

Management of chronic obstructive pulmonary disease (COPD)

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Summary

The management of chronic obstructive pulmonary disease (COPD) aims to optimise function. Although drugs have a place in achieving this, non-pharmacological interventions are important. Smoking cessation, long-term oxygen therapy, rehabilitation, and non-invasive ventilation are well supported by the evidence. Preventive measures include the use of influenza and pneumococcal vaccines and the treatment of nicotine addiction. A self-help plan, along the lines of those used in asthma, is helpful and leads to a rational treatment of exacerbations. Surgical procedures have a small place and palliative care is important in the humane treatment of end-stage disease.

The term chronic obstructive pulmonary disease (COPD) is usually applied to a group of diseases where there is airflow obstruction with minimal reversibility. It includes chronic bronchitis, emphysema and the late stages of poorly controlled asthma, where there has been extensive remodelling of the airways. By far the most significant factor in the development of COPD is tobacco smoking. Rational management is hampered by negative attitudes of patients, doctors, and funding agencies. These attitudes probably arise from a sense of nihilism and a perception that it

is mainly a self-inflicted disease. It is the fourth highest cause of death in New Zealand. In Australia it results in a third of all hospital admissions, with an average length of stay of 5.3 days and it accounts for 8% of total health system costs.¹ It is likely that the economic burden in New Zealand is similar.

Global Initiative for Obstructive Lung Disease (GOLD) is a collaborative project of the World Health Organisation and the National Heart and Blood Institute.² This project aims to improve the management and prevention of COPD. Guidelines have been produced using the acronym COPD-X:

- C** – Confirm diagnosis and confirm severity
- O** – Optimise function
- P** – Prevent deterioration
- D** – Develop self-management and support plans
- X** – Exacerbation management.

Confirm diagnosis

The main differential is asthma. Although some people with COPD show some reversibility of spirometry with a bronchodilator, more than 10% reversibility raises the

possibility of asthma. If in doubt, a trial of prednisone 30mg per day for two to three weeks will resolve this issue. In addition to spirometry, an assessment of functional capacity

based on the ability to perform common tasks is helpful.

Optimise function

There has been a tendency to emphasise pharmacological treatments but these have limited long-term benefits although bronchodilators offer some short-term help. Measures which are of proven benefit (level A evidence) include:

- Smoking cessation
- Long-term domiciliary oxygen
- Pulmonary rehabilitation
- Non-invasive positive pressure ventilation for acute exacerbations.

Smoking cessation is the most effective intervention and the only one to make major changes in the natural history and progression of the disease.³ All medical practitioners should be familiar with the New Zealand Guidelines for Smoking Cessation and the

5As approach.⁴ After stopping smoking, the accelerated rate of decline of lung function is stopped although the age-related decline continues. It is often appropriate to advise use of a cessation service such

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as the Quitline. Nicotine replacement, with skin patches or chewing gum, is a well-established pharmacological aid to cessation. It is useful for a member of a practice, often a nurse, to be ac-

credited to offer 'exchange cards', obtained through the Quit Group, which provide a patient with heavily subsidised nicotine replacement. Bupropion (Zyban) is an antidepressant, which, independently of its effect on mood, increases the rate of quitting; it is not subsidised and contraindications include any comorbidity which predisposes to seizures. Nortriptyline may be almost as effective as bupropion.

Long-term domiciliary oxygen therapy reduces mortality in patients who, when stable and not recovering from an exacerbation, have PaO_2 less than 55 mm Hg or less than 60 mm Hg in the presence of end organ damage such as cor pulmonale.^{5,6} The two major trials used different designs but it is possible to amalgamate the evidence. Oxygen is unlikely to be beneficial if used for less than 16 hours each day and is even more effective if used close to 24 hours daily. In most parts of New Zealand oxygen concentrators are provided by District Health Boards after recommendation by a Respiratory Physician. Most boards do not provide equipment for using portable oxygen delivery systems, although patients may buy these. The local Community Nursing Service will be able to advise on purchase arrangements including second-hand equipment.

Pulmonary rehabilitation programmes improve exercise capacity and quality of life.^{7,8,9} Most include education about COPD, and its treatment, and a programme of exercises, which can be undertaken with oxygen if necessary. Provision of these services is very uneven; some

for coordination and standardisation of rehabilitation services through the country.

Non-invasive positive pressure ventilation provides ventilatory support using a nasal mask and a bi-level pressure support ventilator. In the treatment of exacerbations it reduces mortality and length of hospital stay but its place in the overall management of COPD is not yet clear.

Optimise function (pharmacological)

Bronchodilators improve symptoms but do not alter mortality or the inexorable decline in lung function. Ipratropium bromide (Atrovent) and beta-2 agonists are both useful. It is often possible to provide benefit by regular four-hourly use of ipratropium with a beta-2 agonist used for additional relief as required. For more severe disablement, the use of a nebulised combination of ipratropium and salbutamol is helpful. Long-acting beta-2 agonists have been shown to have some benefits in COPD but their place in the overall management is unclear and, on present evidence, they are not usually indicated.¹¹ The long acting anticholinergic, tiotropium, is a promising alternative to ipratropium and may soon be available in New Zealand. New classes of drugs, such as

phosphodiesterase 4 inhibitors and new types of beta-2 agonists are under development.

Inhaled steroids are widely prescribed in COPD but there is little evidence for ef-

fectiveness. Some trials have shown symptomatic benefits but they do not alter the rate of decline in lung function.^{11,12,13} Patients on inhaled steroids are often reluctant to stop these and so presumably there is some perceived benefit; however, at present, it is difficult to justify in-

haled steroids in COPD, especially in mild disease. Those patients who are taking these drugs should have the dose gradually reduced and some will be able to discontinue.

Oral steroids are often needed in the treatment of exacerbations but are rarely indicated in long-term treatment. In very severe disease it may be difficult to completely tail off oral steroids after a period of de-

terioration although it is important to try. Where there is doubt about the diagnosis, and asthma is possible, a short course of prednisone is the easiest way of determining if there is significant reversibility of airflow obstruction.

Prevent deterioration

Although infection is not usually a major factor in the genesis of COPD, once the disease is established, episodes of lower respiratory tract infection are common causes of exacerbation, hospitalisation and death; if recovery occurs, there is usually significant further impairment of function. Hence prevention and prompt treatment of infection is important. The influenza vaccine is useful in reducing the frequency and severity of exacerbations. The value of the pneumococcal vaccine is less clear, and protection is dependent on the serotypes contained in the vaccine.¹⁴ On current evidence, it appears to be worthwhile, certainly in those with severe COPD.

Relapse after quitting smoking is common; hence treatment of nicotine addiction is a long-term preventive measure. Medical practitioners can assist by asking if smoking has restarted and offering advice to quit. Reinforcement of this message by a discussion about the effects on exercise tolerance and lung function tests is useful.⁴ There are several services, such as Aukati Kai Paipa and Noho Marae, which provide Maori with support in quitting and staying smoke free.

Pulmonary rehabilitation programmes improve exercise capacity and quality of life

There is a pressing need for coordination and standardisation of rehabilitation services through the country

Develop self-management and support plans

Action plans modelled on the successful asthma schemes are useful. However, COPD is a more complex disease and it is not possible to directly apply the asthma plan. Peak flow measurements, whilst helpful in monitoring COPD, will change in less predictable ways than in asthma; other indicators such as the change in colour of the sputum or onset of an upper respiratory tract infection are also important. The plan needs to outline the indications for prompt treatment with an antibiotic, and often prednisone; it may also include indications for the use of a nebuliser and must have clear indications of the situations where the patient needs to seek urgent medical help or attend an Emergency Department.

Exacerbation – management

Patients and their doctors need to be comfortable with the self-management plan. In general hospital admission should be considered if there is not a

prompt response to antibiotics and prednisone or if there are features such as confusion or drowsiness that may indicate CO₂ retention. Hospital treatment should include consideration of non-invasive positive pressure ventilation and intubation with conventional assisted ventilation.

Surgical treatments

If large bullae are shown on CT scanning, it is sometimes possible to achieve dramatic improvement in shortness of breath by bullectomy. The newer procedure of lung volume reduction surgery removes the upper (and most severely emphysematous) portions of both lungs so that the less severely diseased portions can function better, mainly due to more effective diaphragmatic function. At present there is limited experience of this in New Zealand and very careful assessment is needed. In end stage disease, for patients under 60, without serious comorbidities, lung replacement surgery is an option. Referral to a respiratory physician is advised if surgical treatments are being considered.

Palliative care

End stage lung disease can result in disabling shortness of breath; the accompanying anxiety makes this worse. Patients and their care-givers often seek frequent assessments at after-hours services and emergency departments or make calls to ambulance services. If the measures already considered have not resulted in adequate symptomatic improvement, there may be a case for palliative treatment of the breathlessness. The most useful agent is morphine syrup, which may be effective in doses as low as 2.5mg. There is evidence for the usefulness of slow-release morphine preparations, but many patients seem to do better with the short acting syrup, which allows titration of the dose according to the severity of symptoms. Consultation with a hospice service may be useful for patients and their care-givers and may provide useful assistance with the selection of drugs for relief of symptoms.

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