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2nd Edition



PK Sasidharan

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Medical Emergencies

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CHAPTER

PK Sasidharan

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INTRODUCTION

The acid test to a doctor's efficiency is his performance in the emergency room. One has to act quickly and effectively without referring to textbooks. This calls for reasonable clinical skill and experience. Unfortunately, the emphasis given in the MBSS curriculum to training in emergency diagnosis and treatment was grossly inadequate, but somehow the doctors used to gain skill and experience after passing out. With the mad race for specialization, now it is totally neglected and consequently PG program in Emergency Medicine is being implemented, which is not a solution to the problem. In reality any doctor is likely to come across emergencies in clinical practice and has to be competent to handle them. Prompt recognition of a problem based on clinical features alone and institution of empirical treatment without any delay should be the aim of the doctor. If one is reasonably sure of the diagnosis, no time should be wasted, waiting for investigations. At the same time tact and sympathy in dealing with anxious relatives and proper explanation regarding the nature of the illness to them is equally important to avoid allegations of negligence. One should not shout at relatives while working in government hospitals and should not lose confidence while working in private hospitals. We should develop the courage and confidence to shoulder the responsibility and not to shunt the patient to some other place on trivial excuses, which results in loss of valuable time. Many a time referrals are made only to escape from shouldering a responsibility. Remember that no patient comes to the emergency

room with a diagnostic label; they come with problems of acute onset. Hence a problem-oriented discussion is attempted in this chapter for day-to-day practical use.

Check daily to ensure that there is ready access to all emergency medicines and functioning equipment. Once a sick patient comes to us avoid running around for these things, which leads to waste of valuable time.

EQUIPMENT IN AN EMERGENCY ROOM

- Syringes and needles
- Cotton/gauze
- Drip sets
- Blood transfusion sets
- Intravenous (IV) cannulas
- Scalp vein sets
- Urinary catheters
- Ryle's tubes
- Airways
- Suction apparatus
- Endotracheal tube
- Ambu bag
- Suction cannulas
- Oxygen cylinder
- Nasal cannulas/masks for oxygen delivery
- Lignocaine jelly
- Adhesive plaster
- Antiseptic solution
- Cut down set
- LP set
- Aspiration needles
- Electrocardiography (ECG) machine

MEDICATIONS (PARENTERAL)

- *Adrenaline:* (1:1,000) 1 mL ampule
- *Aminophylline:* 250 mg in 10 mL ampule
- Antitetanus serum or tetanus immunoglobulin
- *Atropine sulfate:* 0.6 mg/mL, 1 mL ampule
- Antibiotics (ampicillin/ciprofloxacin/amikacin/gentamicin/cefotaxime/ceftazidime/metronidazole)
- *Calcium gluconate, 10%:* 10 mL ampule
- *Chlorpromazine:* 50 mg in 2 mL ampule (Largactil)
- *Diazepam:* 10 mg in 2 mL ampule
- *Dicyclomine:* 10 mg in mL ampule (Cyclopam)

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- *Deriphyllin:* 2 mL ampule
- Dexamethasone 4 mg/mL—2 mL ampule (Dexona)
- Dextrose 25%—25 mL ampule
- Dextrose 5% in 500 mL bottle
- Digoxin 0.5 mg in 2 mL ampule
- Distilled water ampules
- *Dopamine:* 200 mg in 5 mL ampule
- *Furosemide (Lasix):* 20 mg in 2 mL ampule
- *Haloperidol (Serenace):* 5 mg/mL ampule
- *Heparin:* 5,000 units/mL in 5 mL vial
- *Hydrocortisone (Efcorlin):* 100 mg/vial
- *Insulin (plain):* 40 units/mL
- *Isoptin (verapamil):* 5 mg—2 mL ampule
- *Potassium chloride (KCl) ampules:* 20 mEq in 10 mL vial
- *Labetalol:* 20 mg in 4 mL ampule (5 mg/mL)
- *Lorazepam:* 2 mg/mL
- *Lignocaine (Xylocard 2%):* 20 mg/mL (30 mL bottle)
- Nitroglycerin
- *Metoclopramide:* 10 mg in 2 mL ampule
- *Morphine sulfate:* 15 mg in 1 mL ampule
- *Normal saline (NS):* 500 mL bottles
- *Neostigmine:* 0.5 mg in 1 mL ampule
- *Ondansetron:* 4 mg/mL
- *Pantoprazole:* 40 mg/vial, 10 mL NS to be added
- *Pethidine:* 50 mg in 1 mL ampule
- *Phenytoin sodium:* 100 mg in 2 mL ampule (Dilantin sodium)
- *Pheniramine maleate (Avil):* 45 mg in 2 mL ampule
- *Promethazine (Phenergan):* 50 mg in 2 mL ampule
- *PAM (pralidoxime):* 500 mg ampule
- *Prochlorperazine (Stemetil):* 12.5 mg in 1 mL ampule
- *Ranitidine:* 50 mg in 2 mL ampule
- Snake antivenom
- *Streptokinase:* 1.5 million units
- *Sodium bicarbonate:* 7.5% in 10 mL ampule (1 mEq/mL)
- *Terbutaline:* 0.5 mg in 1 ampule
- *Tramadol:* 50 mg/mL, 1 mL ampule.

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MEDICATIONS (ORAL)

- Paracetamol/aspirin/isosorbide dinitrate/ nifedipine/amlodipine
- Furosemide/prednisolone/diazepam/metoclopramide/ deriphyllin/promethazine/prochlorperazine/digoxin.

These equipment and medications are in addition to those required for physical examination [stethoscope, blood pressure (BP) apparatus, torch, tongue depressor, etc.]. The list can be more elaborate depending on the set up we want. One can include a nebulizer, defibrillator, ECG monitor, ventilator, dextrometer, pulse oximeter and blood gas analyzer for an elaborate set up. When possible, arrange also for access to routine laboratory investigation round the clock (urine examination, blood sugar, urea, electrolytes, total count, differential count and peripheral smear).

This is the ideal set up; but depending on the place of work and resources available one may have to delete or add some more. The skill to work with bare minimum facilities has to be developed by using common sense.

While treating patients always remember "*Never make treatment worse than the disease, first do no harm*". To err is human, even with the best possible competence errors can occur, but if the treatment was done with utmost care such errors are always accepted by patients and relatives, if problems arise still, it is due to communication gap. Always talk to a responsible bystander after evaluation and initial treatment, regarding the diagnosis in the patient and reassure them that you are doing whatever is possible for the patient, also tell them that this is the best possible treatment available for the condition, otherwise they will always be tempted to shift the patient for "better" treatment from other places based on false information.

COMMON MEDICAL EMERGENCIES

- Acute chest pain
- Acute breathlessness
- Drowsiness/coma/delirium
- Headache

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- Fever
- Seizures/status epilepticus (see relevant sections in "Neurology and Pediatric Medicine")
- Giddiness/vertigo/syncope
- Vomiting
- Diarrhea [see section in "Gastrointestinal Tract (GIT)"]
- Abdominal pain (see "surgical emergencies" also)
- Hemoptysis/hematemesis (see relevant sections in "Respiratory System and GIT")
- Poisoning including snake bite (discussed separately)
- Shock/hypotension
- Acute renal failure/acute kidney injury (see under "Nephrology")
- Acute retention of urine
- Acute psychosis
- Acute onset weakness of limbs
- Pulmonary embolism
- Hypertensive emergencies.

ACUTE CHEST PAIN

Important Causes

- Musculoskeletal pain
- Esophagitis and esophageal spasm
- Angina and myocardial infarction (MI)
- Pleurisy
- Pneumothorax
- Fracture rib
- Pericarditis
- Pancreatitis
- Cholecystitis
- Radicular pain in cervical spondylosis
- Dissecting aneurysm of aorta
- Esophageal rupture, mediastinitis
- Mediastinal emphysema
- Costochondritis/intercostal myalgia
- Nonorganic chest pain and fibromyalgia.

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Approach to a Patient with Chest Pain

- Decide whether the patient is very sick or not
- Check vital signs (pulse, BP, respiratory rate and temperature)
- Short history to differentiate between various causes of chest pain, decide whether the pain is due to ischemic heart disease (IHD) or not (see cardiac pain and noncardiac pain)
- Proper and quick physical examination for the cause
- If pain is very severe, give parenteral analgesics preferably morphine or pethidine or tramadol or pentazocine (opioid drugs are contraindicated in bronchial asthma)
- If cardiac pain is suspected get ECG done. In the periphery, primary management for IHD can be or should be done on clinical suspicion alone, even if ECG is not available (like giving sedative—analgesic/sublingual nitrate/aspirin). Detailed history can be taken after the initial management
- Always reassure the patient, but only after a quick evaluation, avoid premature reassurance.

Differentiating Features of Cardiac Pain from Noncardiac Chest Pain

Cardiac Pain

Decide whether chest pain is consistent with cardiac pain, which is a visceral pain (diffuse, deep seated, poorly localized and central pain which does not fluctuate rapidly, occasionally the pain radiates and is not affected by posture, respiration or swallowing). Besides this, who complains of chest pain is the most useful differentiating feature, or in other words, assessing the risk of developing IHD is very crucial in this decision-making. Does the individual belong to the high-risk group for IHD or not? (e.g. Is the patient overweight, hypertensive, diabetic, smoker, above 40 years, male, postmenopausal woman, sedentary life, lack of a balanced diet?). For example, the chances of having IHD as the cause of chest pain are very high if it is an elderly male, chronic smoker, who is diabetic and hypertensive even if the chest pain is

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atypical—especially when we have no other explanation for the chest pain. The most typical pain suggestive of IHD in a young female without any of the risk factors for IHD would be more likely a visceral pain of esophageal origin.

Features of Cardiac Pain

- Retrosternal with characteristic radiation (sometimes pain is confined only to the sites of radiation)
- Diffuse, deep seated, poorly localized and central pain with constricting or oppressing character (visceral pain), the patient will not be able to pinpoint the site of pain with one finger
- Precipitated by exertion and relieved by rest is typical of stable angina. Pain may occur at rest in MI or unstable angina. Even if the chest pain develops during exertion, it does not subside with rest in unstable angina or MI
- Associated sweating/dyspeptic symptoms/palpitation/breathlessness
- Sense of impending death and apprehension
- No change in intensity with respiratory movements, swallowing or posture
- Intensity of pain does not fluctuate rapidly; it is a steady pain in IHD
- Past history of angina/infarction/hypertension/diabetes all favor if the character is suggestive of a cardiac pain
- Ischemic heart disease can present without chest pain and having only dyspeptic symptoms described as gas or sometimes with no symptoms referable to chest or abdomen; may be presenting as giddiness, vertigo, syncope, cerebrovascular accidents (CVAs) or transient ischemic attack (TIA) with altered sensorium due to the perfusion disturbances in the brain consequent to myocardial dysfunction.

Physical Findings that Favor Diagnosis of Ischemic Heart Disease

- Apprehensive look with a sense of impending doom with pale face, sweating and cold skin, hypotension or shock

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- Tachycardia/bradycardia, arrhythmias, hypertension and hypotension
- Wide or narrow pulse pressure, presence of peripheral vascular disease
- Dyskinetic apical impulse, cardiomegaly
- Muffled heart sounds/S3/S4/apical systolic murmur (papillary muscle dysfunction)
- Pericardial rub, features of pulmonary edema.

Features of a Noncardiac Chest Pain (Mostly Somatic Pain Except in Esophageal Disease)

- Consider noncardiac chest pain as the first possibility or only possibility, in persons belonging to low risk group (young, nonobese, nonhypertensive, nondiabetic, nonsmokers and menstruating females and those who consume a balanced diet containing vegetables and fruits regularly are less likely to have IHD), especially when the chest pain is not visceral in character too. The chances of having IHD should be assessed by studying the patient before going ahead with laboratory investigations
- *Site*: Anywhere in the chest; need not be central, but can be sternal or retrosternal
- Often superficial, well localized, patient can pinpoint the site of pain with one finger
- Absence of features of cardiac pain, the pain could be fluctuating rapidly rather than remaining as a steady one
- May increase with respiratory movements and cough (pleurisy, intercostal myalgia, costochondritis, fracture rib and radicular pain)
- Change of pain with change of posture is seen only in noncardiac chest pain
- Increase of pain on swallowing is not a feature of cardiac pain, change of pain with swallowing could suggest esophageal or rarely pericardial pain, retrosternal pain similar to IHD can occur in these two conditions

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- Local tenderness at the site of pain favors noncardiac pain or is against myocardial ischemia
- History of an unaccustomed posture during travel, sleep or of an unaccustomed physical activity involving the pectoral muscles, especially in those with cervical spondylosis, could be elicited in several patients who come with somatic chest pain and fear of IHD, they have undoubtedly musculoskeletal chest pain. Such patients should not be unnecessarily subjected to ECG and chest X-ray, unless there is a genuine doubt regarding coexisting IHD or other problems
- Presence of pleural rub or clinical features of pneumothorax favors noncardiac chest pain; in pneumothorax, sometimes, the pain could be retrosternal and even have radiation to arm. This is because sometimes there is a mediastinal collection of air in pneumothorax (mediastinal emphysema)
- If radicular pain is suspected examine thoracic spine for deformity and local tenderness. Herpes zoster in pre-eruptive phase has radicular pain, which is superficial and well localized to one side without crossing the midline, in the distribution of a dermatome and then rash appears in a few days
- Pain due to pericarditis is retrosternal, relieved on sitting up, worsens in supine position. It may increase on swallowing and respiratory movements. The pain is superficial, sharp and often a pericardial rub is heard; the pain may be diffuse over retrosternal area. Pericardial rub may not be heard when fluid accumulates in the pericardial sac
- In fracture rib, the pain is sharp, increases with respiratory movements and cough and anteroposterior compression of chest wall elicits pain at the site of fracture
- Esophageal spasm and esophagitis may be very difficult to differentiate from IHD (one is justified in starting drugs useful in both conditions, especially when ECG is also normal. Nitrates and calcium channel blockers can relieve the pain in both IHD and esophageal spasm)
- When uncertainty exists regarding diagnosis, in a person who is at high risk of developing IHD, manage the case as IHD

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- Pulmonary thromboembolism (PTE) can cause chest pain mimicking IHD; it can sometimes precipitate IHD in a predisposed individual and often have a noncardiac chest pain due to pulmonary infarction and pleurisy
- Sometimes incidental association of IHD can cause confusion in diagnosis.

Management of Acute Chest Pain

For severe chest pain of any etiology parenteral analgesics like morphine, pethidine, tramadol or pentazocine can be given provided there are no contraindications. These drugs can precipitate bronchospasm in patients with bronchial asthma, in whom diazepam may be used for sedation, but it lacks analgesic effect. Pentazocine may be avoided in hypertensives. Investigations like ECG must be done only after giving sedative/analgesic drugs and reassuring the patient. Institute treatment for the specific conditions detected without any delay, this calls for good clinical skill. The present trend of depending too much on investigations is going to cost several lives in an emergency set up. Never send the patient walking for ECG, if acute MI or unstable angina is suspected, arrange for bedside ECG only—even in doubtful cases send the patient in wheel chair/trolley for investigations.

Some practical tips: Cervical spondylosis is a very common cause for noncardiac chest pain. Fibromyalgia is a waste paper basket diagnosis; it is often due to multiple factors like hypocalcemia, hypophosphatemia, hyperuricemia, hypothyroidism, cervical spondylosis, hypokalemia and sometimes fears of disease, anxiety and depression added to any one of these. The so-called costochondritis is often due to metabolic causes like hyperuricemia.

Specific Treatment

- Ischemic heart disease (refer chapter on IHD)
- Costochondritis and intercostal myalgia—reassure that it is not cardiac pain, most often that alone is needed, if severe,

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may be given analgesic, anti-inflammatory drugs, local heat, correct the underlying disorder
- Pleurisy—analgesics, treat the primary cause
- Pneumothorax (see under Respiratory Medicine)
- *Esophagitis:* A liquid antacid containing local anesthetic (Mucaine gel) can be given for instant relief, if the esophagitis is due to acid reflux. Treat the acid peptic disease and prevent reflux esophagitis using prokinetic agents like domperidone and other conservative measures. But avoid prolonged use of proton pump inhibitors. The most important measure to prevent reflux is by ensuring regular intake of a high fiber diet containing vegetables and fruits and avoiding excess coffee, tea, etc. If candidal esophagitis is suspected, give tablet fluconazole 150 mg OD for 3–5 days or Nystatin in glycerine three times daily for a week
- *Fracture rib*: Rest, analgesics and treatment of complications, if any
- *Pericarditis*: Analgesics/anti-inflammatory drugs or steroids when indicated. Treat the cause (infection, uremia and rheumatic fever)
- Pancreatitis, cholecystitis (see section on Surgery).

ACUTE BREATHLESSNESS

IMPORTANT CAUSES

- *Bronchial asthma:* Acute exacerbation
- *Chronic obstructive pulmonary disease (COPD):* Acute exacerbation
- Cardiogenic pulmonary edema
- Severe respiratory infection like pneumonia, bronchopneumonia
- Pneumothorax
- Pulmonary embolism
- Upper airway obstruction by foreign body, tumor
- Rapidly accumulating pleural effusion or hemothorax
- Acute respiratory distress syndrome (noncardiac pulmonary edema)

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- Acute allergic alveolitis
- Rapidly accumulating pericardial effusion
- Exclude tachypnea due to other causes like—metabolic acidosis, hyperventilation due to anxiety.

APPROACH TO A PATIENT WITH ACUTE BREATHLESSNESS

- The attitude and body language of the treating persons should be reassuring and appropriate to the situation. Keep the patient in a propped up position, make a quick evaluation by checking pulse, BP, respiratory rate, jugular venous pressure (JVP), look for cyanosis, pallor, auscultate the chest and cardiovascular system (CVS)
- Give oxygen inhalation when required (bronchial asthma/COPD/pulmonary edema)
- After a quick preliminary assessment, reassure that he/she will be all right, and that we will do everything possible
- Relevant history and physical examination for the cause of breathlessness should be done as quickly as possible.
  (To differentiate between cardiac asthma and bronchial asthma see Table 2.1). Fever and/or yellow sputum always suggest the presence of respiratory infection, which could be the only cause for breathlessness or cause for exacerbation of another underlying disorder. Always consider pulmonary thromboembolism (PTE) as the major cause or at least as a possible complicating problem and look for the risk factors for developing it. Presence of atopic/allergic tendency favors bronchial asthma. History of chronic smoking and physical findings favoring COPD should be looked for in all smokers with breathlessness. Presence of risk factors for IHD, or presence of muffled heart sounds, dyskinetic apex, feeble apex, cardiomegaly, basal crepitations all favor pulmonary edema as the cause. As in the case of chest pain knowing the background health status and risk factors in the patient with breathlessness often suggests the cause for it.
- Specific management according to the cause of breathlessness should be instituted without any delay.

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PK Sasidharan MD FICP FRCP is distinguished teacher, academician, and researcher with more than 35 years of teaching and clinical experience. He is an Author of HEAL-THY INDIA (Jaypee Brothers Medical Publishers) and written chapters in textbooks of Medicine and Hematology. He is a renowned speaker in national and international meetings. He published 89 papers, notable of which are the landmark study on vitamin D deficiency in India, and on systemic lupus erythematosus (SLE), developed new criteria for diagnosis of SLE-The Kozhikode Criteria. He is a Former Professor and Head, Department of Medicine and Hematology. Currently he is an Emeritus Professor, Department of Family Medicine, Government Medical College, Kozhikode, Kerala, India, and PhD research Guide for University of Calicut, Kerala.

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