Evaluation and management of dyspnoea

Sam Hjelmeland Ahmedzai

Academic Palliative Medicine Unit, The University of Sheffield, Royal Hallamshire Hospital, Sheffield, UK; Address correspondence to: Sam Hjelmeland Ahmedzai MD, FRCP, Professor of Palliative Medicine, Academic Palliative Medicine Unit, The University of Sheffield, Royal Hallamshire Hospital, Sheffield S10 2JF, UK; The manuscript was received: 15.08.2004, Accepted for publication: 15.09.2004

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Dyspnoea is one of the commonest symptoms experienced by patients with cancer - both as a feature of the disease and also as a consequence of its treatments. In a recent Canadian series of nearly 1000 cancer out-patients, 46% reported dyspnoea (1). The Medical Research Council (MRC) of the UK has found that of lung cancer patients entering its trials, dyspnoea was a presenting complaint in 87% of small cell cancer and in 86% of non-small cell cancer patients. In advanced cancer, 33% of patients entering a Japanese hospice reported dyspnoea but that rose to 66% near to death (2).

CAUSATION

Dyspnoea is the end result of many discrete but overlapping potential pathways of pathophysiological change that can occur in patients with cancer. These are modified and may be amplified by:

- Co-morbidities (especially COPD, other chronic lung diseases and heart disease);
- De-conditioning associated with immobility and cancer cachexia;
- Effects of ageing;

In any single patient, several of these factors could be involved, to produce a symptom level and an effect on functioning and quality of life. Thus, the assessment and management of dyspnoea requires a good understanding of the underlying mechanisms. However, the clinical features displayed by patients with dyspnoea are often non-specific and this often makes it difficult - even with laboratory testing and medical imaging - to differentiate between different pathophysiological causes.

There are three basic dimensions of the sensation of dyspnoea: (1) Air hunger - the unpleasant sensation of the need to breathe harder, but being unable to actually increase ventilation; (2) Effort of breathing - the physical discomfort and tiredness associated with prolonged hard breathing; (3) Chest tightness - the feeling of constriction in the chest wall and the inability to breathe in or out.

There are several validated questionnaires, which have been developed to capture these dimensions of dyspnoea and their impact on functioning and quality of life (3).

ASSESSMENT

Put together, the signals from the peripheral and medullary receptors to the brain processing areas form the "feed-back" system, while the neurogenic flow from the brain to the respiratory muscles are the "feed-forward" system. When an imbalance forms between these
two information flows, the resulting ‘error signal’ is a key factor in the generation of the sensation of dyspnoea4. It is important to be aware of non-respiratory causes of dyspnoea, e.g., anaemia, heart failure and pulmonary thromboembolism. With normal ageing, several changes take place -
- Decreased lung elasticity
- Decreased respiratory muscle strength
- Reduced forced vital capacity and peak flow rate
- Increased air-trapping
- Reduced ventilatory response to hypoxia and hypercapnia
- Increased ventilatory response to exercise.
Bedside assessment of the breathless patient therefore requires several clinical measures:
- Observation of the patient's position and behaviour
- Clinical examination of the chest and heart
- Pulse oximetry
- Simple exercise testing.
Further investigations that may be helpful include -
- Medical imaging (chest radiograph; ultrasound; CT for mediastinal features)
- Response in dynamic lung volumes to bronchodilator
- Flow-volume loop if upper airway obstruction is suspected
- MIP

MANAGEMENT

With the preceding grounding in respiratory physiology and understanding of the pathological mechanisms, it is possible to prepare a rational multimodal plan for management. First, treatable factors should be tackled, e.g., pleural effusion, heart failure, anaemia, and reversible airflow obstruction. If anti-cancer treatments are still feasible (radiation or chemotherapy) then these should be started sooner rather than later.

Agents, which modify the neurochemical drives, are most helpful for symptomatic palliation. These include the opioids, benzodiazepines and oxygen. Systematic review favours oral or subcutaneous morphine but other opioids may have advantages (5). The addition of helium to oxygen (heliox) gives significant improvement to exercise-related dyspnoea in lung cancer (6). Novel approaches, e.g., nebulised furosemide, need further evaluation (7). Non-pharmacological approaches are nearly always helpful, particularly in the early stages. These include psychological therapies, breathing training and acupuncture (8). However, in the terminal stage, the management of dyspnoea requires sensitive use of sedation-inducing drugs, oxygen and nursing care.

REFERENCES