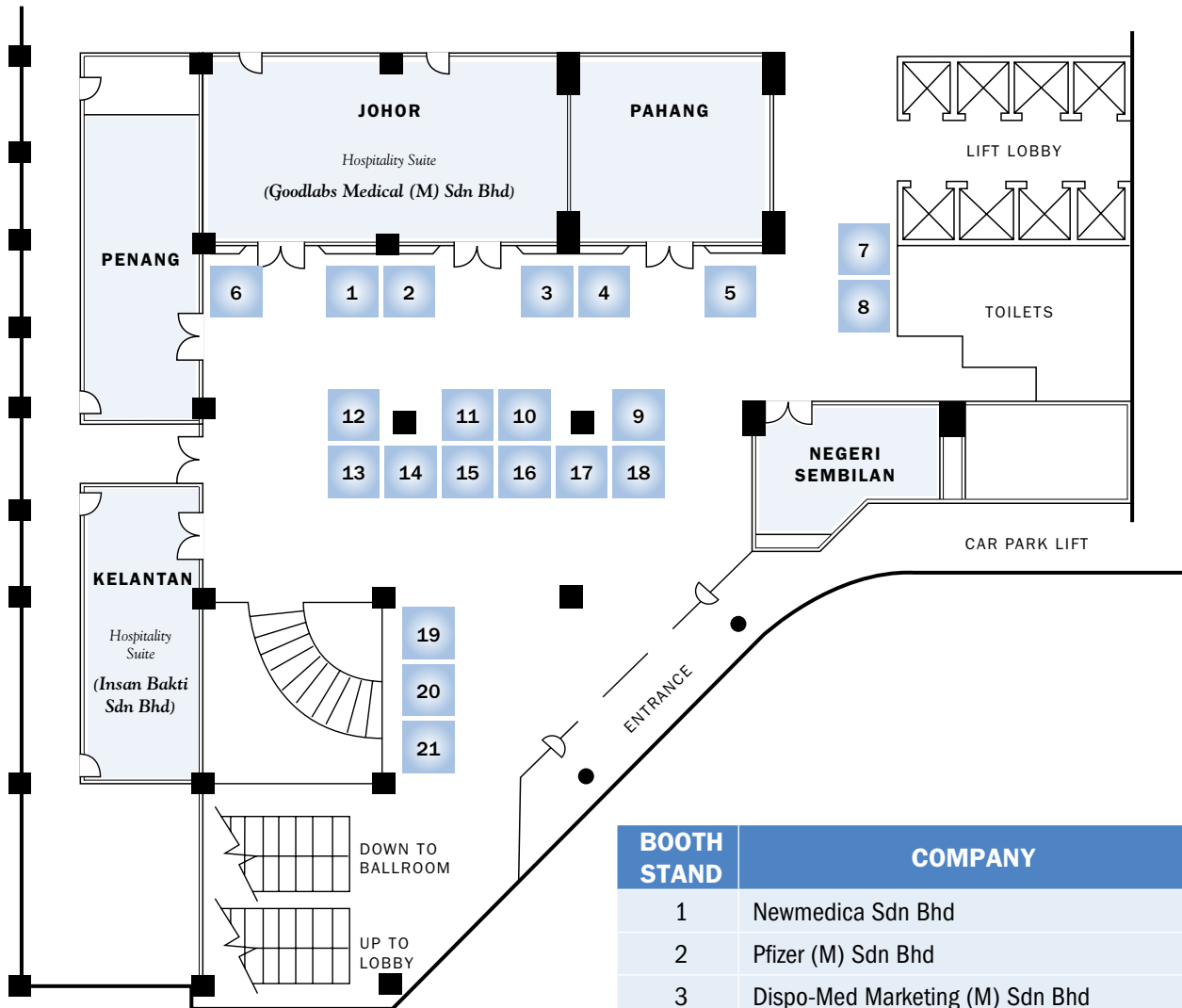
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The Organising Committee of ASMIC 2013 records its deep appreciation to the following companies for your contributions and support:

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## FUNCTIONAL HEMODYNAMIC MONITORING

*Michael R Pinsky*

Department of Critical Care Medicine, University of Pittsburgh, Pennsylvania, United States of America

The goals of hemodynamic monitoring are multiple, including identification of cardiovascular deterioration, diagnosis and monitor response to therapy. Within the context of guiding resuscitation therapies, static hemodynamic variables are singularly not useful for decision making. The combined clinical literature to date support the concept that traditional static measures of left ventricular (LV) preload, such as right atrial pressure (Pra), pulmonary artery occlusion pressure (Ppao), right ventricular (RV) end-diastolic volume (EDV) or LV end-diastolic area (EDA) do not predict well volume responsiveness across groups of critically ill patients (1). Furthermore, neither Pra nor Ppao reflect well their respective ventricle's EDV, nor do changes in either pressure reflect changes in either EDV or stroke volume. Static measures of Pra and Ppao do not take into account pericardial pressure to calculate a true transmural pressure (2). RV EDV is inaccurate if tricuspid regurgitation is present. And LV EDA is not EDV. Still, if EDV were accurately known, these estimates would still be poor predictors of preload responsiveness. Clearly, patients with small ventricles can be not responsive to fluid loading whereas patients with large ventricles can be volume responsiveness. However, if fluid resuscitation does increase EDV, then by the Starling mechanism stroke volume does increase. Accordingly, preload cannot be equated with preload-responsiveness. The probable reason why all these estimates of LV preload are such poor predictors of fluid responsiveness is that they are poor estimates of the wrong parameter. Functional hemodynamic monitoring accepts this reality and uses small reversible volume loading challenges to see if cardiac output will change. If it does not change, then that subject is not preload responsiveness, even if filling pressures and ventricular volumes are decreased. And if it does change then that subject is preload responsive even if filling pressure and ventricular volumes are increased. Once a subject has been identified as either preload responsive or no-responsive, then specific therapies can be used with confidence that rely on these predictions being accurate.

The accurate assessment of cardiovascular performance to both predict hemodynamic response to interventions and provide cause-specific cardiovascular management goals can be addressed for most hemodynamically patients by answering three functional performance-based questions:

1. Will blood flow to the body increase (or decrease) if the patient's intravascular volume is increased (or decreased), and if so, by how much?
2. Is any decreased in arterial pressure due to loss of vascular tone or merely due to inadequate blood flow?
3. Is the heart capable of maintaining an effective blood flow with an acceptable perfusion pressure without going into failure?

Although previous studies have validated the gross inaccuracy of using either Pra or Ppao in predicting preload-responsiveness, dynamic measures show better utility. Such dynamic measures of ventricular responsiveness allow for the assessment of preload-responsiveness prior to giving a fluid challenge. During spontaneous ventilation, dynamic decreases in central venous pressure (CVP) of  $> 1$  mm Hg predict preload-responsiveness in critically ill patients, but may not be accurate during positive pressure breathing because preload may decrease by excessive hyperinflation in even heart failure patients (3).

During positive pressure breathing, measures of left ventricular outflow variation have been used as a preload response test. Recent studies from numerous centers have underscored the accuracy and

usefulness of monitoring arterial pulse pressure variation (PPV) or stroke volume variation (SVV) during mechanical ventilation (1, 4, 5). The greater the degree of PPV or SVV the more cardiac output will increase for a fixed bolus volume challenge (1).

Since arterial pressure varies as a function of blood flow and arterial tone, the greater (or lesser) the arterial tone, the greater (or lesser) will be the PVV relative to SVV. The ratio of PPV to SVV defined the lumped arterial input elastance and has a normal range of 1 to 2. If arterial elastance is  $< 0.8$  then pathological vasodilation is present. Thus, in a hypotensive patient, if PPV/SVV is  $< 0.8$  even if volume resuscitation increases cardiac output, blood pressure may not increase sufficiently to restore pressure-dependent organ blood flow and the combined use of vasopressors plus fluid resuscitation would be indicated.

Thus, by measuring relatively simple but varying cardiovascular variables, fluid resuscitation, vasoactive drug therapy and inotropic therapy can be given and their effects monitored in real time. Importantly, using these measures of pressure and flow variation to guide resuscitation algorithms, improved patient outcomes have been reported (6, 7, 8). Since no monitoring device will improve patient outcome unless coupled to a treatment that improves patient outcome, these recent studies are very relevant.

Presently, several minimally invasive techniques exist for the measure of cardiac output and related hemodynamic variables. Their accuracy has been documented to a greater or lesser degree in various studies. More importantly, using their output to drive resuscitation algorithms has been shown to improve outcomes (6, 7, 8). Thus, the future of minimally invasive monitoring will be their direct involvement in the driving of resuscitation algorithms in setting previously not studied because the prior need for much more invasive monitoring to monitor such otherwise dangerous and aggressive therapies.

Functional tests need not be restricted to assessment of volume responsiveness. We recently validated and calibrated the use of a vascular occlusion test (VOT) when coupled to measures of thenar  $StO_2$  (5). Although  $StO_2$  values are only late markers of circulatory shock, their dynamic responses to complete stop flow and then restoration of flow using a blood pressure cuff as a vascular occlude has proven useful in identifying occult shock (6). The potential uses of this approach and others using similar principles of a defined reversible stress remain to be seen but open a very wide avenue for future methods development for assessing cardiovascular state.

#### REFERENCES

1. Michard F, Boussat S, Chemla D, Anguel N, Mercat A, Lecarpentier Y, Richard C, Pinsky MR, Teboul JL. Relation between respiratory changes in arterial pulse pressure and fluid responsiveness in septic patients with acute circulatory failure. *Am J Respir Crit Care Med* 162:134-8, 2000.
2. Kumar A, Anel R, Bunnell E, et al. Pulmonary artery occlusion pressure and central venous pressure fail to predict ventricular filling volume, cardiac performance, or the response to volume infusion in normal subjects. *Crit Care Medicine* 32:691-699, 2004.
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**FLUID THERAPY – IS THE NON-RESPONDER AN ICU MYTH?***Brendan Smith*

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What is volume responsiveness and why do we care about it anyway? This might seem a ridiculous question, but this actually begs further questions: “What do we mean by respond?” is perhaps the most obvious, but following close behind must be “What do we mean by fluid?”

The answers are different for different clinicians. We might be looking for a response in terms of an increase in blood pressure, or increased cardiac output, or perhaps an increase in oxygen delivery. We might mean an increase in urine output, or stroke volume, or a reduction in heart rate or pulse pressure variation, or in respiratory rate. To a paediatrician, fluid responsiveness often means an increase in peripheral oxygen saturation as measured with a pulse oximeter. The situation becomes even more difficult when we examine a system which may respond in multiple ways. We might fluid challenge our patient in the hope of raising arterial pressure, only to find that arterial pressure remains constant but that there is a fall in heart rate. This suggests that stroke volume has increased. Is this what we were looking for, and is it indeed a response? Do we even perceive the fall in heart rate as being due to an increase in stroke volume, or do we simply see the arterial pressure and assume that there has been no response? Unfortunately, there is no standard as to what constitutes a response.

The obvious next question is what do we mean by fluid challenge? Do we have a given fluid in mind? If so, then what volume? Should it be a standard volume such as 500ml or 20ml/kg? Should the standard volume be proportional to the likely response? If we give 250ml of saline to a 100 kg subject are we really expecting a significant change in arterial pressure? How quickly should we give this fluid? If the fluid rapidly equilibrates with the extra vascular compartment before our infusion is complete, then our challenge volume is effectively markedly depleted. Can we realistically expect the same response to the same challenge in different subjects, whatever their age, fitness, cardiovascular status or medication?

Perhaps the most fundamental question is the one that is seldom asked: what evidence do we have that giving fluid to the patient will improve their outcome? Will oxygen delivery be improved? If so, will their oxygen utilisation improve? In effect, the question we must ask is will there be a fundamental improvement in the patient’s pathophysiology? If not, then why not?

We need to start by asking what exactly are we looking for, and what is the physiology that underlies this potential response? Can we standardise our fluid challenge and can we standardise the response that we are looking for? Even if we can do this, do we have sufficiently sensitive monitoring systems in place to detect that change?

In this lecture I will argue that the entire question of fluid responsiveness should be based on fundamental cardiovascular physiology, but this essential grounding is largely deficient in medicine. Without fundamental knowledge of the underlying haemodynamics, ill-advised attempts at volume expansion are doomed to failure, often to the detriment of the patient. The absence of sufficiently sensitive indicators of response further compounds the problem.

All patients respond to fluid – but it may not be the response that you were hoping for!



## **CARDIOVASCULAR INSUFFICIENCY WITH INITIATION AND WITHDRAWAL OF MECHANICAL VENTILATION**

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The hemodynamic effects of ventilation are multiple and complex, but can be grouped into four clinically relevant concepts. First, spontaneous ventilation is exercise. In patients increased work of breathing, initiation of mechanical ventilatory support will improve O<sub>2</sub> delivery to the remainder of the body by decreasing O<sub>2</sub> consumption. To the extent that mixed venous O<sub>2</sub> also increases, arterial PO<sub>2</sub> will also increase without any improvement in gas exchange. Similarly, weaning from mechanical ventilatory support is a cardiovascular stress test. Patients who fail to wean also manifest cardiovascular insufficiency during the failed weaning attempts (1). Improving cardiovascular reserve or supplementing support with inotropic therapy may allow patients to wean from mechanical.

Second, changes in lung volume alter autonomic tone, pulmonary vascular resistance, and at high lung volumes compress the heart in the cardiac fossa similarly to cardiac tamponade. As lung volume increases so does the pressure difference between airway and pleural pressure. When this pressure difference exceeds pulmonary artery pressure, pulmonary vessels collapse as they pass from the pulmonary arteries into the alveolar space increasing pulmonary vascular resistance. Thus, hyperinflation increases pulmonary vascular resistance, pulmonary artery pressure, impeding right ventricular ejection. Spontaneous ventilation that induces dynamic hyperinflation and rapid mechanical breaths that cause auto-PEEP can both induce acute cor pulmonale. Decreases in lung volume below functional residual capacity, as occurs in acute lung injury, alveolar collapse and increased pulmonary vasomotor tone by the process of hypoxic pulmonary vasoconstriction (2). Recruitment maneuvers, positive-end expiratory pressure and continuous positive airway pressure may reverse hypoxic pulmonary vasoconstriction and reduce pulmonary artery pressure.

Third, spontaneous inspiration and spontaneous inspiratory efforts decrease intrathoracic pressure. Spontaneous inspiratory efforts often occur during positive-pressure ventilation and can be quite forceful. Since diaphragmatic descent increases intra-abdominal pressure, these combined effects cause right atrial pressure inside the thorax to decrease, but venous pressure in the abdomen to increase, markedly increasing the pressure gradient for systemic venous return. Furthermore, the greater the decrease in intrathoracic pressure the greater the increase in left ventricular afterload for a constant arterial pressure (3). Thus, spontaneous inspiratory efforts increase LV afterload and can induce acute cardiogenic pulmonary edema. Mechanical ventilation, by abolishing the negative swings in intrathoracic pressure will selectively decrease left ventricular afterload, as long as the increases in lung volume and intrathoracic pressure are small (4).

Finally, positive-pressure ventilation increases intrathoracic pressure. Since diaphragmatic descent increases intra-abdominal pressure, the decrease in the pressure gradient for venous return is less than would otherwise occur if the only change were an increase in right atrial pressure (5). However, in hypovolemic states, positive-pressure ventilation can induce profound decreases in venous return. Increases in intrathoracic pressure decreases left ventricular afterload and will augment left ventricular ejection. In patients with hypervolemic heart failure, this afterload reducing effect can result in improved left ventricular ejection, increased cardiac output and reduced myocardial O<sub>2</sub> demand (6).

Using the obligatory changes in venous return induced by positive-pressure breathing, one can readily identify which patients are volume responsive and by how much (7). Use of the associated arterial pulse



pressure variation or its derived stroke volume variation, resuscitation algorithms can be created to sustain adequate blood flow in high risk patients decreasing morbidity and mortality (8).

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## HOW USEFUL ARE LACTATE LEVELS

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Lactate is a byproduct of inadequate tissue perfusion when the body switches to anaerobic metabolism in order to produce ATPs. Lactate production occurs in all tissues including skeletal, brain, red blood cells and kidneys. Basal lactate production occurs even under adequate oxygenation conditions, but liver metabolism and lactate-to-pyruvate reconversion maintains arterial and venous lactate level below 1mmol/L.

Increased lactate production occur when there is (i) inadequate oxygen delivery, (ii) disproportionate oxygen demands or (iii) inadequate oxygen utilization. Clinical conditions encountered in critically ill patients include sepsis, trauma, hypoxia, blood loss, dehydration, hyperthermia, seizures, SIRS, thiamine deficiency, drugs eg. metformin, cyanide poisoning. Elevations in serum lactate occur from either increased production or impaired lactate clearance.

Elevated serum lactate is associated with increased mortality. The role of serum lactate as a therapeutic target in sepsis is well known with the recent SSC guidelines recommending resuscitation immediately in patients with hypotension and elevated serum lactate > 4 mmol/L. Likewise, studies have shown the utility of measuring serum lactate in critically ill trauma patients.

In addition, lactate clearance or the time to normalize serum lactate may be an important monitoring tool in the management of critically ill patients with sepsis and trauma. (Lactate clearance = the initial lactate - subsequent lactate/initial lactate × 100). Patients with increased lactate clearance have been shown to have a decreased mortality. The longer it took to clear lactate, the higher the rate of multisystem organ failure and mortality.

In summary, studies have demonstrated the role of lactate levels as a therapeutic guide, monitoring tool and prognostic indicator in critically ill patients particularly those with sepsis and trauma. Routine measurement of serum lactate would be useful in the critical care setting.

## **HYPONATRAEMIA – CURRENT MANAGEMENT STRATEGIES**

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Hyponatremia is one of the commonest electrolyte disorders in ICU. It's presence usually denotes a disorder of water balance rather than sodium balance. The clinical manifestations are protean and deciding which patients to treat and how is always a clinical dilemma. This is especially so as rapid correction may result in osmotic demyelination which has devastating neurologic consequences. A clinical approach to management will be discussed through interesting case scenarios.

## **DIAGNOSING AND TREATING CORTISOL INSUFFICIENCY IN ICU**

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Critical illness elicits a major stress response that activates the hypothalamic-pituitary-adrenal (HPA) axis. The diurnal variation is often lost. The criteria for determining which patients have an adequate response to severe stress and which have an inadequate response are arbitrary and controversial. Furthermore, cortisol metabolism and function may also be altered by other methods which include reduced cortisol breakdown, renal dysfunction, reduction in albumin and cortisol binding protein (CBP) and the effects of SIRS response on plasma cytokines.

Absolute adrenal insufficiency is rare in critical care and the incidence is less than 3%. Assessing adrenal insufficiency or relative adrenal insufficiency (RAI) is challenging in the ICU. Laboratory assays of plasma cortisol concentration and ACTH stimulation test are unreliable in this setting. Although severe stress activates the HPA axis, dissociation between plasma corticotropin levels and cortisol levels may occur, marked by suppressed corticotropin levels and elevated plasma cortisol levels. Critically ill patients have a marked reduction in levels of CBP with proportional increases in free cortisol, which can diffuse into tissues. Levels of interstitial cortisol obtained by microdialysis in patients with sepsis correlated only moderately with total plasma cortisol levels. This observation suggests blood levels of cortisol poorly reflect the amount of hormone available to target tissues.

## **CRITICAL ILLNESS POLYNEUROPATHY AND MYOPATHY IN CHILDREN**

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Critical illness polyneuropathy and myopathy (CIPNM) are syndromes that lead to weakness and failure to wean from mechanical ventilation. CIPNM not only prolongs mechanical ventilation and hospitalization but also increases hospital mortality as well as lead to chronic disability in survivors of critical illness. Associated structural changes seen in this condition include axonal nerve degeneration, muscle myosin loss and muscle necrosis. The diagnosis is complex and requires clinical, electrophysiological and muscle biopsy investigations. Although well documented in the adult literature, the incidence and significance of this condition in children is less well known. Paediatric CIPNM has only been described in isolated case reports or small series with significant variability in the classification of these syndromes. In the only prospective study reported to date, the incidence of CIPNM was 1.7%. Of the 34 reported cases in the literature, the median age at paediatric intensive care admission was 11.5 years (range 0.13 to 17 years) and there appears to be a bimodal distribution with 9 aged < 3 years and 20 aged > 10 years. Two-thirds of these children had sepsis or systemic inflammatory response, supporting the adult data of a strong association between these 2 conditions. All patients were mechanically ventilated with 24 and 21 patients receiving neuromuscular blockade and steroids before the onset respectively. Failure to wean from mechanical ventilation was common. Although difficult to diagnose in children due to the need for electrophysiological testing and muscle biopsy, an awareness of this condition is important so that appropriate investigations and early rehabilitation can be carried out.

## **MANAGEMENT OF THE DIFFICULT PAEDIATRIC AIRWAY**

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Looking at management of difficult paediatric airway by identifying common congenital and acquired conditions, and discussing difficult airway algorithm in children. Discussion of gadgets and tools that is currently available for difficult airway scenarios.

## **MANAGING COAGULOPATHY IN THE PICU**

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Coagulopathy is relatively uncommon in acute paediatrics but when it happens it is associated with severe illness. It is caused by a wide variety of diseases such as infection, blood loss from tissue injury, malignancy, liver dysfunction and iatrogenic causes. The coagulation system is complex and involves a series of dynamic pathways, the contact activation (intrinsic) pathway and the tissue factor (or extrinsic) pathway which lead to thrombin formation. The diagnosis of abnormal coagulation and when treatment should be initiated is influenced by age and developmental status and limited by the range of tests available. Treatment largely depends upon plasma based components with its potentially adverse effects and hence guidelines have focussed on using these components appropriately and promote restrictive transfusion practices. However in the presence of severe trauma and massive blood loss there has been an increased plasma usage.. Novel and established pharmaceutical agents have also been used as plasma sparing agents in severe bleeding and coagulopathy.

## **GLYCAEMIC CONTROL IN CRITICALLY ILL CHILDREN: EVIDENCE-BASED PRACTICE?**

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Critically ill children frequently develop hyperglycaemia, with studies suggesting that the magnitude of the hyperglycaemia is related to outcome. In addition hypoglycaemia and the degree of variability in blood glucose may also impact on outcome. There remains considerable uncertainty about whether clinicians caring for a critically ill child should manipulate the blood glucose using insulin therapy to achieve what has become known as 'tight glycaemic control (TGC)'. Recent studies in critically ill children have tested the use of TGC against a more permissive approach and have provided us with some answers but yet more questions. What approach should we take in 2013?



## **WHEN NOT TO USE NIV. EMERGING PATTERNS OF NIV FAILURE**

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NIV is enjoying a greatly increase use with success in an increasing number of circumstances. Concomitant with this is emerging circumstances where NIV may worsen the outcome. Recognition of these circumstances and avoidance of NIV is becoming an important part of the use of NIV. The benefits of NIV in exacerbations of COPD and in acute pulmonary oedema (APO) are well established.

Variable outcomes have been reported in the range of causes of acute respiratory failure (ARF) with adverse outcomes reported.

A large meta-analysis of hypoxaemic ARF from a range of causes has shown overall less requirement for intubation, less length of stay and lower mortality, but other studies in specific subsets (ALI / ARDS) has shown overall worse outcomes or worse outcomes in those patients with NIV failure.

NIV has reported benefit in post-operative hypoxaemia and in preventative NIV post-extubation but worse outcomes have been reported when NIV is only used once ARF has occurred post extubation.

Several studies comparing the NIV failure subset with the same patient group who underwent intubation without NIV have shown or implied worse outcomes in the NIV failure group.

The evidence is complex and variable but there is an emerging pattern of NIV subsets who would have had a better outcome with early intubation. These groups should be identified and NIV avoided or abandoned early if not succeeding.

## **THE OBESE PATIENT – CHALLENGES IN MECHANICAL VENTILATION AND EXTUBATION**

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Malaysians are the most obese nation in ASEAN. The obese have a two fold increase risk of death. However, obese intensive care patients do not have an increased mortality but an improved survival (Obesity Paradox). The reason is unknown but adipose tissue may play an immuno-modulatory role.

The effect of obesity is a reduction in lung volumes and compliance leading to atelectasis, VQ mismatching and hypoxia. In the ARDS network study, 60% of patients were obese. There were no differences in mortality but similar benefits of lower tidal volume (TV) ventilation on survival. However, obese patients tend to be ventilated with higher TVs when based on actual rather than ideal body weight (IBW).

Higher plateau pressures may be necessary when ventilating obese patients to overcome higher intra-pleural pressures to maintain trans-pulmonary pressures for alveolar distension. As to the mode of ventilation (volume or pressure control), there is insufficient evidence to suggest that one is superior to the other. PEEP is useful but studies have shown that a higher PEEP (15cmH<sub>2</sub>O) combined with a recruitment procedure may be necessary to optimize lung recruitment. Head up positioning is critical and may have a similar effect to PEEP. Trendelenburg and supine positioning should be avoided.

Non invasive ventilation (NIV) in weaning of the obese appears to be beneficial in preventing post extubation respiratory failure and reducing length of stay. Hypercapnic obese patients had a significant reduction in mortality. Higher pressures and a longer duration of NIV may be necessary.

Considerations:1) TV based on IBW,2) Higher plateau pressure,3) Higher PEEP (15cmH<sub>2</sub>O), 4) Recruitment procedure & PEEP,5) Head up positioning6) NIV for weaning

The number of ventilated obese patients in the ICU is going to increase and future provision of services will have to take account of this.

## **ECMO – ROLE IN RESPIRATORY FAILURE**

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Early ECMO trials (1979 & 1994) with old ECMO technology showed a high mortality in both groups

Since then, new ECMO technology has resulted smaller, lighter, easier, more transportable equipment requiring less anticoagulation and with less clotting, less haemolysis and less haemorrhagic patient complications.

The results of veno-venous ECMO for respiratory failure (especially ARDS/influenza/pneumonia) are now very good, especially since it is used in circumstances where there is a high confidence of a poor outcome without ECMO. A randomized trial of VV-ECMO for respiratory failure is currently underway but there is sufficient evidence at present to justify routine use in correctly selected patients in a specialized center.

The CESAR trial, a pragmatic randomized controlled trial, showed a significant 31% relative risk reduction in the ECMO group. Although this trial was criticized for control patients remaining in their institution of origin while ECMO patients were transferred to a specialized center, the result remains strongly in favour of ECMO. Two case control studies have been performed, one showing ECMO benefit and the other no difference however the latter has been strongly criticised for being unable to match half the patients (with a 22% mortality) and only matching the remaining group with a much higher (50%) ECMO mortality.

We have shown that full use or rescue manoeuvres, especially lung recruitment, can prevent the need for ECMO in over 30% of patients fulfilling ECMO criteria (SaO<sub>2</sub> <90%, despite 100% O<sub>2</sub> and PEEP >15 cmH<sub>2</sub>O). It is important to perform a full lung recruitment manoeuvre (unless contraindicated) prior to undertaking ECMO or patients who may not require ECMO will be cannulated. We have also shown a significant relationship between the % of ECMO patients retrieved without ECMO and mortality.

In conclusion, new technology has made ECMO smaller, easier and safer but it should only be done in a specialized center. Although RCT evidence is not available yet, there is sufficient evidence of benefit to warrant its use. For the best results, ECMO for respiratory failure should be preceded by a full recruitment manoeuvre and accompanied by an ECMO retrieval service.

## **NOSOCOMIAL INFECTION: NURSES ROLE IN MINIMISING TRANSMISSION**

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The nurse plays a critical role in preventing and controlling infectious disease. They are directly involved in creating and providing biologically safe environments for the patients.

They have the unique opportunity to reduce the potential for nosocomial infections. Utilizing the skills and knowledge of nursing practice, they can facilitate patient recovery while minimising complications related to infections.

They lead the healthcare team in practicing prevention strategies to protect the patient from infection. Some of the basic strategies resulting in positive patient outcomes include the practice and promotion of hand hygiene, consistent use of aseptic technique, cleaning and disinfection practices, use of standard precautions, patient assessment and additional precautions, patient education, use of safety devices, removal of unnecessary invasive devices, use of bundle strategies for infection prevention and 'fit for duty'.

## **MAKING THE INTENSIVE CARE SAFE**

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### INTRODUCTION

Human beings are imperfect and to err is human. These sayings are well recognized by all of us. As such, we readily accept that healthcare can fail and errors are excused and medicine is not an exact science. In fact, our level of tolerance for error and adverse events in healthcare is unacceptable in other high-risk industry eg aviation industry.

### CONCERN FROM AUTHORITY

The Institute of Medicine's Report "To err is Human: Building a Safer Health System" in 2000 marked a turning point in attitudes of individuals and whole systems to safety. Subsequently in 2004, the Dutch Institute for Healthcare Improvement is association with several European governmental and non-governmental organizations started the Safety Improvement for Patients in Europe [SIMPATIE] project. In the same year, the World Health Organisation formed the World Alliance for Patient Safety.

The Malaysian Patient Safety Council was formed in 2003 and the Council was headed by the Director General himself. However the Council has not gone very far in the journey to safer care and this year the Director General issued a circular dated 13 February 2013 to direct all hospitals to form the Patient Safety Committee and to achieve Malaysian Patient Safety Goals which consist of 13 goals and 19 performance index for hospitals and 4 goals and 6 performance index for clinics.

#### WHAT IS SAFETY?

The 2003 Institute of Medicine's Report "Patient Safety: Achieving a New Standard of Care" defined patient safety as the prevention of harm caused by errors of commission (unintentionally doing the wrong thing) and omission (unintentionally not doing the right thing). An adverse event was defined as "an event that results in unintended harm to the patient by an act of commission or omission (unintentionally not doing the right thing) rather than by the underlying disease or condition of the patient". "Near misses" was defined as "acts of commission or omission that could have harmed the patient but did not cause harm as a result of chance, prevention, or mitigation. The concept of "near misses" is extremely important as they occur much more frequently than adverse events.

#### HOW COMMON ARE CRITICAL INCIDENTS IN THE INTENSIVE CARE UNITS?

Donchin et al in their paper on "a look into the nature and causes of human errors in the intensive care unit" published in Critical Care Medicine in 1995 recorded an average of 178 activities per patient per day and an estimated 1.7 errors per patient per day. More recent study by Valentin et al entitled "Patient safety in intensive care: results from multinational Sentinel Events Evaluation (SEE) study published in Intensive Care Medicine in 2006, reported that 38.8 events per 100 patient-days were detected in five categories – medication, lines, catheters and drains, equipment, airway and alarms.

#### WHAT ARE THE CAUSES OF CRITICAL INCIDENTS?

The causes fall into two main categories: human factors and system factors. The main system factor will be workload and the main human factors will be related to culture or attitudes held in workplace.

#### HOW TO IMPROVE SAFETY?

Improving safety is complex work. Simply telling caregivers to adopt new practices eg 5 moments of hand hygiene, double-checks of high-risk medication doses before administration, not to leave patient unattended etc, usually does not work well. Improving safety requires a culture change.

#### HOW TO IMPROVE SAFETY CULTURE?

The Center for Innovation for Johns Hopkins Medicine recommends the following steps to improve safety culture. These steps have been proven to be effective. They are:

1. Show leadership's commitment and encourage accountability
2. Create a patient safety program
3. Identify and mitigate harm
4. Communicate adverse events
5. Adopt the Comprehensive Unit-based Safety Program (CUSP), a five-step program to change a unit's workplace culture. The CUSP Framework includes:
  - a. Train staff in the science of safety
  - b. Engage staff to identify defects
  - c. Senior executive partnership/safety rounds
  - d. Continue to learn from defects
  - e. Implement tools for improvement
6. Pass a code of conduct – civility and respect for colleagues is at the core of patient safety. A code of conduct can spell out the expectations for behavior and lay out the consequences for those who violate it

#### CONCLUSION

It is every health care provider's business, regardless of his or her role or place in the organization's hierarchy, to make intensive care safe. Creating a safety culture will ensure consistent and sustainable improvement in safety. Culture does not change overnight and has to be built over the years. However with effective interventions, culture change is achievable.



## **IMPACT OF CRITICAL ILLNESS ON THE FAMILY**

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A medical staff working in intensive care may easily forget the first impact the ICU environment makes and therefore may unintentionally overlook a family needs. Managing a patient as a holistic approach should not only include or focus on patient alone but also consider family members. The seriousness, uncertainty and suddenness of a family member's critical illness or injury can cause significance impact to families. It may effect physical, psychological and social economic. Accurately assessing and responding to family needs of critically ill patients is significant in reducing the negative impact of stress, strengthens the ability to interact positively, increases family satisfaction with care and promotes trust and confidence. Inadequate attention to complex family needs can result in care fragmentation, family alienation and the development of adversarial relationships among family members and also with care givers.

Family members not only exhibit distress throughout their relative hospitalization but also post ICU care. A study showed that, in families that their member died, despite a high level of satisfaction with the care provided during the ICU stay, many families member considered a follow-up bereavement service potentially useful to deal with the death of the family member and to get remaining questions answered. No doubt with advances in medical technology, survival rates for critically ill patients have increased. However some of these patients alive but may suffer some permanent damage/disabilities leading to an ambiguous loss in families. It may be a loss that relates to physical absence or psychological loss. Many former ICU patients need ongoing support and care from family. The family members who take on a caregiving role often experience an enormous burden.

An organization structured on the needs of the patient and their family is mandatory in designing a new ICU.

## **UPDATES IN ADVANCED LIFE SUPPORT**

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Cardiac arrest is a common emergency in acute hospitals. Guidelines for cardiopulmonary resuscitation (CPR) are continually modified and updated as resuscitation science advances in order to promote changes and developments. This is fundamental to both practice innovation and improvement in quality of patient outcomes. A major new worldwide consensus has been sought based upon the best available scientific evidence, and the most recent updates were in 2010.

### 2010 REVISIONS EMPHASIS:

- On high quality uninterrupted chest compressions
- The early detection and prevention of cardiac arrest in the pre-hospital and in-hospital settings.

### LEADING TO CHANGES OF GUIDELINES ON:

- Defibrillation
- Drugs
- Airway
- Ultrasound
- Post-resuscitation care

Therefore, it is important to understand the changes in order to be able to perform a high quality life support, for us to see a better outcome.

**EVIDENCE-BASED MEDICINE AND RESEARCH IN THE ICU***Arjen M Dondorp*

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Evidence-based medicine is today's standard of medical practice, including in the ICU. There is a generally accepted hierarchy in the level of evidence. Top are results from meta-analyses and controlled, preferably blinded, randomized clinical trials. Expert opinion is low in the evidence pyramid, and so are case reports, case series and case control studies, which are regarded as prone to bias. Although this will be true in general, there are important exceptions that these designs lower in the hierarchy have produced important knowledge for current medical practice. On the other hand, results from meta-analyses, randomised clinical trials, as well as guidelines based on these results, are not always generalizable to different settings than where they were obtained. For instance, several aspects of the 'surviving sepsis' guidelines will not be directly transferable to the tropical setting, where the case mix and sometimes available facilities are different. Certain sepsis syndromes, including severe malaria and severe dengue will require different fluid therapy than described in these guidelines. Strict glucose control requires frequent monitoring, which might not be available. Early enteral feeding for patients with decreased consciousness is only recommended in settings where these patients can be intubated. Testing new interventions or strategies in the ICU can be difficult for several reasons, including the large variety of underlying pathology. Recent examples of large and expensive clinical trials have produced negative results, after initial smaller studies showed promise. A recent development is the Bayesian 'adaptive trial design', where randomization to different treatment arms can vary, in a predefined way, during the course of the trial. This allows for earlier termination of 'non-performing' interventions, and optimizes the sample size for the more promising ones. This approach might prove important in keeping the incentive for researchers, industry and other stakeholders to keep developing innovative new drugs and other treatments.

**SEDATION IN THE ICU – LESS IS MORE***Claudia Cheng Ai Yu*

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The goals of ICU sedation include facilitation of mechanical ventilation, alleviate anxiety and allow tolerance of procedures. Hence it has been common practice in ICUs worldwide to keep critically ill patients well sedated to make their ICU experience less traumatic and to prevent post-traumatic stress. Certainly under-sedation should be avoided; however, an increasing number of studies have shown that over-sedation is associated with serious adverse effects resulting in increased morbidity and mortality. Deep sedation has been associated with prolonged ventilator days and hospital length of stay; the use of benzodiazepines as a sedative agent has been implicated in the development of ICU delirium. Delirium in turn is associated with increased mortality, length of stay and long-term cognitive impairment.

Nowadays, we are seeing a shift in paradigm in sedation practices to avoid prolonged, deep, uninterrupted sedation in ICU patients. Certain exceptions include patients with intracranial hypertension or those requiring neuromuscular blockade. Daily interruption in sedation has been shown to result in shorter duration of mechanical ventilation and shorter ICU stay. Guidelines are advocating daily interruption in sedation or targeted sedation aiming at the lightest possible level of sedation. Moreover, many ICU patients experienced pain, and inadequate analgesia increases the need for sedation. A strategy using analgesia-first or analgosedation rather than employing hypnotic-based sedation first is advocated.

Other strategies include promoting normal sleep using non-pharmacotherapy. Early mobilization is also advocated in order to reduce the incidence of delirium. It is recommended to use validated scales such as RASS or SAS in patients not on neuromuscular blockade to assess the desired level of sedation.

In summary, current sedation practices recommend daily sedation interruption or light level of sedation, starting with analgesia-based sedation, using assessment scales routinely to achieve target level of sedation, promoting natural sleep in ICU, early mobilization and utilizing sedation protocols.

## WERE THE NEGATIVE ARDS TRIALS REALLY NEGATIVE?

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Since 1998, there have been over 14 large randomized controlled trials (RCTs) in patients with ARDS and many with promising interventions, that are still believed to be effective, were negative. Many of these trials in ARDS were based on the scientific purity of a single intervention (to ensure it was that intervention that was effective) and are powered for a 7-10% absolute mortality reduction and a >20% relative mortality reduction.

Early ARDS trials had an average control group mortality >40% but since then, with improving patient management, ARDS is becoming less common and the control group mortality has dropped to the 30-35% which results in large increases in the trial size required to achieve a significant outcome using the above criteria. As a result many trials did not have the numbers required to show such differences.

There have been large reductions in ARDS mortality over the last 4 decades, most before any positive trials were done and it is likely numerous factors all contribute small (3-4%) absolute mortality reductions to this complex multifactorial condition. Many larger RCTs have shown exactly this mortality reduction but were not powered to find it significant. Thus, for most of these trials that have not shown significant benefit, we cannot conclude that there was no benefit from the intervention.

More recently, there have been 3 positive trials despite modest trial sizes (340-550 patients) because of large treatment-control mortality differences. However this cannot be relied upon for a study outcome.

Numerous strategies have been proposed to address this problem. These have included multiple interventions (a care bundle) with potential for an additive effect, non-mortality outcomes (VFDs, functional state at 6-12 months), composite outcomes and cluster randomized trials.

Thus we cannot dismiss the interventions in negative trials as of no benefit and trial designs beyond single intervention with a mortality outcome are advisable.



**MANAGING THE RIGHT HEART***Michael R Pinsky*

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Traditional concepts of right ventricular (RV) function is that it is of minimal consequence on overall cardiovascular homeostasis and if anything impaired left ventricular (LV) diastolic compliance if over distended by the process of ventricular interdependence (1). Clearly, RV volumes change with changing venous return such that the expanding right ventricle makes LV end-diastolic volume less for the same filling pressure (2). Indeed at rest and with normal lungs and pulmonary vasculature and right ventricle can be completely replaced by a Dacron graft with no measurable change in cardiac output (3). Furthermore, RV infarction often creates an akinetic right ventricle without also causing cardiogenic shock. Finally, most investigators studied RV function presuming it was a weaker but similar pump to that of the left side of the heart and measures such as diastolic compliance and end-systolic elastance could be defined (4,5). In fact, on superficial inspection, the right ventricle appears to behave like the left in that increasing in filling pressure increase RV stroke volume (6) and classic Starling curves can be created on a beat-to-beat basis for it over the ventilatory cycle (7). But these studies never measured RV pressures and volumes simultaneously whilst taking into account pericardial pressure or their dynamic changes. When such analyses were performed, it became clear the right heart behaves very different from the left.

Three related clinical studies demonstrated that RV filling occurs below the unstressed diastolic volume, such that RV end-diastolic wall stretch is unaltered by filling (8,9,10). This explained the paradoxical observation that unlike the left heart, as RV filling increased, RV ejection fraction decreased. To assess this better measures of RV volumes during the entire cardiac cycle, using conductance catheter technology defined that RV diastolic filling occur whilst transmural RV filling pressure was actually continuing to fall (11,12), with absolute RV end-diastolic pressure more a function of pericardial restraint than end-diastolic stretch. Finally, although RV end-systolic elastance can be measured it does not describe RV contractility as much as systolic ventricular interdependence of LV contraction (13,14).

Coupled to these findings is the reality that RV ejection is exquisitely dependent of RV ejection pressure (15). Thus, if disease processes increase pulmonary artery impedance then RV dilation and failure will eventually occur. Furthermore, most of RV coronary blood flow occurs during systole, unlike LV coronary blood flow, which primarily occurs in diastole (16). Thus, systemic hypotension or relative hypotension where in pulmonary artery pressures equal or exceed aortic pressure must cause RV ischemia.

Clinically these findings carry a common end result. For cardiac output to increase RV volumes must increase. If increasing RV volumes also result in increasing filling pressures then RV over distention may be occurring causing RV free wall ischemia. If relative systemic hypotension exists then selective increases in arterial pressure will improve RV systolic function. Accordingly, fluid resuscitation, if associated with rapid increases in central venous pressure should be stopped until evidence of acute cor pulmonale is excluded. Acute cor pulmonale can be treated by improving LV systolic function, coronary perfusion pressure or reducing pulmonary artery outflow impedance.

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**RAPID BEDSIDE MEASUREMENT OF INOTROPY – NO MORE GUESSWORK*****Brendan Smith***

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Inotropy, or myocardial contractility, is well known to all clinicians as a concept, but who ever thinks of it as a discrete quantity, something that can be measured and quantified like all other haemodynamic parameters? Similarly, when using an inotrope clinically, how many of us stop and think exactly what the inotrope is doing in physical terms of power and energy? In over 95% of the published studies where inotropes were used, the decision was based on clinical judgement alone. Most of us will recognise this practice in our own daily dealings with critical care patients.

But what are our therapeutic targets? How do we know when we've reached them? Which inotrope will give us the best results in any given situation, and what is a sufficient level of inotropy anyway? Is there a minimum level of inotropy that the patient must have? The logical answer to this last question is obviously yes, otherwise the patient would be in cardiac failure, but what is the actual value? Could we even define cardiac failure as a heart with an inotropy below this critical level?

Most of us during our training will have experienced the standard replies from our seniors to these questions. Usually they ran something like "you'll use inotropes when I tell you to use inotropes and not before!" or "you'll use the inotrope that I tell you to use and in the dose that I say!" or, my personal favourite, "when you've been in this game as long as I have you'll know why I use that inotrope and that dose!" Sadly, for many of us, that was as scientific as it got. But how easy life would be if only we could measure inotropy quickly and easily at the bedside. All of these questions would be easily answered, and we could easily monitor highly targeted therapy using not only a single inotrope, but even combinations of inotropes if we wished. But how can we do it?

Inotropy, in a very real sense, is the power that the heart possesses, and as such it can be quantified using standard principles of mechanics and physics. Power is the ability to do work and is the maximum amount of work that can be performed in a given time. When the heart contracts it follows the "all or nothing" rule, contracting with all the power available to it. There is no such thing as a half-hearted contraction! The work that the heart performs in raising one stroke volume from venous pressure to arterial pressure can be calculated quite simply, as long as we know the stroke volume, the pressures involved, and the time taken. This is the potential energy that the heart develops. But the heart also generates blood flow. This is kinetic energy, and again, it can be calculated using basic physics if we know the density of blood and the velocity of ejection. The energy that ultimately appears as potential energy and kinetic energy must have come from the energy developed by the heart as a result of its inotropy. All of the parameters that we need to perform this calculation can be easily obtained at the bedside using Doppler ultrasound. Measurement of inotropy can be performed in less than two minutes, probably quicker than most of us could perform an ECG. This lecture will illustrate exactly how the Smith-Madigan Inotropy Index<sup>1</sup> is measured, and show how simple process this can be.

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## **CHALLENGES IN NON-INVASIVE VENTILATION IN CHILDREN**

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Acute respiratory failure (ARF) is the commonest cause of admission to the PICU. If unsupported, it will lead to cardiac arrest. To avoid the complications of invasive mechanical ventilation, non-invasive ventilation (NIV) is being increasingly applied in children with ARF with a success rate of 50 to 100%. The conditions leading to ARF include acute bronchiolitis, status asthmaticus and pneumonia. Several pediatric clinical studies have suggested the effectiveness of NIV in ARF due to post-extubation or as a means to facilitate extubation and lower airway obstruction. Improvement is usually seen within 1 to 8 hours with improving oxygenation, respiratory rate, heart rate and patients' work of breathing. Failure of NIV is mostly related to the underlying severity of lung pathology as well as extra-pulmonary disease such as septic shock. Insufficient ventilator support gives rise to patient-ventilator dyssynchrony, gastric insufflation, more respiratory distress and haemodynamic instability. Independent predictors of failure of NIV are high FiO<sub>2</sub> needs or high PaCO<sub>2</sub> on admission or within the first hour after starting NIV. Other challenges in children include inappropriate mask interface, increased dead-space, nasal secretions, and skin abrasions causing patient discomfort. To optimize patient outcome, NIV should be applied by a trained and experienced team with careful patient selection and good clinical judgment and monitoring for improvement in respiratory status.

## **MYOCARDITIS AND CARDIOMYOPATHY**

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Acute viral myocarditis should be suspected in any child presenting in cardiac failure with a structural normal heart without a history of heart disease. It is an important cause of cardiac morbidity and mortality in infants and children, and there is increasing evidence to suggest that it is a major cause of sudden, unexpected death in this population.

The presentation of acute viral myocarditis can vary from a mild viral illness with subclinical myocardial inflammation to acute collapse and sudden death in a previously healthy child. Originally, the term myocarditis was used to describe an acute inflammation disease of the myocardium, usually caused by viral infection. We now know that myocarditis and dilated cardiomyopathy represent a spectrum of disease, and there is considerable overlap between the two. The distinction between the two is often difficult.

Despite considerable advances in our understanding of myocarditis pathogenesis, the clinical management of myocarditis has changed relatively little in the last few years. During the sharing, we will try to bridge the widening gap between the recent mechanistic insights ( which are largely derived from animal model), and their potential impact on disease burden.

Current pharmacological heart failure therapy of myocarditis-associated cardiomyopathy mainly focus on decreasing the activity of the neuroendocrine system but does not directly influence viral-induced inflammatory cardiomyopathy. That bring on the discussion on the treatment using immunotherapies namely intravenous immunoglobulin, steroid , azathioprine, cyclosporine, interferon-beta, hemofiltration and immunoabsorption.

Mechanical support in acute viral myocarditis is now increasingly viewed as a definitive supportive treatment in expectation of recovery of cardiac function in the first instance. As it is a important tool in supporting these particular group of patient and also patient with severe lung injury, we should be moving forward to make it possible and available in local paediatric intensive care unit.

## **DO WE STILL NEED RCTS IN ICU RESEARCH?**

*Kevin Morris*

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In the evidence hierarchy we are taught that randomised controlled trials and meta-analysis are top of the pyramid and yet many have become disillusioned with the use of RCTs in the critically ill population, citing methodological flaws with the approach and disappointment at the number of 'negative' trials which have been undertaken. Should the RCT still be considered the top of the pyramid or are there other approaches which we should be using to test our research hypotheses?



## **THE ETHICS OF WITHHOLDING AND WITHDRAWING OF LIFE-SUSTAINING TREATMENT**

*Jacqueline Chin*

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The withholding and withdrawing of life-sustaining treatment has legal and ethical dimensions that are conceptually complex and ethically fraught. This lecture focuses on legal consensus on withdrawing and withholding life-sustaining treatment, but continuing difficulties for health professionals in applying this in practice. We shall also consider some recent ethical debates in withholding/withdrawing life-sustaining treatment and actions with respect to medically futile interventions, and cases of patients in vegetative or minimally conscious states.

## **RATIONALISING ICU CARE IN RESOURCE-POOR SETTINGS**

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Care of critically ill patients in resource-poor settings is a challenge, because of limitations in staffing, monitoring and other equipment, supporting infrastructure and other supplies like drugs. However, basic principles for the care of critically ill patients are applicable in both resource-rich and resource-poor settings, and many strategies can be implemented at no- or low-cost. Examples include lung protective ventilation strategies, restricted use of sedatives, restricted use of fluid therapy in septic shock after the initial phase and early start of antibiotics in patients with bacterial sepsis. Close monitoring with proper alarm limits prompting appropriate action, use of both short- and long-term treatment plans, good organization of the intensive care unit with accurate patient documentation, and enforcement of strict hygiene rules, are essential ingredients for good critical care management. Interventions tested in resource-rich settings are not always transferable to the resource-poor settings and sometimes need re-evaluation before implementation. The disease burden of critical illness and severe sepsis in low- and middle income countries is often not well known. For most of these countries it is also not clear what the current ICU capacity is and how well ICUs perform. A critical care disease surveillance and registry system has been developed in both Malaysia and Sri Lanka, which could serve as a template for other countries. Benefits include aiding the planning of ICU services and capturing changes in ICU performance after implementation of novel treatment strategies, training programmes or other interventions. A modular training programme aiming at both doctors and nurses conducted in Nepal, Bangladesh, and India showed a clear beneficial effect on several ICU performance indicators. The lessons learned from this programme will be discussed.



## **CONFLICTS IN END-OF-LIFE CARE**

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“Conflict” is broadly defined as failure to achieve consensus on the goals of care and related treatment at the end of life despite allowing time ( usually 48 hours) and holding repeat discussions between involved parties. At one level such conflict may represent differences in the differences in the treatment philosophies of involved parties but more often than not involves lack of communication between the caregivers and a perception of lack of care by the family. Differences in educational status, religious/cultural background, social status and ability to pay for treatment may also result in conflicts at the end of life. A practical approach to prevent such conflicts from occurring and and to resolve them if they do occur will be presented.

## **MORAL DISTRESS IN THE ICU**

*Jacqueline Chin*

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Difficulties of decision-making in healthcare are usually not the medical decisions. They usually centre around obstructions to the healthcare provider’s sense of a responsibility to act. There are many sources of such obstruction, and appropriate and inappropriate ways of dealing with them. Common among these are resource shortage problems, inconsistencies between policies or laws and practice, day-to-day conflicts among different parties involved in the care of patients, and under-developed healthcare system and workplace supports. The outcomes of inaction or inappropriate action taken in the obstructive situation are morally distressing, and have been found to lead to poor performance, endangerment, health worker attrition and weakened integrity within healthcare institutions. There is value in thinking about how to deal appropriately with situations of moral distress.

## THE CRITICALLY ILL PATIENT WITH MALARIA

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Case fatality rates of severe falciparum malaria are around 10% in African children and 15% in Asian adult patients, but can increase to over 40% in cases with multi-organ involvement. To improve mortality, different components of the treatment can be targeted, including 1. antimalarial treatment, 2. treatment of concomitant diseases, 3. adjuvant treatments, 4. supportive ICU treatments and nursing care.

1. In large trials, parenteral artesunate reduced severe malaria mortality by 22.5% in Africa and 34.7% in Asia compared with quinine and this large reduction in mortality was not at the expense of an increase in neurological sequelae. The cost per life saved when switching from quinine to artesunate is low, estimated as 120 US\$ in African children and 150 US\$ in Asian adult patients.
2. Parenteral antimicrobials should be given to all children with suspected severe malaria in areas of moderate or high transmission, because of the high incidence of concomitant invasive bacterial disease in these settings. This is because severe malaria is an important risk factor for bacteraemia, but also because children with bacterial sepsis can present with co-incidental parasitaemia related to high background prevalence rates in these settings.
3. Adjuvant therapies have been uniformly unsuccessful to date. Therapies aiming at improving the microcirculation are currently being tested, including nitric oxide donors and compounds reversing cyto-adherence of the sequestered parasite biomass.
4. Strategies proven beneficial for sepsis management are not always applicable to the management of severe malaria. Fluid therapy in both adult and paediatric cases should be restricted. A large study of fluid bolus therapy in African children with compensated shock showed in the subgroup with *P. falciparum* malaria, that mortality in the bolus groups was 51% higher. Permissive hypercapnia is not recommended as a ventilation strategy in severe malaria patients with coma.

**VASOPRESSIN IN SEPSIS: BASIC SCIENCE TO BEDSIDE***Jenny Tong May Geok*

Hospital Tuanku Ja'afar Seremban, Seremban, Negeri Sembilan, Malaysia

Vasopressin is a nonapeptide hormone synthesized in the paraventricular and supraoptic nuclei of the hypothalamus. Hormone precursors migrate via the supraoptic-hypophyseal tract to the posterior pituitary gland where they are stored and released. Vasopressin is rapidly metabolised by liver and kidney vasopressinases and has a half-life of 10-35 minutes. Vasopressin stimulates V1 (vascular), V2 (renal), V3 (central), oxytocin and purinergic receptors. The most important stimuli that evoke vasopressin release are increased plasma osmolarity and decreased arterial pressure. Vasopressin has two distinct roles, in osmoregulation and baroregulation. In health, vasopressin secretion is primarily governed by changes in serum osmolarity. It stimulates V2 receptors in the distal convoluted tubules of the kidney resulting in water reabsorption and a fall in osmolarity. In shock states, vasopressin binds to V1 receptors on vascular smooth muscle that leading to vasoconstriction and maintenance of blood pressure.

Sepsis initially increases vasopressin levels by 20 to 200-fold. Subsequently, levels decline rapidly due to impaired synthesis and release as shock continues. This has been called relative vasopressin deficiency. The Vasopressin and Septic Shock Trial (VASST), a randomized controlled trial of vasopressin versus noradrenaline in septic shock, suggested that low-dose vasopressin (0.01 to 0.03U/minute) may decrease 28 and 90-day mortality in patients with less severe septic shock (defined as infusion of noradrenaline 5 to 14 µg/minute at randomisation). A meta-analysis by the European Society of Intensive Care Medicine Systematic Review Group concluded that although vasopressin did not produce any survival benefit in the short term in patients with vasodilatory shock, it significantly reduced noradrenaline requirements. The Surviving Sepsis Campaign guidelines of 2012 recommended vasopressin up to a dose of 0.03U/minute can be added to noradrenaline use. Several studies have used doses up to 0.06U/minute.

Adverse effects of vasopressin infusion include skin necrosis, digital, mesenteric and myocardial ischemia and hyponatremia.

## THE USEFULNESS OF SEPSIS BIOMARKERS

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Sepsis is a leading cause of death among the critically ill despite advances in modern antibiotics therapy and resuscitation.

How good are we at diagnosing sepsis? It has been reported that physicians are only correct in diagnosis of sepsis 77% of the time. Biomarkers may have a role in this aspect. There are over 170 different biomarkers in sepsis. These large numbers of biomarkers are likely to be related to the complex pathophysiology of sepsis which involves mediators of inflammation, coagulation, complement contact system activation and apoptosis; separate biomarker for each system has been proposed. Among them are procalcitonin (PCT), interleukins, eosinophil count, interferon, adrenomedullin, ANP, TREM-1 and CRP. However only PCT and CRP are routinely used in clinical practice.

An ideal biomarker can differentiate a bacterial infection than other types of inflammatory processes. It should have a short half-life and gives results fast. It should not be influenced by illness. It acts as a guide to effectiveness of therapy and aids prognostication.

CRP correlates with multi-organ failure and death. Cytokines main disadvantage in clinical use is their time course is erratic and they have short half-lives. PCT has a high negative predictive value to rule out sepsis. PCT can also be used to guide antibiotic therapy. The PIRO concept ( Predisposing conditions, Infection, host Response, concomitant Organ dysfunction) suggest PCT use for diagnosis of sepsis.

In summary, although there is not perfect sepsis biomarker, some maybe helpful. Biomarkers are screening tests that should be used in the context of predictive values, should not be used without clinical judgment. The future will see the use of combination of biomarkers, which reflect different aspects of human body's response to infection.

## **MONOTHERAPY OR COMBINATION ANTIBIOTIC THERAPY IN SEVERE INFECTIONS**

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There is much discussion in the medical literature about the issue of whether monotherapy or combination antimicrobial therapy should be instituted when dealing with severe bacterial infections. Increasingly we are faced with a subset of patients who are extremely ill with multi-organ dysfunction where the initial source of sepsis may not be apparent. Choosing the appropriate empirical antimicrobial(s) can be very challenging. Faced with the ever increasing threat of antimicrobial resistance the stakes are high. On one hand we are duty bound to provide optimum care for our patients while on the other we are ever mindful of antibiotic selection pressure and its impact on the microbiological ecology in our facilities.

The choice of antibiotics can have a long lasting effect on the resistance trend in any healthcare institute. For every paper reporting on the efficacy of combination antimicrobial therapy there is another that either fails to demonstrate superiority over monotherapy or sees an increase in adverse events. Clearly more well conducted randomized blinded trials will be needed to address this contentious issue.

## **EMPIRICAL ANTIBIOTICS FOR SEVERE PNEUMONIA IN THE IMMUNOCOMPROMISED PATIENT**

*Lee Kang Hoe*

Singapore

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Patients may become immunocompromised from a variety of conditions and a result of their treatment. These patients have become quite common in all modern tertiary hospital with the practice of oncology, infectious diseases, renal failure patients, rheumatology patients with monoclonal antibody treatment, and transplant patients (solid organs and stem cell transplants). The degree of immunosuppression varies as well as the time frame. Some may have antibody issues, and some may have T cell issues.

The key to treating these patients is optimization of preventive strategies (vaccination, prophylactic treatment, and isolation strategies), and rapid diagnosis of the infection (expectant management strategies) with modern microbiological laboratory support. In order to achieve rapid diagnosis of pneumonias, bronchoscopy is often utilized.

It is important to consider opportunistic infections in the differential diagnosis of severe pneumonias besides the usual bacterial pathogens. In this regard, PCP, TB, viral pneumonias, fungal pneumonias and MRSA need to be excluded as causes of severe pneumonia in immunocompromised patients. It is also important to consider non-infectious causes like pneumonitis which is increasingly seen as a complicated of various targeted and monoclonal therapies in cancer patients.



## **THE CHRONIC CRITICALLY ILL PATIENT**

*Lim Chew Har*

Hospital Penang, Penang, Malaysia

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As a result of advances in intensive care, a large and growing population of patients who, in the past, would have died from their acute critical illnesses now survive but require prolonged life support. These patients are called chronically critically ill (CCI) patients, and, depending on the definition criteria, comprise 5 to 10% of the patients admitted into intensive care units. These patients often have prolonged dependence on mechanical ventilation and other intensive care as long as months or years after the catastrophic illness.

The costs of treating the chronically critically ill patients are high and increasing. Chronic critical illness is a devastating condition and outcomes for patients with chronic critical illness are associated with a high risk of disability, distress, and death. Increasingly, survival is not the only important outcome: functional status, independence, ability to live at home, and burden on family may be more important. The syndrome of chronic critical illness has well-documented emotional, social, and financial burdens for individuals, caregivers, and the health care system.

As patients transition from acute to chronic critical illness, their care needs change from high-tech to high-intensity nursing, respiratory and rehabilitation services. Mobility with a focus on weight bearing and ambulation, nutrition become the priorities as the patient is incrementally moved toward "normalcy".

## **UPDATES IN NUTRITION**

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Nutrition is very important in the critically ill patients. Over the years there have not been many drastic changes except a few. To date, a few important questions that we have may still remain unanswered. We are clear that nutrition should be started early within 24 to 48 hours once admitted to the ICU and enteral nutrition is preferred over parenteral. However, it is still unclear whether continuous infusion or bolus feed is better. In term of gastric residual volume, we are moving towards accepting a higher residual volume but, should we still measure it?

What about enteral feeding supplementation with glutamine and fish oil? Currently, the benefit of adding glutamine in the critically ill population has only been seen in the subgroup of trauma and burn patient. In fact based on the REDOX study, glutamine supplementation should be avoided in patients with shock and multi-organ failure. On the other hand, there is not enough evidence to support the use of fish oil alone as a supplement in critically ill patient. The supplementations with fish oils, borage oils and antioxidants in patients with ALI and ARDS remain controversial.

In patients that cannot tolerate enteral nutrition, the timing of starting parenteral nutrition is a continuous controversy. Previously it was early parenteral nutrition, and now the evidence showed no difference in outcomes among those given early versus late parenteral nutrition. In fact, early parenteral nutrition may be potentially harmful. However, these findings again may be challenged by the recent trial by the Australian and New Zealand intensive care group.

In patients receiving parenteral nutrition, parenteral supplementation with glutamine and IV lipids that reduce the load of omega-6 fatty acids should be considered. However, there are insufficient data to make a recommendation on the type of lipids to be used that reduce the omega-6 fatty acid in critically ill patients receiving parenteral nutrition.

## **MOBILISING THE ICU PATIENT**

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It has been ingrained in most of us that immobility is a part of standard of care in patients who are critically ill. Little do we realize that immobility comes with a heavy price. Increased morbidity, prolonged mechanical ventilation, prolonged ICU and hospital stay and poor physical function after discharge just to name a few.

Early mobility in ICU is an initiative to assess and to get the patient moving within 24 hours of ICU admission. This consist of early exercise in bed and progressive mobility with gradual progression from supine to upright positioning and eventually out of bed.

We will explore the staff perceived barrier to this initiative, the safety aspects and a review of the early mobility protocol during this talk with the objective of creating awareness and a paradigm shift in the immobility culture.

## **FINE-TUNING THE MANAGEMENT IN PAEDIATRIC TRAUMATIC BRAIN INJURY**

*Kevin Morris*

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The intensive care management of a brain injured patient is often referred to as providing 'neuro-protection'. But what is meant by neuro-protection and what monitoring is needed to monitor the wellbeing of the injured brain. For many years a simple approach using ICP and CPP monitoring has been used but with the advent of other monitoring modalities the possibility of extended or 'multi-modality monitoring' is possible. But does it improve outcomes? And should we adopt physiological targets which are based on population norms or should we be applying an individualised approach to such things as CPP targets?

### SYMPOSIUM 13 > *Gastrointestinal*

## **SAVING THE FAILING LIVER WITHOUT EXTRACORPOREAL SUPPORT**

*Lee Kang Hoe*

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Liver failure can be an acute event or chronic. Acute liver failure without chronic liver disease is usually the result of acute hepatitis from a variety of causes – most commonly from drug effects (e.g. paracetamol overdose or idiosyncratic drug reactions like TB medications), followed by viral hepatitis (especially hepatitis B flare). Rarer causes may include Wilson's disease and post partum syndromes.

Acute on chronic liver failures are more common and is usually precipitated by infections, development of liver cancer, vessel thrombosis, alcohol binges, or GI bleeds.

Treatment of such patients involve treating the underlying cause of liver failure, e.g. stopping the offending drug, give IV n-acetylcysteine for paracetamol overdose, treating hepatitis B virus, while supporting the patient to see whether there is an opportunity for liver recovery. It is important to be aware who should be considered for liver transplantation. The window for such an operation is usually short, and organizing such a major operation usually takes some time, especially with donor shortages. For acute liver failure, the King's criteria is usually utilized while the MELD score is used for chronic liver failure.

The patient in liver failure is usually admitted to the ICU as their condition is also involved with multi-organ dysfunction. Often, patient develops renal failure; they develop encephelopathy and even seizures; they have infections; they may bleed; they become hemodynamically unstable; and they have hypoglycemic events and hyponatremia. These are critically ill patients requiring an experienced ICU to manage them well to provide an opportunity for recovery and if necessary, liver transplantation to save their lives.

Extracorporeal treatment is usually required as part of modern ICU care in terms of CVVHDF and in certain units, liver dialysis as well.

**THE OPEN ABDOMEN – INDICATIONS AND MANAGEMENT***Andrew Gunn*

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The open abdomen is one in which the skin and fascia of the abdominal wall is not closed following a laparotomy. Initially described in the management of abdominal war wounds, its use has evolved to being part of damage control surgery for trauma as well as treatment of intra-abdominal hypertension (IAH) and abdominal compartment syndrome (ACS). Prophylactic use of open abdomen to prevent development of IAH and ACS has been suggested to improve survival in critically ill patients at risk in the ICU.

Mortality of patients with an open abdomen remain high especially in septic abdomen or trauma patients with high injury severity score. This reflects the critically ill nature of such patients in the ICU rather than the use of open abdomen technique. Various methods of temporary abdominal wall closure have been described but the most common one in use is the negative pressure therapy technique. Complications of open abdomen are mainly that of intestinal/ entero-atmospheric fistula and large ventral hernias. A strategy on the use and management of open abdomen in the ICU will be discussed.

SYMPOSIUM 14 > *Renal***NUTRITION IN PATIENTS WITH RENAL FAILURE***Wan Nasrudin Wan Ismail*

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Renal failure is common problem in intensive care unit. The patients are either with underlying chronic kidney disease (CKD) who develop complications such as fluid overload, hyperkalemia, severe metabolic acidosis and required ICU admission or more commonly patient who develop AKI as part of multiorgan failure such as in severe sepsis or septic shock.

Malnutrition is common in patient with renal failure and its can be as high 40%. Patient with renal failure is a heterogenous group of patients which nutritional requirement are different, they are

- patients with acute renal failure (ARF),
- patients with chronic kidney disease (CKD),
- patients on hemodialysis therapy (HD) including continuous
- renal replacement therapies (CRRT),
- patients on continuous ambulatory peritoneal dialysis or peritoneal dialysis.

Acute renal failure (ARF) is associated with fundamental alterations of metabolism and immunocompetence with the induction of a pro-oxidative and proinflammatory state and in hypercatabolic state. A nutritional program for a patient with ARF must consider not only the specific metabolic consequences associated with renal failure and with the underlying disease process, but also the profound alterations in nutrient balances induced by replacement therapy. Nutrient requirements thus may differ widely between individual patients and during the course of disease, and nutrition therapy must be coordinated with renal replacement therapy.

The general principle of nutritional support in critically ill patient is also applicable to patient with renal failure. Whenever possible enteral feeding must be started and if not possible or inadequate, supplemental parenteral nutrition should be started.

## **SLEDD – IS IT THE BETTER CHOICE?**

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No difference in outcome from Acute Kidney Injury in the ICU has so far been demonstrated for continuous (CRRT) versus intermittent renal replacement therapy (IRT), Sustained low efficiency dialysis (SLEDD) a form of IRT now also called hybrid dialysis therapy combines the hemodynamic advantages of CRRT and the shorter duration of intermittent hemodialysis. It is less resource intensive and substantially cheaper as it can use conventional dialysis equipment. It is now the dialysis modality of choice in ICU's in resource limited settings. The practical bedside use of SLEDD will be discussed.

## **USE OF DIURETICS IN AKI**

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Acute Kidney Injury (AKI) presents in 5% of hospital admission and nearly 30% of ICU population. There are increasingly good evidence which shows good correlation between the severity of AKI and the increased risk of mortality. As such there are great concern on ways to prevent the onset and treatment of AKI. The use of diuretics is perhaps the no 1 controversy in the management of AKI. Should diuretics be used? When should it be used? How should it be used? Much of these arguments stems from the fact there are wide practices of diuretics usage in AKI and the lack of good clinical data on AKI and diuretics.

In general, the cause of AKI can be divided into 3. Pre renal, when there is insufficient blood flow or circulating volume. Renal, when there is direct injury to the kidney and post renal when there is obstruction to the renal circulation. Obviously, when there is inadequate volume, the use of diuretics will worsen the AKI and the treatment should centres on aggressive fluids resuscitation and haemodynamics restoration. But there are also growing evidence that too much fluids causes generalised odema leading to further deterioration of kidney function. Similarly cardio-renal relationship is now increasingly seen as an important relationship influencing the preservation of renal function and reduction of mortality. As such it appears that diuretics may be useful in some patients with AKI and harmful to others. The recent KDIGO guidelines recommend not to use diuretics for AKI and diuretics should only be used in AKI when fluids overloaded are present.

This talk attempts to discuss the possible pharmacologic basis for diuretics benefits in AKI, the current evidence of the effectiveness of diuretics in AKI and the challenges in gaining new insights to better understands the role of diuretics and AKI



<b>FP 1</b>	<b>Impact Of Daily Information Briefings Provided By Healthcare Workers On Family Awareness And Acceptance Of Intensive Care In Critically Ill Patients</b>	49
	<i>M F Lee<sup>1</sup>, Patrick Tan<sup>2</sup></i> <sup>1</sup> University of Malaya, Kuala Lumpur, Malaysia <sup>2</sup> University of Malaya Medical Centre, Kuala Lumpur, Malaysia	
<b>FP 2</b>	<b>Urine Output Criteria In Prediction Of Mortality And Dialysis Requirements In The Critically Ill</b>	50
	<i>Azrina Md Ralib<sup>1,2</sup>, John W Pickering<sup>2</sup>, Geoffrey M Shaw<sup>3</sup>, Zoltan H Endre<sup>2,4</sup></i> <sup>1</sup> Department of Anaesthesiology and Critical Care, International Islamic University Malaysia, Kuantan, Pahang, Malaysia <sup>2</sup> Christchurch Kidney Research Group, Department of Medicine, University of Otago, Christchurch, New Zealand <sup>3</sup> Department of Intensive Care, Christchurch Hospital, Christchurch, New Zealand <sup>4</sup> Department of Nephrology, Prince of Wales Clinical School, University of New South Wales, Sydney, Australia	
<b>FP 3</b>	<b>The Impact Of Fluid Overload On Mortality And Acute Kidney Injury</b>	51
	<i>Azrina Md Ralib<sup>1,2</sup>, John W Pickering<sup>2</sup>, Geoffrey M Shaw<sup>3</sup>, Zoltan H Endre<sup>2,4</sup></i> <sup>1</sup> Department of Anaesthesiology and Critical Care, International Islamic University Malaysia, Malaysia <sup>2</sup> Christchurch Kidney Research Group, Department of Medicine, University of Otago, Christchurch, New Zealand <sup>3</sup> Department of Intensive Care, Christchurch Hospital, Christchurch, New Zealand <sup>4</sup> Department of Nephrology, Prince of Wales Clinical School, University of New South Wales, Sydney, Australia	
<b>FP 4</b>	<b>Early Extubation After Cardiac Surgery: A Prospective Study In Sabah Cardiothoracic Centre</b>	52
	<i>Mat Ramlee Md Tahir, Noemi Maiton, Rukina Gilod, Norhaineh Ruddin, Erika Apong</i> Department of Cardiothoracic Anaesthesia and Perfusion, Hospital Queen Elizabeth II, Kota Kinabalu, Sabah, Malaysia	
<b>FP 5</b>	<b>Early Mobilisation In Intensive Care: Perceived Barriers And Facilitators Among HRPB ICU Staff Nurses</b>	53
	<i>Foong Kit Weng</i> Intensive Care Unit, Hospital Raja Permaisuri Bainun, Ipoh, Perak, Malaysia	

## **IMPACT OF DAILY INFORMATION BRIEFINGS PROVIDED BY HEALTHCARE WORKERS ON FAMILY AWARENESS AND ACCEPTANCE OF INTENSIVE CARE IN CRITICALLY ILL PATIENTS**

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### BACKGROUND

Sudden admission of a family member into ICU is stressful for whole family. They feel vulnerable, helpless and often lack of clear information given by critical care professionals. Failure to interact appropriately with those families can lead to heightened anxiety, misunderstanding, and mistrust the management.

### OBJECTIVE

To examine the impact of daily information briefings provided by critical care professionals on family awareness and acceptance of intensive care in critically ill patient.

### METHODS

This was a quasi-experimental study with pre- and post-test design. A total of 80 subjects were equally divided into experimental and control groups. For experimental groups, subjects were received regular daily information updates and also based on their demand. For control groups, information was only given upon requested. All subjects in this study were requested to complete a pre- and post-test questionnaire and their mean scores were compared.

### RESULTS

No significant difference detected in the pre-test mean total scores between groups ( $p > 0.05$ ). For post-test results, the mean total scores for the experimental group was  $92.00 \pm 2.51$ , whereas mean total scores for the control group was  $70.60 \pm 8.62$ . An independent-samples t-test results revealed  $t(45) = 15.07$  with  $p < 0.0001$ . Paired samples t-test for experimental groups,  $t(39) = -23.03$ ,  $p < 0.0001$ , indicated that there was marked improvement in post-test total mean score.

### CONCLUSION

Our study's finding suggested that providing adequate and correct information to the family members based on their needs increased the family members' awareness and their satisfaction. The family members understood more, were willing to accept the given care and trusted the critical care professionals more.

## URINE OUTPUT CRITERIA IN PREDICTION OF MORTALITY AND DIALYSIS REQUIREMENTS IN THE CRITICALLY ILL

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### INTRODUCTION

Urine output criteria have been incorporated into AKI consensus definitions, but not well validated. We assessed urine output criteria as predictors of mortality or dialysis in critically ill patients.

### METHODS

All admissions to a general ICU were prospectively screened for 12 months, and hourly urine output over the moving intervals between 1 and 12 hours. Prediction of the composite of mortality or dialysis by urine output was analysed in increments of 0.1 ml/kg/h from 0.1 to 1 ml/kg/h and the optimal threshold for each collection interval determined. AKI<sub>cr</sub> was defined as an increase in plasma creatinine of  $\geq 26.5$  mmol/l within 48 hours or  $\geq 50\%$  from baseline.

### RESULTS

Of 725 admissions, 72% had either AKI<sub>cr</sub> or AKI<sub>uo</sub>. A larger proportion had AKI<sub>uo</sub> alone compared with AKI<sub>cr</sub> alone (33% vs 11%,  $p < 0.0001$ ). An average 6-hour urine output threshold of 0.3 ml/kg/h was associated with a step increase in mortality or dialysis (30% below 0.3 ml/kg/h, 10% above). The threshold also had the same sensitivity as AKI<sub>cr</sub> for predicting mortality or dialysis. Hazard Ratios for in-hospital and one-year mortality after adjustment for age, body weight, severity of illness, fluid balance, and vasopressor use were 2.25 (1.40 to 3.61) and 2.15 (1.47 to 3.15) respectively. The optimal urine output threshold was linearly related to duration of urine collection ( $r^2 = 0.93$ ), with regression line of  $[(0.03 \times \text{duration of assessment}) + 0.11]$  ml/kg/h.

### CONCLUSION

A 6-hour urine output threshold of 0.3 ml/kg/h best associated with mortality and dialysis, and was independently predictive of both hospital and 1-year mortality. This suggests that the current AKI urine output definition is too liberally defined. Shorter urine collection intervals may be used to define AKI using lower urine output thresholds.

## THE IMPACT OF FLUID OVERLOAD ON MORTALITY AND ACUTE KIDNEY INJURY

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### INTRODUCTION

Volume resuscitation is a fundamental component of the acute management of critically ill patients, however there has been growing concern of the adverse effect of positive fluid balance. Dilution of plasma creatinine concentration following fluid loading delays AKI diagnosis. We investigated the impact of positive fluid balance on mortality, and AKI in general ICU patients.

### METHODS

All admissions to a general ICU were prospectively screened for 12 months. Cumulative fluid balance as a percentage of body weight was calculated from ICU admission to 24 and 48 hours post-admission. A positive fluid balance was defined as cumulative fluid balance greater than 5% body weight. Plasma creatinine concentration was adjusted for cumulative fluid balance at time of measurement. AKI was defined and classified based on creatinine criteria using the Kidney Disease: Improving Global Outcomes definition.

### RESULTS

Of 725 ICU admissions, 33% had AKI and 26% had a 24-hour positive fluid balance. At 48 hours of 411 patients remaining in the ICU 12% had a positive fluid balance. A 48-hour positive fluid balance was independently predictive of hospital and 1-year mortality (Hazard ratios of 3.73 (1.98 to 7.02), and 3.15 (1.72 to 5.76), respectively). Adjusting plasma creatinine for fluid balance re-classified 40 (8.2%) of no-AKI patients as having AKI, and 34 (14%) of AKI patients to higher AKI severity categories. Reclassified AKI patients had longer ICU lengths of stay ( $p < 0.02$ ), and were 40 to 70% more likely to than those not reclassified.

### CONCLUSIONS

A positive fluid balance of  $>5\%$  at 48 hours post admission was independently associated with mortality. Failing to adjust plasma creatinine for fluid balance masked AKI diagnosis and underestimated AKI severity. Adjustment of plasma creatinine concentrations to correct for dilution is necessary in patients undergoing volume resuscitation.

## **EARLY EXTUBATION AFTER CARDIAC SURGERY: A PROSPECTIVE STUDY IN SABAH CARDIOTHORACIC CENTRE**

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### INTRODUCTION

Early extubation is the most important determinant to the success of fast track cardiac anaesthesia in which the patients are extubated within 8 hours after surgery. Fast track cardiac anaesthesia is part of the fast track cardiac surgery pathways which involved a multidisciplinary approach aimed to improve the efficiency of care in cardiac surgical patients. The approach is proven to be safe, cost effective and result in better resource utilization. The objective of this study is to determine the ability of our new unit to perform early extubation as part of our effort to embrace fast track cardiac anaesthesia and surgery pathways.

### MATERIAL AND METHODS

All patients underwent open heart surgery from 2011 to 2012 were involved in this prospective observational study. Fast track anaesthetic techniques were employed in every patient considering that every patient is a potential candidate for early extubation. The data collection consisted of demographic data, anaesthetic drugs, types of cardiac surgery, sedation and analgesia, extubation time, post extubation events and total stay in intensive care unit. Weaning and extubation processes were clinician guided.

### RESULTS

A total of 160 adult patients which consist of 118 males (73.75%) and 42 females (26.25%) were analyzed. Over 90 patients (56.25%) underwent Coronary Artery Bypass Surgery, 63 patients (39.4%) had various valves procedures and 7 patients (4.4%) had adult congenital heart surgery. More than two third or 119 patients (74.4%) were successfully extubated within 8 hours post operation. Among these patients with early extubation, 94 patients (79%) had uneventful post extubation course, 23 patients (19.3%) received non invasive ventilation and 2 patients (1.7%) required re intubation for emergency chest re operation and over sedation.

### CONCLUSION

Early extubation is achievable in our newly established cardiothoracic unit and this information is valuable in generating our fast track cardiac anaesthesia and surgery policy.



## **EARLY MOBILISATION IN INTENSIVE CARE: PERCEIVED BARRIERS AND FACILITATORS AMONG HRPB ICU STAFF NURSES**

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### INTRODUCTION AND RATIONALE

Early mobilization (EM) among critically ill patients has been demonstrated to reduce the incidence of ICU acquired weakness, shortened the duration of mechanical ventilation, length of ICU and hospital stay and reduce debilitation upon discharge. Initiation of early mobility programme in ICU requires staff awareness and knowledge of possible barriers to successful implementation.

### OBJECTIVE

To assess the perceived institutional, provider and patient related barriers to EM among staff nurses in HRPB ICU.

### METHODOLOGY

This is a cross-sectional self-administered survey involving 107 ICU nurses in the Intensive Care Unit of Hospital Raja Permaisuri Bainun, Ipoh using a validated questionnaire. Descriptive statistics were reported as proportions. Fisher's-Exact test was used to compare the proportions between the ICU post-basic trained and non-ICU trained nurses' responses.

### RESULTS

The overall response rate was 71% (76/107) which includes 90.3% (28/31) ICU post basic trained nurses and 63.2% (48/76) non-ICU post-basic trained nurses. There was no significant statistical difference in all responses between the ICU and non-ICU trained nurses. 82.9% of the nurses felt that they are still inadequately trained to mobilize the critically ill patients in ICU although all of them recognised the importance of EM. Medical stability, obesity and excessive sedation were perceived as the most important patient barriers. Safety concern, limited staff and conflicting perceptions about patient suitability were stated as the main provider barriers. There was also concern that some does not support EM. Inadequate equipment was perceived as the key institutional barrier. A surprisingly high proportion of responder felt that EM should only be initiated when patient is ready to be transferred from the ICU.

### CONCLUSIONS

This survey had identified a number of modifiable factors that provided us a platform when initiating a training programme for EM in our ICU.

## POSTER PRESENTATIONS

- PP 1**      **High Frequency Oscillatory Ventilation (HFOV) With Inhaled Nitric Oxide For Severe Acute Respiratory Distress Syndrome (ARDS), A Case Report**      59  
*S S Yap, C H Lim, C Y Yong, Jahizah Hassan*  
Hospital Pulau Pinang, Pulau Pinang, Malaysia
- 
- PP 2**      **Refractory Hypokalemia After Barbiturate Coma Therapy For Refractory Intracranial Hypertension In Traumatic Brain Injury: A Case Report**      60  
*Nazuha M N<sup>1</sup>, W Mohd Nazaruddin W H<sup>1</sup>, Halimatun Sa'adiyah M<sup>1</sup>, Abdul Rahman Izaini G<sup>2</sup>*  
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<sup>2</sup>Department of Neurosciences, Universiti Sains Malaysia, Kubang Kerian, Kelantan, Malaysia
- 
- PP 3**      **To Validate The Utility Of Triage NGAL Test In The Early Diagnosis Of Acute Kidney Injury In Critically Ill Patients**      61  
*Seethal Padmanathan<sup>1</sup>, Suresh Venugopal<sup>2</sup>, Wong Kang Kwong<sup>3</sup>*  
<sup>1</sup>Hospital Sultanah Aminah, Johor Bahru, Johor, Malaysia  
<sup>2</sup>Sime Darby Medical Centre, Selangor, Malaysia  
<sup>3</sup>Pusat Perubatan Universiti Malaya, Kuala Lumpur, Malaysia
- 
- PP 4**      **A Case Report: Glidescope® And A Tear**      62  
*L Y Tham, H Amiruddin, J Hassan, T H Khoo*  
Hospital Pulau Pinang, Pulau Pinang, Malaysia
- 
- PP 5**      **Case Report: Aggressive Conservative Management Of A Paediatric Iatrogenic Esophageal Perforation In Paediatric ICU, Hospital Kuala Lumpur**      63  
*Z Habibullah<sup>1</sup>, M Maznisah<sup>2</sup>, S Thavaranjitham<sup>1</sup>, J Azizah<sup>1</sup>, M F Intan<sup>1</sup>*  
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<sup>2</sup>Department of Paediatric, Paediatric Institute, Hospital Kuala Lumpur, Kuala Lumpur, Malaysia
- 
- PP 6**      **Coronary Stent Thrombosis In Post-Arrest Therapeutic Hypothermia: A Case Report**      63  
*C C Ng<sup>1</sup>, K W Foong<sup>1</sup>, A Ranga<sup>2</sup>, A Osman<sup>3</sup>*  
<sup>1</sup>Department of Anaesthesia and Intensive Care, Hospital Raja Permaisuri Bainun Ipoh, Perak, Malaysia  
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<sup>3</sup>Department of Emergency Medicine & Trauma, Hospital Raja Permaisuri Bainun Ipoh, Perak, Malaysia
- 
- PP 7**      **The Pharmacodynamics Of Low Dose Dexmedetomidine Infusion In Mechanically Ventilated Elderly ICU Patients**      64  
*Y S Law, Noorjahan Haneem, Lucy Chan, Gracie Ong*  
University of Malaya, Kuala Lumpur, Malaysia
- 
- PP 8**      **Burkholderia Pseudomallei Infection Presented As Mediastinal Mass: A Case Report**      65  
*Asmah Z, S C Lai, Norsila A R, Norzalina E*  
Sarawak General Hospital, Sarawak, Malaysia
-



## POSTER PRESENTATIONS (cont'd)

- |              |  |    |
|--------------|--|----|
| <b>PP 20</b> | <p><b>Unexpected, Life-Threatening Tracheal Tear Following Bougie-Assisted Endotracheal Intubation</b></p> <p><i>M Shahnaz Hasan, Julie Razak, Vineya Rai, K K Wong, Gracie Ong</i><br/>Department of Anaesthesiology, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia</p>   | 74 |
| <b>PP 21</b> | <p><b>Septic Shock From Salmonella Enteritidis Necrotising Fasciitis</b></p> <p><i>Julie Razak, M Shahnaz Hasan, Nadia Atiya, K K Wong, Vineya Rai</i><br/>Department of Anaesthesiology, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia</p>  | 75 |
| <b>PP 22</b> | <p><b>Blue Micturation... Calcium Channel Blocker Toxicity: Administering Methylene Blue When All Others Failed</b></p> <p><i>Alfred Joseph<sup>1</sup>, K W Foong<sup>1</sup>, Adi Osman<sup>2</sup></i><br/><sup>1</sup>Anesthesia and Critical Care Department, Hospital Permaisuri Bainun, Ipoh, Perak, Malaysia<br/><sup>2</sup>Emergency Department, Hospital Permaisuri Bainun, Ipoh, Perak, Malaysia</p>   | 76 |
| <b>PP 23</b> | <p><b>Quality Of End-Of-Life Care</b></p> <p><i>Subramanian P, Wong L P, Emni Omar</i><br/>University of Malaya, Kuala Lumpur, Malaysia</p>  | 77 |
| <b>PP 24</b> | <p><b>Case Report Of Paediatric Dengue Shock Syndrome In The ICU</b></p> <p><i>Marina Sham<sup>1</sup>, Noraini Mustafa<sup>1</sup>, Suhaila Omar<sup>1</sup>, Jeya Bawani Sivabalakrishnan<sup>1</sup>, Hafizah Zainuddin<sup>2</sup>, Wan Jazilah Wan Ismail<sup>1</sup>, Lucy Lum<sup>3</sup></i><br/><sup>1</sup>Hospital Selayang, Selangor, Malaysia<br/><sup>2</sup>Universiti Institut Teknologi Mara, Selangor, Malaysia<br/><sup>3</sup>Universiti Malaya Medical Centre, Kuala Lumpur, Malaysia</p> | 78 |
| <b>PP 25</b> | <p><b>Effects Of Sedation Practice And Delirium On ICU Morbidity And Mortality</b></p> <p><i>K K Wong, V Rai, M Shahnaz Hasan, Gracie Ong S Y, Lucy Chan</i><br/>Department of Anaesthesiology, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia</p>  | 78 |
| <b>PP 26</b> | <p><b>Correlation Of Phenytoin Level With Rhabdomyolysis And Thrombocytopenia In Critically Ill Patients With Hypoalbuminaemia</b></p> <p><i>S C Loo<sup>1</sup>, Rahela A K<sup>1</sup>, S Y Ang<sup>1</sup>, W L Lim<sup>2</sup>, Shanthy R<sup>2</sup>, Norirmawath S<sup>1</sup>, Hannah M M<sup>1</sup>, E L Bay<sup>1</sup></i><br/><sup>1</sup>Pharmacy Department, Hospital Sungai Buloh, Selangor, Malaysia<br/><sup>2</sup>Anaesthesiology Department, Hospital Sungai Buloh, Selangor, Malaysia</p> | 79 |
| <b>PP 27</b> | <p><b>Preoperative Booking Requests Of Intensive Care Unit Beds For Elective Surgical Patients: Anaesthesiologist And Intensivist As Gatekeepers To Intensive Care Unit</b></p> <p><i>Zamzairreen Z A, V Rai, M Shahnaz Hasan, K K Wong, G S Y Ong</i><br/>Department of Anaesthesiology, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia</p>  | 80 |



## POSTER PRESENTATIONS (cont'd)

- PP 28**      **Case Report: Critical Ovarian Hyperstimulation Syndrome Presenting As A Life Threatening Complication Of IVF (In Vitro Fertilization)**      81  
*Harmeet Singh Dhooria<sup>1</sup>, Sunil Juneja<sup>2</sup>, Ravinderpal Singh<sup>3</sup>, Akashdeep Singh<sup>4</sup>*  
<sup>1</sup>Department of Medicine, Dayanand Medical College and Hospital, Ludhiana, Punjab, India  
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<sup>4</sup>Department of Chest and TB, Dayanand Medical College and Hospital, Ludhiana, Punjab, India
- 
- PP 29**      **A Case Report: Repeated Dose Of Thrombolytic Therapy in Pulmonary Embolism And Traumatic Airway Post Intubation With Glidescope**      82  
*S Wahab, N H Zainol Abidin, S P Lee*  
Hospital Tengku Ampuan Rahimah, Klang, Selangor, Malaysia
- 
- PP 30**      **A Case Report Of Right Main Bronchial Injury**      83  
*M L Yew, S P Lee, M Rohisham Z A*  
Hospital Tengku Ampuan Rahimah, Klang, Selangor, Malaysia
- 
- PP 31**      **Case Report: Seizure With Absence Of Pulse Upper Limb**      83  
*Saritha Ramachandran, S P Lee, Rosliza S*  
Hospital Tengku Ampuan Rahimah, Klang, Selangor, Malaysia
- 
- PP 32**      **Activity Of A Multidisciplinary Sepsis Team**      84  
*B Dios<sup>1</sup>, M Borges<sup>1</sup>, T D Smith<sup>2</sup>*  
<sup>1</sup>Hospital Son Ulatzer, Palma de Mallorca, Spain  
<sup>2</sup>Newcastle University Medicine Malaysia, Nusajaya, Malaysia
- 
- PP 33**      **Communicating With Patients And Their Relatives : Attitudes And Perceptions Of Anaesthetic Medical Officers In Two Klang Valley Hospitals**      85  
*I Noor Airini, A R Raha<sup>2</sup>, I Noor Aireen<sup>3</sup>, I Azharina<sup>2</sup>*  
<sup>1</sup>Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang, Selangor, Malaysia  
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<sup>3</sup>Language Academy, Universiti Teknologi Malaysia. Skudai, Johore Bahru, Johor, Malaysia
- 
- PP 34**      **Survey On Knowledge Of Withholding Of Life Support Therapy In Intensive And Coronary Care Unit's Hospital Selayang**      86  
*Lissi Hansen, Teresa T Goodell, Josi DeHaven, Mary Denise Smith*  
Hospital Selayang, Selangor, Malaysia
- 
- PP 35**      **Posterior Reversible Encephalopathy In Paediatric Intensive Care Unit**      87  
*Vasanthakumar S, Soo Thian Lian*  
Sabah Women and Children's Hospital Malaysia, Kota Kinabalu, Sabah, Malaysia
- 
- PP 36**      **A Delayed Diagnosis Of Boerhaave Syndrome**      87  
*N H Zainol Abidin<sup>1</sup>, S N A Abdul Aziz<sup>2</sup>, S P Lee<sup>2</sup>*  
Hospital Tengku Ampuan Rahimah, Klang, Selangor, Malaysia
-



## POSTER PRESENTATIONS *(cont'd)*

- PP 37**      **Case Report: Eclampsia With Posterior Reversible Encephalopathy Syndrome**      88  
*Sukhdev Singh, S P Lee, Noraini S*  
Hospital Tengku Ampuan Rahimah, Klang, Selangor, Malaysia
- 
- PP 38**      **The Emotions Of A Long Standing Critical Patient In ICU**      89  
*N Ganason<sup>1</sup>, S P Lee<sup>2</sup>*  
<sup>1</sup>Hospital Tengku Ampuan Rahimah, Klang, Selangor, Malaysia
- 
- PP 39**      **Respiratory Virus Infections In Paediatric Intensive Care Unit**      90  
*S C Tan, T L Soo*  
Sabah Women and Children Hospital, Sabah, Malaysia
- 
- PP 40**      **Critical Care Nurses' Pain Assessment And Management Practices: A Survey In Hospital Raja Permaisuri Bainun, Ipoh**      90  
*Devanandhini Krisnan<sup>1</sup>, Foong Kit Weng<sup>2</sup>, Foo Sze Shir<sup>2</sup>, Nitthya Sukumar<sup>2</sup>*  
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- 
- PP 41**      **Tracheostomy In Children In A Tertiary Hospital With Paediatric Otorhinolaryngology Service – Indications And Outcomes**      91  
*R L Ng, K H Teh*  
Hospital Sultanah Bahiyah, Alor Setar, Kedah, Malaysia
- 
- PP 42**      **Magnesium Sulphate Infusion To Control Spasm And Rigidity In A Pediatric Patient With Severe Tetanus. A Case Report**      92  
*R L Ng, K H Teh*  
Hospital Sultanah Bahiyah, Alor Setar, Kedah, Malaysia
-

## **HIGH FREQUENCY OSCILLATORY VENTILATION (HFOV) WITH INHALED NITRIC OXIDE FOR SEVERE ACUTE RESPIRATORY DISTRESS SYNDROME (ARDS), A CASE REPORT**

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### OBJECTIVE

To report a case of fat embolism leading to severe ARDS which required HFOV in combination with inhaled nitric oxide.

### CASE SUMMARY

A 25-year-old gentleman with no comorbidities, was involved in a motor vehicle accident sustaining open fracture left proximal 1/3<sup>rd</sup> tibia and had emergency fixation. Noted desaturation immediate post-operatively in the ward. Patient however further desaturated requiring urgent GICU transfer and was soon ventilated conventionally using SIMV mode, after failing non invasive ventilation. Further desaturation occurred on post-op day 2 despite on BILEVEL mode and HFOV was soon commenced. Initial differential diagnosis included acute pulmonary embolism. As the patient was too unstable to be transferred for a CT pulmonary angiogram (CTPA), a bedside transthoracic echocardiogram was performed and has revealed a severe pulmonary hypertension with right heart dilatation and no evidence of pulmonary embolus. Inhaled nitric oxide was commenced after oxygenation failed to improve by HFOV alone. Good improvements allowed patient to be switched back to conventional ventilation after only 1 day of HFOV + inhaled nitric oxide. Patient was extubated 10 days after slow weaning process. Patient was transferred out well and subsequently discharged home.

### DISCUSSION

HFOV is an important alternative method for management of severe ARDS. Many adjunctive therapies are commonly advocated for use in combination with HFOV. Combined treatment of HFOV and inhaled nitric oxide may augment nitric oxide delivery to target vessels. The lung recruitment by HFOV, enhances effect of low dose inhaled nitric oxide on gas exchange.

### CONCLUSION

Combined therapy of HFOV and inhaled nitric oxide may be more superior to HFOV alone for improving oxygenation in certain selected cases. However, adjuvant therapies may or may not improve mortality or ventilator free days.

**REFRACTORY HYPOKALEMIA AFTER BARBITURATE COMA THERAPY FOR  
REFRACTORY INTRACRANIAL HYPERTENSION IN TRAUMATIC BRAIN  
INJURY: A CASE REPORT**

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Barbiturate coma therapy is the treatment of choice in refractory intracranial hypertension after all surgical or medical managements have failed to control the intracranial pressure. It causes reduction in cerebral blood flow, cerebral metabolic rate of oxygen consumption and intracranial pressure. However, this therapy can also cause many complications. One of the rare complications is refractory hypokalemia which can lead to subsequent rebound hyperkalemia after sudden cessation. We reported our experience managing this complication in 54 year old man who sustained traumatic brain injury after fall from height.

## **TO VALIDATE THE UTILITY OF TRIAGE NGAL TEST IN THE EARLY DIAGNOSIS OF ACUTE KIDNEY INJURY IN CRITICALLY ILL PATIENTS**

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### BACKGROUND

Acute kidney injury(AKI) is a common problem in critically ill patients and is associated with increased hospital stay, morbidity and mortality. It is usually diagnosed by observing a rise in serum creatinine over a few days. This study aimed to evaluate whether NGAL (Neutrophil Gelatinase Associated Lipocalin), an early marker of acute kidney injury, could reliably be used to diagnose AKI much earlier than the conventional method thereby enabling early institution of optimized therapy to protect renal function.

### METHODS

Thirty four critically ill patients participated in this prospective observational study conducted in the Intensive Care Unit of Pusat Perubatan Universiti Malaya, Kuala Lumpur. Plasma NGAL (point of care test) was measured within 24 hours of ICU admission; whereas daily serum creatinine was measured and recorded through day 7. Co-morbidities, potential renal insults, need for Nephrology consultation, initiation of renal replacement therapy and mortality in ICU/ hospital was recorded.

### RESULTS

Plasma NGAL was only a minor predictor for AKI with a modest AUC of 0.673 ( 95%CI 0.486 – 0.860). However, plasma NGAL is highly sensitive though a poor specific predictor of AKI in critically ill patients. Higher ICU mortality was observed in patients requiring renal replacement therapy.

### CONCLUSION

Our study showed that plasma NGAL was not a major predictor of AKI. However, higher NGAL values were noted in patients who developed severe AKI and subsequently required renal replacement therapy. Further studies are needed before NGAL can be reliably used for clinical purpose in the early diagnosis of acute kidney injury.

## **A CASE REPORT: GLIDESCOPE® AND A TEAR**

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### OBJECTIVE

To report a serious complications that may occur with the usage of Glidescope (GLV® ) and it's rigid stylet

### CASE SUMMARY

A 63 year old lady diagnosed with a bladder tumor was scheduled for an elective TURBT. Review of her previous anaesthetic records revealed that she had a Cormack-Lehane grade 3, necessitating the use of Gum elastic bougie to assist intubation. Anaesthesia was induced with inhalation of sevoflurane and oxygen. The GLV® was inserted in the midline after it was deemed that the patient was adequately relaxed under inhalational anesthesia. The uvula and epiglottis were identified however vocal cord was not clearly seen on the monitor. A prefixed Glidescope styletted ETT was inserted into the oral cavity in the lateral position and rotated anteriorly towards the posterior part of the epiglottis. Resistance was felt during insertion and blood was noticed pooling at the pharynx. An immediate referral to the ENT team was sought. Examination revealed a perforation at the right lateral border of tonsil till the lateral pharyngeal wall. Haemostasis controlled by the insertion of throat packs. Cystoscopy revealed no tumour recurrence hence TURBT was abandoned. Patient was then sent to GICU for ventilatory support. The next day, the ETT was changed via conventional laryngoscope and a repair done. Patient was extubated the following day.

### DISCUSSION

The GLV® is a useful tool for anticipated and unanticipated difficult intubation. Unwanted complications may arise causing devastating injuries to the airway. Proper GLV® intubation technique describes direct visualization of the tube at the pharynx. This practice must always be adhered to.

### CONCLUSION

Constant visual assessment of the tip of the ETT during the initial oral pharyngeal insertion is a must while performing GLV.



**CASE REPORT: AGGRESSIVE CONSERVATIVE MANAGEMENT OF A PAEDIATRIC IATROGENIC ESOPHAGEAL PERFORATION IN PAEDIATRIC ICU, HOSPITAL KUALA LUMPUR**

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CASE REPORT

Esophageal perforation is one of the most serious injuries that the alimentary tract can sustain. Although esophageal perforation is a potentially life threatening condition, advances in antibiotic therapy, imaging, parenteral nutrition and intensive care have permitted considerable reduction of its morbidity and mortality. Primary closure with tissue reinforcement is the usual approach for the treatment of esophageal perforation in adults. In contrast, more conservative measures have been preferred in children.

The focus of this report is to present the prompt and aggressive non-operative treatment of esophageal perforation of a child which occurred during esophagoscopy for extraction of foreign body. This case shows the success of aggressive conservative approach, which allowed preservation of the organ and its function, and a reasonable length of hospitalization.

**CORONARY STENT THROMBOSIS IN POST-ARREST THERAPEUTIC HYPOTHERMIA: A CASE REPORT**

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Although current guidelines recommend that Therapeutic Hypothermia improved the survival and neurological outcome for comatose survivors post cardiac arrest, several complications arose albeit the benefit. Few clinical researches had shown that mild hypothermia adversely increased platelet reactivity and hence insufficient platelet inhibition which can attenuate the action of drug such as clopidogrel and lead to ineffective antiplatelet therapy post coronary stenting.

We report the case of a 75-year-old Malay man, who presented with ventricular fibrillation secondary to acute myocardial infarction and angiographic evidence of left main coronary artery disease who had undergone primary percutaneous intervention and initiation of dual antiplatelet therapy (aspirin and clopidogrel). Therapeutic hypothermia was commenced for 24 hours post return of spontaneous circulation. He had full neurological recovery post Therapeutic Hypothermia treatment. However he developed another episode of myocardial infarction due to coronary stent thrombosis at day 9 of ICU stay and he succumbed.

Ineffective antiplatelet therapy during TH is a likely cause of stent thrombosis. Further studies are required to determine the other associated causes of this event as well as to evaluate the efficacy of novel pharmacological strategies in such patient.

## **THE PHARMACODYNAMICS OF LOW DOSE DEXMEDETOMIDINE INFUSION IN MECHANICALLY VENTILATED ELDERLY ICU PATIENTS**

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### OBJECTIVE

To evaluate the safety and efficacy of low dose dexmedetomidine infusion for sedation up to 48 hours in elderly ICU patients ( > 65 years ) who were mechanically ventilated.

### METHOD

This was a prospective, non-randomised, open label, single group assessment study done on 19 ventilated elderly ICU patients. After obtaining informed consent, infusion of dexmedetomidine was started on patients at an initial rate of 0.2 mcg/kg/hr and slowly titrated up to 0.5 mcg/kg/hr targeting a sedation level of RASS 0 to -2. Other sedatives or analgesic agents administered before recruitment were stopped after 1 hour of dexmedetomidine infusion. No loading dose was administered. Parameters observed were blood pressure (MAP), heart rate, CVP and respiratory data.

### RESULTS

The mean APACHE II in patients recruited was 23 +/- 8.95. Only 11 out of 19 patients were able to complete the 48 hours duration of infusion. Out of these patients, 60% were able to achieve the targeted sedation of RASS 0 to -2 more than 50% of the time. There were no significant changes in MAP and CVP. Heart rate was reduced to a maximum of 23% from baseline. There was a significant increase of respiratory rate up to a maximum of 30% from baseline. Adverse effects observed were bradycardia and arrhythmia (atrial fibrillation and bigeminy)

### CONCLUSION

Dexmedetomidine is a relatively safe sedative agent suitable for infusion up to 48 hours in elderly mechanically ventilated, ICU patients. It offers haemodynamic stability and improves respiratory effort which is ideal for the elderly.

## **BURKHOLDERIA PSEUDOMALLEI INFECTION PRESENTED AS MEDIASTINAL MASS: A CASE REPORT**

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### INTRODUCTION

Melioidosis, which is infection with the gram-negative bacterium *Burkholderia pseudomallei* is an important cause of sepsis not only in Malaysia but also in East Asia and northern Australia.

### CASE DESCRIPTION

A 35 year old gentleman, a known case of Diabetes Mellitus was presented with history of fever, cough and shortness of breath on and off for one month. Associated symptoms are loss of appetite, loss of weight and hoarseness of voice. On examination, he was alert, conscious, jaundice with mild pallor. He was in respiratory distress and shock. Arterial blood gases showed partially compensated metabolic acidosis. Liver enzymes and renal function were also deranged. Total White Blood Cells (TWBC)  $19.88 \times 10^9/L$ , platelet count  $146 \times 10^9/L$  and hemoglobin 9.7g/dl. Chest X Ray showed widening of mediastinum. CT thorax showed masses at right paratracheal 6.5 x 4.5 x 4.0 cm, right hilar 3.5x3.5x3.5 cm and subcarinal 4x2x3 cm. The masses were in contact with superior vena cava, right pulmonary artery, right main bronchus and left atrium. He was treated as leptospirosis with septic shock to rule out lymphoma and started on Intravenous (IV) Ceftriaxone , IV Azithromycin, IV Dexamethasone and planned for biopsy. Initially he was put on non invasive ventilation but his condition deteriorates and later intubated via awake fibreoptic scope. Bedside ultrasound showed multiple splenic abscesses. Antibiotic was escalated to Meropenem. Dexamethasone was taken off. On day four, blood culture and sensitivity (C&S) test came back as *Burkholderia pseudomallei*. Patient's condition improved and extubated 10 days later. Antibiotic was later de-escalate to IV Ceftazidime.

### CONCLUSION

Melioidosis is still underdiagnosed, probably due to low index of suspicion among clinicians. In any patient with sign of sepsis and a mass of collection, one should consider melioidosis as a differential diagnosis and started on appropriate antibiotic as soon as possible as any delay may become fatal.

## **'KUEH TIAW' AND A PENCIL STORY**

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### CASE REPORT

A 5 years old boy became blue and cough out blood after eating 'kueh tiaw' at school. He was taken to the hospital immediately and admitted directly to paediatric ward. Emergency intubation was performed due to acute respiratory distress. Unfortunately paediatrician had difficulty to ventilate the child. The case was subsequently referred to both anaesthesia and otorhinolaryngology team. Clinically and radiologically showed evidence of right lung collapsed. In view of acute presentation of upper airway obstruction, emergency bronchoscopy was performed and surprisingly 4 cm length pencil was removed. 4 days post bronchoscopy, patient was extubated after right lung fully expanded. The child was discharge well later.

### DISCUSSION

Foreign body aspiration is common in children. This case showed the importance role of bronchoscopy in the management of acute respiratory distress. Immature dentition, poor feeding control, physical activity during feeding and propensity to explore environmental orally make children susceptible to foreign body aspiration. Unsupervised, parental denial, difficulty performing radiographic examination may cause delay in diagnosis. The symptoms may mimic asthma or croup and physical examinations are non-specific. Most cases have triad of wheeze, cough and reduced breath sound. A high index of suspicious is required in all patients with pneumonia, atelectasis/ wheezing with atypical course especially not respond to medical therapy

### CONCLUSION

Tracheobronchial foreign body aspiration is highly preventable condition. Both parents and caregiver should be educated about the risk. Early diagnosis and prompt management of foreign body aspiration is required for a better outcome and to prevent mortality and morbidity.

## **HIGH FREQUENCY OSCILLATION VENTILATION (HFOV) FOR ACUTE RESPIRATORY DISTRESS SYNDROME (ARDS): OUR IMPRESSIONS AND EXPERIENCE**

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### OBJECTIVES

The acute respiratory distress syndrome (ARDS) is a common complication of critical illness with high mortality. Previous trials showed no reduction and even increment in hospital mortality by using HFOV in ARDS patients. Therefore, our aim is to review case series about Penang General Hospital Intensive care unit (ICU) patients' outcome with ARDS by using HFOV as rescue therapy after failing of conventional ventilator care.

### METHODS

Retrospective case series on 5 adults with new onset, severe ARDS who treated with HFOV in the ICU from May 2012 to May 2013, as rescue therapy after failing of conventional ventilator care. Primary outcome looking at in-hospital mortality. Secondary outcome looking at mean duration of using HFOV and morbidity such as barotrauma and hemodynamic changes while on HFOV.

### RESULTS

There were 3 out of 5 patients who died even treated with HFOV after failed conventional ventilator care. Mean durations of using HFOV were about 3 days. There was one patient developed barotrauma while on HFOV and required chest drain insertion, however minimal differences in hemodynamic changes noticed among patients with HFOV as compared with conventional ventilator care. In our case series, we also experienced that adjuvant therapy of prone position did help in improving hypoxaemia in patients with severe ARDS when concomitant in used with HFOV as seen in our 2 successful cases.

### CONCLUSIONS

In conclusions, HFOV can be considered relatively safe rescue therapy for patients with severe ARDS who failed conventional ventilatory care as low morbidity seen in our patients. Adjuvant therapy such as prone position is beneficial in improving hypoxaemia and can be concomitant in used with HFOV.



## **WORMS IN A BRAIN – A CASE REPORT OF NEUROCYSTICERCOSIS**

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### INTRODUCTION

Neurocysticercosis is a treatable parasitic infection caused by larval of the pork tapeworm (*Taenia solium*). Larval cysts in the brain are called neurocysticercosis which can lead to seizures and it is the most severe form of the disease.

### CASE PRESENTATION

A 38 year old Nepalese man presented with fever, confusion and status epilepticus with a background history of recurrent seizures at home for the past 2-3 months. His conscious state deteriorated thus intubated and admitted to ICU. Plain CT brain showed scolex with multiple cystic lesions and very significant perilesional edema.

Patient was loaded with IV phenytoin and received IV dexamethasone 8mg tds to reduce the inflammatory response. Neurosurgical referral was made as there were concerns of high intracranial pressure. He was sedated and cerebrally protected while awaiting an EVD insertion.

Starting of antiparasitic therapy was a concern as it may exacerbate the host inflammatory response and lead to generalized cerebral edema. However, after 24 hours of IV dexamethasone, he was started on IV Praziquantel (50mg/kg/day in three divided doses) and oral Albendazole 400mg od.

The diagnosis was confirmed further by positive ELISA by detection of anticysticercal antibodies. Finding of eosinophils in cerebrospinal fluid strongly suggest this patient had neurocysticercosis.

Patient was extubated well and discharged home with oral anti-parasitic and steroid treatment. Serial neuroimaging follow up was also scheduled for this patient.

### CONCLUSION

This case gives us yet another differential diagnosis for seizures. As we are seeing more foreigners from poor socioeconomic countries getting admitted to our hospitals, we will have to have a broad spectrum of differential diagnosis so that appropriate treatment and care can be given for the patient.

## **HIGH ANION GAP METABOLIC ACIDOSIS SECONDARY TO 5- OXOPROLINE ACIDURIA AN UNDERDIAGNOSED CONDITION WHICH IS EASILY TREATABLE**

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High anion gap metabolic acidosis is commonly encountered in intensive care units. While in most cases an endogenous causative factor can be identified. In patients with unexplained high anion gap metabolic acidosis, 5- Oxoproline aciduria is worth considering. Previously described in paediatric age group, these condition is gaining recognition amongst adults with unexplained high anion gap metabolic acidosis. Here we report this under-diagnosed condition in a 52 years old Malay lady who was referred to intensive care unit, Hospital Sungai Buloh, for severe metabolic acidosis and acute drop in conscious state. She was initially admitted to the orthopaedic ward for diabetic foot ulcer. She has received high dose intravenous cloxacillin for Staphylococcus Aureus bacteremia for a total duration of 5 weeks with presumption of Infective Endocarditis. Her anion gap upon admission to icu was 34 mmol/l and urine analysis for organic acids revealed increased level of 5-Oxoproline. Cloxacillin is known to produce 5- Oxoproline production. Her acidosis gradually resolved with continuous renal replacement therapy. We suggest that the high anion gap metabolic acidosis seen in this patient is attributed to high dose cloxacillin which may disrupt the regulation of the gamma-glutamyl cycle. Demonstration of elevated 5-oxoproline levels in urine clinches the diagnosis.

## **USE OF VIDEO LARYNGOSCOPY IN A CHILD WITH LARYNGEAL EDEMA**

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A 12 year old girl was referred from district hospital for ICU admission. This is a case of epilepsy with poor compliance and control. Patient was intubated for airway protection prior to transportation. It was difficult airway. Attempted 3 times and was intubated by consultant anesthetist. In the referral form, evidence of laryngeal edema was noted.

3 days later, leak test was negative, extubation was abandoned. Patient was extubated on D4 of ICU admission with Cook's airway. However post extubation patient developed stridor and laryngospasm. Patient was reintubated. Video laryngoscopy was done on D8 to access degree of laryngeal edema. Patient was successfully extubated after video laryngoscopy showed improvement of laryngeal edema.

Conclusion : Respiratory complications after tracheal extubation are associated with significant morbidity & mortality such as post extubation airway pulmonary edema. Planning for tracheal extubation is a critical component of a successful extubation. This case emphasized the importance of clinical leak test as well as both Cook's exchange catheter & video laryngoscope to ensure successful extubation.

## UPPER AIRWAY OBSTRUCTION IN NEUROFIBROMATOSIS

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A 30 year gentleman case of neurofibromatosis type 1 with history of recurrent pneumothorax presented with sudden onset of dyspnea. Diagnosed as spontaneous right pneumothorax and chest tube was inserted. On physical examination noted plexiform neurofibromas extending from right maxillofacial extending to the neck and whole left upper extremity and macroglossia.

The decision to proceed to CT thorax to rule out right bronchopleural fistula was made. During the procedure noted right chest tube accidentally dislodged. The procedure was abandoned and patient was send to ED for further management. In ED patient developed cardio respiratory arrest. A diagnose of right tension pneumothorax was made and CPR was initiated and right chest tube was reinserted.

There was difficulty in intubating the patient by both ED and anesthesia team, finally managed to secured airway.

There was difficulty in ventilating the patient 24 hour later and at the same time the plexiform neurofibroma around the neck became harden and increasing in size thus unable to insert video laryngoscope. In view of impossible to reintubate the patient , surgical team was called to do emergency tracheostomy at bed side and this was performed with great difficulty and ventilatory support was continue in ICU till swelling subside.

### CONCLUSION

Neurofibroma is a typical hypervascular tumor and can cause bleeding during surgical intervention. The neurofibromatous tissue itself also has an abnormal vascular structure with thin-walled blood vessels lying in loose neural stroma that replaces the normal adipose tissue

We are reporting this case to share the experience of handling the airway.

## A CASE OF LEPTOSPIROSIS COMPLICATED BY FATAL INTRACEREBRAL BLEED

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Leptospirosis, a re-emerging infectious zoonosis has become more prevalent in recent years in Malaysia especially in certain states like Pahang. In 2012, the Health Ministry's disease control division recorded 3665 cases, an increase of 85.5% from the 1976 cases (69 deaths) in 2010 while 2268 cases (55 deaths) were reported in 2011. The diagnosis and management of leptospirosis can be quite challenging for physicians as the presentation may vary from asymptomatic acute febrile illness to often fatal multi-organ involvement compounded further by the lack of early accurate laboratory diagnostic tools. We present our first encounter with a case of leptospirosis complicated by an unanticipated fatal intracranial bleed at day 19 of illness. The patient was a 50 year old plantation manager who presented at day 5 of illness with severe pulmonary, hepatic and renal involvement. Although he showed recovery from these organ involvements, he succumbed following the massive intracranial bleed. Here we present the case history and management of the patient, followed by a short discussion on the possible pathology contributing to the intracranial bleed.

**FATAL SPONTANEOUS RUPTURE OF LIVER HEMATOMA DURING PREGNANCY ASSOCIATED WITH SEVERE PRE-ECLAMPSIA – A CASE REPORT**

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Subcapsular liver hematomas are rare complication of severe pre-eclampsia and review of literatures suggest that it may even occur without accompanying HELLP syndrome. Diagnosis of liver hematoma requires a high degree of suspicion and early intervention in case of rupture with intraperitoneal hemorrhage. We present a case of a 35 year old lady presenting at 28 week of gestation with spontaneous liver hematoma, undiagnosed until she collapsed 10 hours post admission. The presentation and the initial diagnosis as well as the efforts taken to revive her will be presented here. Discussion is based on the available literature reviews of the condition.

POSTER PRESENTATION 17

**RATTLESNAKE BITE IN MALAYSIA: A CASE REPORT**

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∂ are a group of venomous snakes native to the Americas. We report a rare case of rattlesnake bite injury presented to University Malaya Medical Centre (UMMC).

A 40-year-old gentleman with no medical illness was brought into emergency department of UMMC with alleged Timber Rattlesnake bite on his left little finger. He presented with severe pain and swelling of his left arm. He was diagnosed with acute compartment syndrome and emergency fasciotomy was performed under general anaesthesia. Blood investigation showed platelet count of only 24,000. In ICU, he developed disseminated intravascular coagulopathy (DIC) with worsening thrombocytopenia. CroFab® antivenom was sourced from Singapore Zoo and transported to UMMC via helicopter. Antivenom infusion was initiated 16 hours post injury. His coagulation profile and platelet count markedly improved and he was extubated 32 hours post injury. Rattlesnake bite is a rare incident in Malaysia, but potentially fatal due to lack of accessibility to its specific antivenom. Supportive care and early antivenom infusion is the most important factor in ensuring survival. Timely and co-ordinated effort would be needed in acquiring non-native snake antivenom to avoid delay in treatment.



## **ATYPICAL APML: MULTIPLE ARTERIAL THROMBOSIS AND RIGHT VENTRICULAR THROMBUS SUCCESSFULLY TREATED WITH tPA ALTEPLASE®**

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### OBJECTIVES

To highlight the atypical presentations of acute promyelocytic leukaemia (APML) and the use of tPA Alteplase® in the treatment.

### METHODOLOGY

This is a case report of a 9 year old girl, presented with 1 month history of intermittent claudication and discolouration of her right 5<sup>th</sup> toe. Clinically, the whole right lower limb was cold, pulseless and the right 5<sup>th</sup> toe gangrenous. She was noted to have persistent low level of platelet and haemoglobin. A CT Angiogram revealed a long thrombus in her right popliteal artery. An ECHO showed a large right ventricular thrombus. Full blood picture and immunophenotyping confirmed the diagnosis of APML. She was initially started on heparin infusion. Despite 3 peripheral thrombectomies, the limb remained the same. She was started on systemic tPA Tenecteplase® but had to be stopped secondary to anaphylactic reaction. However her condition worsened, the right ventricular thrombus enlarged with development of altered behaviour; she was then transferred to our institution. CT Brain revealed an infarcted left middle cerebral artery. She was soon intubated. We proceeded to give 0.5mg/kg/hour tPA Alteplase® over 6 hours with concurrent heparin infusion at 10u/kg/hour and pre-lytic transfusion of 10ml/kg of FFP. The second dose of Alteplase® was given 48 hours later at 0.3mg/kg/hour. Chemotherapy was started once she became stable.

### RESULTS

The right lower limb turned warm till below the knee, the popliteal artery was also palpable. ECHO revealed the cardiac thrombus reduced 50% in size. She was later extubated with completely normal neurological state. She underwent right below knee amputation (BKA), unfortunately the BKA stump was infected requiring above knee amputation. She was later discharged home.

### CONCLUSIONS

APML is unique subtype of AML. This is a very rare presentation of APML involving multiple arterial thrombosis. We believe it is worth sharing our experience managing this very difficult case.



**PULMONARY EMBOLISM: AN ATYPICAL PRESENTATION***Sakthi Nathan<sup>1</sup>, Mat Ramlee Md Tahir<sup>1</sup>, Lily Ng<sup>1</sup>, Rajesh K M<sup>2</sup>*<sup>1</sup>Department of Anaesthesiology and Intensive Care, Queen Elizabeth Hospital, Kota Kinabalu, Sabah, Malaysia<sup>2</sup>School of Medicine, Universiti Malaysia Sabah, Kota Kinabalu, Sabah, Malaysia

Pulmonary embolism (PE) has been described as one of the most commonly missed diagnoses. This is attributed to its various forms of presentation, which may not always be the classical triad of hemoptysis, dyspnoea and chest pain. We would like to present a case where the diagnosis of pulmonary embolism was delayed for this very reason.

A 29 year-old gentleman presented with progressive dyspnoea and reduced effort tolerance for one week. He had intermittent fever with productive cough. On examination, he was tachypnoeic, tachycardic and hypoxemic in room air. On auscultation, the lungs were clear. Chest x-ray, electrocardiogram and routine blood parameters were unremarkable except for thrombocytosis. He was treated for atypical pneumonia for 3 days with no clinical improvement. Due to persistent tachycardia, an echocardiogram was done. It showed an ejection fraction of 49%, dilated right atrium and ventricle, tricuspid regurgitation with severe pulmonary hypertension. This finding prompted an urgent CT pulmonary angiography, which revealed an extensive left pulmonary artery thrombosis with inferior vena cava thrombosis. An urgent thrombophilia screening confirmed the presence of lupus anticoagulant. A diagnosis of PE with underlying idiopathic thrombophilia was made and he was commenced on anticoagulant and hydroxyurea. He was subsequently transferred to our cardiac centre where he underwent an urgent left pulmonary embolectomy and endarectomy. Intraoperatively he showed heparin-resistance requiring three times the normal heparin dose prior to cardio-pulmonary bypass. He was ventilated in cardiac intensive care unit postoperatively for 8 hours. Following extubation, he developed atelectasis and pleural effusion, requiring non-invasive ventilation. He was discharged well to the ward after 5 days.

In conclusion, although PE can be challenging to diagnose, given its profound clinical implications, it is mandatory for clinicians to have a high index of suspicion especially in atypical presentations.

## **UNEXPECTED, LIFE-THREATENING TRACHEAL TEAR FOLLOWING BOUGIE-ASSISTED ENDOTRACHEAL INTUBATION**

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Airway injury is an established complication of endotracheal intubation and it occurs more commonly in patients with difficult airway. ETT introducers or bougies are common adjuncts used to assist intubation and they infrequently caused airway injury. We present a case of distal tracheal tear following bougie-assisted intubation.

A 56 year-old obese (BMI 37), diabetic and hypertensive lady presented to our Trauma Unit with neuroglycopenic coma. Her GCS did not improve after a dextrose bolus and a decision to intubate was made by the attending emergency registrar. A poor glottic view warranted the use of a bougie (Muallem ET Tube Stylet, 12CH, 65cm; VBM Medizintechnik, Germany). The intubation went smoothly with only small amount of blood seen at tracheal suction. Post-intubation revealed a significantly reduced breath sounds on the right lung and this was confirmed by the presence of massive pneumothorax on chest X-ray. Patient later developed extensive subcutaneous emphysema involving the chest, neck and upper arm. A needle thoracocentesis was performed followed by a chest tube insertion. A thoracic CT scan confirmed the above findings and a posterolateral tracheal tear measuring 6 mm was noted approximately 2.4 cm above the carina. The patient was taken to ICU whereby a bronchoscopy revealed the above tear and to avoid leakage, the ETT was adjusted to ensure that its cuff is at or below the tear and its tip above the carina. A multidisciplinary team involving cardiothoracic surgeon, chest and ICU physician decided to treat conservatively by allowing spontaneous healing to take place. After 10 days of ventilation, a repeat CT scan revealed a partially healed tear. Patient was extubated uneventfully the following day after a negative bronchoscopy. She was then discharged to the ward for rehabilitation.

The use of bougie can be life saving; however its potential to cause airway injury cannot be overemphasised.

**SEPTIC SHOCK FROM SALMONELLA ENTERITIDIS NECROTISING FASCIITIS***Julie Razak, M Shahnaz Hasan, Nadia Atiya, K K Wong, Vineya Rai*

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Necrotising fasciitis (NF) is a rare but life-threatening infectious process associated with high mortality. Most commonly identified pathogens are Group A streptococci, *Staphylococcus aureus*, Enterobacteriaceae and *Peptostreptococcus* spp. We report a rare case of *Salmonella enteritidis* NF.

A 72 years lady with past history of diabetes, hypertension, dyslipidaemia and IHD presented to us with bilateral lower limb pain, swelling and redness for one week. There were no prior history of gastrointestinal symptoms. She was febrile and hypotensive despite fluid resuscitation. Blood results revealed severe metabolic acidosis and impaired renal function. IV vasopressor was started to restore and maintain adequate perfusion pressure. A broad-spectrum antibiotic comprising of IV Piperacillin-Tazobactam and Clindamycin were administered. The orthopaedic team performed an extensive bilateral wound debridement under general anaesthesia. She was transferred to ICU postoperatively for stabilization. The tissue and blood cultures isolated a sensitive strain of *Salmonella enteritidis* and the antibiotic was changed to IV Ceftriaxone. She was extubated uneventfully the next day and transferred to ward where she had multiple wound debridements performed. Fifteen days later whilst in the ward, her conscious level dropped suddenly. Raised troponins with ECHO showing a severely impaired LV function suggest an acute MI. She died on the same day.

NF due solely to *Salmonella enteritidis* with bacteraemia is very uncommon and this is the fourth case report based on Pubmed database. It would be interesting to perform a molecular work on the isolate ie. PCR for any variations or mutations in the genome that makes this particular strain more prone to causing NF compared to the typical strains that is pretty much limited to causing gastroenteritis.

**BLUE MICTURATION... CALCIUM CHANNEL BLOCKER TOXICITY:  
ADMINISTERING METHYLENE BLUE WHEN ALL OTHERS FAILED**

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This is case write up involving a 26 year old Indian lady with no underlying medical problems presented to Hospital Batu Gajah with overdose of anti hypertensive (calcium channel blocker and beta blocker) and oral hypoglycemic agent. She claimed that she took 40 tablets of Tab. Amlodipine 10mg, 8 tablets of Tab. Co-Aprovel 300mg, 10 tablets of Tab. Atenolol 100mg and 10 tablets of Tab. Glicazide 80mg belonging to her mother-in-law following an argument with the patient's husband. She presented with severe hypotension and was then started on the standard therapy of calcium channel blocker toxicity, which includes high dose insulin and dextrose, infusion of glucagon and vasopressors. Multiple boluses of calcium gluconate were given to counteract the action of the calcium channel blocker and intravenous intralipid was infused to act as lipid sink. She was admitted to the intensive care unit supported with quadruple inotropic/ vasopressor agents namely dobutamine, noradrenaline, dopamine and vasopressin in addition to the on going insulin/ dextrose and glucagon infusion. She remained in refractory hypotension. Patient was getting more drowsy with worsening metabolic acidosis. Intravenous methylene blue was administered as a rescue therapy. To our amazement, patient's blood pressure improved within (**minutes**) followed by gradual improvement in metabolic acidosis. We managed to taper off all the vasopressors and the other agents, namely insulin and glucagon infusion was offed over the next few days and the patients was discharged home well.

We would like to share our experience of CCB toxicity management in this write up and suggest a possible management algorithm.

## QUALITY OF END-OF-LIFE CARE

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### BACKGROUND

Critical care units (ICU) have been designed to provide highly skilled, lifesaving care for patients with acute illnesses or injuries. The mortality rate in the ICU still remains as a high rate comparing to the general word. Having a good quality of end of life care (EOLC) is a common wish for patients who dying in the ICU. Quality of EOLC is the most popular measure to evaluate the quality of care provided to critically ill patients in the critical care units.

### AIM

This paper aimed to systematically review original studies of quality of EOLC and appraise their quality.

### METHOD

Only the original Studies that concerned on the quality of EOLC were included. Words like quality of EOLC, quality of dying and death were used to search in Midline and Ovid online data bases.

### RESULT

Eighteen studies meet the selection criteria, 10 quantitative, 6 qualitative, 2 mixed method, these studies identified different level of satisfaction with the quality of EOLC.

### DISCUSSION

The quality of EOLC still need to improve and barriers such as communication, lack of education and experiences, pain management, high expectations of families and environmental circumstances stile hindered the quality of EOLC.

### CONCLUSION

Different studies were conducted using different measures and methods to understand the quality of EOLC, however, further studies to identify the best strategies to improve EOLC are needed.



## CASE REPORT OF PAEDIATRIC DENGUE SHOCK SYNDROME IN THE ICU

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An 11 years old boy presented at Day 4 of illness with dengue shock syndrome with hepatitis and Acute Kidney Injury. He required fluid boluses and was ventilated. He was in persistent decompensated shock despite intensive fluid boluses. He was subsequently managed with slow infusion of colloids, fresh whole blood transfusion and inotropic support. He was discharge home well with no complications and his blood parameters returned to normal. We wish to report the strategy of slow infusion of fluids and blood products during the leaking phase which resulted in the positive outcome in this patient.

## POSTER PRESENTATION 25

## EFFECTS OF SEDATION PRACTICE AND DELIRIUM ON ICU MORBIDITY AND MORTALITY

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Use of sedative drugs is often synonymous with a mechanically ventilated patient in ICU. How we sedate our mechanically ventilated patients can often affect the clinical outcome. As such, we did an audit in the General ICU of University of Malaya Medical Centre.

### METHODOLOGY

We studied the occurrence of delirium using the CAM-ICU scoring system, types of sedative drugs used, sedation scores during their stay in ICU as well as time to extubation and ICU/hospital mortality up till 90 days. Total number of subjects studied was 81.

### RESULTS

Delirium was detected in 20% of patients at first assessment and in 58% of patients throughout the study period. Multivariate analysis showed that presence of delirium prolongs mechanical ventilation and increases hospital mortality. The most common sedative/analgesic drug used is fentanyl (37.4%) followed by midazolam (32.4%). At baseline upon ICU admission, 71.6% of patients were deeply sedated (RASS -3 to -5), 25.9% patients were ideally sedated (RASS -2 to +1) and 2.5% in the agitated state (RASS +2 to +4). As time went by the proportion of deeply sedated patients decreased and those who were ideally sedated increased. Clinicians only prescribed a sedation target on 36 % of occasions out of which target was only achieved in 50.9% of the time.

### DISCUSSION

The literature has shown that occurrence of delirium is a marker of mortality in ICU. However our sedation practice itself may influence the occurrence of delirium and subsequently affect mortality/morbidity rates in ICU. Even the choice of sedative drugs maybe a factor. With this audit we hope to educate our trainees about good sedation practice and hopefully see a reduction in delirium rates.

### REFERENCE

1. Riker R, Shehabi Y, Bokesch P, et al, Dexmedetomidine vs Midazolam for Sedation of Critically Ill patients: A Randomised Trial. JAMA 2009; 301(5):489-499

## **CORRELATION OF PHENYTOIN LEVEL WITH RHABDOMYOLYSIS AND THROMBOCYTOPENIA IN CRITICALLY ILL PATIENTS WITH HYPOALBUMINAEMIA**

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### INTRODUCTION

Phenytoin is widely used for traumatic brain injury patients in Intensive Care Unit (ICU) of Hospital Sungai Buloh (HSgB). Phenytoin has been reported to induce rhabdomyolysis, where there is breakdown of muscle fibres and cause raised of Creatine Kinase (CK). In addition, thrombocytopenia, a rare but serious adverse effect, has also been reported to be caused by phenytoin.

### OBJECTIVES

To evaluate the impact of sub-therapeutic or toxic levels of phenytoin towards rhabdomyolysis and thrombocytopenia and other factors that may affect phenytoin level.

### METHOD

Medical records of 70 patients admitted to Intensive Care Unit of HSgB prescribed with phenytoin from October 2011 to May 2012 were retrieved. 61 patients with hypoalbuminemia (albumin <35 g/L) were identified for inclusion. CK level, platelet level, albumin level and phenytoin level were collected and the data was analyzed using 2 way chi-square test.

### RESULTS

The mean age of the 61-subjects was  $31.8 \pm 8.7$  years (range 20 to 57 years). The subjects had traumatic brain injury, subarachnoid haemorrhage or epilepsy. Subtherapeutic (less than 40  $\mu\text{mol/L}$ ) and toxic level (more than 80  $\mu\text{mol/L}$ ) of phenytoin were associated with increased CK level compared to normal phenytoin level, however, it is not statistically significant ( $p > 0.05$ ). Toxic level of phenytoin compared to subtherapeutic and normal level of phenytoin was associated with significant thrombocytopenia (platelet less than  $100 \times 10^9/\text{L}$ ;  $p < 0.05$ ). Very low albumin level (less than 20 g/l) was associated with significant phenytoin toxicity ( $p < 0.05$ ). **CONCLUSION:** Rhabdomyolysis is easily affected by other factors, thus it is not a strong indicator to predict phenytoin level. Thrombocytopenia and very low albumin level may play a role in predicting phenytoin toxicity.

## **PREOPERATIVE BOOKING REQUESTS OF INTENSIVE CARE UNIT BEDS FOR ELECTIVE SURGICAL PATIENTS: ANAESTHESIOLOGIST AND INTENSIVIST AS GATEKEEPERS TO INTENSIVE CARE UNIT**

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It is an accepted fact that the intensive care unit (ICU) provides the best care for critically ill patients. It is an immense dilemma to anaesthesiologist and intensivist when demand for ICU care exceeds its availability. Patients that may benefit from ICU care may then be denied admission.

### OBJECTIVE

The accuracy of preoperative booking requests for elective surgical patients requiring ICU care.

### METHODOLOGY

A retrospective audit was performed over the month of June 2013 in University of Malaya Medical Centre, Kuala Lumpur. Data was obtained from 'ICU booking book' and the scheduled operations list. Data was analysed to determine the intended versus the actual admission and the reason for cancellation.

### RESULTS

55 cases had ICU beds booked preoperatively but only 44 were performed. 11 cases were cancelled due to insufficient operating time and family refusal. Admission to ICU was 59.1% among performed cases and 47% of all preoperatively booked cases. Patients who were not admitted were deemed well enough to be cared for by normal wards after assessment by the attending anaesthesiologist.

### DISCUSSION

Bookings should be based on the assessment of the level of patient's care requirements and not based on the procedure. Over-estimation of care can stretch the ICU team's resources. Furthermore, this will deny admissions of other deserving candidates. Therefore, we propose altering certain ICU bed bookings to 'KIV bookings' ie. proceeding with surgeries without booking and help be rendered should the need arises. Furthermore, the decision to accept bookings should be made after discussion between the senior attending anaesthesiologist and the ICU consultant. Many deemed difficult major surgical cases may not need ICU admission provided good and skilled anaesthesia and surgical care is rendered.

## **CASE REPORT: CRITICAL OVARIAN HYPERSTIMULATION SYNDROME PRESENTING AS A LIFE THREATENING COMPLICATION OF IVF (IN VITRO FERTILIZATION)**

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### OBJECTIVE

To highlight that IVF (In Vitro Fertilization) may get complicated and present as Critical (Life Threatening) Ovarian Hyperstimulation Syndrome.

### SUMMARY OF THE CASE

28 year old female presented to our tertiary care medical college with history of undergoing IVF (Embryo Transfer) for I<sup>o</sup> Fertility from nursing home outside 1 week prior following which she developed progressively increasing dyspnea 5 days prior to admission.

She was tachypnoeic and drowsy and had bilateral pleural effusion (R>L). Pleural tap had been done twice outside with no relief of dyspnea. Therapeutic pleural tap done in our hospital was hemorrhagic, exudative with normal cytology. She was also found to be associated Diabetic Ketoacidosis and Sepsis and raised D-Dimer levels.

As she was having rapidly filling pleural effusion, chest tube insertion was done. However, she developed respiratory failure and was put on mechanical ventilation.

She was managed with broad spectrum antibiotics, LMWH, albumin infusion and frusemide as required. ECHO was normal with no pericardial effusion. USG Abdomen showed B/L bulky ovaries with multiple follicles with no free fluid.

She remained on mechanical ventilation for 10 days. CT Chest Angiography was normal. Subsequently, her chest tube was removed on Day 19 and was discharged satisfactorily.

### CONCLUSION

Ovarian hyperstimulation syndrome (OHSS) is a rare, iatrogenic complication of ovarian stimulation by IVF which when presents with Critical OHSS may be life threatening.

## **A CASE REPORT: REPEATED DOSE OF THROMBOLYTIC THERAPY IN PULMONARY EMBOLISM AND TRAUMATIC AIRWAY POST INTUBATION WITH GLIDESCOPE**

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### CASE REPORT

We present a case of 29 years old obese gentleman referred to our centre who presented with a sudden onset of breathlessness and was intubated in view of respiratory distress and type 1 respiratory failure. ECG showed S1Q3T3 and P pulmonale. Patient required high inotropic support. Immediate diagnosis of PE being made based on clinical symptoms, ECG and raised D-dimer. Intravenous Streptokinase was initiated by medical team in the periphery hospital. On arrival to our ED, noted dislodgement of the endotracheal tube. Reintubation was attempted using Glidescope. Post intubation, noted the ETT pierced the right lateral side of the tonsillar pillar with substantial bleeding. ENT team was called in and packing was done.

In ICU, blood pressure was persistently low. Patient required high inotropic support and progressed to multiorgan failure. Bedside ECHO revealed significant right ventricular enlargement. Decision of repeating the thrombolytic therapy methylase has been made by the intensivist. He showed improvement in term of oxygenation and haemodynamics. Patient was started on CRRT. Patient later went for tracheostomy and repair of the traumatic airway. He improved subsequently during his ICU stay, decannulated and discharged well from ICU.

### DISCUSSION

Intubation using glidescope is not without a risk. Omission of direct view of the surrounding structures will result in trauma to the airway. Proper visualization of the surrounding structures should be made before insertion of endotracheal tube.

Repeated thrombolytic therapy has been reported to salvage a number of patients with acute PE. It is crucial especially in centres where the facilities of surgical and mechanical fragmentation and/or aspiration of the emboli is not available.



**A CASE REPORT OF RIGHT MAIN BRONCHIAL INJURY***M L Yew, S P Lee, M Rohisham Z A*

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A 22 year old gentleman presented to emergency department with a GCS 14, and right sided chest pain following a motor vehicle accident. Clinical examination was suspicious of right sided pneumothorax in which a chest tube was inserted. However, patient developed respiratory distress complicated by subcutaneous emphysema from the neck extending to anterior chest wall. He was subsequently intubated. Further bilateral chest tubes were inserted by emergency physician. Unfortunately, they were unable to ventilate the patient and continuous air leak was present. Patient was desaturated. Airway injury was suspected with continuous air leak and difficult ventilation. Immediate bronchoscopy was performed in intensive care unit which we found a tear at the right main bronchus. He underwent emergency right thoracotomy and repaired right main bronchus. He was later extubated and recovered well. Bronchial injury is associated with a mortality rate of 30%. Presentation of continuous air leak and difficult ventilate should raise high suspicions of airway injury. Early diagnosis is either by bronchoscopy or CT thorax. Treatment of bronchial injury is by surgical repair. Good outcome with early diagnosis and surgical intervention, but prognosis depends on other associated injuries.

## POSTER PRESENTATION 31

**CASE REPORT: SEIZURE WITH ABSENCE OF PULSE UPPER LIMB***Saritha Ramachandran, S P Lee, Rosliza S*

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A 18 years old girl presented with generalized tonic clonic seizure following one day history of severe headache and vomiting. She was intubated due to low GCS and transferred to a tertiary hospital. She was on high inotropic support due to unstable hemodynamic. Treated as septic shock with a provisional diagnosis of meningoencephalitis. Further examination revealed a discrepancy between upper and lower limb blood pressure with an absence of upper limb pulses. Proceeded with ultrasonography Doppler which showed bilateral upper limb arterial thrombosis. Further imaging with computer tomography angiography shown thrombosis of both subclavian and renal arteries thrombosis with thickening of brachiocephalic trunk and common carotid arteries. The findings suggestive of Takayasu arteritis. She was treated with prednisolone and warfarin. She was extubated and recovered well. Later coronary angiogram done in IJN showed bilateral subclavian, carotid and right renal arteries occlusion and treated with medication therapy.

## DISCUSSION

Takayasu arteritis is a one of the vasculitis syndrome in which inflammation occurs in the large arteries (aorta and its main branches). This inflammation in the vessels lead to narrowing of blood vessels and cause reducing blood flow to many parts of body. It results in weak or loss of pulses in arms, legs and organ and so referred as "pulseless disease". In this case, a proper initial physical examination would have lead to probable differential diagnosis and appropriate management.

## ACTIVITY OF A MULTIDISCIPLINARY SEPSIS TEAM

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### OBJECTIVE

To examine the pattern of referrals to a multidisciplinary sepsis team (MDST) and the effect on antimicrobial drug prescription of the first patient contact by the MDST.

### METHODS

Data for all new patients seen during the 18 month study period were extracted from the MDST clinical database. Site of infection, referral source and method, treatment modifications recommended and their acceptance by treating physicians were recorded. A descriptive statistical analysis was performed.

### RESULTS

There were 1581 new patient consultations during the study period.

Respiratory infections (34.4%) were most common followed by abdominal (22.4%) and urinary (18.2%) infections. At 23.9% of first consultations no infective site was identified.

The departments generating the greatest volume of referrals were the ED (353, 22.3%) and the ICU (332, 21.0%).

Most referrals (65.1%) came from the patient's treating physician the majority (84%) being made on-line using dedicated software. A significant proportion of referrals (22.8%) were generated by the microbiology laboratory. Referral patterns varied markedly between departments.

Antimicrobial prescription change was commended at 32% of first consultations and 78.1% of those recommendations were implemented by the treating physician.

### CONCLUSIONS

Patterns of infection are consistent with published data from other centres.

Most patients were referred by their physician which, coupled with the high rate of implementation of recommended treatment changes (even in unsolicited consultations), implies that the MDST's activity is generally well received.

The great majority of physician generated referrals were made on-line suggesting that the software is widely perceived to be convenient and effective.

The significant number of referrals generated by the microbiology laboratory suggest a possible non-recognition of sepsis or unawareness of the MDST's role.

Future efforts should seek to raise awareness of sepsis and of the role of the MDST and on making the on-line referral system more accessible to all.

## **COMMUNICATING WITH PATIENTS AND THEIR RELATIVES : ATTITUDES AND PERCEPTIONS OF ANAESTHETIC MEDICAL OFFICERS IN TWO KLANG VALLEY HOSPITALS**

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### OBJECTIVES

1. To study the perceptions among anaesthetic medical officers towards training in communications and how that prepares them for effective communications with their patients and relatives.
2. To study their attitude towards effective communications and what they perceive is the most important method of acquiring good communication skills .

### DESIGN AND METHOD

This is a descriptive questionnaire-based study containing 9 questions with Likert scale type answers, distributed among medical officers in two Klang Valley hospitals. Responses were tabulated and analysed Results

There were a total of 49 responders. The majority of them were aged between 26-40 years (85.7%) with a mean working experience of 5.5 years. The male to female percentages of the responders were 36.7% to 67.3%, giving a ratio of 1:2. A third of the responders (36.7%) were trained overseas while two thirds (67.3%) were trained in various universities locally.

At least 40% do not think that their medical school training prepared them well for effective communication but 55% felt confident to deliver bad news to their patients or relatives. A slightly lower percentage ( 47%) felt confident to discuss end of life issues with patient's relatives. 81.7% felt they learn most about effective communication by observing superiors, by trial and error (65.3%) and by going through formal training (53.1%). 85.7% agreed that communications skills training improve doctor patient communication and 93.2% acknowledge that almost all problems and conflicts can be solved through effective communication.

### CONCLUSION

In this population of medical officers, confidence with appropriate attitude and perception towards issues related to communication were generally observed.

## **SURVEY ON KNOWLEDGE OF WITHHOLDING OF LIFE SUPPORT THERAPY IN INTENSIVE AND CORONARY CARE UNIT'S HOSPITAL SELAYANG**

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### BACKGROUND

Nurses play a critical role in the withdrawal of life support (WDLS) as nurses are present at the bedside more than any other member of the health care team. Nurses are also responsible for carrying out physician's orders for withdraw of life support.

### OBJECTIVES

To ascertain the level of knowledge and education related to withdrawal of life support of nurses in the intensive and coronary care units. To find out how nurses participate and manage in withdrawal of life support therapy.

### METHOD

A questionnaire on withdrawal of life support was sent to 100 randomly selected nurses in intensive and coronary care unit's.

### RESULT

The survey received the response rate of 100% of the nurses. The questionnaire distributed to 65% of the respondent with basic nursing education. Many respondents reported difficulties with the process of withdrawing life support, most of the nurse cited emotional difficulties (41%) documentation (24%) and procedural difficulties (14%). Nurses were present during withdrawal procedures 51% of the time, family member were present 31% of the time. Nurses rated receiving emotional support during and after the withdrawal of life from other nurses between 10% to 17%. Out of 100% of the nurses only 14% of them participate actively during the withdrawal of life support discussion, 32% were present as observer and 27% were present as a witness.

### CONCLUSION

To improve the nursing practices during the process of withdrawal of life support (WDLS) institutions should develop best practices to support nurses in providing the highest quality care for patients nearing their end of life. These best practices can be implemented ensuring formal training on withdrawal of life support (WDLS).



## POSTERIOR REVERSIBLE ENCEPHALOPATHY IN PAEDIATRIC INTENSIVE CARE UNIT

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Posterior reversible encephalopathy syndrome (PRES) is a clinico-neuroradiologic disease signified by characteristic magnetic resonance image (MRI) changes of subcortical/cortical hyperintensity in T2-weighted sequences, more often observed in parieto-occipital lobes, accompanied by clinical neurologic alterations. The presentation in our series ranged from altered behaviour, headaches, hypertension and ultimately seizures. In this study, 4 patients with PRES who were admitted to the PICU were reviewed, retrospectively from 2012-2013. There were 3 patients with acute lymphocytic leukemia and 1 with aplastic anemia. The leukaemic patients were on chemotherapy and our patient with aplastic anaemia was on immunosuppressant. All patients experienced seizure attacks of different types and showed typical MRI findings except for our patient with aplastic anaemia in which it was a clinical diagnosis. All patients were started on anti-seizures and suffered no post-event complication or sequelae. Being an increasingly recognized complication of Paediatric cancer treatment, careful examination of the patients receiving chemotherapy and immunosuppressive therapy and monitoring for 'warning signs' are of prime importance in early detection and management of PRES. The development of a clinical diagnostic scoring system will be of benefit towards this aim.

## POSTER PRESENTATION 36

### A DELAYED DIAGNOSIS OF BOERHAAVE SYNDROME

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A 32 year old gentleman presented with persistent vomiting, difficulty breathing and epigastric pain for 2 days . He was in septic shock state and required intubation. Chest x-ray showed a left pneumothorax with a left pleural effusion in which a chest tube was inserted. Further imaging with a CT thorax revealed bilateral empyema thoracis that was decorticated and drained via video-assisted -thoracoscopy. Post operatively ,milky content was draining out from the chest tube after feeding commenced. Oesophageal perforation was suspected and confirmed by a barium swallow. The patient further underwent transhiatal oesophagectomy. Unfortunately the surgery was complicated with anastomosis leak which required total oesophagectomy, stomach pull up and cervical oesophago-gastric anastomosis. Tracheostomy was performed concurrently. Cultures taken from the pus grew *E coli ESBL*, *Klebsiella sp*, *Enterococcus sp*, *Pseudomonas aeruginosa* and *candida tropicalis*. He was treated with intravenous meropenem, tigecycline and caspofungin. He responded to the treatment and managed to be decanulated and discharged well. In this patient, there was a delay in the diagnosis as we were focusing on managing the empyema without investigating the underlying cause. Boerhaave syndrome which is a spontaneous rupture of the oesophagus precipitated by vomiting is often difficult to diagnose .Often no classical symptoms are present and delays in presentation for medical care is common. Mediastinitis and septic shock are seen late in the course. Early diagnosis and surgical intervention is the key for best outcomes. Left untreated, the mortality rate is near 100%.



**CASE REPORT: ECLAMPSIA WITH POSTERIOR REVERSIBLE ENCEPHALOPATHY SYNDROME***Sukhdev Singh, SP Lee, Noraini S*

Hospital Tengku Ampuan Rahimah, Klang, Selangor, Malaysia

A case of 28 years old female G2P1 at 34 weeks with poor antenatal checkup presented to clinic with the complain of vomiting and blurring of vision. She was referred to a district hospital with the impression of impending eclampsia with a documented BP of 150/100. Patient fitted en route to the hospital. On arrival to hospital her GCS was 7/15 with the BP of 225/125. She was intubated for low GCS and transferred to tertiary hospital. Patient was treated as Eclampsia. IV MgSo<sub>4</sub> and IV Hydralazine were commenced. Emergency LSCS was performed under GA. Post- operatively she was monitored in ICU. CT-brain revealed bilateral ill defined hypodense lesion at cortical region, subcortical white matter in frontal and parieto-occipital region which likely to represent Posterior Reversible Encephalopathy Syndrome (PRES). Patient was extubated the next day but still complained about blurring of vision. She was started on Captopril and Metoprolol to control her BP. Her vision gradually improved with the good control of her BP. She was discharged home with full neurologic recovery.

**DISCUSSION**

PRES is a clinikoradiologic entity characterized by headaches, confusion, seizures, and visual loss. It may occur due to a number of causes, predominantly malignant hypertension, allogeneic bone marrow transplantation, cyclosporine after transplantation, autoimmune disease, high dose chemotherapy and immunosuppressive therapy. This case highlights the need to diagnose PRES in eclamptic patients as it is uncommonly seen in eclampsia. Awareness of the diverse clinical and radiographic presentation of acute PRES is essential to avoid misdiagnosis and treatment delay. It is imperative that the syndrome of PRES is correctly recognized on neuro-imaging, as the condition is reversible and potential complications can be avoided with appropriate therapy.

## THE EMOTIONS OF A LONG STANDING CRITICAL PATIENT IN ICU

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### OBJECTIVE

In a busy world of accidents and chronically diseased patients invading the ICUs, there is hardly any thought given to the feelings of a patient. The treatment plan comes from Texts and the treatment results enter Journals. The purpose of this paper is to understand the tear filled eyes and sore trembling hands of a patient who we might otherwise treat as any other 'case'. This I believe will undoubtedly improve the treatment plan from the doctor's point of view, as well as, optimize the response of the patient to the treatment.

### BACKGROUND

Interview conducted with a long standing ICU patient on the verge of recovery. A young gentleman entered the ICU with a diagnosis of GBS and tetraplegia complicated by lung collapse and septic shock. The interview comprised of a retrospective series of emotional outburst from the time of admission in the ICU, through the days of pain and varied treatments.

### RESULTS

The patient voiced a beginning with uncertainty when he was informed of the diagnosis. Fear of death seeped in over the news of bad lungs and worsening sepsis. Immense pain ruled over his sense, on endotracheal suctioning. He then felt neglect which he blames on his own depressed self. Understanding of his needs by a specific staff nurse during the days of paralysis amazed him. Then came the better days of acceptance, confidence and gratitude towards the doctors and staff nurses.

### CONCLUSION

We're lulled into thinking that we've done our job when these people are wheeled out of the ICU. But a treatment influenced by an understanding of the pains of such a patient definitely paves a better journey post ICU.

## RESPIRATORY VIRUS INFECTIONS IN PAEDIATRIC INTENSIVE CARE UNIT

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The purpose of this study was to report the severity and outcome of all children with a laboratory proven diagnosis of respiratory virus infection admitted to Paediatric Intensive Care Unit (PICU), Sabah Women And Children Hospital. Retrospective data were collected between January 2013 and June 2013 in PICU. Every child with a laboratory-confirmed respiratory viral infection was included. The viruses isolated were respiratory syncytial virus (RSV) (n=16), adenovirus (n=7), parainfluenza 3 (n=5) and influenza A (n=2). There were 65 children (44 M, 21 F) admitted to PICU for lower respiratory tract infection over the 6-month period. More than half of these patients required invasive ventilatory support and 80% had intravenous salbutamol infusion. All patients received initial broad spectrum antibiotic coverage. Five patients with RSV (31.3%) and two patients with adenovirus (28.6%) died during their PICU stay. In conclusion, respiratory virus infections especially RSV infections were associated with significant morbidity and mortality.

## POSTER PRESENTATION 40

## CRITICAL CARE NURSES' PAIN ASSESSMENT AND MANAGEMENT PRACTICES: A SURVEY IN HOSPITAL RAJA PERMAISURI BAINUN, IPOH

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### OBJECTIVES

To document knowledge and perceptions of pain assessment and management practices among intensive care unit nurses of Hospital Raja Permaisuri Bainun, Ipoh.

### METHODS

A self-administered questionnaire was provided to 122 intensive care unit nurses of Hospital Raja Permaisuri Bainun, Ipoh

### RESULTS

A total of 122 nurses (95%) responded. Nurses were significantly less likely ( $P < .001$ ) to use a pain assessment tool for patients unable to communicate than for patients able to self-report. Significantly fewer respondents ( $P < .001$ ) rated behavioral pain assessment tools as moderately to extremely important compared with self-report tools. Routine discussion of pain scores during nursing handover was reported by 61% nurses. Few nurses (29%) were aware of guidelines for pain assessment and management. Routine use of a behavioral pain tool was associated with awareness of published guidelines and clinical availability of the tool

### CONCLUSIONS

A substantial proportion of intensive care unit nurses did not use pain assessment tools for patients unable to communicate and were unaware of published pain management guidelines.

## **TRACHEOSTOMY IN CHILDREN IN A TERTIARY HOSPITAL WITH PAEDIATRIC OTORHINOLARYNGOLOGY SERVICE – INDICATIONS AND OUTCOMES**

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### OBJECTIVES

To describe the indications and outcomes of paediatric tracheostomy carried out in a tertiary hospital.

### METHOD

A retrospective analysis of 55 patients who had tracheostomy performed between May 2008 and August 2012

### RESULTS

The patients who undergo tracheostomy ranges from as young as 3 months old to 14 years old. 13 patients (24%) aged less than 1 year old when tracheostomy was performed. There were 34 males and 21 females. 14 (25%) were referred from other hospital. The commonest indication for tracheostomy was mechanical obstruction (n = 35, 63%) as compared to prolonged ventilation (n = 20, 37%). 13 patients were lost to follow-up or transferred to other hospital. Of the remaining 42 patients, 14 (33%) were successfully decannulated. Overall mortality was 16 (38%) and none were related to tracheostomy.

### CONCLUSION

Mechanical Obstruction is the commonest indication for tracheostomy in our study and paediatric tracheostomy is safe when performed at young age group.

## **MAGNESIUM SULPHATE INFUSION TO CONTROL SPASM AND RIGIDITY IN A PEDIATRIC PATIENT WITH SEVERE TETANUS. A CASE REPORT**

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### INTRODUCTION

With the widespread coverage of the primary immunization programme tetanus has become a rare disease. However it still carries with it a high mortality despite intensive care management and the use of drugs to maintain deep sedation and analgesia giving rise to complications.

### CASE REPORT

A 3 years old child developed severe tetanus a week after a fall onto a muddy beach and sustained a 2 cm laceration on the vertex of his scalp. Although this was dressed and sutured, pieces of wood were left behind and the wound became infected. His immunization status was unclear. .

He was intubated for airway protection. Sedation with iv morphine and iv midazolam at high doses did not reduce the spasms. He developed hypotension which needed inotropic support. Hence iv magnesium sulphate was started and the infusion rate was increased keeping Magnesium level between 2.2 to 2.6 mmol/l. Spasms were controlled and assessment of knee reflexes was monitored. Absent reflexes being used as an indicator of optimal dose. The midazolam and morphine infusion were reduced. Close monitoring of the heart rate, blood pressure, oxygen saturation in addition to the calcium and magnesium level was carried out. No autonomic disturbances occurred during the treatment

The patient was extubated to facemask oxygen after 29 days in the PICU, oxygen was taken off on day 31 and he was discharged on day 42.

### CONCLUSION

Control of the rigidity and spasms required drugs which include benzodiazepines and morphine at high dosages. Magnesium sulphate infusion should be considered as an addition to this armamentarium but close monitoring is required