**SHORTNESS OF BREATH**

Shortness of breath is the chief complaint for about 8% of 997 calls to the ambulance service,

and is the third most common type of emergency call. It can also be an important symptom

in patients with a wide range of conditions.

**OBJECTIVES Box** 1 Article objectives

* To consider the causes of breathlessness
* To describe the recognition of primary survey positive patients and treatment of immediately life threatening problems
* To describe the recognition and treatment of primary survey negative patients requiring immediate hospital admission
* To describe the findings and treatment of primary survey negative patients suggesting delayed
* admission, treatment and referral, or treatment and discharge may be appropriate
* To consider a list of differential diagnoses.

The common causes of shortness of breath are acute respiratory infection, asthma, chronic obstructive pulmonary disease, and other pulmonary disease but there are many other conditions that can pose diagnostic problems.

**CAUSES OF BREATHLESSNESS**

***Very common***

* Asthma
* Acute respiratory infections
* Chronic obstructive pulmonary disease (cyst, fibrosis, BPD, structural disorders of airways, bronchiectasis)

***Common***

* Pneumonia
* Pneumothorax
* Pulmonary embolus
* Pleural effusion

***Less Common***

* Metabolic acidosis
* Aspirin poisoning
* Renal failure

**RECOGNITION OF THE PRIMARY SURVEY POSITIVE PATIENT WITH SHORTNESS OF BREATH**

***Increased work of breathing***

* Stridor associated with other key findings
* Use of accessory muscles
* Need to sit upright
* Tracheal tug
* Intercostal recession
* Expiratory wheeze associated with other key findings
* Cessation of expiratory wheeze without improvement in condition
* Inability to speak in whole sentences

***Systemic effects of inadequate respiration***

* Increased respiratory rate. Weak respiratory effort
* Decreased, asymmetrical, or absent breath sounds
* Oxygen saturation,92% on air or ,95% on high concentration oxygen
* PEFR,33% of normal
* Hypercapnia (measured with end tidal CO2 monitor)
* Tachycardia (>120) or bradycardia (late and ominous finding)
* Arrhythmias
* Pallor and/or cyanosis (particularly central cyanosis)
* Cool clammy skin
* Falling blood pressure (late and ominous finding)
* Changed mental status—confusion, feeling of impending doom, combativeness
* Falling level of consciousness
* Exhaustion (+/2muscular chest pain)

**INITIAL MANAGEMENT**

* Secure the airway (in moribund patients it may be necessary to escalate rapidly through manual methods, simple adjuncts, intubation, and cricothyroidotomy until airway secured)
* High concentration oxygen via non-rebreathing mask (consider titrating concentration to oxygen dependent patient’s ‘‘normal’’ SpO2)
* Assist ventilations if required, titrated to SpO2
* Nebulised b2 agonist in the presence of wheeze (for example; salbutamol)
* Nebulised anticholinergic in the presence of asthma or COPD (for example, ipratropium bromide 0.5 mg, may be mixed with salbutamol)
* IM adrenaline in the presence of anaphylaxis
* Decompress tension pneumothorax

In addition to the above, consider:

* IV fluids (asthma and anaphylaxis)
* Intravenous or oral corticosteroids (asthma and anaphylaxis)
* Antihistamines (anaphylaxis)

***Findings (not reversed by initial treatment) suggesting need for hospital admission***

* Inspiratory or expiratory noises (stridor or wheeze) audible without the aid of a stethoscope
* Cannot speak in whole sentences
* Respiration >40 breath/min
* Pulse >110 beat/min
* Supplemental oxygen required to maintain SpO2 at 95% or above (or at ‘‘usual’’ level of SpO2 for COPD patients)
* PEFR,50% of normal

**Subjective assessment**

Confirm that the chief complaint is shortness of breath. Remember that this may be a symptom of conditions affecting systems other than the chest (for example, hypovolaemia attributable to bleeding). Determine if this is a new problem or an exacerbation of a chronic condition. Ask what precipitated the problem and what, if anything, makes the patient feel more or less breathless. Ask about associated symptoms, such as chest pain, cough and sputum production, palpitations, fever and malaise. Has the patient been using inhalers or nebulisers more than normal? Have they recently sought other medical assistance? Inquire about previous similar episodes. If this has occurred before, find out what treatment led to its resolution. Has the patient been hospitalised previously for this condition? What is their general previous medical history? What medications are they currently taking, and why? Is there a family history of respiratory illness or heart disease? Finally, investigate the patient’s social circumstances. Is there evidence of neglect?

**Examination**

The vital signs that should be recorded in a patient with shortness of breath are listed below.

**VITAL SIGNS FOR ASSESSING SHORTNESS OF BREATH**

* Respiratory rate and effort
* SpO2
* Peak expiratory flow rate (PEFR) (fig 2)
* Pulse rate
* Blood pressure
* Orientation and Glasgow coma score
* Temperature

A detailed examination of the respiratory system is mandatory for patients with shortness of breath. Remember, however, that acute coronary syndromes and congestive cardiac failure can also result in respiratory distress, as may endocrine and neurological problems (for example Kussmaul’s and Cheyne-Stokes respiration in hyperglycaemia and raised intracranial pressure respectively). If a respiratory problem cannot be readily identified as the cause of the patient’s symptoms, undertake an examination of the other systems.

Note if the patient has excessive production of sputum. What colour is this? Yellow, green, or brown sputum indicates a chest infection. White frothy sputum, which may also be tinged with pink, suggests pulmonary oedema. Look at the patient to determine their colour, and for signs of raised jugular venous pressure. Is the patient breathing through pursed lips, or using accessory muscles, perhaps suggesting COPD? Are there signs of CO2 retention (tremor of the hands, facial flushing, falling conscious level)? Palpate the trachea to check that it is in the midline. Examine the chest and observe chest expansion. Is this the same on both sides? Is there evidence of hyperinflation? Are scars present from surgery? Is there evidence of chest wall deformity? Feel the chest to confirm equality of movement, and check for chest wall crepitus and surgical emphysema. Is there evidence of chest wall tenderness or pain? Is any pain positional, or worsened on inspiration (as, for example, in pleurisy)? Feel for tactile vocal fremitus (see the web site <http://www.emjonline.com/supplemental>). Listen to the chest. Percuss the anterior and posterior chest wall bilaterally at the top, middle, and bottom of the back. Is the percussion note normal, dull, or hyper-resonant? Auscultate the chest at the same locations and in the axillae while the patient breaths in and out of an open mouth. Listen for the sounds of bronchial breathing, wheeze, or crackles. Listen for vocal resonance (see web site http://www.emjonline/supplemental) and pleural rubs.

**DIFFERENTIAL DIAGNOSIS**

Diagnosis is often straightforward with a typical history and findings. For example, the patient presenting with wheeze and tachypnoea may state that they have asthma. The skill is in determining the severity of the condition. Few patients die as a result of the misdiagnosis of asthma but significant numbers die because professionals or patients underestimate the severity of an episode. Differential diagnosis can also be very difficult, the classic situation being in distinguishing between an exacerbation of COPD and cardiogenic pulmonary oedema. This may be made simpler by the use of b-naturetic peptide (BNP) estimations. This has recently been made available as a near-patient test and may become increasingly common in the out of hospital setting.

**ASTHMA**

Patients with severe or life threatening asthma need calm reassurance (even if the healthcare provider is panicking internally), early treatment with b2 agonists, oxygen, and immediate transfer to hospital. Patients with mild or moderate episodes who respond well to treatment may be suitable for home management with further inhaled b2 agonists, oral corticosteroids, and early review.

**COPD**

Bold exacerbations of chronic obstructive lung disease are common. These can be triggered by a number of factors but a viral infection is the most frequent. Diagnosis is often simple but it is the assessment of the severity of the condition that needs skill. The main differential diagnosis is of cardiogenic pulmonary oedema

(LVF). A pneumothorax is an uncommon reason for a severe sudden exacerbation of COPD. Knowledge of the patient’s normal pulmonary function is important. Some patients with COPD have a ‘‘normal’’ PO2 that would indicate severe respiratory failure in a normal person. Signs of exhaustion, inability to expectorate, or CO2 retention are the main worrying features indicating a severe episode.

**PNEUMONIA**

Fever, malaise, and cough and shortness of breath suggest a diagnosis of pneumonia.

Pneumothorax can occur without known lung disease, whereas secondary spontaneous pneumothorax occurs as a complication of chronic or acute lung disease. Traumatic pneumothorax is caused by a blunt or penetrating trauma to the chest. Iatrogenic pneumothorax is a complication of certain diagnostic or therapeutic procedure such as central line replacement or a consequence of mechanical ventilation.

**PULMONARY EMBOLISM (PE)**

Pulmonary embolism (PE) is an infrequent event in children. It has a bimodal distribution during the pediatric years. Occurring pre-dominantly in neonates and adolescence.

The most important predisposing factors to PE in children are the presence of a central venous line (CVL) infection and congenital heart disease. Clinical signs of PE are non-specific in children or can be masked by underlying conditions.