

NUTRITIONAL MANAGEMENT OF PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE



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Chronic obstructive pulmonary disease (COPD) is the term used to describe emphysema, chronic bronchitis or a mixture of the two. In the UK, there are currently one million individuals with a known diagnosis of COPD (1) and around 30,000 people die as a result of the disease every year (2). Although patients with COPD are primarily managed in the community, COPD is the second largest cause of emergency hospital admissions in the UK (3) and poses a significant burden on healthcare resources (2). From the patients' perspective, COPD is associated with significant morbidity and a poor quality of life that progressively declines as disease severity increases (4).

While smoking is the most important pathogenic factor in COPD, some heavy smokers do not develop the disease and there are, therefore, significant hereditary and environmental risk factors, e.g. air pollution (5). Furthermore, in epidemiological studies, a poor quality diet, especially low in fruit and vegetables and high in meat and potatoes, has been associated with an increased likelihood of developing COPD (6).

nutritional status. Treatment is essentially limited to symptom relief with acute exacerbations of COPD being managed with inhaled and/or oral corticosteroids and antibiotics. As the disease progresses, many patients require prolonged periods on home oxygen therapy.

Weight loss and low body weight are associated with poor prognosis and increased mortality in COPD (8). Until recently, weight loss was seen as an inevitable and irreversible part of the disease process and therefore inaccessible to therapeutic management. Recent studies have challenged this view and a new systematic review demonstrates clear benefits in terms of functional outcomes resulting from nutritional support in COPD (9).

The symptoms of COPD that most impact on dietary intake and nutritional status reflect the fact that the disease not only affects the lungs but is also frequently accompanied by a low-level systemic inflammatory response (10). Systemic inflammation has important clinical consequences in terms of anorexia, weight loss, selective wasting of fat free mass (FFM) and impaired muscle function. The mechanisms for decline in nutritional status have yet to be fully characterised, but are likely to result from a complex interaction between genetic predisposition, physical, social and psychological factors, including disease severity, the presence of an inflammatory response and, perhaps more surprisingly, social deprivation (11). Importantly, some patients lose FFM despite maintaining normal body weight and indeed, depletion of FFM may have a more profound effect on outcome than weight loss per se (12).

Similar to other chronic conditions however, survival in COPD appears improved in overweight or obese individuals, an effect known as the 'obesity paradox' (13). This paradox extends beyond

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Patients usually present with a history of increasing dyspnoea over several years, chronic cough, muscle weakness and poor exercise tolerance, secondary to muscle wasting. A history of recurrent bronchial infections or weight loss may also be reported, especially in emphysema. Diagnosis relies on medical history and symptoms at presentation, as well as performance of post-bronchodilator lung function tests, i.e. forced expiratory volume in one second (FEV1) and forced vital capacity (FVC). Test results are compared with age and gender-specific standards to determine disease severity using the GOLD criteria (7). The lack of a cure for COPD means that for many patients, the disease is progressively debilitating with an increasing impact on functional and

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reduced mortality in COPD, with one study reporting decreased hospitalisation rates in overweight patients (14) and another reporting fewer emergency hospital admissions and shorter lengths of stay in overweight and obese patients with COPD (15). The implications of these observations on the management of COPD certainly merit investigation.

NUTRITIONAL MANAGEMENT IN COPD

Recent national guidelines (1) recommend the nutritional assessment of patients with COPD should take account of body mass index (BMI), history of unintentional weight change and measurement of body composition to determine if an individual is FFM deplete, e.g. using skinfold thickness measurements or bio-electrical impedance analysis. Other factors to consider in the nutritional assessment of patients with COPD include the presence of co-morbidities, therapeutic drugs and the social and psychological impact of the disease on ability to shop, cook and consume food. For example, patients often present with a number of nutritionally relevant co-morbidities such as diabetes and gastro-oesophageal reflux, the management of which may require the patient taking a large number of different drugs, some of which have the potential to cause nutritional side effects, e.g. oral corticosteroids and antibiotics.

With regard to nutritional requirements, recent evidence suggests that weight stable outpatients with COPD have energy requirements similar to others of their age and gender. In those who are housebound, however, energy requirements are likely to be lower than for healthy individuals of the same age and gender (16). Similarly, while resting energy expenditure may be up to 15 to 20 percent above predicted basal metabolic rate during an acute exacerbation (17), acute illness is usually accompanied by a decrease in physical activity. Total energy expenditure is likely, therefore, to be similar to, or even slightly lower than, normal (18). The requirements for other macro- and micro-nutri-

ents have yet to be fully determined and a recent systematic review found no evidence of benefit from vitamin supplementation with regard to symptoms, hospitalisation or pulmonary function in patients with COPD (19). Recent research has focused on the role of Vitamin D and calcium in COPD patients due to the high prevalence of both osteoporosis and vitamin D deficiency (20). With regard to vitamin D supplementation, however, intervention studies to date have reported heterogeneous results that require further examination (21).

The most frequently reported symptoms of COPD likely to affect nutritional intake are anorexia, early satiety and dyspnoea (22). Dietary intake studies suggest that stable patients with COPD consume close to recommended daily amounts for energy and protein while at home (23). However, intake is often deficient in hospital, especially during an acute exacerbation (24). Most patients report experiencing at least two symptoms that affect dietary intake at any time and symptoms change over time, therefore a range of dietetic strategies may be required over an extended period to achieve an increase in intake and functional improvements.

In contrast to the results of a Cochrane review (25), a recent systematic review and meta-analysis of 13 randomised controlled trials in 419 subjects (9) shows that, compared with usual care, nutritional support significantly improves energy and protein intakes in COPD and is associated with significant increases in body weight, quality of life and functional outcomes, such as handgrip strength and walking distance. Importantly, from the patient's perspective, the improvements in quality of life and walking distance were of a magnitude that would be noticeable to them.

While the review suggests that oral nutritional supplements (ONS) may be more effective in increasing energy intake and body weight than dietary counselling alone, it should be noted that 11 of the 13 studies used ONS while only two used dietary counselling. In one randomised trial of outpatients with severe COPD, six months dietary

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counselling by a dietitian resulted in improved intake and body weight (26). Although weight change was not accompanied by improvements in muscle function, significant improvements in quality of life were seen which persisted for six months after intervention ceased. Another important finding from this trial was that simply providing patients with a dietary advice leaflet, without dietetic input, failed to result in any improvements.

While there is some discussion of the relative effectiveness of ONS compared with dietary counselling, it is important to recognise that many patients with COPD are unable to continue in employment as their disease progresses or have to decrease their working hours (27) and a significant proportion are housebound by their condition (28). Financial resources, therefore, may be limited, often accompanied by social isolation and limited access to affordable food. Strategies for improving nutritional intake may need therefore to include not only the prescription of ONS and counselling to change dietary habits, but also referral for meals-on-wheels type services and encouragement to increase socialised eating opportunities, such as lunch clubs. To date, there appears to be an absence of trials comparing such interventions with ONS or dietary counselling and research is therefore required to examine the clinical and cost effectiveness of different nutritional support strategies in patients with COPD.

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A simple imbalance between intake and expenditure, such as may occur in stable COPD patients living at home, should be amenable to oral nutritional support. In the presence of a chronic inflammatory response, however, nutritional support alone is unlikely to result in improved outcomes (29) and patients may require a combination of pharmaceutical, nutritional and other strategies, e.g. exercise training, in order to achieve functional or clinical benefits. The most effective setting for nutritional intervention in COPD is likely, therefore, to be in outpatients since individuals tend to be less acutely unwell and more mobile. The role of nutrition intervention, together with pulmonary rehabilitation, self-management programmes and pharmaceutical interventions therefore requires evaluation.

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Questions relating to: *Nutritional management of patients with chronic obstructive pulmonary disease.*
 Type your answers below and then **print for your records**. Alternatively print and complete answers by hand.

Q.1	What is COPD and what are the main causes of this disease?
A	
Q.2	What are the symptoms of COPD?
A	
Q.3	What is the treatment for symptom relief?
A	
Q.4	Describe the role of systemic inflammation on weight loss in this patient group.
A	
Q.5	What is the 'obesity paradox'?
A	
Q.6	What are the guidelines for nutritional assessment of a patient with COPD?
A	
Q.7	What other factors need to be considered in a nutritional assessment of a COPD patient?
A	
Q.8	What symptoms are likely to affect nutritional intake?
A	
Q.9	Describe the dietetic strategies that can be used to improve nutritional intake in this patient group.
A	
Q.10	How can improved outcomes be achieved?
A	
Please type extra notes here . . .	