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NAP4. Major complications of airway management in the United Kingdom

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The report and findings of the 4th National Audit Project (NAP4) of The Royal College of Anaesthetists and the Difficult Airway Society with the heading “Major complications of airway management in the United Kingdom” was published in March 2011. It examines major airway complications (leading to death, brain damage, surgical airway or unexpected ICU admission) in the specialties of Emergency Medicine, Intensive Care Medicine and Anaesthesia.

The full report is 217 pages long and has 24 different chapters. The chapters focus on specific topics such as Intensive Care (chapter 9) and Airway management in the emergency department and remote hospital locations (chapter 10). The document gives over 150 recommendations.

I will discuss some of these recommendations. These include capnography in critical care and training in cricothyroidotomy/emergency surgical airway.

Airway algorithms

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I will discuss the role and use of algorithms in airway management. During this presentation I will compare and discuss some of the issues surrounding the algorithms from the Difficult Airway Society and the American Society of Anesthesiologists.

The Difficult Airway Society has recently released guidelines for the safe management of tracheal extubation in adults. The main features of the basic, low risk and at risk algorithms will be presented. Foundation of New Zealand.

Intravascular ultrasound in the ICU: The case of IVC filters

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The past five years have seen an exponential growth in the use of intravascular ultrasound (IVUS) in several fields of

medicine. For example, the use of IVUS in the assessment of coronary obstructions is no longer a rarity. A variety of invasive

cardiology procedures are now guided by this diagnostic modality. This rapidly evolving assessment technique has reached therapeutic applications. Some of these applications have now reached the field of critical care medicine.

One interesting use of IVUS technology in the ICU, is the bedside-insertion of inferior vena cava (IVC) filters. Whether placing a temporary or a permanent device, IVUS application in this setting is relatively simple and cost-effective. As many critically ill patients are at high risk for developing life-threatening deep vein thrombosis (DVT), placement of IVC filters is a common practice throughout the world. In most countries, once the patient is deemed appropriate for such intervention, the patient is transported to a radiology suite or to the cardiac catheterization, where the procedure is performed under fluoroscopic guidance. These interventions are routinely performed by interventional radiology, cardiology and vascular surgery professionals.

Unfortunately, many critically ill patients are unable to be transported to these specialized radiology suites due to hemodynamic instability and equipment issues. For example, in some instances, such as in major trauma, patients can not

be moved anywhere in the hospital and any intervention needs to be performed at the bedside. IVUS placement of IVC filters seems to solve some of these issues effectively. By having the technology available in critical care settings and qualified physicians that can insert these filters at the bedside, even the most unstable patients can receive a caval filter.

The procedure itself is relatively simple and follows standard aseptic techniques combined with the modified Seldinger's technique of vascular access. Once this has been attained, and utilizing the IVUS probe the renal veins and arteries are localized and the position marked. Utilizing a special deployment device an IVC filter can then safely be placed and its position corroborated by insertion of the IVUS probe after deployment of the filter. Critical care professionals can master this technique quite easily, making this procedure friendly for the intensivist.

The one limitation that remains under investigation is how to safely utilize IVUS for filter retrieval, in those cases where a temporary device was appropriate.

Can't intubate can't ventilate

John Copland

All anaesthetists, intensivists and emergency physicians should have a rehearsed plan for the "can't intubate can't ventilate" scenario.

The series of video clips will demonstrate a simple and logical algorithm to establish a surgical airway in the absence of a surgeon.

Advanced airway management, devices, new and old

John Copland

This talk will look at the advantages and disadvantages of airway devices used in difficult intubation.

These devices will range from the simple and inexpensive,

such as the stylet and bougie through to the complex and expensive such as video laryngoscopes and fibre optic bronchoscopes.

The intubation bundle: Towards safer tracheal intubation in critically ill patients

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Tracheal intubation is a routine procedure in the intensive care unit (ICU), and is often life saving. However life threatening complications occur in a significant proportion of procedures, making tracheal intubation (TI) perhaps one of the most common but underappreciated airway emergencies in the ICU. In contrast to the controlled conditions in the operating room (OR), the unstable physiologic state of critically ill patients along with under evaluation of the airways and suboptimal response to preoxygenation are the major factors for high incidence of life threatening complications like severe hypoxaemia and cardiovascular collapse in the ICU. Studies have shown strategies planned for TI in the

OR can be adapted and extrapolated for the use in the ICU. Non-invasive positive pressure ventilation (NIPPV) for preoxygenation provides adequate oxygen stores during TI for patients with precarious respiratory pathology. The intubation procedure should include not only airway management, but also hemodynamic, gas exchange and neurologic care, which are often crucial in critically ill patients. Hence there is a necessity for the implementation of an intubation bundle during routine airway management in the ICU. Adherence to a plan for difficult airway management incorporating the use of intubation aids and airway rescue devices and strategies is useful.

The neurology series

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Many diseases simultaneously affect the central nervous system, causing symptoms such as a reduced level of consciousness, cognitive impairment, or multiple motor and sensory deficits. Other disorders are due to circumscribed lesions, which include vascular occlusions, haemorrhage, infections, neoplasm and physical injuries. When neurological symptoms and signs result from a circumscribed lesion, an accurate diagnosis may often be made on the basis of the physician's knowledge of the normal anatomy, and often supplemented by radiological imaging.

The clinical neuroanatomy presentation will cover areas such as major components of the brain, arterial supply and venous drainage, motor and sensory pathways and finally, the neurological symptoms and signs with respect to the specific anatomical locations within the brain.

The neuroradiology presentation will focus on interpretation

of cerebral computerized tomography (CT) scan as this is one of the most immediately available imaging techniques. The different pathological conditions on cerebral CT scan will be correlated with the clinical manifestations based on the understanding of the neuroanatomy.

While my colleagues will compliment our neurology series with specific neurological conditions and neurophysiology, my final presentation will focus on issues surrounding the brain death criteria. The brain death criteria will firstly be discussed, and the role of clinical testing will be elaborated based on the understanding of the anatomical pathways involved.

In conclusion, life threatening neurological conditions is commonly encountered in the intensive care unit. Basic knowledge in neuroanatomy, neuroradiology and neurophysiology are vital for the clinical management of this special group of patients.

Sixth truth about acute kidney injury that the intensivist should be aware of

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In the last decade, we have seen important changes in the epidemiology of AKI in ICU patients. There has been an important increase in the incidence of patients with AKI who are treated with renal replacement therapy, although the indication for initiation of renal replacement therapy have not been changed drastically. Further, there is growing consensus on the definition of AKI, with the introduction of the RIFLE classification, which has been modified recently into the AKI staging system. An important aspect of this classification is the gradation of AKI severity in

three stages of increasing severity, including even small decreases in kidney function. Although diuretic agents and dopamine are widely used in AKI, their use cannot be recommended. Volume expansion with saline or sodium bicarbonat is the recommended strategy for prevention of CIN. Pharmacologic treatment for prevention of CIN has not been proven beneficial yet, although some drugs are promising. Finally, despite many theoretical advantage of CRRT, the optimal modality for renal replacement therapy in ICU patient with AKI is still not established.

How do I feed my septic shock patient?

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In patients who are critically ill, there is no doubt that nutritional status and clinical outcome are linked. ICU patients with poor nutritional status commonly experience immune dysfunction, weakened respiratory muscle and lowered ventilation capacity, and reduced GI tolerance. As a result, patients are at risk for a wide range of complications that can lead to sepsis, multi-organ failure, even death. Traditionally, nutrition support in the critically ill population was regard as adjunctive care designed to provide exogenous fuels to support the patient during the stress response.

The support had 3 main objectives: to preserve lean body mass, to maitain immune function, and to avert metabolic complications. Recently, these goals have become focused on nutrition therapy, specifically attempting to attenuate the metabolic response to stress, to prevent oxidative celluler injury, and to favorably modulate the immune response. Nutritional modulation of the stress response to critical illnes includes early enteral nutrition, appropriate macro and micronutrient delivery and meticulous glycemic control.

Pain management for trauma patients

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Trauma reliably produces pain so that pain management through proper use of analgesics and other treatments should be done as soon as possible.

Although pain is a helpful 'friend' to tell about the sources and orders us to limit the injury, it consists of neuroendocrine stress response and behavioral response that may produce distress and other problems. Uncontrolled pain due to trauma may have bad effects on other organ systems such as respiratory, cardiovascular, genitourinary, gastrointestinal, hematology, and endocrine.

Pain management in emergency department requires a system for quantification of pain, initiation of therapy, and reassessment. The general rule is to start with simple then complex, specific then nonspecific, and local before general. Pain treatments will include the non-pharmacological and pharmacological, such as opioids, NSAIDs, and nerve blocks.

Key words: trauma, pain, responses, and treatments.

End-of-life care in ICU

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There is evidence for an evolution in medical practice towards a more active role in managing the deaths of the critically ill. (1) Depending on the type of patients, the country and the doctors' preference, foregoing life support therapy (FLST) in the ICUs may vary from 1% to 87% withholding and 13% to 99% withdrawing. (2) The incidence of FLST in 2 MICUs in Singapore were 20.8% and 22.8%. (3,4)

Withdrawal of ventilators and vasoactive drugs is legal and accepted practice in terminally ill ICU patients in North America, Europe and Australia. (2) In Israel however, the withdrawal of ventilators and vasopressors leading to death in these patients is considered by many to be illegal and unethical.

In a questionnaire survey in Singapore on nurses' attitudes toward ethical issues concerning pre-terminal life support, 59.8% felt it was not against their religious beliefs to practice FLST. (5) 51.7% were more disturbed by withdrawing than withholding, with 41.4% indicating no difference and the rest were unsure. 73.6% agreed (versus 23.0% disagreed) that life support should be withdrawn from a patient in "permanent vegetative state." 64.4% disagreed that withdrawal of nutrition and hydration was the same as withdrawal of other therapies. 83.9% felt it was ethically permissible to provide analgesics and sedatives during withdrawal of ventilatory support.

Euthanasia is illegal in many countries, including Singapore,

but is practiced without consequence of persecution in Holland. Despite this, in a survey conducted among general practitioners and specialists in Singapore, about 18% felt that euthanasia should be allowed. (6)

Patient's decision-making capacity for FLST was found in only 0% to 10% of ICU patients. (2) If the patient lacks the capacity of informed consent, prior expressions of the patient's treatment preferences, such as a living will and a medical durable power of attorney, should be given effect (substituted judgment). In the absence of such advance medical directive (AMD), the decision should be made by the surrogate decision maker and the physician, on the basis of their understanding of the best interests of the patient.

The agreement between proxies and patients on the predictions of ICU patients' wishes was 50%-88%. (7) Ability of doctors to predict their patients' wishes was 47% to 72%. Doctors tended to want to withhold more treatment than the patients/families did. 7%-46% of patients and 6%-57% of families reported ever discussing their resuscitative preferences with a doctor.

AMD preserves patient's autonomy, facilitates end-of-life decision making and optimizes ICU utilization. The AMD

Act was passed as a law in Singapore in May 1996 to "provide for, and give legal effect to, advance directives to medical practitioners against artificial prolongation of the dying process and for matters connected therewith." (8)

A study of 872 critically ill cancer patients in the U.S. showed that more patients with AMD had do-not-resuscitate orders within 72 hr (19% vs. 11%, $p=0.046$). (9) Patients with AMD also had shorter ICU durations (4.0 vs. 5.0 days, $p=0.008$) and lower ICU charges (US\$ 27,504 vs. US\$ 33,922, $p=0.041$).

Diverse cultural, religious, philosophical, legal and professional attitudes may lead to great differences in attitudes and practices in various countries and in different units within a country. (2) Therefore, confusion and conflicts involving such sensitive and emotive end-of-life issues will always arise between health care providers and patients/surrogates. When the doctor assumes the role of patient advocate, the physician has to adhere to the ethical principles of beneficence, nonmaleficence and disclosure; the patient's right to self autonomy and self determination; and the community's right to just distribution of medical resources. (8)

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Myocardial protection in trauma patients: How to preserve?

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Trauma condition especially major trauma can lead to any degree of myocardial injury. This injury occurs when there is a significant imbalance between myocardial oxygen delivery and energy requirements. In the vast majority of trauma cases, perioperative myocardial injury is minimal and is well tolerated. However, severe perioperative myocardial injury often lethal. Adequate myocardial protection can minimize the detrimental effects of myocardial injury in these trauma patients. Myocardial protection aimed to balance oxygen demand and oxygen supply, the strategy consists of basic and advanced methods. A proper strategy of myocardial protection encompasses events before, during and after the myocardial injury, including treatment of the

patients both preoperatively and postoperatively. As such medical personnel involved in the perioperative care of the trauma patient should be cognizant of the implications of their actions toward myocardial preservation. A strategy of myocardial protection may be made infinitely complex, but most patient will be adequately served through the use of limited number of techniques and agents designed to minimize the difference between oxygen delivery and its utilization. The term of 'myocardial management' is a better term than 'myocardial protection' as it encompasses the whole strategy employed.

Key words: myocardial protection, trauma.

Cardiovascular diseases, the principal cause of death during Hajj

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Over the past few years cardiovascular diseases have emerged as an important cause both of intensive care unit (ICU) admission and of mortality during Hajj. For instance, in a study analyzing Hajj hospital admissions in 2004 as a function of pilgrims' geographical origin, myocardial infarction was identified as the major cause of admission into the intensive care units (ICU) of seven hospitals (four in Mena, three in Arafat), ahead of pneumonia, asthma, chronic obstructive pulmonary disorder (COPD) and pulmonary edema. More than 60% of the ICU admissions came from cardiovascular causes of which myocardial infarction and left ventricular failure occurred with the highest frequencies. This was slightly different from a 2009 prospective study involving over 500 Hajj pilgrims from France (median age 61) attending the 2007. While cardiovascular disease-related conditions (e.g., hypocholesterolemia and hypertension)

represented significant co-morbidities in the pilgrims prior to Hajj, the reported hospitalization was much lower than in the previous study. While this particular study represented a highly non-generalizable account of Hajj medical experience, it adequately represents the stratification according to age often reported for pilgrims attending Hajj (median age 61 years). According to the study, pilgrims with ages ranging from 65 to 74 years had the highest number of age-related chronic conditions like diabetes mellitus (31%), hypertension (27.5%), and hypercholesterolemia (11.4%). This age group understandably would constitute the highest number of hospitalizations during Hajj. The pattern shown in this particular study suggests a need to separate the overall number of hospitalization from ICU admissions and contribution to total reported mortalities reportedly dominated by cardiovascular conditions. Also,

it is necessary to view the French study within the highly restricted context of the study group not representative of the overall Hajj attendance. Similarly, in another study involving a total of 105,713 Iranian pilgrims covering two successive Hajj pilgrimages (2004 and 2005), cardiovascular diseases were responsible for only a small number of the overall hospitalizations. This was attributed to effective pre-Hajj screening procedures that successfully reduced the number of high risk groups composed mainly of individuals with cardiovascular diseases. It is only fair to expect the outcome of similar studies would be different where such pre-Hajj screening of high risk groups is absent. The changing

pattern of hospital admissions during Hajj, the Muslims yearly pilgrimage attracting millions of pilgrims from all around the globe, has gradually seen infectious causes of hospital admission replaced by cardiovascular diseases as a leading cause of both intensive care unit admission and death. While this trend is partly associated with the high quality of medical services and awareness programs targeted at reducing the spread of infections, at the same time it underscores an urgent need to establish a pragmatic system to manage the challenge of cardiovascular morbidities and mortality during Hajj.

Permissive underfeeding and intensive insulin therapy in critically ill patients

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Nutritional support has been recognized as an essential part of intensive care unit (ICU) management. However, the appropriate caloric dose for critically ill patients remains ill defined. The perceived benefit of achieving the caloric target is to attenuate malnutrition—a common complication during critical illness that is associated with increased morbidity and mortality. In fact, several studies have shown worse outcomes in patients receiving a low caloric intake. On the other hand, some evidence supports caloric restriction. Studies have shown that caloric restriction prolongs the life span in several species, promotes mammalian cell survival, and improves longevity biomarkers in humans. These effects have been attributed to several mechanisms, including a reduction in the metabolic rate and oxidative stress, a reduction in mitochondrial free radical generation, an up-regulation of the plasma membrane redox system, an improvement in insulin sensitivity, modification of cardiovascular disease

risk, an improvement in myocardial ischemic tolerance, and changes in neuroendocrine and sympathetic nervous system function. Although the applicability of these findings to critically ill patients is unknown, physiologically stressed critically ill patients are likely to be in a hypercatabolic state and to have augmented oxidative stress, insulin resistance, and altered neuroendocrine and sympathetic nervous system function. In fact, some clinical studies have shown that a lower caloric intake in critically ill patients is associated with better outcomes. Because of this controversy, it remains unclear what constitutes an appropriate caloric dose for critically ill patients. Although clinical practice guidelines recommended initiating nutritional support early in the course of critical illness, the evidence for achieving the caloric target was insufficient to make recommendation. In critically ill patients, permissive underfeeding may be associated with lower mortality rates than target feeding.

Radiological manifestation of idiopathic interstitial pneumonia

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New modalities in the radiological sciences continue to develop. The development of computerized tomography (CT) has improved the diagnosis of all type of lung diseases, including idiopathic interstitial pneumonia (IIP). IIP refers to a group of DILD of unknown etiology with varying degrees of inflammation and fibrosis, that affecting of secondary pulmonary lobule. Diagnosis of IIP is based on the symptoms and signs, chest radiography and HRCT finding, and proved by histo PA. Most types of IIP involve

fibrosis. If lung scarring occurs, it is generally irreversible. The classification of IIP is based on ATS and ERS 2002. It consists of 7 distinct type of diseases likes COP or BOOP, AIP, IPF or UIP, NSIP, RB ILD, DIP and LIP. Accurate diagnosis of IIP must be based on consensus multidiscipline team approach.

Key words: IIP, chest radiography, HRCT.

Warmed humidified high-flow oxygen: A new option in respiratory care?

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Inadequate heating/humidification of the airways is known to result in drying of secretion, airway obstruction, and infection. Humidification during respiratory care is, however, often overlooked by many clinicians. Because mucociliary function is the primary and essential defense mechanism of the respiratory system, heating and humidifying of inspired gases (at 37 °C with 44 mgH₂O/L absolute humidity) is mandatory during oxygen therapy. For non-invasive administration of oxygen, there have been low-flow system (nasal cannula, oxygen mask), and high-flow system (Venturi mask). Both of these two are not ideal with regard to humidification of inspired gases. Heated high-flow nasal

cannula is a newer method that is believed to combine the advantages of both oxygen delivery systems. Beyond the use in pediatric ICU, it has recently been introduced to adult ICU. According to a systematic review, heated high-flow therapy in adult respiratory care may be useful in optimizing oxygenation in adults with intermediate respiratory failure. This therapy may reduce the effort of breathing and provide augmented airway pressures. Patients described the therapy as comfortable. However, further studies are needed to know its role as a salvage method for impending respiratory failure, or a long-term effect of airways.

Perioperative acute renal failure: How to manage

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At present there is no universally recognized definition of acute renal failure (ARF). Whereas some define ARF as oliguria and an increase (e.g. 50%) in creatinine concentration, others call this combination 'renal insufficiency or dysfunction' and reserve the term of ARF for patients requiring renal replacement therapy (RRT) as the definition. Although rarely the primary cause of death, ARF is associated with 30% mortality. The incidence need for RRT after major operation ranges from <1% for patients with normal preoperative urea and creatinine concentration to >40% in patients with preoperative creatinine concentration >200 $\mu\text{mol/L}$. Renal dysfunction after major operation often increases the length of ICU and hospital stay. The development of acute renal failure is associated

with substantial morbidity and mortality independent of all other factors. The pathogenesis of ARF involves multiple pathways. Hemodynamic, inflammatory, and nephrotoxic factors are involved and overlap each other in leading to kidney injury. Many studies have identified clinical factors for ARF that can be used to determine effectively the risk for ARF patients. These high risk patients then can be targeted for renal protective strategies. Preoperative risk stratification-prevention is preferable, good hydration preoperatively, intravascular volume and cardiac output optimisation throughout surgery are amongs the strategies to ensure renal protective.

Key words: acute renal failure, perioperative surgery

Hypertonic sodium lactate for small volume resuscitation in dengue shock

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Fluid resuscitation is the principal supportive treatment in dengue shock according to the World Health Organization (WHO) guidelines. The standard fluids for dengue shock are isotonic crystalloids (NaCl 0.9%, Ringer lactate) and colloids (dextran, gelatin, and hydroxy ethyl starch/HES). Despite of decreasing number in dengue mortality after aggressive fluid therapy with crystalloids, its morbidity is still high as reflected by high incidence of fluid overload (52%). The small volume resuscitation using hypertonic saline alone, or combined with colloid has been applied in septic shock, traumatic brain injury, burn, and hemorrhage. The hypertonic sodium lactate (HSL) is the hyperoncotic, hypertonic crystalloid. Its physicochemical effect will cause

osmotic gradient which will shift fluid from edematous cells and interstitial into intravascular space until fluid osmotic balance is reached. Its osmolarity resemble to 3% hypertonic saline (1,020 mOsm/L) with Cl ion being substitutes by lactate ion, avoiding hyperchloremic acidosis which may occur after administration of hypertonic saline. The exogenous lactate can be used as a source of energy in hypoglycemia and tissue hypoxia state in shock. HSL may cause hyponatremia and slight alkalosis, but these side effects may correct hyponatremia and metabolic acidosis that are often found in shock states. HSL has been studied clinically and applied in cardiac surgery, burn, traumatic brain injury, and dengue shock. In our experience, HSL

fluid resuscitation dose for dengue shock is only a quarter of isotonic crystalloid (5 mL/kg vs 20 mL/kg given within 15 minutes). It can be repeated once if shock is not recovered, then colloid should be given if shock still exist. If shock has recovered, HSL dose should be decreased gradually within 3-6 hours to 2.5 mL/kg/hour. After stable, the recommended dose is 1 mL/kg/hour for 12-24 hours. After using HSL, we found less fluid overload and less edema

clinically. Theoretically, HSL may avoid reperfusion injury, pro-inflammatory cytokine expression and reactive oxygen substances production. In turns HSL may minimize the inflammatory responses after fluid resuscitation and shorten the hospital stay.

Key words: dengue shock, hypertonic saline, lactate, small volume resuscitation

Word culture transformation in the clinical approach ~ an evolutions

Prof Dato Sri DR Abu Hassan Asaari Abdullah

Work culture transformation in emergency medicine, acute medicine and critical care, where life saving intervention is the core business, have been revolutionised to create a razor decision making and prolific interventions.

The revolutionisations of the clinical approach is the reengineering of the work process by applying the philosophy of the activations of ALL senses in human capacity to manage clinical situations in multidimensional clinical situations and providing a focused humanistic interventions.

The philosophy of redesigning and reengineering the work culture by instilling a new perceptions, values, aspirations and commitment and motivated by energizing vision and challenging goals.

The transformations is a dynamic process adapting the external or internal forces to initiate value creations,value conversions and value connections.

The critical steps and methodology will be elaborated in the presentations.

Role of biomarkers in sepsis

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A prospective observational diagnostic accuracy study in patients with a discharge diagnosis of community acquired pneumonia, or an exacerbation of asthma/COPD demonstrated that procalcitonin (PCT) and C-reactive protein (CRP) levels can both independently distinguish pneumonia from exacerbations of asthma/COPD. (1)

In a meta-analysis, PCT level was more sensitive (88%, 95% CI 80%-93% vs. 75%, 95% CI 62%-84%) and more specific (81%, 95% CI 67%-90% vs. 67%, 95% CI 56%-77%) than CRP for differentiating bacterial from non-infective causes of inflammation. (2)

Inflammatory biomarkers identified patients needing ICU admission. In a prospective clinical study in ICUs of 2 university hospitals, serum levels of PCT, CRP, TNF- α and IL-6 at admission in the emergency room for patients without major criteria of the Infectious Disease Society of America/American Thoracic Society (IDSA/ATS) guidelines for severe community-acquired pneumonia (CAP) were higher in ICU patients compared with non-ICU patients. (3) Serum levels of these biomarkers increased as the number of minor criteria of severe CAP increased, although the difference achieved statistical significance for PCT and IL-6 only. Although the accuracy of the minor severity criteria of the IDSA/ATS guidelines to predict ICU admission was better than biomarkers alone, patients with low levels of PCT (<0.35 ng/mL) may be safely admitted to wards. Combining PCT levels with the correct application of these guidelines would substantially reduce delayed ICU admission.

In a prospective observational cohort study in a multidisciplinary ICU in a tertiary reference hospital, it was reported that a high maximum PCT level and a PCT increase (≥ 1.0 ng/mL) for 1 day are early independent predictors of all-cause mortality in a 90-day follow-up period after ICU admission. (4) Mortality risk increases for every day that PCT increases. Levels or increases of CRP and white blood count do not seem to predict mortality.

PCT guidance on antibiotic decisions can be helpful in the ICU patients from a step-down perspective as shown in the French PCT to Reduce Patients' Exposure to Antibiotics in Intensive Care Units (PRORATA) (5) and to reduce antibiotic exposure in ventilator-associated pneumonia (VAP). (6)

A systematic review on published literature from 1990 to 2009 showed PCT-guided antibiotic therapy is associated with a reduction in antibiotic usage that, under certain assumptions, may reduce overall costs of care. However, the overall estimate cannot rule out a 7% increase in

hospital mortality. (7)

A randomised controlled open-label trial involving 1200 critically ill patients in 9 multidisciplinary ICUs across Denmark found that before a microbiologic diagnosis, PCT-guided antimicrobial escalation in the ICU from target-directed to very broad-spectrum piperacillin/tazobactam or meropenem did not improve survival and did lead to organ-related harm and prolonged ICU stay. (8)

Serum PCT elevation is particularly good for differentiating bacterial infections from viral infections, which is probably the most frequent dilemma encountered in clinical practice. (2) However, Candida-related severe sepsis or septic shock does not necessarily elicit a substantial increase in serum PCT. (9) A PCT level of higher than 5.5 ng/mL yields a 100% negative predictive value and a 65.2% positive predictive value for candidemia-related sepsis.

In a prospective, observational study in a MICU in a teaching hospital, it was found that alveolar PCT performed by BAL does not help to identify VAP. (10) In contrast, microbiological resources available at the time of VAP suspicion (BAL gram staining, last available endotracheal aspirate) combined or not with Clinical Pulmonary Infection Score (CPIS) are helpful in distinguishing VAP diagnosed by BAL from patients with a negative BAL.

In summary, PCT elevation is related to bacterial infection. It is a valuable predictor of prognosis from bacterial infection. PCT-guided strategy could guide treatment and reduce unnecessary antibiotic use. However, some studies have reported prolonged ICU length of stay, prolonged organ failure and increased mortality in the PCT-guided strategy. Biomarkers cannot substitute for good microbiologic data in the ICU, as the sensitivity of baseline PCT is low and cannot be used to rule out infection; however the turnaround time for microbiologic results is a problem.

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Empiric antibiotic therapy in severe sepsis

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Severe sepsis is sepsis associated with organ dysfunction, hypoperfusion or hypotension (systolic BP < 90 mmHg or a 40 mmHg decrease below baseline systolic BP). Septic shock is severe sepsis plus hypotension despite adequate fluid resuscitation. Sepsis is the most common cause of death in most ICUs worldwide. The mortality rates for severe sepsis ranged 30% to 50%, and for septic shock 50% to 60%. (1)

In the murine surgical implantation model of septic shock, when antibiotics were initiated before shock onset, mortality was < 20%, and if they were delayed > 3 h after shock onset, mortality was > 85%. (2) A retrospective review of adult patients with septic shock reported inappropriate initial antimicrobial therapy for septic shock in about 20% of patients and was associated with a fivefold reduction in survival. (3) Inadequate initial empirical antibiotic therapy in patients admitted to the ICU for sepsis was

associated with a higher 28-day, 60-day, and in-hospital mortality rates, although early mortality rate (< 3 days) was unaffected. (4) Factors associated with early mortality were immunosuppression, chronic cardiac failure, and renal, respiratory or hepatic failure within the first 24 hours in the ICU.

In a large retrospective multicentre study of 2,154 septic shock patients, in-hospital mortality was 58% and the median time to effective antimicrobials were 6 h (interquartile range 2-15 h). (5) If appropriate antimicrobials were given in the first hour of hypotension, mortality was 20.1%; for each hour's delay over the next 6 hours, mortality increase by an average of 7.6%. Despite a progressive increase in mortality with increasing delays, 78.9% received effective antimicrobial therapy only after the onset of recurrent or persistent hypotension, and only 50% of septic shock patients received effective antibiotic therapy within 6 hours

of documented hypotension.

At highly experienced centres where the time to antibiotics has been minimised and care delivery optimised with mature early goal-directed therapy (EGDT) protocol, hourly delays in antibiotic administration are not associated with mortality – unless the patient either presents in shock or is initially not recognised as being at risk for the development of shock and antibiotics are not administered until after shock ensues. (6,7)

Selection of appropriate antibiotic therapy depends on the likely pathogens, site of infection, Gram's stain results, local flora and susceptibility patterns, and co-morbidities. (8-10) In addition, the tissue penetration into the suspected septic source and adverse effects of each antibiotic should be considered. Aminoglycosides and glycopeptides (e.g. vancomycin) have relatively poor tissue penetration and are nephrotoxic. Most agents have poor CNS penetration, except when the meninges are inflamed. (8)

Consider combination therapy for immunocompromised or neutropenic patients and certain pathogens e.g. *Pseudomonas aeruginosa*. (8-10) The previous use of

antibiotic is a key factor to broaden the empirical regimen to cover multiply resistant strains. (4) Non-bacterial infectious pathogens are uncommon in most ICUs but may vary depending on geographic location and host susceptibility. Fungal infection should be considered in the presence of predisposing factors such as malignancy, neutropaenia, broad-spectrum antibiotic therapy, parenteral nutrition, severe burns, organ transplantation, or central venous catheter. (10)

Review empirical broad-spectrum antibiotic regimen after 48-72 hours, based on microbiological results and clinical response. Use a narrow spectrum antibiotic to prevent the development of resistance, to reduce toxicity and to reduce cost. (4,9) The duration of therapy should typically be 7-10 days and guided by clinical response. (9) Stop antibiotic therapy immediately if the aetiology is determined to be non-infectious.

In summary, outcomes in patients with severe sepsis or septic shock are improved with EGDT (11) and prompt, effective antibiotic administration (2,5,6) against the presumed or isolated pathogens.

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Ethical dilemmas in the ICU: An everyday issue

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Everyday there are many ethical dilemmas in the ICU. The most commonly observed dilemmas in the ICU, may be the decision to resuscitate or not to resuscitate, weather or not to initiate mechanical ventilation, or withdrawal of life-sustaining therapy, although the independent predictor is the physicians perception of the patient's preferences about the use of life support.

Certain variables have been analyzed in order to understand the factors that may alter the process of decision making at times when stress is met. The religious background, ethical and moral principles, physician's age, patients age, level of physician experience, personal beliefs and values, functional and employment status of the patient before admission to the ICU (up to one month), chronic diseases, and ethnical background are considered variables that could affect the process of decision making.

The fact that physicians could forego resuscitation to a patient they did not know, is also a known important factor for decision making, since most physicians state that CPR is not justifiable for all patients under every circumstance.

Certain recommendations have been made to help improve outcomes, such as the existence of formal CPR guidelines in each hospital. Advance care planning or resuscitation directives stated by the patient towards end of life care before hand, and also as a preventive measure so that physicians do not have to make decisions over them, and also stating their decision not leaving it for their family members or legal representation to make have shown positive results, being followed by the fact of whether or not to have the patients' family present while performing CPR would improve grief, or worsen it.

Acute Physiology and Chronic Health Evaluation score (APACHE II), a resource developed to predict ICU survival,

has been taken as a factor that may be involved in decision making.

A new and popular variable is the global functional status and/or employment status, in which the first 24 hours of ICU admission patients could be rated, as severely limited, somewhat limited, totally independent, or unknown. Finding these variable may influence the decision onto perform CPR in the first 24 hours of ICU admission.

The do-not-resuscitate (DNR) status, has been implemented for years now, and it still has been found that most patients make a decision 1-2 days before death. Patients with severe functional status impairment were more likely to have a do-not-resuscitate (DNR) directive, and absent in most younger patients, but as well they were more likely to have positive results from CPR. Physicians have stated they are more likely to suggest DNR to patients working at home or unemployed than to those working outside the home.

Another big dilemma physicians undergo is weather or not to withdraw mechanical ventilation in anticipation of death, since it is known as the most common form of advanced life support. The fact that patients who are under mechanical ventilation are usually also being treated with vasopressors, inotropes, and dialysis, factor that could affect decision making as well, while on mechanical ventilation. Even with the ventilator in place if the vasopressors or inotropes are removed and a DNR status is on, the result of all these could be death.

Another important ethical issue found on ICU is the authorization by the family and physician to perform post mortem procedures for training purposes, it has been debated for a while, and the best results have been found when preauthorization is demonstrated.

Pharmacological update in CPR

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On 2010 the ILCOR (International Liaison Committee on Resuscitation) along with the AHA (American Heart Association) released the new update on the guidelines and algorithms for patients with cardiac arrest. The new changes in the protocols change totally the perspective in the actual outer and inner hospital care. Among the most important changes it is clear that the change in the CPR (cardiopulmonary resuscitation) sequence from ABC (Airway, Breathing & Circulation) to CAB (Circulation, Airway & Breathing) is the biggest of all. ACLS (Advanced Cardiac Life Support) new changes gave the medications a new role in the CPR protocols leading them to a second or third option in the sequence of action.

Medications take the backseat in the newest ACLS update, the latest data that supported the changes in the protocols showed no significant improvement in the long-term outcome after a cardiac arrest in patients that were treated early in the treatment chain versus the ones who were medicated after even though it was revealed that a higher rate of ROSC (Return of Spontaneous Circulation) was accomplished with the use of vasopressors, there was no comparison against the early implementation of chest compressions. Therefore providing proper blood flow to the brain with early chest compressions (CC) is the first and most effective maneuver to improve the patient's outcome; turning every other action that may interrupt or hold the earlier assessment of CC. The chest compression must be delivered without interruption that's why medication administration has to be done simultaneously to the compressions or delayed if necessary. The central line as the most effective route of medications is as well very unpractical for the character of the placement technique in detriment of proper chest compressions; peripheral access, intraosseous infusion and endotracheal routes are now being used more and more as validate option as route of administration.

After unsuccessful resuscitation with chest compressions and subsequent cardioversion the use of medications is well indicated. Vasopressors are the first medicament option in ventricular tachycardia (VT) and ventricular fibrillation (VF) unresponsive to the protocol, the use of epinephrine and dopamine is widely documented; both without a significant advantage over the other one, single dose of vasopressin and regular sustaining dose of epinephrine are the most used regimens. Antiarrhythmics are second line medications in VT and VF after a failure achieving ROSC with the use of vasopressors; amiodarone is preferred over the other antiarrhythmics, lidocaine is accepted as a valid option if amiodarone is not available. Perhaps the most unsuspected change in the drug category is the discontinuation of atropine in the protocols for pulseless electrical activity and asystole as the data of 2005 revealed that it is no major improvement in the long-term outcome of the patients that received routinely atropine in these conditions; this will break deeply raised practices in the medical staffs around the world. PEA and asystole should be primarily resolved with quality compressions but when ROSC is not achieved the use of vasopressors (epinephrine and vasopressin) with the same dosages for VT and VF is second line action in the protocol; the use of antiarrhythmics has shown no clinical advantage.

Outside the algorithm for cardiac arrest and CPR the use of atropine is still reliable for the management of symptomatic bradycardia along with epinephrine and dopamine. Tachycardia should be addressed first with vagal stimulation manouvers if that failed the adenosine is the first line drug in narrow complex tachycardia followed by calcium channel blockers, beta-blockers, amiodarone and digoxine.

Other drugs which are applied in the ACLS as treatment

option during the management of the cardiac arrest are mentioned but they are conditioned in the individual treatment for particular leading conditions of the cardiac arrest; i.e. fibrinolytic therapy is used on the ACLS algorithms when the diagnosis of pulmonary embolism is proven; nitrates during an acute coronary syndrome are the gold standard in the management of this entities.

For years there was a perception that the use of medications was essential in order to achieve ACLS success but the latest evidence has shown that the chest compressions are the most successful maneuver yet; no matter this rational use of the drug therapy are still an important part of a successful protocol and has well mentioned indications that are design to improve the outcome of the patient.

Pain management in ICU

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Pain is one of the sources for anxiety of the critically ill patients. Pain itself might be a good sign or alarm for certain pathophysiologic condition that need to be corrected but also a bad cause for unwanted stressor of that pathophysiologic problem(s).

It is not easy to measure pain in ICU especially for those who are not conscious or not able to communicate with the examiners. Several tools for measuring the pain for critically ill patients already developed and validated for uncommunicated patients, such as BPS (Behavior Pain Scale) or CPOT (Critically-ill Pain Observation Tool). BPS use three parameters that are facial expression, upper extremity

movement, and the compliance with ventilator, while CPOT use four parameters that are facial expression, muscular tone (passive movement), upper extremity movement (active), and the compliance with the ventilator.

A strategy for pain management starts with the measurement of pain and the proper analgesics use. Pain must be differentiated from another important cause of anxiety, delirium. Controlling the pain in ICU means to reducing the complications and LOS.

Key words: critically ill, measurement, analgesics

How to transport the critically ill children?

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Safe transport of the critically ill children remains a global important issues. The importance is because of high risk mortality and morbidity that exists during the transport process. The goal is to stabilize the patient condition and

to refer the patient to a better facility and more specialized personnel to prevent further deterioration. Thus, extremely ill patients can be transferred with minimal risk with this approach. In critically ill children, the indications for

emergency transport are most likely due to respiratory problems (32%), trauma (22%), neurologic (15%), neonatal (15%), and several other emergencies (9%). Transfers can be primary or secondary. Primary transport occurs from the scene of acute illness or injury to hospital and secondary transport is transfer of patient between a referring and receiving hospital. The intra-hospital and inter-hospital transfer of critically ill patients is an inevitable part of emergency department practice. Transportation of patients within a hospital for the purpose of undergoing diagnostic, procedures, therapeutic, or transfer to a specialized unit are called intra-hospital transport and transportation between hospitals by several transfer mode are called inter-hospital transport. Transfer can be safely accomplished even in extremely ill patients. Those involved in transfers have the responsibility for ensuring that everything necessary in pre-transport, during transport, and after-transport/arrival

is well prepared. In pre-transport, good coordination and communication between personnel, trained personnel, adequate equipment and medication, mode of transport, and monitoring during transport are required. During transport, an algorithm is provided for the inter- and intra-hospital transport of critically ill patient for assuring patient condition. After transport, the receiving teams reevaluate patient condition with SOAP approach and should make the retrieval process uneventful. Although, transport of critically ill patient carries inherent morbidity and mortality risk, with safe transport of critically ill children, patient safety is enhanced and this will give better outcome in those who received the measures. Establishing an organized and efficient safe transport process supported by adequate personnel and equipment resources is mandatory.

Key word : critically ill, children, transport

Hyperbaric oxygen therapy for neonatal patients: When and why?

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Hyperbaric Oxygen Therapy (HBOT) as a therapeutic intervention was developed during the 19th century. The main principle of HBOT is to expose a patient to 100% oxygen, at a pressure greater than the atmospheric pressure (1 ATA). Among infants and children, the accepted indications for HBOT include: smoke inhalation, carbon monoxide poisoning, arterial air embolism, compartment syndrome, acute traumatic peripheral ischemia, compromised skin flaps and grafts, chronic or refractory osteomyelitis, osteoradionecrosis, radiation-induced soft tissue injury, purpura fulminans, chronic or non-healing wounds and decompression sickness.

Although the experience in neonatal patients is quite limited and in some clinical conditions lacking, there have been a series of case studies that show potential applications of HBOT in this population for neonatal hypoxic-ischemic encephalopathy, carbon monoxide poisoning, arterial air embolism and necrotizing fasciitis.

The mechanisms on which HBOT is based can be divided into 2 main categories; the effects that reflect the increase in atmospheric pressure, such as the bubble size reduction in arterial air embolism or the unbinding of carbon monoxide from hemoglobin during carbon monoxide poisoning, and the ones that reflect the biochemical reactions enhanced by an increased delivery of oxygen to the affected tissues, such as the increase in the respiratory burst in necrotizing fasciitis, as well as the neuroprotection offered to any patient with a sudden decrease in PaO₂ in brain tissue, such as the one experienced in neonatal hypoxic ischaemic encephalopathy.

General considerations regarding this patient population, as thermoregulation and thermoprotection, should be taken into account, because it can be extremely challenging to manage in a hyperbaric environment.

The potential side effects include the same ones as for the

adult population, and some related to the neonatal period, including central nervous system toxicity, pulmonary and middle ear barotrauma, and oxygen induced retinopathy. These potential side effects are extremely uncommon and potentially treatable in case of occurrence.

HBOT is feasible and useful in neonatal patients. Provision

of this therapeutic intervention requires a multidisciplinary team approach. The “team” needs to be able to identify as early as possible these potentially curable entities, and implement safely HBOT. Clinicians must be vigilant of potential adverse reactions and attempt to minimize oxygen toxicity. In depth clinical trials are required to define clinical guidelines applicable to this patient population.

Use of therapeutic hypothermia for ARDS

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The Acute Respiratory Distress Syndrome (ARDS) is a rapidly progressive disease, characterized by severe dyspnea, tachypnea and refractory hypoxemia that quickly evolve into respiratory failure. The diagnostic criteria as defined by the American-European Consensus Conference (AECC) are: acute onset, $PaO_2/FiO_2 \leq 200$, bilateral infiltrates on chest X-ray and wedge pressure ≤ 18 mmHg. This is a critical condition with enormous rates of morbidity and mortality (30-50%), in spite of modern techniques and aggressive treatment. This disorder is fairly common in the critical care setting, with an incidence as high as 306 per 100,000 person-years for people in aged 75-84 years in the US, (average 64 cases 100,000p/year). More importantly 7.1% of patients in the Intensive Care Units (ICUs) develop ARDS and in patients on mechanical ventilation, the incidence increases to 16%.

Many therapeutic approaches have been developed and tested in the last decades without significant improvement. The only improvement in treatment guidelines that has established some marginal enhancement in overall general condition is the modification of ventilatory parameters to lower tidal volumes as demonstrated by the ARDS-Net trial. It is evident that further research and new management techniques are needed in order to better overcome the burden of this severe medical condition.

Therapeutic hypothermia (TH) is an old treatment approach that has been resurrected and scientifically proven to have

great potential and provide substantial benefit for a number of conditions. The most studied and accepted indications are the use of TH in cardiac arrest survivors who remain comatose, stroke patients and new born hypoxemia among others. Nevertheless, there are other not-so-common indications that need to be studied further and put to practice. One is the use of TH in cases of severe refractory hypoxemia like patients with ARDS.

TH has shown to decrease metabolic rates, for every 1 °C decrease in temperature there is a reciprocal 5-6% decrease in metabolism, helping to reduce the oxygen demand and improving ventilatory parameters. Additionally the effect of low temperature in the immune system, though not fully understood yet, might play a role in inhibition of the exaggerated response, responsible for the pulmonary damage in ARDS.

Several animal models have demonstrated the feasibility and potential benefits of the use of TH in the setting of a similar pathologic process. Small pilot studies, done over the last three decades have also shown improvement in pulmonary parameters, i.e. A-a gradient and lung compliance, chest X ray, and mortality rates in patients with ARDS who have undergone TH. Additionally, a group of coworkers and me have observed similar favorable results in our population when used this therapeutic technique. Larger randomized trials are still needed for a certain definition on the benefits of this promising treatment choice.

Pharmacokinetics in sepsis

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Sepsis is a hyperdynamic state, characterized by several features including a hyperdynamic state, high cardiac output, increased capillary permeability, hypovolemia, hypoalbuminemia, hepatosplanchnic hypoperfusion, renal dysfunction and polypharmacy. These result in alteration in pharmacokinetic variables including volume of distribution (Vd), protein binding, peak drug concentration in a dosing interval (C_{max}), minimum drug concentration in a dosing interval (C_{min}), area under the concentration-time curve from 0 to 24 hours (AUC 0-24), clearance (Cl) and elimination half life. These changes can lead to decrease levels of drugs in plasma, which can result in reduction in efficacy of important treatments such as antibiotics, or to increases in drug levels, leading to increased toxicity of drugs. Gut hypomotility, venous congestion, mucosal edema and reduced muscle blood flow make the oral, transdermal, subcutaneous, intramuscular routes unreliable, and this discussion will be restricted to the intravenous route.

The Vd is increased due to increased capillary permeability, low albumin levels and fluid resuscitation; hydrophilic drugs such as the aminoglycosides, beta-lactam antibiotics and glycopeptides are most affected. In the presence of a hyperdynamic circulation, a higher than normal glomerular filtration rate results in increased renal clearance (>120 ml/min) leading to significantly lower plasma concentration of antibiotic. In such circumstances, higher loading and maintenance doses may be required. Lipophilic drugs such as the fluoroquinolones are less affected by alterations in Vd. On the other hand, decreased Cl and/or metabolism of drugs due to renal and hepatic hypoperfusion and dysfunction will lead to accumulation of drugs and/or metabolites with possibility of increased risk of toxicity. Dose reductions need to be considered.

Knowledge of PK/PD properties of antimicrobials can be used to improve dosing regimens for critically ill patients with

sepsis and septic shock. For the β -lactams and carbapenems, C_{max}>4x MIC is adequate to achieve maximal bacterial killing, and no further benefit is obtained with higher C_{max} levels. Further C_{max}>4x MIC for 40% of the dosing interval is adequate for static response, and C_{max}>4x MIC for 100% of the dosing interval achieves maximal killing. Improved pharmacodynamic profile is achieved with more frequent dosing or extended or continuous infusion.

For aminoglycosides, C_{max}/MIC of at least 10 is the PK/PD index related to clinical success, and high trough concentrations of aminoglycoside are related to toxicity. These antibiotics also demonstrate prolonged postantibiotic effect. Thus single daily weight-based initial dosing of 7 mg/kg for gentamicin and tobramycin, and 20 mg/kg for amikacin will result in high C_{max}. Therapeutic drug monitoring should be performed after the first dose. In addition, knowing the MIC for the pathogen(s) allows further dose refinements to achieve PK/PD.

Fluoroquinolones are lipophilic antimicrobials and demonstrate concentration-dependent kill characteristic with time-dependent effects. Thus C_{max}/MIC ratio of 10 is the PK/PD parameter correlated to bacterial eradication, and an AUC/MIC>125 has been shown to be the PK/PD target for ciprofloxacin against gram-negative pathogens for clinical and microbiological cure.

In conclusion, altered pathophysiology can have a significant influence on pharmacokinetic parameters, particularly Vd and CL. Knowledge of PK/PD principles can be used to maximize antimicrobial activity, minimize toxicity and reduce the development of antimicrobial resistance. Therapeutic drug monitoring for commonly used antimicrobials as well as MICs of the infecting microbe can help complete the picture and optimise antibiotic therapy in sepsis.

Antihypertention treatment in severe preeclampsia

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Hypertension is the most common medical problem encountered during pregnancy, complicating 2-3% of pregnancies. Preeclampsia is a multi-system, life-threatening disorder to both mother and unborn child and characterized by hypertension and proteinuria (greater than 300 mg/day), developing after the 20th week of pregnancy. In severe preeclampsia, the maternal risk of cerebral hemorrhage increases with SBP \geq 160 mmHg, and DBP \geq 110 mmHg has been associated with greater risk of placental abruption and intrauterine growth restriction. Usually pharmacologic treatment initiation at 140/90 mmHg. If a woman has target organ damage or concomitant medical issues warranting tighter control (e.g., diabetes or pre-existing renal disease), 130/80 mmHg is preferable. Patients with severe preeclampsia will need parenteral agents to achieve rapid blood pressure control to avoid end-organ damage. The goal of antihypertensive treatment during pregnancy is to avoid acute maternal or fetal complications of severe hypertension. Magnesium sulfate is not recommended as antihypertensive agent, but as the drug of choice for seizure prophylaxis in severe preeclampsia and for controlling seizures in eclampsia. First-line medications for the management of acute onset, severe hypertension in pregnant and postpartum women are intravenous hydralazine and labetalol. In fact

these agents are not available in Indonesia. Some studies showed that infusion of nitroglycerine is an effective, safe and alternative therapy for severe pre-eclampsia. Less information currently exist for the use of calcium channel blockers for this clinical indication. Nifedipine is often used as a second-line agent, with extended-release preparation preferred. Short-acting nifedipine should be used with caution during pregnancy due to the potential for acute impairment of uteroplacental flow. One of the agents available for management of crisis hypertensive is nicardipine. Information regarding the use of continuous i.v. administration of nicardipin as an antihypertensive agent in the management of pre-eclampsia is rare. An ongoing prospective study is looking at maternal and fetal outcomes in women with preeclampsia. In the present study, i.v. nicardipin were administered to 30 women with severe pre-eclampsia who were being managed with magnesium sulfate loading and maintenance doses. Maternal blood pressure and heart rate responses, fetal heart rate responses and perinatal fetal-maternal adverse effects were evaluated. A hypotensive response, an important heart rate increased and the adverse effects were not observed. There were no significant changes in fetal heart rate in response to this vasodilator therapy. Nicardipine is an effective, safe and alternative therapy for severe preeclampsia.

Chronic opioids and sleep disordered breathing

Kannan Ramar

Use of opioids in the treatment of both acute and chronic pain has increased significantly in the last two decades. Recent literature suggests that chronic opioid use is related to sleep related breathing disorder, particularly central sleep apnea of both the periodic and non periodic breathing pattern. The clinical significance of these sleep related breath-

ing disorders, the pathogenesis, and the treatment options are not well understood. This article summarizes the current literature on the effects of both acute and chronic opioids use on sleep, sleep disordered breathing and the current evidence on various treatment options available to treat the breathing disorder related to chronic opioid use.

Sleep issues in ICU

Kannan Ramar

Sleep disruptions and derangements commonly encountered in ICU patients may lead to increased morbidity and possibly increased mortality. This interactive session highlights the clinical implications of sleep disruptions in ICU, including factors leading to delirium, and helps the participant to identify various factors including noise, ICU medications, mechanical ventilators and patient care related activities that contribute to poor sleep quality. Participants are also guided through interventions to improve sleep quality in critically ill patients.

- Sleep quality is affected in the ICU with increased arousals and awakenings
- Though the total sleep time over a 24-hour period may occasionally be normal, the sleep-wake cycle is severely fragmented with more than half of the sleep occurring during the day and the other half at night
- Sleep architecture is altered in the ICU with an increase in stage N1 and decrease in stage N2 and REM
- Altered circadian rhythm
- Recording of sleep using polysomnogram is very difficult
- Noise and patient care related activities contribute to about 30% of the factors that affect sleep in the ICU. The other determinants include medications, delirium, sepsis, pain, and mechanical ventilation
- Further studies and research opportunities exist in this area of medicine.

Fluid resuscitation strategies in trauma patients – emergency medicine perspective

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Trauma is one of the leading causes of death in many nations. According the WHO update, in 2004, South East Asia Region, has the highest proportion and injury related death (116.6/100,000 population) in the world. Trauma is a disease that consists of many specific disease conditions such as chest injuries, crush injuries, solid organ injuries, head injuries and many more. Volume deficiencies are often the present in trauma patient therefore can subsequently result in morbidity and mortality. Adequate volume resuscitation, with the objective of restoration of blood volume appears to be the main principles and basis in the management of most trauma patients. However, there is still no consensus regarding the optimal treatment of hemorrhagic shock in trauma patients.

Controversies always exist with regards to types of fluids to be utilized, and clinical end points of fluid resuscitations.

This paper highlight strategies that can be utilized in fluid resuscitation of trauma patient, looking into the perspective of the various issues and challenges faces by the medical practitioner and physicians in this region. Sophisticated approach, tailored to specific trauma disease needs to be looked into in objective manner, considering the limitations encountered by physicians in emergency setting. Golden hour concept, team work approach shall be incorporated as the determining factor in adequate fluid resuscitations in trauma, hence play a major role in ensuring optimal outcome.

Carotid stenting is the treatment of choice for all patients with carotid artery disease to prevent a stroke

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Affecting over half a million people per year in the USA and 1 million in Indochina, stroke is the third leading cause of death in the United States. Approximately 30% of strokes are caused by carotid occlusive disease. The traditional methods of treating carotid stenosis have included medical therapy or surgical therapy.

Those with symptomatic moderate or severe cervical carotid arterial stenosis have been treated with carotid endarterectomy (CEA). Medical therapy with aspirin and more recently with clopidogrel (Plavix) and statins such as atorvastatin has been reserved for mild to moderate (asymptomatic) carotid stenosis or non-cervical carotid stenosis.

First performed nearly 26 years ago, carotid arterial stenting (CAS), until recently, has been a footnote in the treatment of carotid artery disease having been performed only at a few centers for a few select indications. Coupled with the recent developments such as proximal and distal embolic protection devices (EPD), CAS has become a viable option

in the treatment of carotid artery occlusive disease.

The initial carotid angioplasty was first performed by Mathias in 1979, followed a decade later by the first stent deployment in 1989. At 1 year in the landmark SAPPHERE trial, CAS with EPD fared significantly better than CEA in the composite endpoint of death, stroke and myocardial infarction (12.0% vs. 20.1%, $p < 0.05$). Since then multiple trials including the latest CREST trial have all shown comparative long term results

In the future, as endovascular therapy becomes further refined, with better EPD's, better stents (drug eluting) and more experienced operators, mortality and morbidity associated with the procedure will continue to decline.

Just as medical therapy has a role in mild to moderate lesions, the final role of endovascular therapy in this huge population remains to be seen. If I were a surgeon in 2012 I would start learning how to perform endovascular carotid stenting or look for a new job!

Management of metabolic disorders in children

Osama Kentab

The unexpected presentations of this group of disorders make it unique, finding and trying to diagnose them creates a dilemma.

I will try to shed some light on the assessment of these disorders in a simple way from the emergency medicine perspective and try to show one of the ways of management

to make you comfortable in dealing with these children.

They are a challenge. We are going to learn about presentations and their urgent needs.

Coming out from this presentation you will feel more at ease when dealing with them in an emergency situation.

Pulmonary fibrosis in ICU setting

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Idiopathic pulmonary fibrosis is a part of large group of interstitial lung disease with unknown etiology, progressive and poor prognosis. In most cases of IPF, the diffusion and ventilator defect worsens as the result of the extent of fibrosis. The most common reason for ICU admission in pulmonary fibrosis was respiratory failure, and mostly have poor prognosis in short and long term. The complication

of ICU admission in pulmonary fibrosis range from sepsis, multiple organ failure and death. The mortality rates were as much as 61%, and was not improved by mechanical ventilation. In this presentation, the pathophysiology of IPF and progressivities that lead to ICU setting and strategies for IPF in ICU were presented.

Review of COPD and comorbidities

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Chronic obstructive pulmonary disease (COPD) is a growing global epidemic that is particularly important in developing countries. Morbidity and mortality from COPD will rise as populations age and mortality from cardiovascular and infectious diseases falls. Whereas cigarette smoking is the commonest cause of COPD in developed countries, COPD is also seen in nonsmokers.

Pathogenesis consist of smoking processes which also inducing local inflammatory and followed by systemic inflammation and wide variety of systemic consequences or extra-pulmonary manifestations, the presence of comorbidities, and functional decline ageing. Other possible mechanisms (which are not mutually exclusive) include shared genetic predispositions, physical inactivity secondary to airway obstruction, and chronic hypoxia. Several inflammatory cytokines, including tumour necrosis factor- α (TNF α), interleukin (IL)-6, CXCL8 (IL-8), and

IL-18, and acute phase proteins, such as C-reactive protein (CRP), serum amyloid A, and fibrinogen are increased within the circulation of patients with COPD, particularly during exacerbations.

Broader J (2012) found out 79 comorbidities from a COPD study which included 15 comorbidities that was significantly higher in nonsurvivors vs survivors. With use of multivariate analysis, only 12 of the comorbidities increased the risk of death. These 12 comorbidities fell into 6 areas: oncologic (lung, pancreatic, esophageal, and breast cancers), pulmonary (pulmonary fibrosis), cardiac (atrial fibrillation/flutter, congestive heart failure, and coronary artery disease), gastrointestinal (gastric/duodenal ulcer, liver cirrhosis), endocrine (diabetes with neuropathy) and psychiatric (anxiety). These systemic manifestations can further impair functional capacity and health-related quality of life and mortality. Hence it is important to improve the health status

and prognosis of COPD patients through the optimal care of COPD and its extrapulmonary manifestation.

Basic needs in management of COPD according to Caverly (2008) are more effective diagnosis and prevention, better symptom control, prevention of disease progression, prevention of exacerbations, reduction of disease-related mortality, identification and reduction of systemic disease secondary to COPD and comorbidities. The basic treatment for COPD are choices of bronchodilator such as short acting or long acting bronchodilator, and treatment of COPD inflammation which may concomitantly treat systemic inflammation and associated comorbidities. New broad-spectrum anti-inflammatory treatments, such as phosphodiesterase 4 inhibitors, have significant side-effects so it may be necessary to develop other inhaled drugs in the future.

Management of comorbidities depends on its specific organ involvement. The researchers found that CVD (heart disease, hypertension, stroke, claudication) was more prevalent in patients with COPD than in control subjects with normal lung function (50.1% vs 41.0%; $p < .001$). In addition, they

found that the combined prevalence of angina pectoris, heart failure, and myocardial infarction was 18.5% in the COPD group and 13.7% in the control group ($p = .006$). Recently statins have emerged as a possible disease modifying agent in COPD. Studies showed that statins possess pleiotropic effects in addition to their conventional lipid-lowering properties including anti-inflammatory, antioxidant, antithrombotic and vascular function-restoring actions. For example they have been shown to have a beneficial effect in sepsis and pneumonia. A systematic review concluded that statins may reduce morbidity and/or mortality in COPD patients. More research is needed on COPD inflammation and their treatment.

Findings showed that patients in the BODE cohort had an average of 6.0 (± 3.5) comorbidities. Nonsurvivors had a higher number of comorbidities (6.5 ± 3.8) compared with survivors (5.8 ± 3.3 comorbidities). COPD specific comorbidity test (COTE) developed by Dr. Divos (2011) on these 12 comorbidities to a comorbidity risk index are complementary to the BODE index and can be used to help predict an increased risk of death in COPD patients in both clinical and research settings.

Enteral nutrition therapy with omega 3, omega 6, and antioxidant in ARDS and sepsis

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It has been reported that nutritional therapy with specialized diets can modulate the inflammatory responses.

The inflammatory reaction is capable of activating the synthesis of several lipid mediators which are involved in the complex regulation of the inflammatory process. Lipid mediators are synthesized by three main pathways, cyclooxygenase, 5-lipoxygenase and cytochrome P450, by using fatty acids such as arachidonic acid (AA), eicosapentaenoic acid (EPA) and α -linolenic acid (GLA) as substrates, but the biological anti-inflammatory activities of EPA and GLA are far beyond the simple regulation of eicosanoid production.

In 1999, Gadek and co-workers demonstrated that the

use of a diet enriched with EPA, GLA and antioxidants can improve oxygenation status in patients with acute respiratory distress syndrome (ARDS). The same study demonstrated that patients nourished with this diet spend fewer days in the ICU as well as in the hospital. This diet was further evaluated in two additional studies published in 2006. Singer et al demonstrated the effectiveness of an EPA/GLA diet in improving oxygenation status and decreasing the ICU and hospital length of stay (LOS) of patients with acute lung injury (ALI). This diet was also associated with lower mortality rates on the basis of 28-day all-cause mortality. Similar results were observed by Pontes-Arruda et al in which such a diet was fed to patients with ARDS secondary to severe sepsis and/or septic shock.

Relationship between intracranial pressure monitoring and outcomes in severe traumatic brain injury patients

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Traumatic brain injury (TBI) is a major medical and socio-economic problem and is the leading cause of death and disability in young adults. In the United States, approximately 60,000 to 75,000 deaths and 70,000 to 90,000 disabling injuries occur each year. Intracranial hypertension is a common secondary brain insult that may occur in up to 70% of patients with severe TBI. Several studies have demonstrated a correlation between intracranial hypertension and poor outcome in patients with severe TBI. For several years, continuous monitoring of intracranial pressure (ICP) and therapies that lower it have been major components and the mainstay of management of patients with severe TBI. In 2007, the Brain Trauma Foundation (BTF) published the third edition of “Guidelines for the Management of Severe Traumatic Brain Injury” which included “Indications for Intracranial Pressure Monitoring”. The BTF recommended that “ICP should be monitored in all salvageable patients with a severe TBI (Glasgow Coma Scale [GCS] score of 3 to 8 after resuscitation) and an abnormal computed tomography (CT) scan”. Also, “ICP monitoring is indicated in patients with severe TBI with a

normal CT scan if two or more of the following features are noted at admission: age over 40 years, unilateral or bilateral motor posturing, or systolic blood pressure <90 mmHg”. These guidelines are based on Class II and III evidence, respectively; however, they have not been validated using either prospectively or retrospectively collected data. There is contradicting evidence about whether ICP monitoring improves outcome. Several studies demonstrated that ICP monitoring reduces the overall mortality rate of severe TBI. However, other studies have not shown benefits from ICP monitoring. Moreover, a few studies have demonstrated that ICP monitoring was associated with worsening of survival. In the Cochrane database, a recent systematic review found no randomized controlled trials that can clarify the role of ICP monitoring in acute coma whether traumatic or non-traumatic. The purpose of this study was to examine the relationship between ICP monitoring and outcomes in patients with severe TBI. We hypothesized that ICP monitoring may not be associated with a reduced mortality in patients with severe TBI.

How to manage cervical spine injury

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Introduction: Many airway management plans would be reasonable for patients with potential cervical spine injuries because there is no evidence for the superiority of any individual tracheal intubation technique. The urgency of

airway intervention is the most important factor in planning airway management for patients with potential C-spine injuries. Other considerations include the assessment of the risk of cord injury with head and neck movement, the

airway anatomy, the patients degree of cooperation, and the anesthesiologists expertise.

Method: The standard radiologic evaluation consists of 3 views: the cross-table lateral, anterior-posterior, and open-mouth view. All 7 vertebrae must be examined because 20%-30% of all C-spine injuries are at C-7. Pulling the arms and shoulders caudad may be necessary to see C-7. If this is insufficient, raising the arm closest to the film over the head and depressing the opposite arm (the swimmers view) may expose it. In doubt, computed tomography (CT) scan is considered the gold standard. It is superior to plain films in identifying injuries at C-1 or C-2, showing fine detail and resolving tissue densities. Fractures in an axial plane are difficult to identify by CT scan and ligamentous injuries may not be appreciated.

A radiologist should evaluate emergency C-spine films, but the anesthesiologist should have the skill in reading them also, as the condition of the spine will usually affect the approach for airway management. Evaluation includes the alignment of the vertebrae, the condition of the bones and cartilage, and the width of the soft tissue spaces and intervertebral spaces.

Result: It involves people of all age; the age frequency peaks are 15-35 years and greater than 65 years of age. Cervical spine injuries occur in 1.5%-3% of all major trauma cases. The type of accidents include motor vehicle accidents (50%-70%), falls (6%-10%), diving accidents, blunt head and neck traumas, penetrating neck injuries and contact sports injuries. The incidence of cervical spine injuries in head trauma victims is 1%-3% in adults and 0.5% in children, no higher than the figures for trauma victims in general. At least 20% of the patients will have more than one cervical spine fractures. Twenty to 75% of the cervical spine fractures are considered unstable and 30%-70% of these have associated neurologic injuries to the spinal cord. In traumatized patients, 3%-25% of spinal

cord injuries occur during field stabilization, transit to the hospital, or early in the course of therapy, In operating theatre and Intensive Care Unit.

Conclusion: The goals of resuscitation should be stabilization of the cervical spine, prevention of secondary injury, reduction of the fracture as soon as possible and protection of the spinal cord. The circulation of the spinal cord is more vulnerable to injury than that of the brain. Immediately following blunt trauma or compression, hemorrhages are seen in the central gray matter. A zone of hemorrhage, edema and necrosis spreads from the central area to involve, in severe injuries, the entire diameter of the cord within 6 to 24 hours. Damage to the gray matter involves only two or three segments at the level of injury. This will cause an interruption of nerve conduction in the fiber tracts, which isolates the region of the body below the level of injury from cerebral control.

There is progressive loss of function after the initial impact for the first 24 hours related to associated secondary injury, edema, disc compression, hematoma and hypoperfusion to the spinal cord. As edema subsides or circulation is reestablished, the function in some areas may improve slightly; in the absence of further injury, the pattern is usually stable after the first day. The rest of the patients progress can be divided in an acute and chronic phase. This implies that, in order to prevent additional neurologic disability, care of any severely injured patient must include neck stabilization until cervical fracture is ruled out. Since the prognosis for recovery from complete cervical cord lesions is poor, emphasis must be placed first on preventing injury and second on preventing extension of neurologic injury once trauma has occurred.

Key words: Cervical injury, stablitation, operating theatre, Intensive Care Unit, spine surgeon, anesthesiolog.

Disaster action team: To care & to safe

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Introduction: The Faculty of Medicine - University of Brawijaya, Indonesia, has organized Disaster Action Team (DAT) called ‘Team for Emergency and Disaster’ (TED) to ensure that trained physicians and nurses can respond rapidly in a disaster event within hours. Disaster action teams provide immediate, identifiable emergency services to those affected by disaster. In addition to initiating rapid response team for disaster relief, TED determines the need for mobilizing additional resources for other institutions that may be needed. The TED uses the key principle of disaster medical care ie ‘to do the greatest good for the greatest number of patients’ in determining its disaster services program, while the objective of conventional medical care is to do the greatest good for the individual patient.

Review: Disaster action teams are comprised of Rapid Response Team, Rapid Health Assessment Team, and Health Assistant Team, with a single leader and several members. The Disaster Action Team leader serves as coordinator of and provides leadership for other teams. The Disaster Action Team concept is intended to place trained physicians & nurses on the scene of a disaster within hours. The responding disaster action team volunteer makes an

initial assessment and calls for additional help as needed. We applied this concept during earthquake in West Sumatra (2009), flash flood in West Papua (2010), and volcano eruption in Central Java (2010).

Discussion: This team is applicable in 3 different type of disasters; either in advanced medical service post (hospital & field hospital) or basic medical service post. Mission period of 14 days is considered effective to make the system runs, with or without substitution with fresh team with overlapping time. By empowering local capacities, we successfully carried on the established system and maintained system sustainability.

Conclusion: Disaster medicine is clearly a marriage between emergency medicine & disaster management. Emergency department is the best learning ground to manage disaster care, by performing good daily emergency practice. Preparedness is essential to set up our mission during the disaster.

Key words: Disasters, natural disaster, disaster medicine, disaster management, emergency medical assistance, template for disaster.

Precaution practices in emergency setting

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Hospital Emergency Department (ED) in our setting has led to an important increase in the number of visits in recent years. This fact, together with the frequent lack of hospital beds, produces overburdened emergency services. On average, waiting time from arrival at ED to be admitted to

the room is about 2 to 6 hours and it could take longer in the several situations.

In these circumstances, the risk of transmission of infectious diseases in emergency rooms, particularly of the respiratory

pathways, is especially relevant. Infections may be transmitted by three mechanisms: by air, by droplets and by physical contact.

The transmission of air-borne diseases occurs via droplets or dust particles which contain the infectious agent. These droplets are produced when an infected person speak, coughs or sneezes.

Transmission may also occur by direct contact with the infected person or indirect contact with contaminated objects or surfaces in the surroundings.

In the area of a crowded ED, new baby born, immune-compromised or patients with significant co-morbidity (HIV, severe malnutrition, malignancy, severe sepsis, liver or renal failure) may wait for hours in contact with other

patients some of respiratory infection, or carries of extended spectrum of beta-lactamase or methicillin-resistant *S. aureus*. And those patients in ED maybe contact to lung tuberculosis, avian flu, or diphtheria.

Besides of the possibility of the patients contact to infectious diseases, health-care workers (incl. doctors, nurses, medical students) also take a risk. The occupational diseases infection can be happened because of work over-load in ED.

Precaution practices in emergency setting is very important to protect not just patients but also the health-care workers. The standard and isolation precautions should be practices in ED, including protected the health-care workers health by giving vaccinations.

Chest compression mechanical devices

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Cardiac arrest is considered the cause of more than half of the cardiovascular disease cause of deaths, with a high morbidity and mortality. The aim of CPR is to restore circulation to the vital organs, and the heart itself, so the patient reestablishes spontaneous circulation without the need for further intervention. Since cardiac compressions were developed in 1968 by Kouwenhoven et al., there have been a number of mechanical devices generated to help improve the quality and overall results, but above all improve survival rates. The main focus of mechanical devices has been adequate compression depth, rate and consistency; but with other objectives such as improving inter-rescuer variations, unifying techniques, and above all get successful treatment of out-of-hospital cardiac arrest. Chest compressions are divided into two phases: compression phase and decompression phase. Compression phase were ejection of blood from the heart is managed, and decompression phase where there is flow back into the heart.

Some of the devices developed have gained acceptance and clinical usage has started in every day life.

With various randomized trials performed and being performed at this time such as OHCA, CIRC, PARAMEDIC. Finding advantages and disadvantages for each. Overall disadvantages have been found, such as the quality diminishes after a short period of time when provided by medical staff, failure to maintain the relationship of compression to ventilations, slow compression rate, inappropriate compression depth, among others.

In order to judge a good CPR quality and technique have been analyzed, the most commonly used is coronary perfusion pressure (CPP), which works as indicator of successful return of spontaneous circulation (ROSC). Along with end-tidal carbon dioxide (ETCO₂) pressure, which helps by assessing cardiac output, systolic arterial pressure (as a predictive value for neurological recovery) and survival to hospital discharge.

The Piston Chest Compression device is considered an extension of the standard technique, administers chest compressions at a specific rate, compression depth, and duty cycle. Active compression-decompression increases the negative intrathoracic pressure during decompression phase. Load-distributing band CPR works as it produces positive and negative changes in intrathoracic pressure as it inflates and deinflates. Lund University Cardiopulmonary Assist System is a gas-driven, pneumatic device, which delivers both compressions and active decompressions. Life belt compresses the sternum and lateral walls of the chest to provoke increased blood flow.

There is still controversy on whether or not to use mechanical

devices for CPR against manual chest compressions. With little clinical evidence, and the need for a perfect technique of position of the device in order for it to work, the ability and acceptance by the medical team, for them to be used.

The research done is aimed to improve both in-hospital and out-of hospital survival rates. With the known value of the early defibrillation to improve blood flow. And the need for good ventilation, as well as to follow ACLS guidelines to complete cardiac resuscitation in a logical and coordinated way. Chest compressions represent the foundation for maximal survival rate. The different kinds of devices will be analyzed and compared

The Stevens-Johnson syndrome: Implications for acute care physicians

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Stevens-Johnson syndrome is a rare syndrome manifested as a severe cutaneous adverse reaction, as the result of an idiosyncratic reaction to various medications and virus. Described in 1922 by Stevens and Johnson with two cases, being named after them for their introduction of the same into the medical world.

They are commonly compared to erythema multiforme and toxic epidermal necrolysis (TEN), the two other entities manifested by cutaneous reactions to medications.

Stevens-Johnson syndrome can be arbitrarily divided into acute phase, and late phase or sequelae. Manifesting itself as cutaneous erythema with blister formation and hemorrhagic erosions of mucous membranes, accompanied by fever and malaise. Characterized by the occupation of up to 10% of body surface area; in contrast with TEN were the BSA affected should be above 30%. It is classified as: EM minor with target or elevated edematous lesions peripherally distributed, and EM major involves ≥ 1 mucous membranes in addition to the feature of EM minor. A clinical sign that

helps to distinguish SJS is the “Nikolsky sign”, in which if mechanical pressure induces epidermal detachment. With a presentation usually in the first 63 days of use of the offending agent. Mainly caused by drugs, but infections have also been associated. Drugs such as: allopurinol, carbamazepine, cotrimoxazole, lamotrigine, nevirapine, phenobarbital, phenytoin, cephalosporines, macrolides, quinolones, tetracyclines, among others, have been attributed as drugs with risk for developing SJS. Virus may also be triggers for SJS, being important to state that 100% of Mycoplasma pneumonia-induced SJS always presents itself as SJS and never as TEN. Many clinical entities have been associated to the same, such as radiotherapy treatment, systemic lupus erythematosus, hepatitis, diabetes mellitus, human immunodeficiency virus infection.

The pathophysiology has been lately based on genetic findings with certain population associations, such as HLA-B*1502 in Han Chinese population reacting against carbamazepine. In European populations allopurinol-triggered SJS and HLA-A*3303, C*0302, and C*0801 has been found.

It is a syndrome categorized as a type IV reaction, where keratinocytes suffer apoptosis, mediated by Fas, FasL, and caspase cascade activation. The activated cytotoxic T lymphocytes (CTLs)/natural killer cells (NK) produce perforin, causing granzyme B to enter the target cell and therefore activate the caspase cascade.

The diagnosis is still based on skin biopsy, but may be complemented by the adverse drug reactions criteria (ARDs).

Identification of the offending agent, and withdrawal of the same is the basis of the treatment, although it is still controversial, and should be accompanied by wound care, supportive management, all this if possible in the ICU or burn unit. Drug therapy is usually divided into systemic steroids, thalidomide, high-dose intravenous immunoglobulins, ciclosporin, Tumor Necrosis Factor (TNF) antagonists,

plasmapheresis, and cyclophosphamide. Thanks to the development of the SCORTEN criteria it is now possible to predict an adequate prognosis, by the evaluation of the severity-of illness, developed with the results from RegiSCAR study, the European registry.

Up to this date complications are common such as the development of a systemic infection which can lead to death. The involvement of the tracheal and bronchial epithelium, which may lead to hypoxemia, hypocapnia, and increases death risk. With the most acquired sequelae being ocular sequelae, which can range from common discomfort, over dryness to functional changes of the conjunctival epithelium, and pathological consistence of tears, resulting in chronic inflammation, entropion, fibrosis, trichiasis and symblepharon; reason for which the ocular treatment from the beginning of its presentation is key to preserving its functionality.

Current management of postpartum hemorrhage

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Obstetric hemorrhage, during or after the third stage of labor, is an extremely dangerous complication that requires immediate diagnosis and management. Post partum hemorrhage (PPH) is the leading cause of maternal mortality worldwide representing the 25% of the cases of maternal mortality according to the World Health Organization.

PPH has been defined as a loss of more than 500 mL of blood during a vaginal delivery or more than 1000 mL of blood during a cesarean section. Other accepted definitions include a decrease of 10% or more in the hemoglobin level or the hematocrit of the patient after delivery. The main causes can be summarized in 4 groups; placental and amniotic tissue retention, hypotonic or atonic uterus, traumatism to the genital tract during labor, and primary or secondary coagulopathies. It is imperative to determine the cause of PPH on each of the patients in order to provide not only

treatment to the hemorrhage itself but specific treatment for the underlying cause as well.

There is data that shows an incidence decrease from 13% to 5% after adequate active management of the third stage of labor, consisting of uterine massage, uterotonic administration after delivery, and proper umbilical cord clamping and placental delivery maneuvers, representing the cornerstone in the prevention of PPH.

Urgent management of PPH is the most important measure to prevent mortality from this complication and includes; aggressive fluid resuscitation and prevention of hypovolemic shock, use of uterotonic drugs (i.e. oxytocin, ergonovine and carbetocin), mechanical devices to prevent further blood loss (i.e. balloon compression devices) , interventional radiology procedures (i.e. selective uterine

arteries embolization), conservative surgical management (i.e. uterine devascularization and compressive sutures) and radical surgical management (i.e. total hysterectomy).

The main complications of this severe clinical picture includes hypovolemic shock, acute respiratory distress syndrome, renal failure, Sheehan's syndrome (hypopituitarism following severe PPH), thrombotic events, gastrointestinal stress ulcers and ultimately death.

In an emergency medicine setting, there are three situations

in which the emergency medicine physician might encounter with this complication and include; patients that are too close to delivery and should not be transferred to another facility, patients who had a delivery in a non-hospital environment, and patients who were discharged home in a stable condition and then had a concerning bleeding that led to an emergency room visit. It is imperative that emergency medicine professionals learn to recognize and treat this potentially fatal complication.

Prompt recognition of hyperkalemia on ECG may save life an ESRD patient from VT

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Background: Hyperkalemia, the most fatal emergency condition in end-stage renal disease (ESRD), may trigger ventricular tachycardia (VT) that leads to cardiac arrest. Studies validate a good correlation between potassium level and ECG changes. Unfortunately, serum electrolytes result will not be available rapidly in most hospitals in Indonesia as it may postpone the treatment.

Case presentation: A 44-year-old woman presented to ED with history of ESRD and 5 times general seizure since 5 hours before admission. No history of fever, headache, nor previous seizure. She routinely underwent 4-hour haemodialysis once a week. BP 176/91 mmHg, pulse rate 50 bpm, respiration 30 tpm, temperature 36.3 °C, RBS 102 g/dl, SaO₂ 95% on room air, GCS E3V3M5, Kusmaull breathing with clear lungs, acral edema, chronic tropic skin, and no focal neurologic deficit. Cardiovascular examination revealed regular bradycardia, no rubs, no gallops murmurs, and flat jugular vein. Patient was placed on cardiac monitor, supplemental oxygen was administered, and IV line was obtained. ECG showed bradycardia, absent P wave, broad QRS and tall T; typical for severe hyperkalemia. As we managed the hyperkalemia with salbutamol nebulae, IV

calcium gluconate 10%, and IV regular insulin plus IV 40% glucose, the patient suddenly had seizure and ECG showed VT with pulse. Then we administered IV midazolam for her seizure and IV sodium bicarbonate, resulted in normal sinus rhythm and hemodynamic improvement in 10 minutes. Electrolytes result has completed in 4 hours and showed potassium level 9.55 mg/dL, ureum 303 mg/dl, and creatinine 13 mg/dl. And the second lab result showed improvement.

Discussion: In this appropriate clinical setting, where ECG changes consistent with severe hyperkalaemia and supported with history of ESRD, we performed empiric therapy since the serum potassium result was anticipated to be unavailable rapidly. Response to therapy was prompt with visualization noted on the ECG and clinically.

Lesson learn: Prompt recognition of hyperkalemia based on ECG may save life an ESRD patient from VT.

Key words : hyperkalemia, end-stage renal disease, ventricular tachycardia.

Status epilepticus: Current management

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Status epilepticus (SE) is a life-threatening medical emergency that still remains a challenge in management for the emergency and critical care physician. As defined by the Epilepsy Foundation, SE is any episode of continuous seizure that last 30 minutes or longer or 2 or more seizures that don't have a recovery phase in between. Lowenstein and colleagues modified the definition in 2007 for a better clinical approach as any event lasting over 5 minutes. After this insight the Epilepsy Foundation agreed that in order to start treatment an episode lasting over 10 minutes is considered as SE. This condition has high morbidity and mortality rates, and is more common in the African American male and twice as common in the elderly population.

There is a wide classification for this condition depending on the type of seizure that predominates during the event. A simple classification is to divide the incidents in convulsive and non-convulsive. More importantly, depending the etiology or triggering factor a SE can be classified as an exacerbation of a preexisting disorder, initial manifestation of a seizure disorder, or it could be secondary to another pathology. With the proper identification of this categories not only will the physician have a better understanding of the implications but also the appropriate management to suppress the ongoing SE and prevent its recurrence. The management of SE independently of its cause is based on simple steps. First as is standard of care, of great importance is the airway

management and aspiration precautions. Secondly is the termination of the seizure activity. This can currently be accomplished, even from the prehospital setting with rapid administration of intravenous or intramuscular drugs. Benzodiazepines remain the first line of treatment with lorazepam in a dose of 0.1 mg/kg as drug of choice, followed by the use of diazepam, phenytoin or fosphenytoin. The next step is an early identification and appropriate management of the precipitating factor. For this, it is essential to do a rapid but complete laboratory workup including basic electrolytes, complete blood count with cultures, toxicology screen, liver function test, and anticonvulsant levels in patients with history of epilepsy. If appropriate, the clinician can consider the use of other diagnostic exams like CT, MRI or lumbar puncture, always taking into account the risk-benefit of these interventions. Of equal importance at this point in time is the management of possible complications, prevention of recurrence and treatment of concomitant or underlying conditions. Still some controversy exists regarding the best treatment approach for refractory SE. Few clinical trials have evaluated the different drugs used for this situation, to date the generalized consensus to use continues infusion of midazolam and propofol and a continuous EEG monitoring. New interventional therapies and anticonvulsive agents show a promising future but large randomized trials are still needed to ascertain if they have superior benefits in comparison to the currently accepted treatment.

Anesthesia management for abdominal aortic aneurysm repair

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Objectives: Abdominal aortic aneurysm (AAA) is a common generative condition affecting the elderly population. Surgery is usually recommended for AAA larger than 5 cm in diameter. Repair also is indicated for painful aneurysms, those that have been associated with atheroembolism. No single anesthetic drugs or technique is ideal for all patients undergoing elective AAA repair. The purpose of this paper is to describe general anaesthesia techniques in the treatment of AAA through laparotomy.

Methods: This paper uses the method of case reports. We report a male – 66-year-old with diagnosis infrarenal AAA, with perioperative problems are hypertension and COPD. AAA repair done through laparotomy under general anaesthesia, insertion endotracheal tube with controlled ventilation. We use intravenous induction, maintenance with inhalation agents and intravenous drug. Monitoring use standard monitor: peripheral saturation, electrode, urinary catheters and invasive monitoring (central venous pressure [CVP] and intraarterial blood pressure).

Results: The operation lasted for 5 hours 30 minutes and aortic clamping lasted for 2 hours 2 minutes. Hemodynamic

fluctuations during surgery: blood pressure 80-150/45-85 mmHg, CVP 6-15 cmH₂O. Intraoperative blood loss was about 2500 ml. Fluids replacement used crystalloid as much as 5800 ml, 1000 ml colloids, PRC 750 ml and 600 ml of FFP. Urine production was about 1.8 ml/kgBW/hour. Postoperative patients remained under general anaesthesia to undergo controlled ventilation in Intensive Care Unit.

Conclusion: No single anesthetic drug or technique is ideal for all patients undergoing elective abdominal aortic aneurysm repair. Monitoring intravascular volume and cardiac, pulmonary, and renal function is essential during the perioperative period. Patients undergoing abdominal aortic aneurysm repair usually experience significant fluid and blood losses. Infrarenal aortic cross-clamping and declamping are significant events during abdominal aortic surgery. Patients recovering from abdominal aortic aneurysm repair are at risk of developing cardiac, pulmonary, and renal dysfunction during the postoperative period. Postoperative patients treated in the Intensive Care Unit. This action is taken to be strictly observed of heart conditions, strict monitoring of renal function and urine production.

Non invasive method of assesing hypoperfusion in paediatric cases in emergency department – our experience using StO₂

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There are many children presented to Emergency Department, with signs and symptoms associated with fluid loss or fluid deficit. However, most of the children were brought by their parents and caretaker in early phase of their disease process. Thus, the manifestation of dehydration at this point of time would be very subtle and in the hand of

inexperienced clinicians, this patient might be regarded of having normal hydration. Despite this, how are we to ascertain or increase our sensitivity towards detecting hypovolemia or occult hypoperfusion in these children in early phase? Invasive method is not well accepted in children as its inflict unnecessary pain and agony. Inspectra Tissue

Oxygenation saturation (StO₂)TM, is recently introduced to the medical field as adjunct measurement in order detect hypoperfusion in adult and as clinical tools to guide in fluid resuscitation. Many studies conducted since 80's, using near spectrum spectroscopy, as an adjunct to help clinicians in deciding for fluid resuscitation, or disposition. However, most of the studies were done in adult age group. This paper reflects on measurement StO₂TM, together with other basic clinical parameters in detecting occult hypoperfusion on those children presented to our department with sign and symptoms of fluid deficit or loss. This is among the first study done as to assess perfusion in the children using Inspectra StO₂TM as an adjunct. These results are also inferred with those presented with mild to moderate, and

to severe degree of dehydration as well, by comparing their StO₂TM readings. StO₂TM readings (as in adult's) of more than 75% indicate adequate perfusion, where as less than 75% indicate inadequate perfusion. Our experience using StO₂TM in children presented with clinical dehydration demonstrated that StO₂TM readings of less than 75% and also some figures did not correlate as in adult. This study also indicate that StO₂TM can be use to predict occult hypoperfusion in pediatric age group, however the baseline figure of 75% need further in depth study.

Key words: Dehydration in children, StO₂TM, hypoperfusion.

A decision to perform thrombolytic procedure for an ACS patient with multiple ST wave alterations

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Background: ECG is central to diagnosis of ACS. ST wave would dynamically alter from time to time. Successful management of ACS requires early diagnosis and aggressive treatment in which limited by time.

Case presentation: A heavy smoker 50-year-old man complained a 2-hour onset of typical chest pain in ED. The pain suddenly emerged when he was watching TV, associated with diaphoresis and vomiting. No history of diabetes nor hypertension. Hemodynamic was unstable with BP 42/26 mmHg, pulse rate 54 bpm, respiration 22x/min, temperature 36 °C, oxygen saturation 96% on room air, and with cold and clammy acral. Cardiovascular examination revealed regular bradycardia, no murmurs nor gallops, unpalpable radial pulse, no jugular vein distension, lungs were clear on auscultation. ECG showed typical inferior and right wall ST elevation and wide QRS bradycardia. The first cardiac enzymes were normal. We administered IV 250 ml fluid bolus, PO aspirin, PO clopidogrel, IM pethidine and supplemental oxygen with close on cardiac monitor. Three minutes afterwards, the ECG was improving into narrow QRS tachycardia and isoelectric

ST wave. BP also improved to 100/50 mmHg. Diagnosis was amended from STEMI to unstable angina, and thrombolytic procedure was suspended accordingly. But the third ECG on 3-hour onset again revealed typical ST elevation. Then cardiac enzymes significantly increased with CPK 6132 U/L, CKMB 683 U/L, and troponin I 82.10 mg/L in the 8-hour of onset. The patient underwent streptokinase procedure as final diagnosis was confirmed as STEMI.

Discussion: Patient presented with typical chest pain, after pain management, was improved clinically on ECG. ST elevation may be due to vasospasm, and the next ST elevation may be caused by re-occlusion. Thrombolytic decision was based on multiple clinical assessments.

Lesson learn: Pain management, close monitoring and good repeated evaluations are crucial before deciding final diagnosis and therapy.

Key words: typical chest pain, ACS, STEMI, UA, thrombolytic procedure.

Disaster management - experiences learned

Osama Kentab

Disasters though a name that we do not like to hear – we have to deal with it and prepare for it.

It is a daily event in some area of the world; we gain a lot of experiences through passing in the way for helping others. Though it is always ugly but we need to build on these

experiences and learn from them how to manage life.

Whether it happens due to war, famine, or natural causes they present a challenge, we are going to share experiences and discuss them, making it a forum of continuous learning which is how we improve our care and planning.

Pocket USG device utilization (or role) on detection of severe dengue in adult patient

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Objectives: Dengue fever may manifested without or with warning sign (DWOWS or DWS) and severe dengue (SD) (WHO 2009). DWOWS can be distinguished from DWS if there is plasma leakage that can be showed by changes in plasma (increased hematocrite) or detecting ascites or pleural effusion by USG. Standard abdominal ultra-sound examination (USG) could found plasma leakage, but this equipment is costly and impractical in daily use. In this study we examined the role of pocket USG device to detect plasma leakage as alternative to ordinary USG.

Methodology: Dengue fever patients are included prospectively in HSH since March 2011 until March 2012, examined appropriately to confirm and classify dengue disease. Pocket USG (P02742, 3.5 Mhz, Signos, Australia) was used to find ascites, pleural efusion or thickened gallbladder wall (defined as wall thickness >0.35 cm). Examined bedside on hospitalized day 1, 3 and 5 for every patients. Analysis was conducted assessing contribution of this USG examination to detect of plasma leakage in comparison with increased hematocrite.

Results: Sixty nine dengue patients were enroled with

characteritis as, fever median duration of 6-7 days, 31 male (45%) with a mean±SD age of 33±15 years. Hct increase (as indicator of plasma leakage) has detected in 22 (31.9 %) of the group. Pocket USG detected ascites in 12 (17.4%), pleural efusion 10 (14.5%). GBT in 22 (31.9%), and pericholecystic fluid in 5 (7.2%) of the patients. Fluid accumulation mostly detect in median day of fever 6 (range 3-8) days. Overall, fluid accumulation as plasma leakage was detected by USG in 27 (39.1%) where as hematocrite increased were found in 22 (31.9%) (p<0.05). GBT were compared to hematocrite for severe dengue (SD), (p<0.01, OR 64.50, 95% CI 9.54-436.20). In comparison with standard USG accuracy was reasonably well. Based on these, we can clasify dengue patient into 42 (60.9%) DWOWS, 22 (31.9%) DWS and 5 (7.2%) SD.

Conclusion: Pocket USG allows detection of plasma leakage including GBT related to severity of dengue infection more sensitive than Hct. Because of its portability, it can be used bedside and in emergency room rapidly.

Key words: Dengue, plasma leakage, hematocrite, GBT, pocket USG.

Case report: Intrathecal normal saline injection at transphenoidal surgery to facilitate tumor exposure

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Background: The transsphenoidal approach to the sella turcica is a direct procedure used to gain access to the pituitary gland and sella region and is associated with relatively fewer complications than a craniotomy. The difficulties of this approach is the small operation field and plenty of important structure inside. Some technique can be used to facilitate tumor expose in this procedure such as: valsava manœuvre, jugular compression, or injection of saline through a lumbar intrathecal catheter. (1)

Case description: 43-year-old with tumor at suprasella region suspected meningioma with compression of optic nerve which causes narrowing of left visual field and decrease of right visus will undergo tumor resection by transphenoidal approach. General anesthesia with induction of propofol 2 mg/kg, fentanyl 1.5 mg/kg, and relaxed by vecuronium 0.1 mg/kg to facilitate 7.5 OTT intubation has been performed, then maintained by intermitten fentanyl and vecuronium and sevofluran and compressed air. Four mL of NaCl 0.9% injected via epidural catheter at L2-L3 to subarachnoid space to facilitate tumor exposure.

Result: During 3 hours surgery tumor can be seen clearly, no injuries to vessel structure and MAP maintained between 80-92 mmHg, HR 60-74/min with bleeding \pm 100 mL. Patient then transferred to ICU for post operative monitoring with ketorolac 30 mg i.v TID and fentanyl 500 mcg/24 hrs via syringe pump. No decrease of visual acuity and field after surgery and neither diabetes insipidus nor sign of meningitis develop.

Discussion: Insertion of 4 mL NaCl 0.9% to subarachnoid space can increase intrathecal pressure then push the tumor and make it more visible. Robert (1999) reported no cases of nerve injury caused by the placement of cerebrospinal fluid drainage needles and catheters in 530 anesthetized patients undergoing neurosurgery. (2) This technique can be used to facilitate tumor exposure, then can prevent neurological or vessel injury, then finally improve the patient outcome.

Key words: Epidural injection, tumor exposure, transsphenoidal approach.

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Mouth to mouth: Would you do it???

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Introduction: Since the 1970's, CPR training guidelines have changed several times. Changes were made to simplify CPR for layman to maximize the potential for early resuscitation. The new CPR guidelines for layperson has been simplified; with chest only compressions without rescue breaths until help arrives; if not confident. Studies have identified reluctance to perform mouth to mouth ventilations as a significant psychological barrier to frequent performance of bystander CPR.

In one survey, only 15% of 975 respondents reported a willingness to perform chest compressions with mouth to mouth ventilations on a stranger, whereas 68% would definitely perform chest only compressions. 80% of the respondents were members of the lay public and 20% were health care providers. I-Yin Lin MD et al suggested that only 2% of participants in a study of 500 laypersons who attended in the training course of DMAT (disaster medical assistant team) would voluntarily perform CPR such as mouth to mouth ventilations.

Study objectives: This study is a phase one study aimed to determine first aid providers' opinion whether layman are willing to provide mouth to mouth ventilations in bystander CPR. Later, phase two study will be carried out via questionnaire directed at layperson, to compare with the outcome of phase one study.

Methodology & instruments: A cross sectional survey,

via questionnaire was done. Questions are based on their opinions regarding possible attitudes of layman in certain scenarios with sample size of 810. Participants were first aid providers: members of the St. John's Ambulance Services and the Red Cross Society. All participants are CPR trained. Age of participants range from 10- to 54-year-old. Out of which 54.8% are females and 45.2% are males.

Conclusion: Based on our study, it is realized that participants with a background knowledge of first aid have different attitude as compared to laypersons when mouth to mouth ventilations is questioned. Hesitancy to provide mouth to mouth ventilations is not an issue for first aid providers when it comes to bystander CPR. Therefore their opinion on layman doing mouth to mouth to strangers when it is required, is 42.2% as compared to 25.9% said they wouldn't. In regards to their opinion on chest only compressions if in doubt to give mouth to mouth, 42.2% was the response as compared to 29.1% said they wouldn't. As recommended by AHA, a bystander who is trained in CPR and is confident, then conventional CPR using 30:2 compressions to ventilations ratio is recommended. Where else compression only CPR is recommended if one is not trained or unwilling to give ventilations. Therefore our survey suggests that implementation of first aid and CPR programs amongst public community may create positive attitude and confidence towards first aid intervention.