Managing exacerbations of chronic obstructive pulmonary disease

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Most of the information available on chronic obstructive pulmonary disease (COPD) prevalence, morbidity, and mortality comes from developed countries. Even in these countries, accurate epidemiologic data on COPD are difficult and expensive to collect. Prevalence and morbidity data greatly underestimate the total burden of COPD because the disease is usually not diagnosed until it is clinically apparent and moderately advanced (World Health Organization (WHO), 2000). The imprecise and variable definitions of COPD have made it hard to quantify the morbidity and mortality of this disease in developed and developing countries (Figure 1).

COPD includes both chronic bronchitis and emphysema

Figure 1. The processes relating to chronic obstructive pulmonary disease (COPD).

Mortality data also underestimate COPD as a cause of death because the disease is more likely to be cited as a contributory rather than as an underlying cause of death, or may not be cited at all. The aim of the article is to demonstrate that exacerbations of COPD can be recognized and treated in primary care.

Prevalence

Acute emergency chronic obstructive pulmonary disease (AECOPD) is a common cause of morbidity and mortality (Higgins and Thom, 1990; Fusco et al, 1995; Connors et al, 1996; Peters et al, 1998) in COPD patients and places a large burden on healthcare resources. In UK hospitals, respiratory admissions make up around 25% of all acute medical emergency admissions and AECOPD accounts for more than half of these admissions (Anderson et al, 1994). There were 193 hospital admissions as a result of AECOPD in 1994 (Goldacre and Ferguson, 1995). A regional UK survey of medical admissions found that in the age range 65–74 years, 73% of male and 32% of female admissions were as a result of COPD (Anderson et al, 1994). Recent studies have suggested that GP consultations for AECOPD underestimate the true number of exacerbations that are not reported (O’Reilly et al, 2004). Additionally, death often occurs during exacerbations (O’Reilly et al, 2004). Hence, the burden on healthcare resources for AECOPD is enormous.

There is a need for a standardized definition of an exacerbation of COPD (Sethi, 2004). The common aetiological factors are bacterial, viral infection and air pollutants, including active and passive smoking.

In the Global Burden of Disease Study conducted under the auspices of the WHO and the World Bank (WHO, 1995; Lopez, 1996), the worldwide prevalence of COPD in 1990 was estimated to be 9.34/1000 in men and 7.33/1000 in women. However, these estimates include all ages and underestimate the true prevalence of COPD in older adults. The prevalence of COPD is highest in countries where cigarette smoking has been, or still is, very common, whereas the prevalence is lowest in countries where smoking is less common, or total tobacco consumption per individual is low (WHO, 2003).

Exacerbations of COPD may adversely affect the natural history of COPD and accelerate the rate of decline and make the control of the patient’s condition far more difficult to manage and decrease the patient’s quality of life. Several strategies are available now to prevent or reduce exacerbations of COPD including...
improvement in respiratory function. However, interpretation of these results will depend on the patients' baseline values. Table 1 shows the indications for hospital assessment or admission for acute exacerbation of COPD.

Table 1. Indications for hospital assessment/admission for acute exacerbation of chronic obstructive pulmonary disease

- Generally an arterial PaO2 <55 mmHg or a PaCO2 >53 mmHg.
- Respiratory acidosis indicates acute respiratory failure and is an indication for hospital admission (normal values are PaO2 75–100 mmHg and PaCO2 35–45 mmHg).
- Marked increase in intensity of symptoms, such as sudden development of resting dyspnoea.
- Onset of new physical signs (e.g., cyanosis, peripheral oedema)
- Failure of exacerbation to respond to initial management
- Significant comorbidities
- Newly occurring arrhythmias
- Diagnostic uncertainty
- Older age
- Insufficient home support

Table 2. Factors influencing whether a person with COPD should be treated in hospital or at home

<table>
<thead>
<tr>
<th>Factor</th>
<th>Favour treatment in hospital</th>
<th>Favour treatment at home</th>
</tr>
</thead>
<tbody>
<tr>
<td>Able to cope at home</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Breathlessness</td>
<td>Severe</td>
<td>Mild</td>
</tr>
<tr>
<td>General condition</td>
<td>Poor/deteriorating</td>
<td>Good</td>
</tr>
<tr>
<td>Level of activity</td>
<td>Poor/confined to bed</td>
<td>Good</td>
</tr>
<tr>
<td>Cyanosis</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Worsening peripheral oedema</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Level of consciousness</td>
<td>Impaired</td>
<td>Normal</td>
</tr>
<tr>
<td>Already receiving LTOT</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Social circumstances</td>
<td>Living alone/</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td>not coping</td>
<td></td>
</tr>
<tr>
<td>Acute confusion</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Rapid rate of onset</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Significant comorbidity (particularly cardiac disease and insulin-dependent diabetes)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>SpO2 &lt;90%</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Changes on the chest radiograph</td>
<td>Present</td>
<td>No</td>
</tr>
<tr>
<td>Arterial pH level</td>
<td>&lt;7.35</td>
<td>≥7.35</td>
</tr>
<tr>
<td>Arterial PaO2</td>
<td>&lt;7 kPa</td>
<td>≥7 kPa</td>
</tr>
</tbody>
</table>
| COPD = chronic obstructive pulmonary disease; LTOT = long-term oxygen therapy; SpO2 = arterial oxygen saturation; PaO2 = arterial oxygen tension

Management

The aims of management in exacerbations of COPD are to relieve airway obstruction, correct hypoxaemia, address any co-morbid disorder that may contribute to the respiratory deterioration such as heart failure (Seemungal et al., 2000) and also to treat any precipitating factors such as infection.

Management at home

Most exacerbations could be managed in primary care. The British Thoracic Society has provided guidelines to help determine which patients may require hospital treatment (British Thoracic Society, 1997). However, these guidelines have never been fully tested. Table 2 highlights the factors that influence whether a person should be nursed at home or in the hospital.

Bronchodilator therapy

Home management of exacerbations of COPD involves increasing the dose and frequency of existing bronchodilator therapy (Turner et al., 1997). If not already used, anticholinergic therapy may be added until symptoms improve. There is evidence that the use of a metered dose inhaler and spacer device has a similar effect as nebulized bronchodilators in these patients (Turner et al., 1997). In exacerbations of COPD it is probably safer to use air as the driving gas for nebulizers, rather than oxygen and continue with oxygen exchange.
by nasal prongs. Long-term use of the nebulizer therapy after the acute episode is not routinely recommended (NICE, 2004). There is still controversy over the use of antibiotics in AECOPD. If antibiotics are given they should be simple antibiotics (i.e. amoxicillin or erythromycin), modified according to local bacterial resistance patterns. Amoxicillin can be given as a first-line treatment or co-amoxiclav in those who fail to respond or who are known to have a beta-lactamase-producing organism. Clarithromycin is an alternative in patients who are hypersensitive to penicillin (American Thoracic Society, 1995; Siafakas et al., 1995). The use of corticosteroids in acute exacerbations of COPD is now well established, with at least four controlled trials showing benefit (Jackevicius et al., 1997; Calpitt et al., 1999; vanAndel et al., 1999; Sayiner et al., 2001). In a study of 27 patients with exacerbations of COPD treated as outpatients, oral corticosteroid showed a greater rate of improvement in oxygenation, spirometry and a decrease in treatment failures, compared with placebo (Thompson et al., 1996).

The lowest dose used in these trials was 30 mg of prednisolone for 2 weeks, but the threshold dose that will produce improvement is not known. Corticosteroids have been shown to be effective in exacerbations in COPD in both primary and secondary care (Albert et al., 1980; Davies et al., 1999; Niewoehner et al., 1999).

**Prevention**

Prevention or reduction in the severity or duration of exacerbations is an important goal in the management of COPD. Influenza vaccination is recommended in the prevention of AECOPD since it reduces hospitalization in older patients with COPD during epidemic periods (Nichol et al., 1999a,b). Vaccination against Streptococcus pneumoniae is available and is effective in preventing infective complications of S. pneumoniae (Nichol et al., 1999a,b). There is evidence that inhaled corticosteroids may prevent exacerbations and reduce their severity (American Thoracic Society, 1995).

**Conclusion**

Since COPD is a progressive, life-long illness, patients need to be able to function as well as possible within the constraints of their disease. As COPD progresses, patients become increasingly breathless and tired, less mobile and less able to perform everyday tasks. Their increased dependence on others may lead to a loss in confidence unless they adapt to the condition. This loss in confidence can be devastating and lead to reduced social interaction, as well as anxiety and depression. However, with the advent of new medications, use of oxygen, pulmonary rehabilitation programmes and support to their carers, and most important of all, better understanding for the management of this condition, patients can live a better quality of life than ever before.


**KEY POINTS**

- In UK hospitals respiratory admissions make up around 25% of all acute medical emergency admissions and acute emergency chronic obstructive pulmonary disease (AECOPD) accounts for more than half of these admissions.
- The aims of management are to relieve airway obstruction, correct hypoxaemia, address any comorbid disorder that may contribute to the respiratory deterioration and also to treat any precipitating factors such as infection.
- Often pneumonia vaccination is recommended in the prevention of AECOPD.