UNIT NO. 2

IMPROVING PRIMARY CARE MANAGEMENT OF TIME SENSITIVE EMERGENCIES

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ABSTRACT

Ischemic heart disease, pneumonia, cerebrovascular accidents and chronic obstructive pulmonary disease rank among the top 10 causes of hospitalisation in Singapore[1]. For optimum patient outcomes, acute presentations of each of these spectrum of diseases requires a continuum of care involving crucial steps at primary healthcare, pre-hospital transport, emergency care at the emergency department, hospitalisation and sometimes, rehabilitation at step-down facilities. For patients with suspected ACS, a resting 12-lead electrocardiogram (ECG) should be obtained as soon as possible: do not rule out acute coronary syndrome (ACS) because of a normal resting 12-lead ECG; administer a loading dose of 300mg aspirin, preferably chewed; do not offer other antiplatelet agents in primary care; and if aspirin is given before arrival at hospital, send a written record with the patient. For patients with suspected stroke, attempt to ascertain exact time of onset of stroke - when the patient was last seen at his or her neurologic baseline, rather than the time at which the symptoms were first noticed; immediate assessment using a standardised tool (CPSS, or FAST, or LAPSS) is indicated for patients with new or developing stroke-like symptoms. The therapeutic window for thrombolsis is 3 hours for intravenous tPA and 6 hours for intra-arterial tPA. For patients presenting with acute onset dyspnea, assess emergently for signs and symptoms suggestive of airway obstruction; administer high flow oxygen in sitting position/ position of comfort; without delaying transfer, obtain CXR, ECG, capillary blood glucose.

Keywords: acute coronary syndrome, cerebrovascular accident, dyspneal

INTRODUCTION

Ischemic heart disease, pneumonia, cerebrovascular accidents and chronic obstructive pulmonary disease rank among the top 10 causes of hospitalisation in Singapore[1]. For optimum patient outcomes, acute presentations of each of these spectrum of diseases requires a continuum of care involving crucial steps

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at primary healthcare, pre-hospital transport, emergency care at the emergency department, hospitalisation and sometimes, rehabilitation at step-down facilities.

In the setting of primary care, patients presenting with acute serious illnesses, or acute exacerbations of chronic conditions benefit from the following:
- Early diagnosis
- Instituting immediate primary intervention(s)
- Expedited transfer to hospital by ambulance.

ACUTE CORONARY SYNDROMES

Acute coronary syndrome (ACS) refers to a spectrum of clinical presentations ranging from those for ST-segment elevation myocardial infarction (STEMI) to presentations found in non-ST-segment elevation myocardial infarction (NSTEMI) or in unstable angina. It is almost always associated with rupture of an atherosclerotic plaque and partial or complete thrombosis of the infarct-related artery.

Ischemic heart disease ranks second as the leading cause of death in Singapore[1]. The clinical presentations of CAD include silent ischemia, stable angina pectoris, unstable angina, myocardial infarction (MI), heart failure, and sudden death. Distinguishing patients with acute coronary syndromes (ACS) within the very large proportion with suspected cardiac pain are a diagnostic challenge, especially in individuals without clear symptoms or electrocardiographic features.

As with most of acute care medicine, the best outcomes are achieved with early pattern recognition, early identification and referral, risk stratification and early appropriate treatment. Similarly, the approach to the diagnosis and correct management of the patient presenting with chest pain requires a combination of detailed history, clinical examination, risk stratification and appropriate management.

Early diagnosis:

An acute coronary syndrome (ACS) is more likely if[2,3]:
- Prolonged episode of anginal chest pain lasting 20 minutes at rest
- New onset angina (class II or III of the Classification of the Canadian Cardiovascular Society), with crescendo symptoms in previously stable angina with at least Class III angina characteristics
- Prolonged pain is observed in 80% of patients while de novo or accelerated angina is observed in the remaining 20%.

Typical clinical presentation of an ACS is retrosternal pressure or

heaviness (angina) radiating to the left arm, neck or jaw, which may be intermittent (usually lasting for several minutes) or persistent - this would be accompanied by symptoms such as:

- Diaphoresis
- Nausea
- Abdominal pain
- Dyspnea
- Syncope.

Atypical presentations more often observed in patients over 75 years, women, patients with diabetes, chronic renal failure or dementia are:

- Epigastric pain
- Indigestion
- Stabbing chest pain
- Chest pain with some pleuritic features
- Increasing dyspnoea.

Physical findings can range from normal to unstable hemodynamics with signs of congestive cardiac failure and/ or cardiogenic shock.

Immediate primary intervention(s):

Management of ACS can start in primary care, and be continued in the ambulance and in secondary care. Management of ACS, whether it be unstable angina (UA) or non-ST-segment elevation myocardial infarction (NSTEMI), or ST-segment elevation myocardial infarction (STEMI), is the same in the primary care setting[4]. Distinguishing between UA, NSTEMI and STEMI cannot be done until an electrocardiogram (ECG) and troponin test have been performed.

Management of (ACS) starts as soon as it is suspected and includes:

- A resting 12-lead electrocardiogram (ECG)[4]. (If possible, transmit ECG to hospital being referred to)
- EMS services in Singapore have the ability to transmit 12-lead ECGs to receiving emergency medicine departments during transit.
- ACS can not be excluded with a normal resting 12-lead ECG
- Administer a loading dose of 300mg aspirin, preferably chewed
- Do not offer other antiplatelet agents in primary care
- If aspirin is given before arrival at hospital, send a written record with
- the patient
- Pain relief may be considered in the form of GTN sublingually or as a patch if the patient has hemodynamic stability
- Intramuscular (IM) injections should be avoided[5]
- Administer high flow oxygen via a non-re-breathe mask during ambulance transfer.

Expedited transfer to hospital by ambulance:

Immediately refer any patient who[3]:

- Has current chest pain
- Is currently pain free, but has had chest pain in the last 12 hours, and resting 12-lead electrocardiogram (ECG) is abnormal or not available
- Has developed further chest pain after recent (confirmed or suspected) acute coronary syndrome (ACS)
- Presents with signs of complications such as pulmonary edema.

It has been established that the faster the arrival at the emergency department the better the patient outcomes[6]. In a recently published multivariate analysis of predictors of pre-hospital delay in ACS[7], the following factors were associated with significant delays in hospital presentation from time of onset of symptoms:

- Inability to recognise the presence of fatigue and abdominal symptoms as symptoms of ACS
- Gradual or intermittent onset of symptoms rather than continuous symptoms was associated with longer delays
- Decision by patients to visit primary care facilities rather than call for ambulance upon onset of symptoms was associated with significantly longer delay times
- Decision by patients to self-treat symptoms with non-cardiac related drugs was also associated with significantly longer delays.

CEREBROVASCULAR ACCIDENT

A cerebrovascular event is a clinical syndrome of rapid onset of global or focal impairment of brain function. It is a medical emergency requiring immediate response. With the widespread availability of emergent thrombolysis capability, the need for immediate transport of suitable patients to the hospital has never been so dire.

Stroke is characterised by the sudden loss of blood circulation to an area of the brain, resulting in a corresponding loss of neurologic function. Classified as either hemorrhagic or ischemic, a significant majority of strokes (approximately 70%) are due to cerebral infarction; about 20% are hemorrhagic and 10% of strokes are of an uncertain type[8].

In an attempt to minimise transfer times and maximise neurological outcomes, the American Stroke Association has described the stroke 'Chain of Survival'.

1. Rapid recognition and reaction to stroke warning signs
2. Rapid EMS dispatch
3. Rapid EMS system transport and pre-arrival notification to the receiving facility
4. Rapid diagnosis and treatment in the hospital.

Early diagnosis:

Common signs of stroke include:

- Acute hemiparesis or hemiplegia

- Acute hemisensory loss
- Complete or partial hemianopia, monocular or binocular visual loss, or diplopia
- Dysarthria or aphasia
- Ataxia, vertigo, or nystagmus
- Sudden decrease in consciousness.

Atypical symptoms, especially in women[9,10], include:
- Loss of consciousness or syncope
- Shortness of breath
- Sudden pain in the face, chest, arms, or legs
- Seizure
- Falls or accidents
- Sudden hiccups/ nausea/ fatigue/ palpitations
- Altered mental status.

Conditions that mimic stroke include[11]:
- Seizures/ postictal paralysis (Todd paralysis)
- Syncope
- Intracranial mass effect (hemorrhage, tumor, abscess)
- Metabolic: Hypoglycemia, hyponatremia, hyperosmotic coma
- Hypertensive encephalopathy
- Meningitis/ encephalitis
- Wernicke encephalopathy
- Otorhinolaryngeal: Labyrinthitis, Meniere's disease, Bell's palsy.

To rapidly evaluate a patient with stroke-like signs and symptoms in an outpatient setting the use of a stroke screening tool with a high sensitivity,[12,13] such as the Cincinnati Prehospital Stroke Scale (CPSS), the Face Arms Speech Time (FAST) test, or the Los Angeles Prehospital Stroke Screen (LAPSS) is recommended.

Immediate primary intervention(s):

Management of CVA can start in primary care, and be continued in the ambulance and in secondary care.
- Obtain full vital signs including Oxygen Saturation
- Mild and moderately elevated blood pressure should not routinely be lowered in the acute phase of stroke[14]
- Deliver Oxygen by Nasal cannula (if Oxygen Saturation <90%)
- Obtain Intravenous Access
- ECG
- Bedside Serum Glucose
- Focused history (LoST MIND mnemonic):
  1. Last well or Onset
  2. Seizure
  3. Trauma (esp. Closed Head Injury)
  4. Migraine
  5. Illness (recent)
  6. Neck injury
  7. Diabetes Mellitus.

Expedited transfer to hospital by ambulance:

Immediate assessment using a standardised tool (CPSS, or FAST, or LAPSS) and then transfer by ambulance is indicated for patients with new or developing stroke-like symptoms.

As the patient might be eligible for thrombolytic treatment, ensure that ambulance control understands the urgency of the situation and that the person needs to be taken immediately to the nearest hospital with facilities for stroke thrombolysis.

Do not delay transfer to hospital.

DYSPNEA

Dyspnea is a common problem affecting up to half of patients admitted to acute, tertiary care hospitals and one quarter of ambulatory patients[15].

The 2012 consensus statement[16] of the American Thoracic Society defines dyspnea as: a term used to characterise a subjective experience of breathing discomfort that is comprised of qualitatively distinct sensations that vary in intensity. The experience derives from interactions among multiple physiological, psychological, social, and environmental factors, and may induce secondary physiological and behavioral responses.

Dyspnea is a complex symptom that potentially warns of a critical threat to homeostasis and thus frequently leads to adaptive responses (such as resting or seeking medical care).

Early diagnosis:

The immediate approach to the acutely dyspneic patient hinges on the following 3 questions:
1. Is there airway obstruction? If yes, is it an upper or lower airway problem?
2. How sick is the patient i.e. is there threat to life?
3. What is the likely cause?

1) Is there airway obstruction?
Symptoms of airway obstruction:
- Choking
- Gasping for air.
Signs of airway obstruction:
- Altered level of consciousness: Panic/ agitation/ confusion
- Cyanosis
- Stridor
- Drooling
- Tripod position.

2) How sick is the patient?
Does the patient demonstrate:
- Hypoxia
- Cyanosis
- Stridor or other signs of upper airway obstruction
- Unilateral breath sounds or signs suggestive of pneumothorax
- Tachypnea with respiratory rate >40 breaths per minute
- Accessory muscle use with retractions
- Arrhythmia
- Hypotension.

FIGURE 1. CAUSES OF DYSPNEA
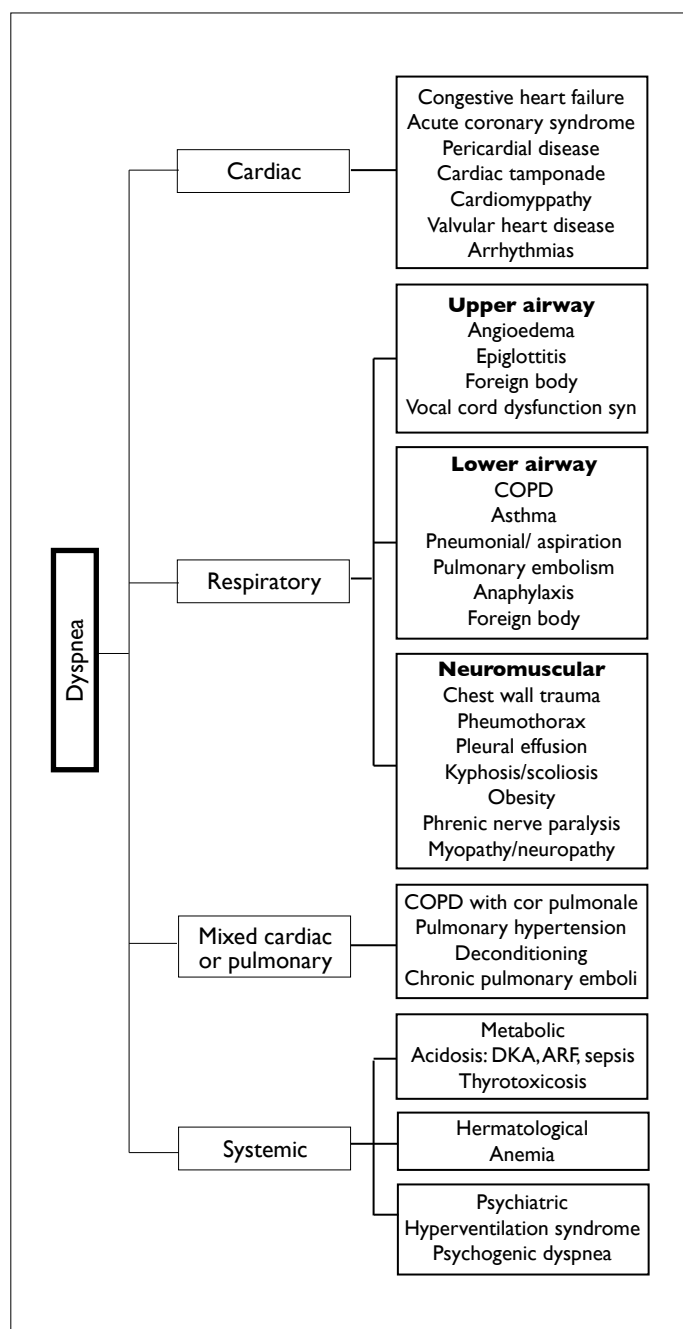
Respiratory:
- Upper airway:
  - o Angioedema
  - o Epiglottitis
  - o Foreign body
  - o Vocal cord dysfunction syndrome
- Lower airway:
  - o COPD
  - o Asthma
  - o Pneumonia/ aspiration
  - o Pulmonary embolism
  - o Anaphylaxis
  - o Foreign body
- Neuromuscular:
  - o Chest wall trauma
  - o Pneumothorax
  - o Pleural effusion
  - o Kyphosis/ scoliosis
  - o Obesity
  - o Phrenic nerve paralysis
  - o Myopathy/ neuropathy: Myasthenia gravis, Guillain-Barre syndrome

Mixed cardiac or pulmonary:
- COPD with pulmonary hypertension and cor pulmonale
- Deconditioning
- Chronic pulmonary emboli.

Systemic causes:
- Metabolic:
  - o Acidosis: DKA, acute renal failure, sepsis
  - o Thyrotoxicosis
- Hematological:
  - o Anemia
- Psychiatric
  - o Hyperventilation syndrome
  - o Psychogenic dyspnea (pseudoasthma)

3) What is the likely cause?

Causes of dyspnea in adults are shown in Figure 1. They include:

Cardiac:
- Congestive heart failure (right, left or biventricular)
- Acute coronary syndrome
- Pericardial disease/ cardiac tamponade
- Cardiomyopathy
- Valvular heart disease
- Arrhythmias

In the acute presentations of dyspnea, it helps to simplify the myriad causes to aid prioritisation of management and correct disposition.

Most-immediately life threatening:
1. Upper airway obstruction
2. Tension pneumothorax
3. Pulmonary embolism
4. Neuromuscular weakness: myasthenia gravis, Guillain-Barre syndrome
5. Fat embolism.

By far the commonest causes of dyspnea in adults are[17]:
1. Asthma
2. Chronic obstructive pulmonary disease (COPD)
3. Interstitial lung disease
4. Myocardial dysfunction
5. Obesity/deconditioning
6. Metabolic causes: DKA, acute renal failure, sepsis.

Immediate primary intervention(s):

Management of acute dyspnea should start in primary care, and be continued in the ambulance and in secondary care.
- ABC Management
- Administer high flow oxygen in sitting position/ position of comfort
- Obtain full vital signs including oxygen saturation
- Chest x-ray
- ECG
- Capillary blood glucose.

Expedited transfer to hospital by ambulance:

Arrange for early transfer to hospital for patients presenting with complaints of:
- Severe dyspnea
- New onset dyspnea at rest
- Sudden onset of dyspnea with chest pain.

Immediate ambulance transfer must be arranged for dyspneic patients with[17]:
- Altered level of consciousness
- Hypoxia
- Cyanosis
- Stridor or other signs of upper airway obstruction
- Unilateral breath sounds or signs suggestive of pneumothorax
- Tachypnea with respiratory rate >40 breaths per minute
- Accessory muscle use with retractions
- Arrhythmia
- Hypotension.

Initiate immediate protocol-based disease specific management.

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LEARNING POINTS

- **For patients with suspected ACS, a resting 12-lead electrocardiogram (ECG) should be obtained as soon as possible.**
  - **Do not exclude acute coronary syndrome (ACS) with a normal resting 12-lead ECG.**
  - **Administer a loading dose of 300mg aspirin, preferably chewed.**
  - **Do not offer other antiplatelet agents in primary care.**
  - **If aspirin is given before arrival at hospital, send a written record with the patient.**

- **For patients with suspected stroke, attempt to ascertain exact time of onset of stroke - when the patient was last seen at his or her neurologic baseline, rather than the time at which the symptoms were first noticed. For patients with new or developing stroke-like symptoms, immediate assessment using a standardised tool (CPSS, or FAST, or LAPSS) is indicated.**
  - **Transfer by ambulance is indicated**
  - **The therapeutic window for thrombolysis is 3 hours for intravenous tPA and 6 hours for intra-arterial tPA.**

- **For patients presenting with acute onset dyspnea, assess emergently for signs and symptoms suggestive of airway obstruction.**
  - **Administer high flow oxygen in sitting position/ position of comfort.**
  - **Without delaying transfer, obtain CXR, ECG, capillary blood glucose.**