NUH National University Hospital

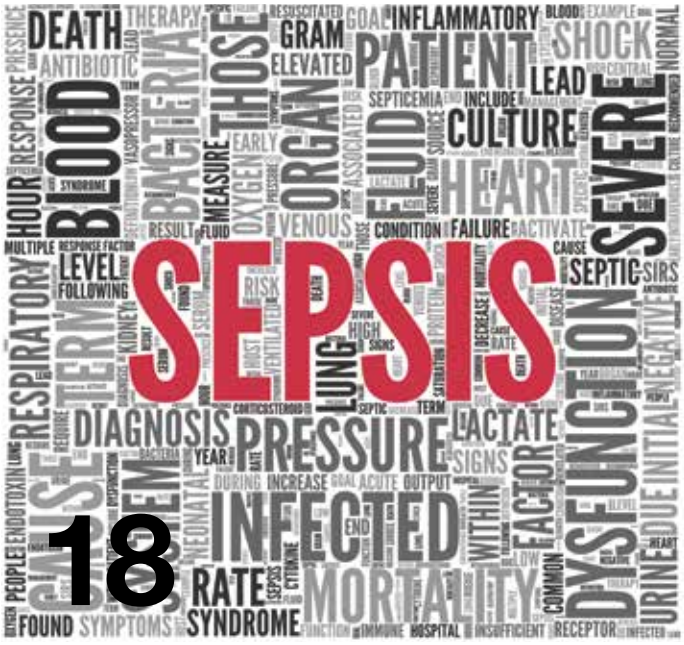
médico

OCT - DEC 2016

A quarterly publication of GP Liaison Centre, National University Hospital. MCI (P) 122/03/2016

NUH Emergency Medicine Department

IN THIS ISSUE



WHAT'S INSIDE

We will love to hear your feedback on Médico

Please direct all feedback to : The Editor, Médico
GP Liaison Centre, National University Hospital,
1E Kent Ridge Road, NUHS Tower Block, Level 6,
Singapore 119228

Tel: 6772 5079 **Email:** gp@nuhs.edu.sg
Fax: 6777 8065 **Website:** www.nuh.com.sg/nuh_gplc

Co. Reg. No. 198500843R

The NUHS group

NUH National University Hospital
NUS National University of Singapore — Yong Loo Lin School of Medicine, Faculty of Dentistry, Saw Swee Hock School of Public Health
National University Heart Centre, Singapore
National University Cancer Institute, Singapore

A Publication of NUH GP Liaison Centre (GPLC)

Advisor
A/Prof Goh Lee Gan

Editors
Amaranta Lim
Karin Lim

Editorial Member
Yvonne Lin

NUH Emergency Medicine Department

The Emergency Medicine Department (EMD) @ National University Hospital (NUH) is a tertiary level emergency department that sees an estimated 130,000 adult and paediatric patients every year. We have a team of 24/7 emergency specialists on site, with accessibility to all other adult and paediatric medical and surgical specialty support within the hospital.

We have a total of 26 specialists, some of whom have had sub-specialty training in and lead emergency cardiac care, disaster medicine, observational medicine, trauma as well as toxicology care. Other areas of interest include critical care, risk management, information technology, pre-hospital, geriatric and end of life care.

A time critical condition that we strive to improve upon is acute stroke care. With a quality initiative, we have managed to reduce thrombolytics treatment time by 20%, resulting in better functional outcomes.

Another time critical condition is Acute Myocardial Infarct (AMI). Our collaboration with the cardiology team to improve our “Door to balloon” time has been ongoing for more than 10 years, culminating in 2011 when our team was awarded the prestigious National Clinical Excellence Team Award. The department has won the National Medical Excellence Award four times to date.

Our clinician leaders, apart from being great clinicians, are also award winning educators, administrators and leaders in both undergraduate and postgraduate emergency medicine nationally. Through great teamwork, the department has consistently been among the top within the healthcare service for both undergraduate as well as postgraduate training.

Department initiatives that have been novel and first in the country include the 24-hours observation medicine facility where we can observe and treat patients who present with the 30 common conditions. This has now become a standard of care across Singapore.

Ultrasonography in Emergency

The use of bedside ultrasonography as point-of-care (POC) testing has become ubiquitous in the Emergency Medicine Department (EMD). POC ultrasonography has been dubbed as the stethoscope of the 21st century and is valuable in providing timely information to aid in diagnosis and clinical management. With a growing need to educate and equip future emergency physicians with this essential skill, a structured training programme for credentialing bedside ultrasonography was initiated in our EMD in 2012. From the beginning of junior residency years, every resident has to go through a series of lectures, hands-on training sessions and competency evaluation under direct observation by a trained faculty to ensure good probe handling techniques, accurate image acquisition and interpretation skills.

Today, all of our emergency physicians, senior residents and resident physicians are well equipped with bedside ultrasonographic skills. Armed with this important knowledge and skill set, POC ultrasonography has become an essential part of clinical evaluation for EMD patients. Since the widespread use of POC ultrasonography by non-expert sonographers more than 20 years ago[1], many protocols have been established to help clinicians in evaluating undifferentiated patients of various commonly encountered symptoms.

For instance, in the acutely dypsnoeic patient, the use of the BLUE (Bedside Lung Ultrasound in Emergency) protocol aids in distinguishing pulmonary edema, pneumothorax, obstructive airway disease or pneumonia as a cause of breathlessness[2]. Diffuse B lines seen on ultrasonography would suggest the presence of interstitial edema while the presence of shred sign indicating alveolar consolidation with an aerated lung border would point towards a diagnosis of pneumonia (see ultrasound images I)[2].

Other frequent complaints such as abdominal pain and chest pain can also be evaluated using POC ultrasonography. An elderly patient presenting with abdominal pain and syncope would warrant bedside ultrasonography to evaluate for presence of leaking abdominal aortic aneurysm (see ultrasound images II). A hypertensive patient with chest pain should be evaluated with a POC echocardiography to look for signs of dilated aortic root with dissection flap.

ULTRASOUND IMAGES I

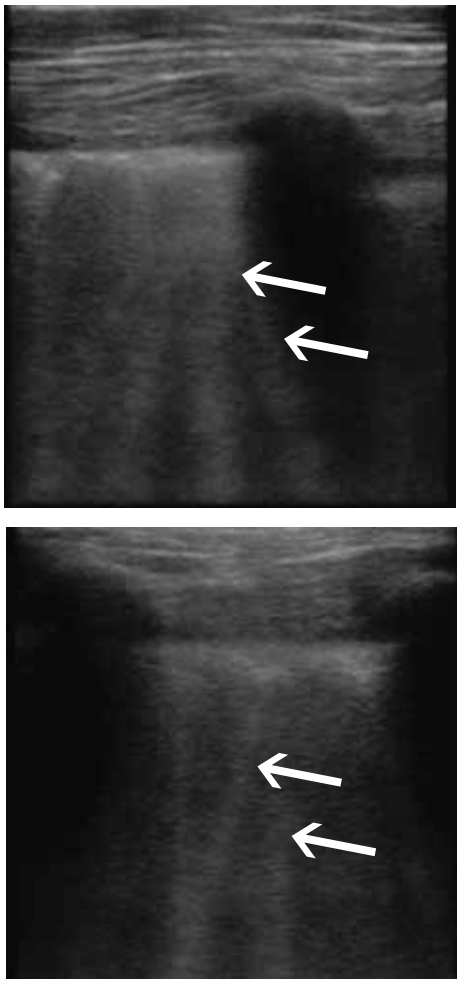


Figure showing multiple B lines (white arrows) on lung ultrasonography, indicating the presence of interstitial edema

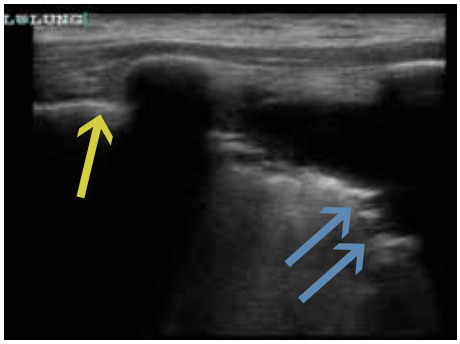


Figure showing shred sign (alveolar syndrome), irregular border with aerated lung (blue arrows). Normal pleural line (yellow arrow).

ULTRASOUND IMAGES II

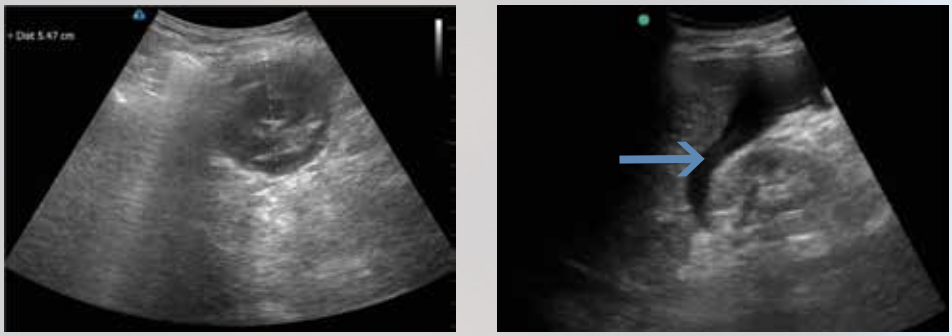


Figure on the left shows an abdominal aortic aneurysm (AAA) measuring more than 5cm with thombus. Figure on the right shows presence of intra-abdominal free fluid (blue arrow) in the Morrison's pouch. In the presence of an AAA, this suggests a leak or rupture with haemoperitoneum.

In the EMD, part and parcel of our daily encounters involve critically ill patients. Evaluating a patient in shock can be challenging. In such situations, ultrasonographic evaluation in the hypotensive patient is particularly informative. The RUSH (Rapid Ultrasound in SHock) protocol provides a rapid 3-step algorithm to evaluate the type of shock and this can guide further management[3]. This 3-step algorithm involves evaluating the pump (heart), the tank (inferior vena cava [IVC], jugular veins and lungs) and the pipes (deep venous system of the lower limbs and abdominal aorta) [3]. Various possible findings could point the physician towards the type of shock present (Table 1) and allow institution of appropriate treatment.

Apart from diagnostic purposes, ultrasound is a useful aid in clinical procedures. Central venous catheter insertions, aspiration of abscesses or reduction of fractures at bedside can be performed using ultrasonographic guidance. Failure rates and complications of central venous catheter insertions have been shown to decrease if performed under ultrasound guidance[4]. Adequacy of alignment of distal radius fractures after manipulation and reduction can also be confirmed by bedside ultrasonography, which aids in reducing throughput time in an ever-crowded emergency department[5].

Most importantly, the use of bedside ultrasonography can be life-saving. The following case study illustrates how bedside ultrasonographic evaluation can guide clinical management and improve patients' outcomes.

Component in RUSH protocol	Ultrasonographic findings			
	Hypovolemic shock	Cardiogenic shock	Obstructive shock	Distributive shock
Pump	Hyperdynamic EF, flattened cardiac chambers.	Reduced cardiac contractility, dilated chambers.	Hyperdynamic EF, pericardial effusion, cardiac tamponade, right heart strain, or cardiac thrombus.	EF can be hyperdynamic in early sepsis or depressed in late septic stage.
Tank	Flat IVC and jugular veins.	Distended IVC and jugular veins. Pulmonary edema, pleural effusion and ascites.	Distended IVC and jugular veins. Absent lung sliding (pneumothorax).	IVC can be normal or small.
Pipes	Abdominal aneurysm, aortic dissection.	Normal	Deep venous thrombosis.	Normal

Table 1: Ultrasonographic findings indicating different types of shock.Legend: EF - Ejection Fraction; IVC - Inferior Vena Cava. Adapted from Perera P, Mailhot T, Riley D, Mandavia D. The RUSH exam: Rapid Ultrasound in SHock in the evaluation of the critically ill. Emerg Med Clin North Am 2010;28(1):29-56[3].

CASE STUDY

A middle-aged Chinese female who was previously well, was brought into the EMD for complaints of shortness of breath, chest pain and bilateral lower limb swelling. On arrival, she was diaphoretic, tachypnoeic and could only converse in phrases. Physical examination also revealed a pelvic mass palpable up to a level above the umbilicus.

A bedside ultrasonography showed right ventricular dilatation with straightening of the interventricular septum, indicating severe right heart strain. The left femoral vein was non-compressible on ultrasound, diagnostic of deep venous thrombosis. She suffered a PEA (pulseless electrical activity) collapse before further radiological imaging could be performed. Thrombolysis with rTPA was given with subsequent return of spontaneous circulation, after which a computed tomography pulmonary angiogram was performed, showing bilateral massive pulmonary emboli.

She was treated and subsequently discharged with no neurological deficit.

Figure showing 'D' sign: straightening of interventricular septum indicating increased right ventricular pressure

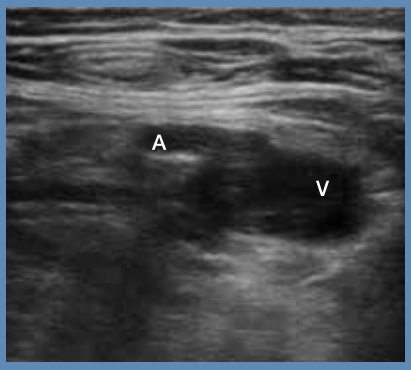


Figure showing A = femoral artery; V = femoral vein. The external compression has caused the femoral artery to be indented but the femoral vein remains non-compressible.

The role of POC ultrasonography in emergency medicine is an exciting and developing field. Various research studies using ultrasonography for evaluation of the dyspnoeic patients and patients in cardiac arrest are currently ongoing in our department. We hope to further develop our ultrasound training and skills for continual improvement in quality of care and outcomes for our patients.

[1] Arntfield RT, Millington SJ. Point of Care Cardiac Ultrasound Applications in the Emergency Department and Intensive Care Unit - A Review. Current Cardiology Reviews. 2012;8:98-108.

[2] Lichtenstein DA, Mezière GA. Relevance of lung ultrasound in the diagnosis of acute respiratory failure. The BLUE protocol. Chest. 2008;134:117-25

[3] Perera P, Mailhot T, Riley D, Mandavia D. The RUSH exam: Rapid Ultrasound in SHock in the evaluation of the critically ill. Emerg Med Clin North Am 2010;28(1):29-56.

[4] Randolph AG, Cook DJ, Gonzales CA, Pribble CG.Ultrasound guidance for placement of central venous catheters: a meta-analysis of the literature. Crit Care Med 1996; 24:2053-2058.

[5] Ang SH, Lee SW, Lam KY. Ultrasound-guided reduction of distal radius fractures. Am J Emerg Med 2010;28(9):1002-8.

Dr Gene Chan

Consultant
Emergency Medicine Department

Dr Chua Mui Teng

Associate Consultant
Emergency Medicine Department

Dr Chua Mui Teng fell in love with ultrasonography during her residency training at the Emergency Medicine Department, NUH. Since then, she has been practising point-of-care ultrasonography routinely during clinical practice. She is passionate about the use of ultrasonography during resuscitation of patients in shock and cardiac arrest. Together with the department's Ultrasound Director, Dr Gene Chan, they hope to they hope to spread this passion and skill among every clinician.

Heart Matters in the Emergency Department

"Hotel Six, Hotel Six, Standby for Male 60 years old, Case of Chest Pain Query AMI." Such standby messages are transmitted over the SCDF VHF radio on a daily basis. As a major cardiac centre in the western part of Singapore, the NUH Emergency Medicine Department (EMD) receives at least one to two of such SCDF ambulance standbys a day. In the pre-hospital setting, SCDF paramedics are trained to follow standard protocols for chest pain, which include providing the patients with supplemental oxygen, glyceryl trinitrate (GTN) sprays to relieve the chest pain, and a loading dose of oral Aspirin. They also provide continuous vital signs and cardiac monitoring for such patients, which enables early detection and management of myocardial infarction (MI)-related-related arrhythmias.

When standbys are called in, pre-hospital ECGs are also transmitted to the EMD by the paramedics. This facilitates early activation of our Cardiology colleagues and the interventional lab. By the time the patient presents at the EMD and initial therapy is instituted, the necessary facilities are ready to receive the patient and the Percutaneous Coronary Intervention (PCI) can be performed within 90 minutes. This timing, from the initial presentation at EMD to the PCI, is also known as the Door-to-Balloon time. Current practices of pre-hospital care and emergent PCI in NUH are in line with the recommendations in the 2013 ACCF/AHA Guidelines on the management of STEMI[1].

A review of our PCI lab activation numbers for the 1st half of 2015 suggests that as many as 40% of our patients with AMI come to the EMD as walk-ins. This potentially delays their treatment since the element of effective pre-hospital care is lost. As such, we advise GPs to call the SCDF for patients who walk into their clinic with features suspicious for AMI, instead of patients coming to the EMD via their own transport.

WHAT HAPPENS DURING A PCI LAB ACTIVATION?

When the patient presents at the EMD, the patient is transferred directly into the Priority 1 area and a team of emergency physicians and nurses attend to the patient immediately.

The focus is on:

1) Ensuring the patient is hemodynamically stable
2) Obtaining an emergent ECG
3) Activating the PCI lab and their staff
4) Obtaining emergent consent from the patient for the procedure
5) Administering a loading dose of dual anti-platelet therapy
6) Transferring the patient to the PCI lab

Besides Aspirin, a loading dose of a 2nd anti-platelet agent is also administered in anticipation of the PCI. Newer agents such as Prasugrel and Ticagrelor have largely replaced Clopidogrel as alternative anti-platelet therapy in suitable patients. This is based on data from the Triton-TIMI[2] and PLATO[3] trials which showed that Prasugrel and Ticagrelor were associated with significantly reduced rates of recurrent AMIs as compared to Clopidogrel.

ONGOING COLLABORATION WITH THE DEPARTMENT OF CARDIOLOGY

To maintain and improve upon our Door-to-Balloon times, the EMD has been working regularly with the Department of Cardiology to audit and

monitor the essential timings. Besides regular meetings, timely feedback on any delays is also shared between our two departments as we continue to ensure the best possible care for our patients with STEMI. This has allowed us to consistently achieve Door-To-Balloon times that are less than 90 minutes for more than 90% of our cases. This collaboration, which has been ongoing for more than 10 years, has culminated in the 2011 National Clinical Excellence Team Award in recognition of the efforts to reduce the median Door-to-Balloon times for patients with STEMI. At present, we have successfully reduced our median Door-to-Balloon times from 72 minutes in 2007 to 47 minutes in 2015[4].

TIPS FOR GPs

AMI remains one of the major causes of death in Singapore. However, symptoms may be atypical, especially amongst the elderly and female patients. Such symptoms include dyspnoea, diaphoresis, weakness and confusion. It is important to keep this diagnosis as a consideration, especially if our patients have significant cardiovascular risk factors. If there are any concerns, such patients should have an ECG done, started on oral aspirin 300mg and referred by ambulance to the EMD for further evaluation and management.

Besides obvious ST segment elevations in contiguous leads on the ECG, there has been increasing awareness of other STEMI-equivalent ECG patterns[5] that may warrant urgent PCI, especially if the patient has cardiogenic shock or ongoing angina. These include:

1. Wellens syndrome (Figure 1: a pattern of deeply inverted or biphasic T waves in V2 to V3 - suggestive of a critical stenosis of the left anterior descending artery)
2. De Winters' T-waves (Figure 2: upsloping ST depression with symmetrical prominent T waves in praecordial leads - suggestive of an acute left anterior descending artery occlusion)
3. Elevation in aVR (Figure 3: ST elevation in aVR with widespread ST depressions - suggestive of a Left Main Coronary Artery occlusion / Triple Vessel Disease)
4. Subtle ST segment elevations (Figure 4: Mild ST elevations in II, III, aVF, V4 toV6 - suggestive of an inferolateral AMI; if in doubt, repeat another ECG 10 minutes later)

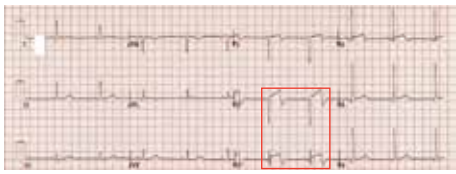


Figure 1

Figure 2

Figure 3

Figure 4

FINAL THOUGHTS

Time is truly myocardium. Delays in urgent PCI in STEMI lead to increased morbidity and mortality for our patients. By working together to educate our patients, maintaining a high degree of suspicion for AMI and optimising pre-hospital and emergent in-hospital care, we can only hope to benefit more patients in the years to come.

References:

[1] O'Gara PT, Kushner FG et al. 2013 ACCF/AHA guideline for the management of ST-elevation myocardial infarction: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2013 Jan 29;61(4) e78-140

[2] Wiviott SD. Braunwalk E et al. for the TRITON-TIMI 38 Investigators. Prasugrel versus clopidogrel in patients with acute coronary syndromes. N Engl J Med 2007 Nov 15;357(20):2001-15

[3] Wallentin L, Becker RC et al for the PLATO investigators. Ticagrelor versus clopidogrel in patients with acute coronary syndromes. N Engl J Med 2009 Sep 10;361(11):1045-57

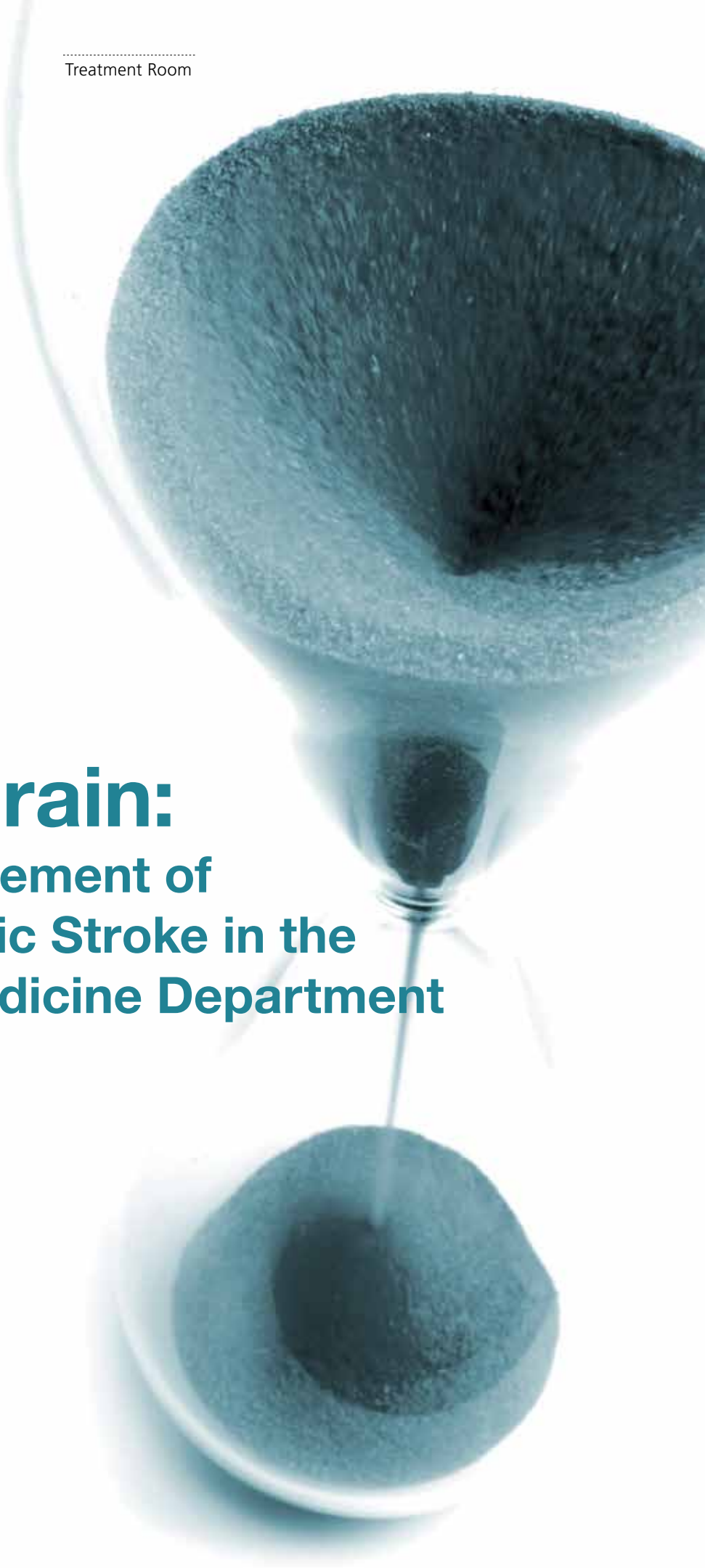
[4] PCI: Door-to-balloon time [cited July 11 2016]. Available from: www.nuhcs.com.sg/clinical-outcomes/pci-doortoballoon-time.html

[5] Life in the Fast Lane [cited July 11 2016]. Available from: lifeinthefastlane.com/ecg-library

Dr Daniel Chor

Senior Resident
Emergency Medicine Department

Dr Daniel Chor is a Senior Resident in his final year of training at the National University Hospital Emergency Medicine Department. He graduated from the Yong Loo Lin School of Medicine, National University of Singapore in 2008 and obtained his MCEM and MMed (Emergency Medicine) in 2014. He believes that good patient care can only stem from collaboration across different medical specialties, as well as timely and relevant patient education.



Time is Brain:

Current Management of Acute Ischaemic Stroke in the Emergency Medicine Department

Stroke is the 9th leading cause of death in Singapore and accounts for significant disability, morbidity and burden on the healthcare system. Primary prevention through the control of cardiovascular risk factors remains the cornerstone of treatment at the population level. However, once acute ischaemic stroke has occurred, the only therapy shown to improve functional outcomes is thrombolysis within 4.5 hours of stroke onset. Therefore, it is critical to identify these patients urgently and refer them to the Emergency Medicine Department (EMD) for evaluation.

STROKE IDENTIFICATION AND PUBLIC AWARENESS

Most of our stroke patients in NUH arrive by ambulance called by a bystander. Local paramedics are taught to identify stroke patients using the FAST mnemonic. FAST has also been used in the United Kingdom and other countries to raise the public awareness of stroke. While it is not perfect, the presence of a **F**acial droop, **A**rm drift or **S**peech disturbance (T stands for **T**ime, which is of the essence) should prompt one to suspect stroke immediately. So far, there have been no campaigns in Singapore to raise public awareness of stroke.

Sometimes, conditions such as a post-ictal state and hypoglycaemia may mimic stroke. It is essential to check the blood glucose of all patients suspected of acute stroke.

DIAGNOSING ACUTE ISCHAEMIC STROKE

A brain CT is done to distinguish ischaemic from haemorrhagic strokes. If no haemorrhage is seen, the stroke is presumed to be ischaemic and the patient will be referred to a neurologist for thrombolysis as an urgent case. Thrombolysis with rTPA (recombinant tissue plasminogen activator) within 4.5 hours of stroke onset is the only therapy shown to improve functional outcomes in acute stroke. Delivery of rTPA must be done expeditiously even within the 'thrombolytic window' of 4.5 hours, as delays within this window may increase the risk of intracranial haemorrhage (ICH) and may result in poor functional outcome.

Here at NUH, we transfer stroke patients from the ambulance directly to the CT scanner, where they are reviewed by a senior emergency physician, instead of assessing them in the resus room first. This has reduced the time of arrival to rTPA administration from 77min to 62min, and this in turn leads to improve functional outcomes.

DECISION TO THROMBOLYSE

The decision to thrombolyse acute ischaemic stroke is complex and all cases involve the neurologist. Symptomatic intracerebral haemorhage is the most feared complication of thrombolysis and occurs in 7% of patients. Therefore, it is important to select patients whose benefits of treatment outweigh the risks. For example, factors such as the current use of warfarin, recent head injury, myocardial infarction and surgery may preclude the use of rTPA. Disease factors such as mild strokes or the presence of cerebral oedema may increase the risk of ICH beyond the benefit of rTPA. If CT angiography identifies a large-vessel (e.g. internal carotid, middle cerebral arteries) occlusion, these patients may be eligible for endovascular clot retrieval. All thrombolysed patients are monitored in a high-dependency ward. Patients diagnosed with ischaemic strokes and deemed ineligible for thrombolysis are usually treated with antiplatelets or anticoagulation.

CONCLUSION

A modern emergency department continuously strives to deliver high-quality and cost-effective care. In the rapidly evolving field of stroke management, our department has innovated processes to meet this goal in an efficient way.

Dr Tam Howen

Senior Resident
Emergency Medicine Department

Dr Tam Howen completed his training in Emergency Medicine at National University Hospital in 2016. He is currently an Associate Consultant in the Emergency Department at Ng Teng Fong General Hospital. While at NUH, Dr Tam led a team together with the Division of Neurology to improve the delivery of care to acute stroke patients.

Trauma care
at the Emergency Medicine Department

Modern day trauma care needs to be understood as a continuum: beginning with safe retrieval and optimal interventions by paramedics in the field; diagnosis and resuscitation by the Emergency Medicine Department; if needed, surgical intervention by trauma surgeons; intensive care support; recovery with physiotherapy and occupational therapy in the wards; long term physical rehabilitation and psychological support services. All the pieces must synergise to ensure the best outcome for our patients.

OVERVIEW OF NUH EMERGENCY MEDICINE DEPARTMENT (EMD)

The role of the emergency medicine physician in the care of trauma patients has undergone significant changes since its earlier days.

Figure 1: EMD Trauma Team assembled in response to a pre-hospital trauma activation.

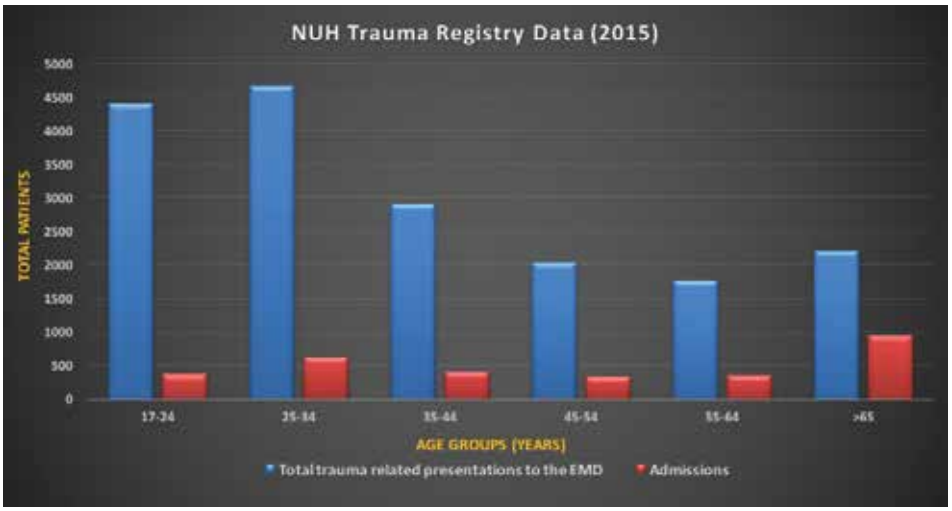


Figure 2: NUH Trauma Registry Data from 2015.

At National University Hospital, our tertiary-level emergency department is staffed with our board-certified EPs 24/7. Trauma related specialties like trauma surgery, orthopaedics, neurosurgery, paediatric surgery, Ob-Gyn, interventional radiology among others, are available 24/7. We are uniquely equipped to manage the immediate, and subsequent downstream care, of all manner of complex trauma cases.

Our hardware includes dedicated trauma resuscitation bays, portable x-ray machines, rapid infusers, intraosseous vascular access systems and a CT scanner in the department.

EPIDEMIOLOGY

Major trauma has traditionally been viewed as a disease of the young. With ageing populations in developed societies, the greater part of the population involved in major trauma is becoming more elderly as well.

The data from the NUH Trauma Registry (2015) indicates that although the ≥ 65 years old demographic comprises 12% of all adult-EMD cases, almost 43% of these patients get admitted (Figure 2). In comparison, the overall admission rate for the 17-64 years old demographic is much lower at 13%[1]. Accidents, violence & poisonings remain the foremost conditions presented with hospitalisation in Singapore[2].

THE 'TIER 3' TRAUMA PATIENT

'Tier 3' trauma patients comprise the majority (up to 98%) of patients seen at healthcare facilities across Singapore presented with trauma related injuries.

Patients with this lower acuity of trauma are routinely seen in the primary care settings and subsequently referred to emergency for various management or interventions.

To optimise care delivery and meet patient expectations, it is advisable that primary healthcare professionals are well versed in the capabilities of the centre that the patient is being referred to.

The segments below elaborate some of NUH EMD's capabilities for the management of a Tier 3 trauma patient.

ORTHOPAEDIC INJURIES

The NUH EMD manages a significant number of orthopaedic injuries. These include sprains (ligamentous injuries), strains (muscle injuries), simple lacerations, joint dislocations and minimally displaced fractures. The majority of these injuries are seen, diagnosed and discharged from the EMD.

Closed fractures of the distal forearm area are frequent presentations at the EMD. The majority of these patients undergo reduction of the fractures under intravenous regional anaesthesia by the Bier's block (Figure 3). Post reduction x-rays ensure acceptable reductions and patients are discharged with short arm back slabs and outpatient orthopaedic follow-up.

Figure 3: Simulated patient undergoing reduction of a distal radius fracture in the EMD under regional anaesthesia (Bier's block), using an automatic tourniquet system.

Figure 4: Simulated patient undergoing reduction of a right shoulder dislocation in the EMD, while being administered Entonox® inhalation for pain relief.

Joint dislocations are routinely reduced in the EMD. Adequate levels of analgesia and sedation are administered using procedural sedation according to departmental protocols. Inhalational aesthetic agents like Entonox®, and nerve blocks are used for the reduction of selected joint dislocations (Figure 4).

OBSERVATION UNIT

The department has an 18-bedded Extended Diagnosis and Treatment Unit (EDTU). The patients admitted to the unit are managed as per specific protocols. Patients presenting with history of trauma and assessed to be requiring prolonged observation are admitted under two protocols: head injury protocol & blunt chest trauma protocols. Patients considered for EDTU admission include:

Minor Head Injury

1. Head Injury with history of loss of consciousness > 10 min or transient amnesia.
2. Persistent nausea and vomiting after minor head injury despite treatment.
3. Uncomplicated, non-depressed closed skull fracture.
4. No reliable caregiver at home.
5. Patient on anticoagulants.

Blunt chest trauma

1. Significant blunt chest trauma (</= 2 ribs fractures of the 4th-12th ribs).
2. Single body region trauma.
3. Normal vital parameters.
4. Normal/non-significant injuries on CXR.
5. Normal screening ECG, haematological & biochemical labs.

In summary, besides being equipped and staffed to manage the entire spectrum of trauma including special groups, the EMD at NUH evaluates and manages a significant number of walk-in trauma patients. To optimise care delivery and patient expectations, it is key that primary healthcare professionals are well versed in the capabilities of the centre that the patient is being referred to.

References:

[1] Trauma Registry (NUH) data 2015.

[2] MOH Singapore Health Facts – Top 10 Conditions of Hospitalisation (2012-15)

Photos courtesy:
Figure 1: (Left to right): Dr Nikhil Joy, Dr Tay Wei Ling, Dr Ian Mathews, SSN Marinel Duclayan Obejas, SN Yu Jialin, SSN Jessica Santyh Anak Silon.
Figure 3: SSN Loh Xie Hui Dave, SSN Toh Shi Yun Kelly.
Figure 4: SSN Eunice Ubaldo, SSN Loh Xie Hui Dave.

The author wishes to acknowledge the tireless efforts of Team EMD in striving to provide world-class care to all our patients.

Special thanks to Ms Chin Sock Teng, Senior Clinical Research Coordinator, National University Health System, Singapore.

Dr Kanwar Sudhir Lather

Associate Consultant
Emergency Medicine Department

Dr Kanwar Sudhir Lather received his Masters in Medicine (Emergency Medicine) from the National University of Singapore in 2011. He was admitted as a Member of the Royal College of Emergency Medicine (UK) in the same year. He has specialty interests in traumatology and emergency critical care.

TIPS

Acute myocardial infarctions (AMI) are time-sensitive emergencies. For suspected cases, call a Singapore Civil Defence Force (SCDF) ambulance to send the patient to the hospital. Oral aspirin 300mg (preferably chewed) can be administered if there are no contraindications (recent gastrointestinal bleeding, NSAID allergies).

During an AMI, the faster the arrival to the emergency department, the better the outcome. Atypical presentations are often seen in diabetics, women, patients with chronic kidney disease or dementia, and elderly patients (above 75 years old). Such presentations include dyspnoea, fatigue, giddiness, epigastric pain and indigestion.

Acute cerebrovascular accidents (CVA), like AMIs, are time-sensitive emergencies, and such patients should be immediately sent to the emergency department via a SCDF ambulance. The window period for thrombolytic therapy is 4.5 hours, the time of onset is taken from when the patient was last known to be at his/her neurological baseline.

Management of CVA can begin in the primary care while waiting for transfer to a hospital with thrombolytic facilities. It includes obtaining full vital parameters including O2 saturations, capillary blood glucose, and intravenous access. However, these recordings should not delay transfer to the emergency department.

Mild and moderately elevated blood pressure should not be routinely lowered in an acute phase of stroke.

In patients with altered mental state, consider reversible causes which can be initiated in the clinic before transferring to the hospital via an ambulance. e.g. hypoglycaemia (oral sugar or IV 20-40mls Dextrose 50%), heat stroke (cooling measures and intravenous normal saline infusion) and hypoxaemia (oxygen supplementation).

Any female in the reproductive group with abdominal pain must have a urinary pregnancy test performed, regardless of menstrual pattern or last menstrual period.

A female with a positive urinary pregnancy test and in shock must be assumed to have an ectopic pregnancy, until proven otherwise.

For cases of haemorrhage, such as haemoptysis, per-vaginal bleeding or bleeding of the gastro-intestinal tract, establish a large-bore intravenous line, preferably in the antecubital fossa, and initiate one pint of intravenous crystalloids prior to ambulance arrival.

Beware of diabetics on SGLT2 inhibitors (e.g. canagliflozin/dapaglifozin) who may develop euglycaemic diabetic ketoacidosis (DKA). This is a patient with signs/ symptoms of DKA but with normal capillary sugar levels.

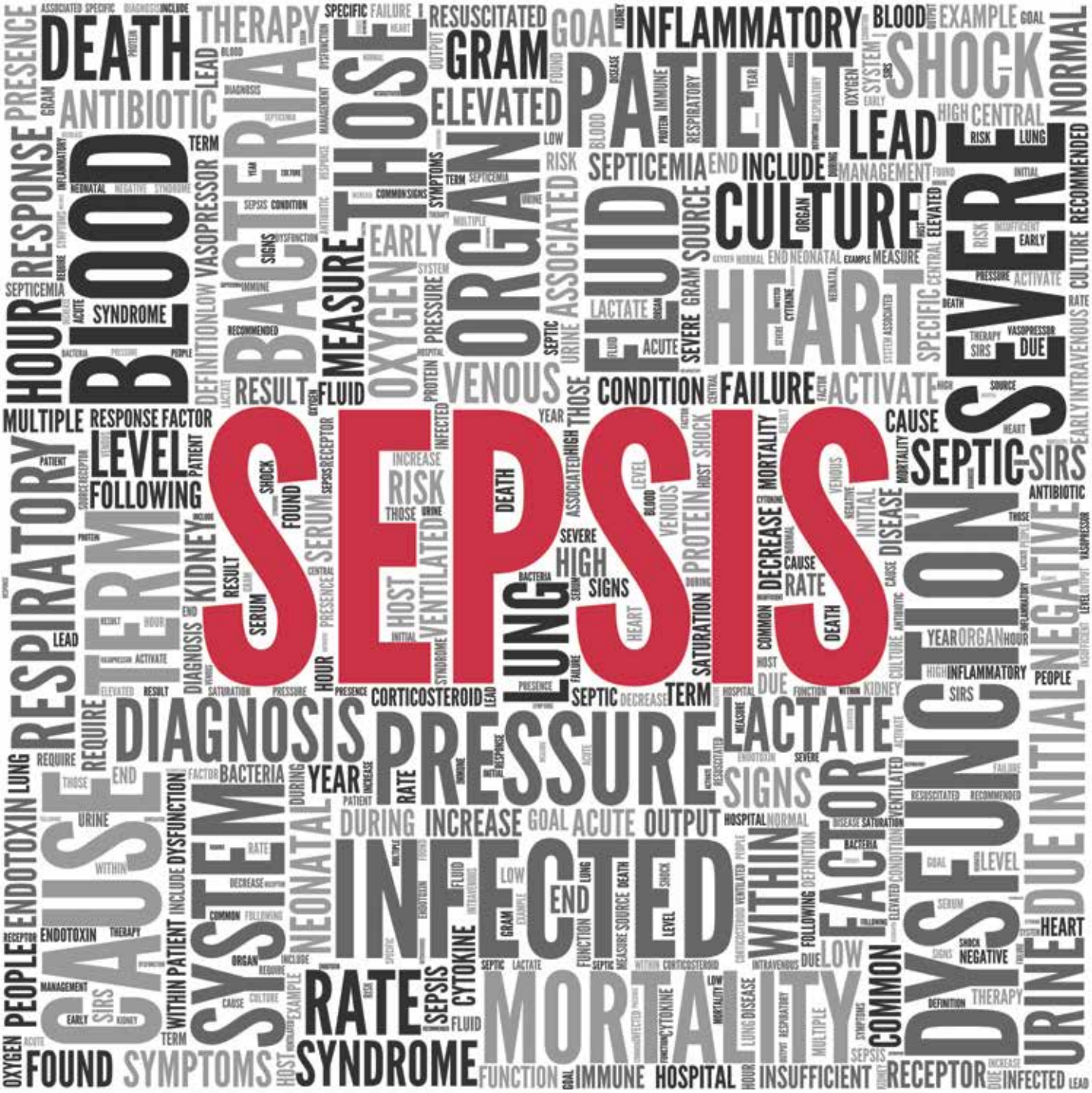
For patients presenting with acute onset dyspnoea, assess for signs and symptoms suggestive of airway obstruction. Administer high flow supplemental oxygen in a sitting position/position of comfort.

Not all that wheezes indicate asthma. Nebulising a patient with cardiac wheeze may be detrimental. A careful history and physical examination is important to differentiate the two.

Dr Ian Mathews

Associate Consultant
Emergency Medicine Department

Dr Ian Mathews obtained his Masters of Medicine (Emergency Medicine) in 2011 and was admitted as a Member of the Royal College of Emergency Medicine (UK) the same year. His area of interest is in emergency critical care.



Sepsis is a life threatening condition that arises when the body's response to an infection injures its own tissues and organs [1]. It is notoriously difficult to diagnose as the traditional signs of the inflammatory response, such as fever, increase in heart rate and respiratory rate, may mimic many other non-infective conditions.

The incidence of sepsis is rising yet its awareness is low worldwide. In 2010, only 5% of the public in Singapore had heard of the term "sepsis" despite it accounting for at least 17% of all deaths through pneumonia and urinary tract infections [2]. Sepsis is more common than heart attack and claims more lives than any cancer. The mortality rate in sepsis is increasing (Figure 1) and is higher than other three conditions treated with time-sensitive interventions: stroke, acute myocardial infarction and trauma (Figure 2) [3,4].

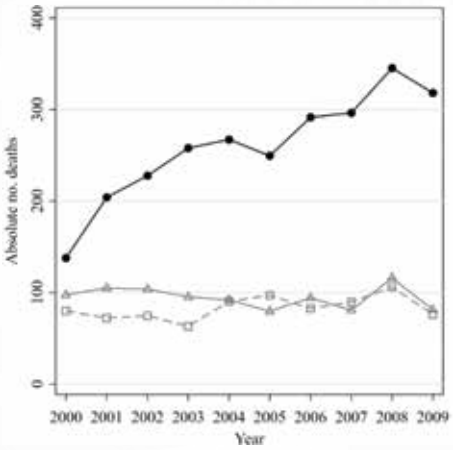


Figure 1: Rising number of deaths in sepsis

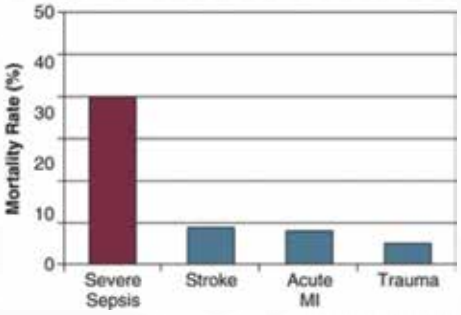


Figure 2: Mortality rate in sepsis compared with other conditions

Early recognition is crucial to improving outcomes in sepsis. Keep a look out for the onset of sepsis which may be indicated by symptoms such as weakness, fever, chills, sudden confusion, disorientation or lethargy along with signs of a rapid pulse and low blood pressure.

One should suspect sepsis when the patient presents with any of the following components in the quick SOFA score: 1) hypotension (systolic BP ≤100mmHg); 2) altered mentation; or 3) tachypnoea (respiratory rate ≥22/min); carry a high mortality rate[1]. These patients should have intravenous access established and intravenous crystalloids started as soon as possible before an urgent transfer to the emergency department.

In the emergency department, fluid resuscitation, obtaining appropriate cultures, identifying the source of infection, and initiating appropriate antimicrobial agents will be carried out. Emergency physicians will risk-stratify patients who may need intensive care, especially those requiring invasive ventilator support and vasopressor therapy.

We are active and focused on research in sepsis to improve the accuracy of diagnosis and to optimise therapy with the ultimate aim of reducing morbidity and mortality. Some ongoing research projects in NUH emergency medicine department involve molecular diagnostics with potential development into point-of-care tests that can be used as adjuncts to clinical evaluation by the bedside or in the outpatient setting. We have also developed a protocol utilising non-invasive haemodynamic monitoring to assess the fluid responsiveness of patients with sepsis, which is particularly useful for patients with concomitant comorbidities such as heart failure and end-stage renal failure[5].

[1] Singer M, Deutschman CS, Seymour CW, et al. The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3). JAMA. 2016;315:801-810.

[2] Phua J, Lim HF, Tay CK, Aung NW. Public awareness of sepsis and stroke in Singapore: a population-based survey. Ann Acad Med Singapore. 2013;42:269-277.

[3] Seymour CW, Rea TD, Kahn JM, Walkey AJ, Yealy DM, Angus DC. Severe sepsis in pre-hospital emergency care: analysis of incidence, care, and outcome. Am J Respir Crit Care Med. 2012;186: 1264-1271.

[4] Parrillo JE, Dellinger RP. Critical Care Medicine: Principles of Diagnosis and Management in the Adult, Fourth Edition. Saunders Elsevier; 2014.

[5] Kuan WS, Ibrahim I, Leong BS, Jain S, Lu Q, Cheung YB, Mahadevan M. Emergency Department Management of Sepsis Patients: A Randomized, Goal-Oriented, Noninvasive Sepsis Trial. Ann Emerg Med. 2016;67:367-378.e3.

Dr Kuan Win Sen

Consultant
Emergency Medicine Department

Dr Kuan Win Sen is a Consultant and Research Director at the Emergency Medicine Department, National University Hospital. He is also an Assistant Professor at the Department of Surgery, Yong Loo Lin School of Medicine, National University of Singapore. He has strong clinical and research interests in emergency critical care, sepsis and pneumonia.

Palliative Care in the Emergency Department - A New Paradigm

Traditionally, emergency medicine (EM) focuses on aggressive resuscitative interventions with a life-sustaining goal. Palliative medicine, particularly in the end-of-life setting, deals with comfort care, symptom control and avoidance of futile interventions, hence allowing the possibility of a comfortable death. It may seem almost paradoxical to practice palliative care in the emergency department. However, NUH Emergency Medicine Department (EMD) was the first emergency department in Singapore to embark on initiatives to integrate palliative care approaches in the EM setting.

Figure 1: Quiet Room for privacy of the patient and family.

This primarily benefits patients with advanced terminal conditions, like cancer or severe end-stage chronic illnesses as well as those with catastrophic life-limiting illnesses. For these patients, death is often imminent. It is pertinent that we identify patients at their end-of-life (EOL) early within the EMD to conduct goals of care discussions, and help them to maximise their comfort and ensure their dignity. Families are given special visitation privileges and the privacy of a "Quiet Room" (Figure 1).

Our team of emergency doctors, nurses and operations manager, in collaboration with the inpatient palliative medicine unit, established various guidelines and clinical workflows for EOL provision at the EMD (Figure 2). We continually aim to equip our EMD staff with knowledge, skills and resources to provide a good standard of palliative care.

Palliative care in EMD aims to help relieve and prevent suffering, and create a more meaningful experience for dying patients and their bereaved relatives. An age-old saying stays relevant to emergency medicine as to any other;
"To cure sometimes, to relieve often, but to comfort always!"

Figure 2: The EMD EOL Care Team.

Dr Rakhee Yash Pal

Consultant
Emergency Medicine Department

Dr Rakhee Yash Pal completed her undergraduate and postgraduate studies in Singapore. She has special interest in traumatology and in the field of palliative medicine, and serves as the Lead of the Palliative Care in the EMD Workgroup.

Caring for the Elderly Patients in the Emergency Department

With the ageing population, the NUH Emergency Medicine Department (EMD) plays an increasing important role in the provision of medical services to the elderly who often have multiple co-morbidities and polypharmacy. Besides managing acute emergencies, we often have to deal with the unique psycho-social needs of the patient and family. There are currently established programmes to reduce elderly admissions from the EMD, and this can translate to cost savings for patients and their care givers, reduction of ward stay and nosocomial infections. The final goal is to integrate the patient back into the community by partnering with various community medical services provider. The multi-pronged approach includes:

1. A geriatric friendly EMD
2. TRST scoring at triage to identify patient at risk of deconditioning or fall.
3. Geriatric Emergency Medicine (GEM) nurses who perform comprehensive geriatric assessment (CGA) in the EMD prior to patients' discharge from EMD with appropriate interventions as guided by the CGA.
4. Care coordinator who plays a key role in coordinating patients' psycho-social needs.
5. Transitional Care which provides medical care to home bound patients discharged from EMD.

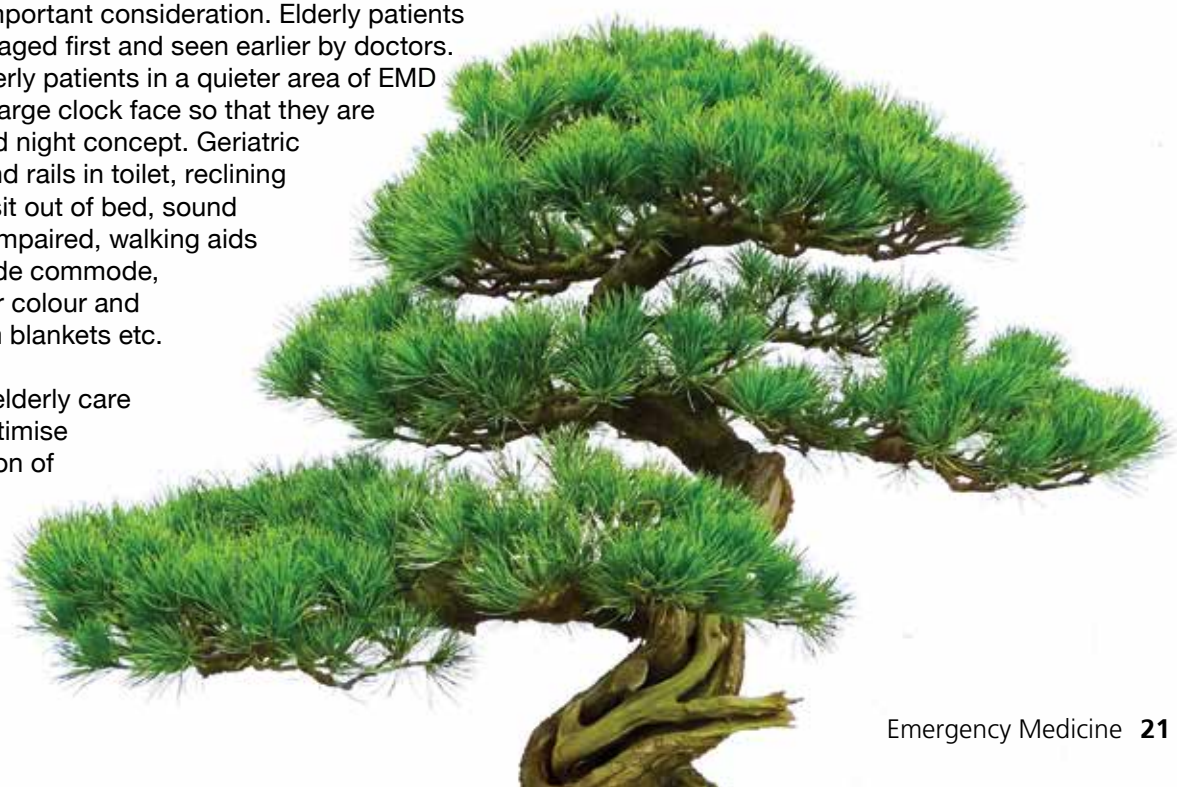
Geriatric Friendly EMD

Because EMD tends to be noisy and hectic, it can pose a stressful experience for the elderly patients and they can feel overwhelmed, increasing the chances of developing delirium. Nursing elderly patient in a geriatric friendly environment is thus an important consideration. Elderly patients are given priority to be triaged first and seen earlier by doctors. We prefer to manage elderly patients in a quieter area of EMD with natural lighting and large clock face so that they are better oriented to day and night concept. Geriatric infrastructure include hand rails in toilet, reclining arm chairs for elderly to sit out of bed, sound amplifier for the hearing impaired, walking aids like walking frame, bedside commode, appropriate wall and floor colour and non-glare lightings, warm blankets etc.

In addition, there is also elderly care bundle put in place to optimise elderly care and prevention of delirium in the EMD.

TRST scoring

Triage Risk Screening Tool (TRST) is a brief risk stratification tool to predict repeat EMD visits and hospitalisations in older patients discharge from the EMD. The TRST identifies high risk elderly patients (define as TRST score ≥2) at risk of functional decline after an initial EMD visit. They would benefit from interventions or referrals for further evaluation or surveillance upon EMD discharge. TRST components are cognitive impairment, falls, EMD visit or hospitalisation in the past 30 days, ≥ 5 types of medications, or EMD staff concerns (poor social support, incontinence, and depression).



Geriatric Emergency Nurses (GEM)

GEM (geriatric emergency nursing) service was initiated in May 2014. As of June 2016, there are 10 GEM nurses in the team. Patients with TRST (triage risk screening tool) score of ≥2 are referred to GEM nurse for screening prior to EMD discharge. GEM nurse are trained to perform comprehensive geriatric assessment (CGA), identify specific care needs, reinforce patient and family education, and recommend appropriate discharge interventions or referrals. This ensures the safe transition of care from tertiary hospital to the community and decreases the re-visit of the elderly patients to EMD. GEM nurses are truly our EMD gems; they "go the extra mile"!

Care Coordinator

With the presence of a dedicated care coordinator in the EMD, we hope to bridge the gap between medical care and social needs. The aim is to enhance patient's optimum functioning in the community, reduce unwarranted repeated emergency visits and hospitalisation. This involves working closely with the physician to formulate individualised discharge planning, facilitate transfer from EMD to St Luke's community hospital, coordination of care between family support system and community resources, and doing follow-up care via home visits.

Supporting patients along the continuum of care after discharge is the care coordinator's primary task. They are the "bridge" linking the patients in need with the community partners in step-down care facilities; the unsung heroes at the front line taking care of the multifaceted needs of patients." (www.aic.sg)

National University Health System (NUHS) Transitional Care Programme: NUH2Home (NUH2H) Programme

The NUHS Transitional Care Programme, NUH2H, provides person-centric inter-disciplinary care to help patients transit from hospital to home during the immediate post-discharge period. It addresses the gap for those who are not critically ill but still need more care in the community.

Our multi-disciplinary team comprises of doctors, advanced practice nurses, senior staff nurses and allied health professionals. The team utilises a holistic approach to care for patients with multiple complex health issues, including medical, nursing and psycho-social needs. Patients with end-of-life issues can also opt to return home to live their last days. The team provides palliative support to relieve their symptoms, as well as psycho-social support for their families.

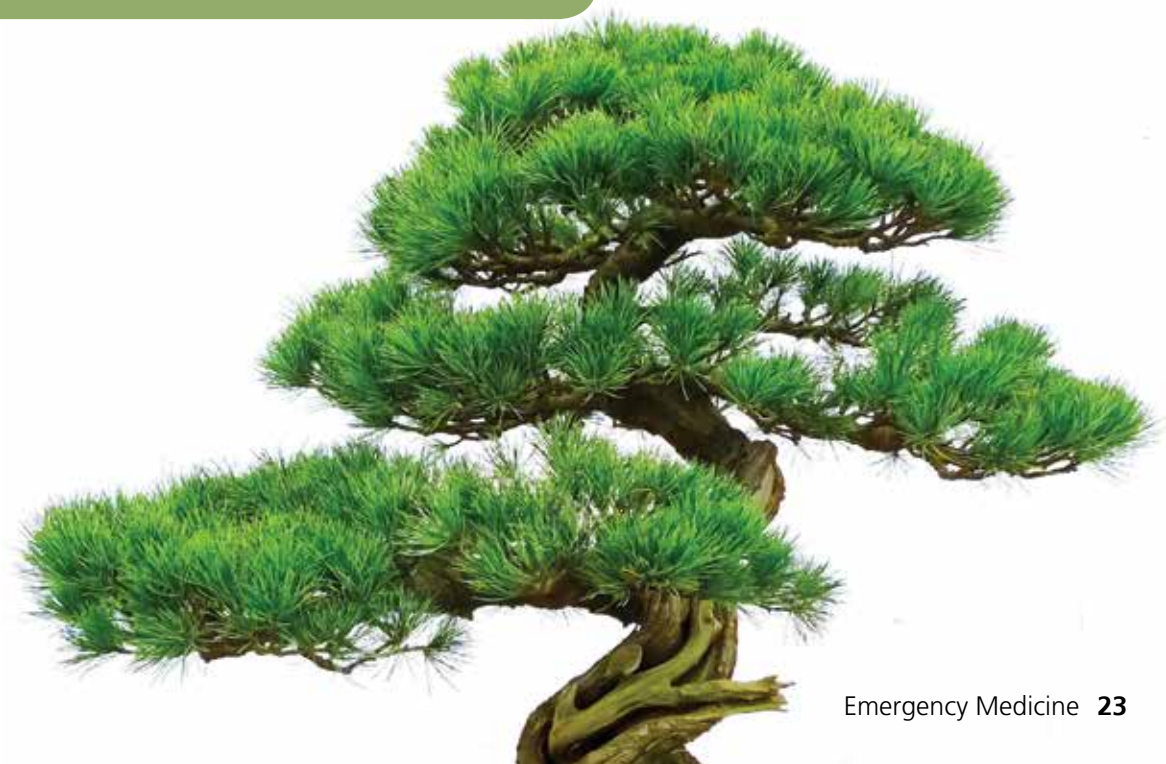
With our presence in EMD, we hope to help patients by providing home visits and follow-up care in the comfort of their home after EMD discharge. This helps to allay patient's and/or caregiver's anxiety.

Future Direction

We hope to get funding for home medical care by putting together a team consisting of emergency physicians, family medicine residents, GEMs, care coordinators/ transition care nurses, and allied health staff including pharmacists and PT/OT to provide a more holistic care for deserving elderly patients discharged from EMD. A multi-disciplinary weekly round will be held to formulate more customised and in-depth care plans for elderly patients. We hope this vision of a new model of care will come to fruition one day!

We are a team of health care providers who are passionate about our work and believe that elderly patients are best taken care of in the comfort of their familiar home. By tapping on community services and caregiver support, we hope to rehabilitate elderly patients back to their baseline functional state seamlessly. Together as a team, we can make this happen!

Authors
1. Dr Sim Tiong Beng, Senior Consultant, EMD, NUH
2. Dr Lee Sock Koon, Senior Consultant, EMD, NUH
3. Liang Sufang, Nurse Clinician EMD, NUH
4. Tay Yee Kian, Advanced Practice Nurse, NUH2H
5. Kan Hong Qing, Senior Manager, AIC ACTION Team, NUH



Specialist in Focus:

Dr Zulkarnain Bin Ab Hamid

You have keen interests in both resuscitation and critical care. Why these areas and do you have any innovative ways to inspire junior doctors to stay in the Emergency Medicine Department (EMD)?

Personally, my interest in resuscitation and critical care stems from the fact that despite current advances in medical care, only 3% of patients who suffer an out-of-hospital cardiac arrest walk out of the hospital. I see it as a responsibility to help improve the outcomes for our patients. Having to consistently make many safe and effective evidence-based decisions in a short period of time and with limited resources and information – and seeing the patients improve – is probably one of the most satisfying aspects of resuscitation and critical care in emergency medicine. What sustains an emergency clinician after the adrenaline rush is the love for the art of medicine: problem-solving, decision-making and critical-thinking. When my junior doctors learn the nuances through acquired knowledge and experience how these translate to improved diagnostics and better patient care, the satisfaction makes them want to know emergency medicine at a deeper level.

One of the reasons why I chose emergency medicine in NUH was because of the senior doctors' passion for teaching and self-imposed high standards of practice. It made me want to be "one of them". We engage the best and brightest to join in our quality improvement projects and initiatives, research projects, and provide them with mentors and regularly seek their feedback. This gives them a sense of belonging, rather than feel that they are just "manpower" for an ever busy EMD.

What are the types of clinical conditions commonly seen at the EMD? How can GPs get involved to ease decision-making at the EMD?

The EMD sees a wide spectrum and variety of cases: acute and chronic, the well and the ill. We do receive many cases from GPs. We make it a point to refer the patients back to the referring GPs, with a description of what we have done for the patients. This closes the loop and informs the GPs of the EMD-level management for similar cases, which GPs may actually duplicate at the primary care level for future cases, should they have the resources or means. I encourage all GPs to attend the monthly lectures for GPs conducted by NUH to understand the capabilities and limitations of each level of healthcare resource within the wider healthcare system. This is an important step towards making the system more efficient and effective for the patients.

Share with us a moment at the EMD where you have experienced a huge adrenaline rush.

Everyone equates EMD with an adrenaline rush but there is another side of EMD that many do not know about – compassion and empathy. As such, I would like to talk about a colleague of mine, Dr Ian Mathews, an Associate Consultant at NUH EMD. Ian was managing an elderly lady who was in the terminal stages of her disease. We knew that she would not make it through the night and her son was in the USA at that time. Ian dialled the patient's son, using his own hand phone, and allowed the patient to talk to him during her final minutes. She passed away peacefully shortly after.
This is what medicine is all about. Edward Trudeau, founder of the tuberculosis sanatorium in the 1800s, reminded us that as physicians, our role is "to cure sometimes, to relieve often, to comfort always."

You are also a medical volunteer at HealthServe and Singapore F1. How different are both volunteer roles and has volunteering made an impact on you?

At HealthServe, I volunteer to help a group of less fortunate and vulnerable people. I see our foreign friends who present with acute or chronic problems, usually as a result of their work. Migrant workers earn little, may not have the best working or housing conditions, and may not have anyone to turn to when they have problems. At HealthServe, we also spend more time talking about their work and life to make sure that they are alright and coping well. Many have become friends with the clinic, with some volunteering to assist in the running of the clinic.

As chief medical officer of the off-track medical service at the Singapore SGP F1 night race, I am responsible for the provision of first-aid and medical services to over 80,000 patrons and 20,000 staff within the Marina Bay Street Circuit daily. I work with a multi-disciplinary team comprising doctors, nurses, student nurses and first-aiders. I volunteer for F1 to help out and to learn new skills such as mass-gathering medicine.

Volunteering requires commitment in time and energy, which not everyone may have at their disposal. I feel many in Singapore would like to volunteer if given the opportunity and the means. Volunteering is a win-win: for the giver and the receiver.

What do you do to prevent burnouts from your duties at NUH, and to maintain a good mental and physical well-being?

Identifying the triggers

Burnout is a symptom and not a disease. There is a need to look for the underlying cause for my burnout. I will find time to be alone on a quarterly basis and review both my work and life and identify stressful areas, how I respond to them and how I intend to rectify the problem.

Reducing the impact of my stressors

I need to have strategies to reduce both chronic stress and improve resilience.

a) I list my priorities at different milestones in life.

b) I speak (euphemism for ventilate), with close friends and my wife on my negative emotions (e.g. anger). It does not solve the problem, but it reduces the risk of accumulation of negative emotions and its impacts.

c) Uncertainty causes anxiety, so I identify the uncertainties and see if I can manage them.

Improving my resilience

Strategies must not focus only on what I can do outside of work. NUH set up a Physician Health and Resilience committee recently, of which I am a committee member. This is a signal that NUH is treating the problem seriously and allocating resources to manage it. Bringing this out in the open is a bold statement acknowledging that the problem is not imagined, but is real. I ensure my resilience gets its regular topping up by:

1. Taking a break such as having a meal during my shifts.
2. Having adequate rest between shifts.
3. Going on leave every three to four months to rejuvenate.
4. Having good relationships with people I work with.
5. Keeping ourselves physically healthy and fit to be resilient. I exercise alone to vent out the negativity and reflect.
6. Religion grounds me and centres me whenever I feel overwhelmed.

Zul with family.

Zul with F1 Spectator Medical Team.

Dr Zulkarnain Bin Ab Hamid is a consultant in National University Hospital (NUH) Emergency Medicine Department (EMD). He received his MBBS and M.Med (Emergency) from NUS in 2004 and 2009 respectively. His clinical areas of interest are Resuscitation and Critical Care and he underwent Advance Resuscitation Training from one of the leading resuscitation centres in US, University of California San Diego, under Dr Daniel Davis. As the Director of Education for medical officers in NUH EMD, he comes up with innovative ways to enhance learning for adult learners with challenging work commitments. He pursued and received his MSc in I/O Psychology in 2012 out of his interest in optimising human performance in the workplace, and is currently an active member of NUH's Physician Health and Resilience Subcommittee. Dr Zulkarnain volunteers with the HealthServe clinic and is also the chief medical officer of the off-track medical service for the Singapore GP F1 since 2012. He is also a happy husband and father of two wonderful children.

UPCOMING EVENTS

22 OCT 2016

New Strategies for Treating Colorectal Cancer in NUH

NUHS Tower Block Auditorium
2pm – 4pm

Colorectal cancer is the number one cancer in Singapore. This cancer has a good long-term survival rate with optimal treatment. Advancement in surgery, chemotherapy and radiotherapy has contributed to this progress. More importantly, with the combined multimodal approach, we have improved the long-term outcome of this common cancer with better patients' experience. In this symposium, NUH model of care, based on our multi-modal and multi-disciplinary approach, will be shared. Topics include:

1. 'Fast Track Surgery' Programme - To improve patients' perioperative experience by Assistant Professor Bettina Lieske
2. 'Tumor Board' Discussion - To optimise cancer patients' care by Assistant Professor Tan Ker Kan
3. Pushing the limits with new techniques of Minimal Invasive Surgery (Robotic and Trans-anal Approaches) - For faster post-operative recovery by Dr Chong Choon Seng
4. Pushing the Boundaries in the Treatment of Liver and Lung Metastases - To improve cure rates by Dr Lee Kuok Chung
5. Hope for Advanced Cancer with Peritoneal Metastases – The Last Frontier (Peritonectomy with Hyperthermic Intra-Peritoneal Chemotherapy - HIPEC) by Assistant Professor Bettina Lieske
6. NUH Colorectal Cancer Expert Group - What we do and offer by Nurse Clinician Rachael Nakawungu

19 NOV 2016

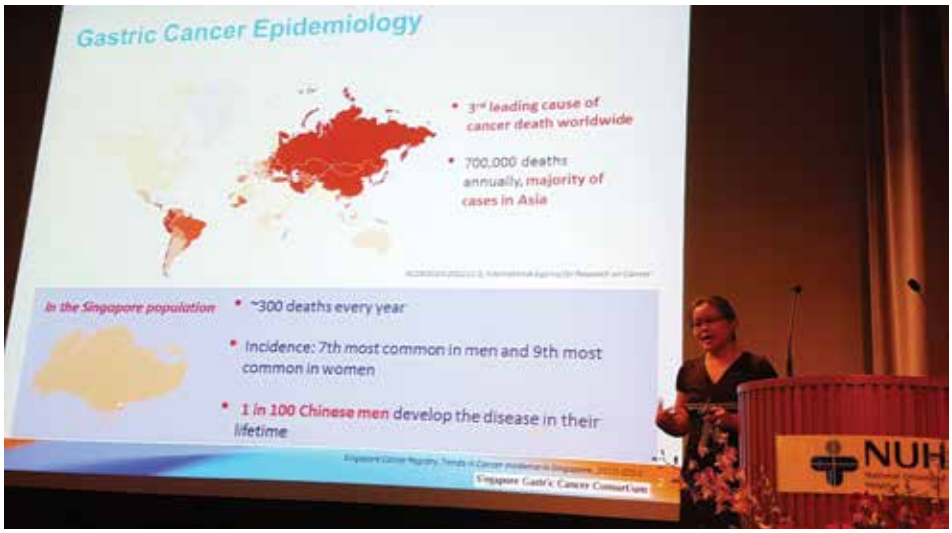
Dental Updates for GPs

University Dental Cluster
NUHS Tower Block Auditorium
2pm – 4pm

The University Dental Cluster (UDC) comprises six dental clinics located at NUH and the National University of Singapore's Faculty of Dentistry (FoD). Our main clinic, the Dental Centre at NUH, is a fully equipped one-stop facility that provides a comprehensive range of services, with an aim to help patients in the prevention, diagnosis and treatment of dental and oral diseases. In addition to basic dental procedures which are provided by our general dental practitioners, patients can be inter-referred to our dental specialists when a more complex or tertiary-level of care is needed, and this gives them the benefit of a multi-disciplinary consultation in one setting.

Event information listed is correct at time of print. While every attempt will be made to ensure that all events will take place as scheduled, the organisers reserve the rights to make appropriate changes should the need arises. Please refer to our events calendar at **www.nuh.com.sg/nuh_gplc** for more updates and information.

POST EVENTS HIGHLIGHTS



9 JUL 2016

Gastroenterology and Hepatology Updates for GPs

A broad spread of updates on gastric cancer, h. pylori, obesity and fatty liver was shared by both Dr Lim Li Lin and Dr Lee Yin Mei, where the role of the GP was further elaborated in the fight against obesity and fatty liver.

30 JUL 2016

Orthopaedics Updates for GPs

Covering updates and the benefits of hip fracture surgery for the elderly, Dr Diarmuid Murphy gave attending GPs a holistic understanding of NUH's integrated treatment programme where care is extended beyond NUH to the community. In addition, Dr Gurpal Singh discussed on common degenerative conditions such as joint pains and provided recommended treatments to GPs for their patients, as well as an insight on the latest advanced treatment options for such conditions.

13 AUG 2016

Advances in Urology – 2016 Updates for GPs

Practical approaches in managing patients with male infertility and small renal masses was the hot topic during this session. The wide-ranging team from the NUH Department of Urology also shared details of a collaborative plan for benign prostatic hyperplasia (BPH) to all attending GPs.

27 AUG 2016

Spine GP Updates 2016: What is New in Lumbar Spine Pathology Management

Attending GPs were warmly treated by the team from the University Spine Centre to a series of 20 minutes interactive discussions on the management of spinal conditions commonly seen in the community. The diverse range of case studies presented an opportunity for all GPs to bring home key updates in the developing field of spine surgery.

GPLC

NUH GP Liaison Centre

At the NUH, we recognise the pivotal role general practitioners (GPs) and family physicians play in providing and ensuring that the general public healthcare is of the highest quality and standard. As such, we believe that through closer partnerships, we can deliver more personalised, comprehensive, and efficient medical care for our mutual patients.

The GPLC aims to build rapport and facilitate collaboration among GPs, family physicians and our specialists. As a central coordinating point, we provide assistance in areas such as patient referrals, continuing medical education (CME) training, and general enquiries about our hospital's services.

Through building these important platforms of shared care and communication, we hope that our patients will be the greatest beneficiaries.

If we could be of any assistance to you, please feel free to contact our office from Mon - Fri : 0900-1200hrs, 1400-1800hrs

GP Appointment Hotline
Tel: +65 6772 2000
Fax: +65 6777 8065

GP Liaison Centre
Tel: +65 6772 2535 / 5079

NUH CME Events

At the NUH, we strive to advance health by integrating excellent clinical care, research and education. As part of our mission, we are committed to provide regular CME events for GPs and family physicians. These events aim to provide the latest and relevant clinical updates practical for your patient care.

Organised jointly by the GPLC and the various clinical departments within NUH, our specialists will present different topics in their own areas of specialties in these monthly symposiums.

For more information on our CME events, you can go to **www.nuhcme.com.sg** or scan the following QR code.