Chronic obstructive pulmonary disease: acute exacerbations

Wisia Wedzicha

Definition and aetiology of exacerbations

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 presents 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.¹,² 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,³ though it is possible that unreported exacerbations that remain untreated contribute to the high hospital admission rate. This 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 changes⁴ 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.

Bronchodilators

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 though studies at exacerbations to date have been relatively small and mainly performed during hospital admission rather than in the community.

Oral corticosteroids

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. 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 treatment...
protocol. The rates of treatment failure were higher in the placebo group at 30 days, compared to the combined two and eight week prednisolone groups. As in the study by Davies and colleagues, the FEV1 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 infectious 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. 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. 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.

Supported discharge programmes for COPD exacerbations

Over the last few years a number of different models of supported discharge have been developed and some evaluated. 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. There was a reduction in hospital stay from a mean of 6.1 days to 3.2 days. In another larger study by Skwarska and colleagues, patients were randomised to discharge on the day of assessment or conventional management. 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.

Conclusions

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.

References

1. Seemungal TAR, Donaldson GC, Paul EA, Bestall JC, Jefferies DJ, Wedzicha JA. Effect of exacerbation on quality of life in patients with chronic obstructive pulmonary disease. Am J Respir Crit Care Med 1998;151:1418-22.
2. Seemungal TAR, Donaldson GC, Bhowmik A, Jefferies DJ, Wedzicha JA. Time course and recovery of exacerbations in patients with chronic obstructive pulmonary disease. Am J Respir Crit Care Med 2000;161:1608-13.
3. Bhowmik A, Seemungal TAR, Sapsford RJ, Wedzicha JA. Relation of sputum inflammatory markers to symptoms and physiological changes at COPD exacerbations. Thorax 2000;55:114-200.
4. Seemungal TAR, Harper-Owen R, Bhowmik A, Moric I, Sanderson G, Message S, MacCallum P, Meade TW, Jefferies DJ, Johnston SL, Wedzicha JA. Respiratory viruses, symptoms and inflammatory markers in acute exacerbations and stable chronic obstructive pulmonary disease. Am J Respir Crit Care Med 2001;164:1618-23.
5. Belman MJ, Botnick WC, Shin JW. Inhaled bronchodilators reduce dynamic hyperinflation during exercise in patients with chronic obstructive pulmonary disease. Am J Respir Crit Care Med 1996;153:967-975.
6. Rebuck AS, Chapman KR, Abdou R, Pare PD, Kreisman H, Wolkove N, Vickerson F. Nebulized anticholinergic and sympathomimetic treatment of worsening of symptoms should be treated with.
7. Davies L, Angus RM, Calverley PMA. Oral corticosteroids in patients admitted to hospital with exacerbations of chronic obstructive pulmonary disease: a prospective randomised controlled trial. Lancet 1999;354:456-60.
8. Niewoehner DE, Erbland ML, Deupree RH et al. Effect of systemic glucocorticoids on exacerbations of chronic obstructive pulmonary disease. N Engl J Med 1999;340:1941-7.
9. Anthonisen NR, Manfreda J, Warren CPW, Hershfield ES, Harding GKM, and Nelson NA. Antibiotic therapy in exacerbations of chronic obstructive pulmonary disease. Ann. Intern. Med 1987;106:196-201.
10. Sachs APE, Koeter GH, Groenier KH, Van der Waij D, Schiphuis J, Meyboom-de Jong B. Changes in symptoms, peak expiratory flow and sputum flora during treatment with antibiotics of exacerbations in...
patients with chronic obstructive pulmonary disease in general practice. Thorax 1995;50:758-63.
11. Saint S, Bent S, Vittinghoff E, Grady D. Antibiotics in chronic obstructive pulmonary disease exacerbations. A meta-analysis JAMA 1995;273:957-60.
12. Gravil JH, Al-Rawas OA, Cotton MM et al. Home treatment of exacerbations of COPD by an acute respiratory assessment service. Lancet 1998;351:853-5.
13. Cotton MM, Bucknall CE, Dagg KD et al. Early discharge for patients with exacerbations of COPD: a randomised controlled trial. Thorax 2000;55:902-6
14. Skwarska E, Cohen G, Skwarski KM et al. A randomised controlled trial of supported discharge in patients with exacerbations of COPD. Thorax 2000;55:907-12

GPIAG Autumn Meetings

The GPIAG are pleased to announce that later this year we will be holding a series of regional meetings across the United Kingdom.

Preliminary venues include; East Surrey, Leicester, Salisbury, York and Glasgow. The meetings will take place between late September and November 2002

In a relaxed workshop style, we will focus on the implementation of the new BTS/SIGN asthma guidelines, which are due for release in the summer time.

'Everything you need to know', 'personal & practice development', 'working together' and 'sharing best practice' will all be key features of the programme.

If you are interested in attending any of the meetings or would like further information, please contact our secretariat at info@gpiag.org.