Editoria
Chronic obstructive pulmonary disease: acute exacerbation

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Definition and aetiology of exacerbation

There has been considerable recent interest into the causes and mechanisms of exacerbations of chronic Obstructive pulmonary disease (COPD) as COPD exacerbations are an important cause of the considerable morbidity and mortality found in COPD. COPD exacerbations increase with increasing severity of COPD. Some patients are prone to frequent exacerbations (with 3 exacerbations or more per year), that are an important cause of hospital admission and readmission; these frequent exacerbations may have considerable impact on quality of life and activities of daily living [1]

COPD exacerbations are associated with worsening of the major exacerbation symptoms of dyspnoea, increased sputum volume and sputum purulence, with other symptoms present such as increased cough, wheeze and upper airway symptoms. Definitions of exacerbations vary but the most useful ones are based on symptom deterioration and depend on worsening of symptoms for at least 48 hours [2, 3]. We found that about 50% of exacerbations were unreported to our research team, despite considerable encouragement provided and only diagnosed from diary cards. However, there were no differences in major symptoms or physiological parameters between reported and unreported exacerbations [1] although it is possible that unreported exacerbations that remain untreated contribute to the high hospital admission rate. Thus patient education targeted at recognising symptoms of COPD exacerbations may be very useful in reducing excess hospital admissions

COPD exacerbations are also associated with considerable physiological deterioration and increased airway inflammatory change [3] that are caused by a variety of factors such as viruses, bacteria and possibly common pollutants. Exacerbations associated with upper respiratory tract infections are associated with respiratory viruses, with rhinovirus, the cause of the common cold, being the commonest trigger of exacerbation [4]. Exacerbations associated with respiratory viruses or increased dyspnoea tend to have more symptoms and be longer in duration. Exacerbations that are triggered by colds are thus more severe in nature and this partly explains the more severe COPD exacerbations seen in the winter months

Bronchodilator

As exacerbations are associated with increased symptoms, β–2-agonists and anti-cholinergic agents are the inhaled bronchodilators most frequently used in treatment. In patients with stable COPD symptomatic benefit can be obtained with bronchodilator therapy in COPD, even without significant changes in spirometry. This is probably due to a reduction in dynamic hyperinflation that is characteristic of COPD and hence leads to a decrease in the sensation of dyspnoea especially during exertion [5]. In contrast to the evidence for benefit in stable COPD, studies investigating bronchodilator responses in acute exacerbations of COPD have shown no significant differences between agents used [6] although studies at exacerbations to date have been relatively small and mainly performed during hospital admission rather than in the community..

Oral corticoseroid

Only about 10 to 15% of patients with stable COPD show a spirometric response to oral corticosteroids. However courses of oral corticosteroids may be beneficial at exacerbation. In a recent cohort study the effect of therapy with prednisolone on COPD exacerbations diagnosed and treated in the community was studied [2]. Exacerbations treated with steroid were more severe and associated with larger falls in peak flow rate. The treated exacerbations also had longer recovery time to baseline for symptoms and peak flow rate. However, the rate of recovery was faster in the prednisolone treated group. An interesting finding in this study was that steroid significantly prolonged the median time from the day of onset of the initial exacerbation to the next exacerbation from 60 days in the group not treated with prednisolone to 84 days in the patients treated with prednisolone. In contrast, antibiotic therapy had no effect on the time to the next exacerbation. If short course oral steroid therapy at exacerbation does prolong the time to the next exacerbation, then this could be an important way to reduce exacerbation frequency in COPD patients, which is an important determinant of health status [1]

Davies and colleagues randomised patients admitted to hospital with COPD exacerbations were randomised to prednisolone or placebo [7]. In the prednisolone group, the FE_1 rose faster until day 5. Length of hospital stay analysis showed that patients treated with prednisolone had a significantly shorter length of stay. Six weeks later, there were no differences in spirometry between the patient groups and health status was similar to that measured at 5 days after admission. Thus the benefits of steroid therapy at exacerbation are most obvious in the early course of the exacerbation. A similar proportion of the patients, approximately 32% in both study groups required further treatment for exacerbations within 6 weeks of follow up, emphasising the high exacerbation frequency in these patients. Niewoehner and colleagues performed a randomised controlled trial of either a two week or eight week prednisolone course at exacerbation compared to placebo, in addition to other exacerbation therapy [8]. The primary end point was a first treatment failure, including death, need for intubation, readmission or intensification of therapy. There was no difference in the results using the two or eight week treatmen

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protocol. The rates of treatment failure were higher in the placebo group at 30 days, compared to the combined two and eight week prednislone groups. As in the study by Davies and colleagues, the FEV_1 improved faster in the prednisolone treated group though there were no differences by two weeks. In contrast, Niewoehner and colleagues performed a detailed evaluation of steroid complications and found considerable evidence of hyperglycaemia in the steroid treated patients. Thus steroids should be used at COPD exacerbation in short courses of no more than two weeks duration to avoid risk of complications.

Antibiotics

Acute exacerbations of COPD often present with increased sputum purulence and volume and antibiotics have traditionally been used as first line therapy in such exacerbations. However, viral infections may be the triggers in a significant proportion of acute infective exacerbations in COPD and antibiotics used for the consequences of secondary infection. A study investigating the benefit of antibiotics in over 300 acute exacerbations demonstrated a greater treatment success rate in patients treated with antibiotics, especially if their initial presentation was with the symptoms of increased dyspnoea, sputum volume and purulence [9]. Patients with mild COPD obtained less benefit from antibiotic therapy. A randomised placebo controlled study investigating the value of antibiotics in patients with mild obstructive lung disease in the community concluded that antibiotic therapy did not accelerate recovery or reduce the number of relapses [10]. A meta analysis of trials of antibiotic therapy in COPD identified only nine studies of significant duration and concluded that antibiotic therapy offered a small but significant benefit in outcome in acute exacerbations [11].

Supported discharge programmes for COPD exacerbation

Over the last few years a number of different models of supported discharge have been developed and some evaluated [12-14]. Patients have been discharged early with an appropriate package of care organised including domiciliary visits made to these patients after discharge by trained respiratory nurses. Cotton and colleagues randomised patients to discharge on the next day or usual management and found that there were no differences in mortality or readmission rates between the two groups [13]. There was a reduction in hospital stay from a mean of 6.1 days to 3.2 days. In another large study by Skwarska and colleagues, patients were randomised to discharge on the day of assessment or conventional management [14]. Again there were no differences in readmission rates, or visits to primary care physicians and health status measured eight weeks after discharge was similar in the two groups. The authors also demonstrated that there were significant cost savings of around 50% for the home support group, compared to the admitted group. However other considerations need to be taken into account in organising an assisted discharge service, in that resources have to be released for the nurses to follow the patients and the benefits may be seasonal, as COPD admissions are a particular problem in the winter months.

Conclusion

Recently there has been much progress in the understanding of COPD exacerbations. Exacerbations that are associated with considerable disability and worsening of symptoms should be treated with Increased bronchodilators and a course of oral corticosteroids. Antibiotics should be given in the presence of purulent sputum or increased sputum volume, though the effects of antibiotics are less marked than expected. Newer antibiotics with more specific bacteriological profiles may have a greater effect on outcome of COPD exacerbations.

There is a need for increased patient education about detection and treatment of exacerbations early in their course. Following an exacerbation, the COPD patient's condition should be reviewed and attention given to risk factors and compliance with therapy. We will then be in a better position to reduce significantly the morbidity associated with COPD exacerbation and improve the health status of these patients. ■

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