

INTRODUCTION

Difficulty breathing is one of the most common causes of emergency calls for ambulance assistance and is the most common reason for Emergency Department (ED) visits.² Approximately 25-50% of dyspnoea patients presenting to the ED are admitted to hospital.³

Dyspnoea has many causes involving single and multiple organ systems.⁴ Asthma, cardiogenic pulmonary oedema, chronic obstructive pulmonary disease (COPD), pneumonia, cardiac ischaemia, and interstitial lung disease account for approximately 85% of all ED cases of shortness of breath (**treat specific cause as per relevant guideline**).³

Less common medical causes of dyspnoea include pulmonary embolus, severe anaemia and hypertensive crisis. In trauma, pneumothorax, flail chest, lung contusion, and severe hypovolaemic shock may also cause severe breathing difficulties. Acidosis following salicylate overdose or ketoacidosis also causes physiological hyperventilation (**treat specific cause as per relevant guideline**).

It is important to identify the underlying cause of the breathing difficulty. Evaluation and assessment of patients with a chief complaint of dyspnoea must include a detailed history and a thorough physical examination.³

Diagnosis can be difficult, even with the aid of a chest X-ray.³ Even so, pre-hospital carers have excellent diagnostic agreement with emergency physician diagnosis by organ system (USA).⁵

HISTORY

A thorough history will help identify possible causes of dyspnoea. In particular ask the patient about:

how long they have had difficulty breathing?

- sudden onset?
- gradual onset?

is there any pain associated with breathing?

- any relationship with pattern of breathing?
- any relationship with depth of respiration?

does the patient have a cough?

- is it productive?
- what colour is the phlegm?

does the patient find certain positions make matters worse?

- e.g. unable to lie down, must sit upright?

Specific respiratory problems:

- asthma (**refer to asthma guideline**)
- COPD – consider acute exacerbation (**refer to COPD guideline**)
- has there been a recent increase in own medication?
- history of pulmonary embolism (**refer to pulmonary embolism guideline**)
- any other diagnosed respiratory disorder?
- smoking.

Specific cardiovascular problems:

- any previous cardiac events e.g. AMI?
- ischaemic heart disease (IHD)
- known heart failure
 - left ventricular failure
 - right ventricular failure
 - congestive heart failure
 - cor pulmonale
- hypertension
- congenital heart problems
- some patients with acute myocardial infarction may have breathlessness as their only symptom.

Other:

- pre-disposing traumatic episodes
- recent surgery or immobilisation
- other associated symptoms to help reach a diagnosis, e.g. constricting pain suggests angina / or possible myocardial infarction (**refer to acute coronary syndrome guideline**):
- hyperventilation syndrome (**refer to hyperventilation syndrome guideline**):
 - often accompanied by numbness and tingling in the limbs and around the mouth.
 - ensure other more serious conditions are excluded before considering this diagnosis.

Table 1 – Evidence Based Differential Diagnosis for Common Conditions^{3,6-9}

Most common findings	Pneumonia	Pulmonary Embolism	LVF	Asthma
Symptoms:	Dyspnoea Fever Cough	Dyspnoea Pleuritic chest pain Cough Leg pain Leg oedema	Dyspnoea especially on exertion Orthopnoea/ nocturnal dyspnoea	Dyspnoea Cough Unable to complete sentences
Physical signs:	Tachycardia	Tachycardia Tachypnoea Fever ECG: Nonspecific ST-T wave changes	Peripheral oedema Raised JVP Tachycardia	Wheeze Tachypnoea Tachycardia Pulsus paradoxus Hyperresonant chest Accessory muscle use PEF<50% normal
Auscultation sounds:	Rhonchi	Focal rales	Rales Heart Murmur Rhonchi	Decreased or absent breath sounds if severe
History of:	Smoking IHD	Prolonged immobilisation Recent surgery Thrombotic disease	IHD Hypertension	Previous asthma Recent sharp increase in inhaler use Allergen exposure

ASSESSMENT

Primary Survey

Assess **ABCDs**

Baseline Observations

Specifically assess:

- respiratory rate, effort and effectiveness of ventilation
- degree of dyspnoea¹ (**see additional information**)
 - where possible, assess on Vertical Visual Analogue Scale (VAS), or against another locally agreed scale.
 - the adequacy of ventilation can be assessed by considering the ventilatory rate and depth (minute volume)
- productive cough, sputum or bubbling:
 - Infection or heart failure
 - frothy white / pink sputum – acute LVF
 - productive cough (yellow / green sputum): chest infection
 - haemoptysis: PE, chest infection, or CA lung
- percuss the chest to determine if there are collections of fluid in the lungs
 - raised Jugular Venous Pressure (JVP) and peripheral oedema: heart failure
- obtain a 12-lead ECG and assess for acute cardiac events
- signs of anaphylaxis:
 - itchy rash
 - facial swelling
 - circulatory collapse
- auscultate the chest to determine:
 - adequacy of air entry on both sides of the chest
 - chest sounds:
 - audible wheeze on expiration – asthma or LVF (especially in older patients with no history of asthma)
 - audible stridor – upper airway narrowing (e.g. anaphylaxis or foreign body airway obstruction)
 - rales (crepitations) fine crackling in lung bases
 - LVF
 - rhonchi (harsher, rattling sound) – collections of fluid in larger airways – pneumonia.

Evaluate TIME CRITICAL factors:

These may include:

- extreme breathing difficulty, **refer to medical emergencies**,
- cyanosis,
- hypoxia – i.e. saturation levels on pulse oximeter (SpO₂) <95% or not responding to high concentration oxygen (O₂) (**see additional information**).
- features of life threatening asthma,
- acute myocardial infarction (**refer to thrombolysis and acute coronary syndrome guidelines**),
- evidence of anaphylaxis,
- features of tension pneumothorax, or major chest trauma,
- if any of these features are present, correct A and B problems, give O₂, **LOAD AND GO to nearest suitable receiving hospital**, applying appropriate individual treatment guideline en-route.
- provide a **Hospital Alert Message / Information Call**.

MANAGEMENT**Follow medical emergencies guideline**

Start correcting:

- **AIRWAY**
- **BREATHING**
- **CIRCULATION**
- **DISABILITY** (mini neurological examination)
- administer high concentration oxygen (O₂) (**refer to oxygen protocol for administration and information**) via a non-re-breathing mask, using the stoma in laryngectomy and other neck breathing patients. High concentration O₂ should be administered routinely, whatever the oxygen saturation, except in patients with chronic obstructive pulmonary disease (COPD) (**refer to COPD guideline**).
- consider assisted ventilation at a rate of 12–20 breaths per minute if:
 - SpO₂ is <90% on high concentration O₂
 - respiratory rate is <10 or >30
 - expansion is inadequate
- position for comfort (usually sitting upright).

Specifically consider:

- anaphylaxis guideline
- asthma guideline
- COPD guideline
- pulmonary oedema guideline
- pulmonary embolism guideline
- thrombolysis guideline and acute coronary syndrome
- Tension pneumothorax: consider needle decompression of the affected side, if suitably trained (**refer to thoracic trauma guideline**).

Reassess degree of dyspnoea after treatment**ADDITIONAL INFORMATION****SpO₂ level**

- SpO₂ levels <95% should be considered as hypoxia in all patients except COPD patients (**refer to COPD guideline**).
- Pulse oximetry readings may be affected by motion artefact¹⁰, carboxyhaemoglobin, and nail varnish. If problem from nail varnish then remove varnish or mount probe sideways on finger.¹

Dyspnoea Visual Analogue Scale (VAS)

Validated Visual Analogue Scales have been used to assess subjective degree of dyspnoea in patients with asthma, COPD, LVF and dyspnoea on exertion.^{1,11–14}

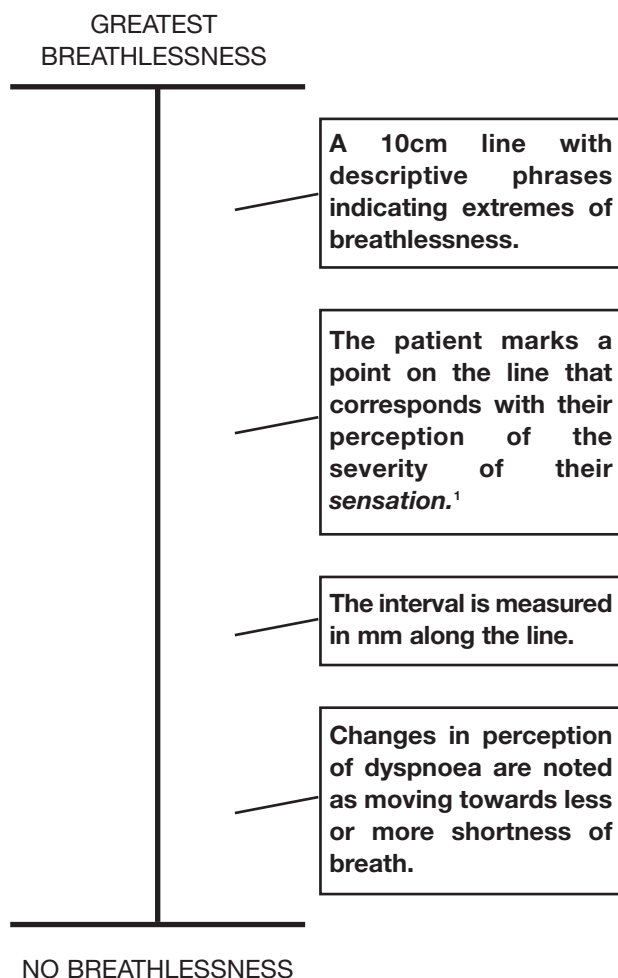
The vertical scale was developed in response to difficulty patients were having using the horizontal scale.^{1,15,16}

Continuous VAS scales can identify transient changes brought about by acute episodes of breathlessness, which discrete (0,1,2,3..10) scales cannot.¹⁷ However the use of the instrument requires that the patient has subjective awareness and cognitive function.¹

The dyspnoea VAS is valid in assessing symptomatic changes and may detect small subjective improvements better than peak expiratory flow rate. In asthma, symptomatic improvement was seen in changes >0.5cm and clinically meaningful improvement seen in changes >2.2cm.¹⁸

VAS scales have been utilised in the pre-hospital field to indicate the efficacy of different drug treatments.^{19,20}

Visual Analogue Scale



Key Points – Dyspnoea

- Is breathlessness of respiratory, cardiac, both or other causes?
- Saturation levels of oxygen <95% are considered hypoxic.
- The visual analogue score is a useful indicator as to the level of dyspnoea and response to treatment.
- Oxygen therapy is essential in dyspnoeic patients; a diagnosis of COPD is not a contra-indication to its administration.

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METHODOLOGY

Refer to methodology section.