

Chronic obstructive pulmonary disease management guidelines

The latest guidelines for managing COPD are summarised. Spirometry is the gold standard for diagnosis, assessment and monitoring. Smoking cessation, vaccinations, bronchodilators, glucocorticoids and pulmonary rehabilitation are the usual interventions, although antibiotics and oxygen therapy may also be required.

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A new set of evidence-based management guidelines for chronic obstructive pulmonary disease (COPD) has been developed jointly by the Thoracic Society of Australia and New Zealand and the Australian Lung Foundation. They are directed at primary care physicians, with the aim of encouraging and facilitating accurate diagnosis and effective management of COPD, based on sound evidence. The main evidence base was derived from the comprehensive 2001 GOLD Report (*Global initiative for chronic Obstructive Lung Disease*) of the US National Heart, Lung, and Blood Institute and the World Health Organization, with newer evidence from the Cochrane Collaboration database.¹

This article summarises the main points of the guidelines. Full details can be found in a recent supplement of the *Medical Journal of Australia* (17 March 2003) and also on the LungNet website at www.lungnet.com.au/COPDHandbook.pdf.²

What is COPD?

COPD is characterised by airflow limitation that is not fully reversible. The irreversible airflow limitation is the result of inflammation, fibrosis and remodelling of peripheral airways and loss of lung elastic recoil. Some people with COPD may have partially reversible airflow limitation. Fully reversible asthma is not COPD; however,

IN SUMMARY

- The key recommendations for the management of COPD are summarised by the acronym COPDX: Confirm diagnosis, Optimise function, Prevent deterioration, Develop a support network and self-management plan, and manage eXacerbations.
- Spirometry is the gold standard for diagnosis, severity assessment and monitoring of COPD.
- The core symptoms (cough, sputum production and dyspnoea) are controlled by pulmonary rehabilitation and efficacious medication (bronchodilators, inhaled glucocorticoids and antibiotics, plus oxygen therapy where there is hypoxaemia).
- Deterioration is prevented by reducing risk factors (stopping cigarette smoking, the most significant risk factor for COPD) and reducing infections and exacerbations.
- COPD impacts on both patients and carers – a multidisciplinary support team, self-management plans and support groups help patients and carers to cope.
- Early diagnosis and treatment of exacerbations may prevent progressive functional decline and hospital admission. Prompt and appropriate referral optimises patient outcomes.

there may be some overlap in symptoms.² COPD is associated with significant morbidity and mortality.

The disease burden

COPD is very common in Australia, with symptoms affecting as many as 800,000 people. It is progressive and potentially disabling, and can have serious complications. On its own, COPD is Australia's third leading cause of disease burden after ischaemic heart disease and stroke.³ In Australia, COPD is the fourth most common cause of death in men and the sixth most common cause of death in women; in New Zealand, it is the third most common cause in men and ranks fourth in women.⁴ Mortality from COPD is at least five times higher in indigenous Australians compared with nonindigenous Australians.

COPD is also a very expensive disease. Direct healthcare costs are conservatively estimated at \$818 to \$898 million annually in Australia, based on 1993–1994 figures extrapolated to the year 2001.⁵ These figures do not include the hidden costs associated with carer burden, loss of productivity due to absenteeism and early retirement, comorbid conditions and the high rates of depression and anxiety associated with COPD.

Despite these rather disturbing facts, COPD has remained a 'hidden disease'. It is often considered incurable and self-inflicted; sufferers often feel guilty, helpless and without hope; society knows little about it; and governments are unaware of its major impacts.

The way forward

While COPD is usually a progressive illness, much can be done to improve quality of life, increase exercise tolerance and reduce disability and mortality. The latest COPD guidelines emphasise the role of objective functional assessment, nonpharmacological interventions and the importance of self-management. The key recommendations can be summarised in the 'COPDX plan':

- Confirm diagnosis and assess severity
- Optimise function
- Prevent deterioration
- Develop support network and self-management plan
- Manage exacerbations.

Chronic obstructive pulmonary disease

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Cigarette smoking is the leading cause of chronic obstructive lung disease, which affects about 800,000 people in Australia. Although stopping smoking may lead to only minimal improvements in lung function, it will slow the rate of decline in lung function and delay the onset of disablement.

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C: Confirm diagnosis

COPD can be missed as a diagnosis because symptoms develop slowly and are often attributed to ageing or other causes. It should be distinguished from asthma, as treatment approaches are different, and it more commonly has serious complications. (Asthma usually has a more variable course, dates back to a younger age, and occurs in patients who are more likely to be atopic and who have a relatively light smoking history. Also, the airflow limitation in asthma is substantially, if not completely, reversible.)

Symptoms

The core symptoms of COPD are cough, sputum production and dyspnoea, and the diagnosis should be considered in patients who display any of these symptoms. Detailed history taking is important to determine the chronic nature of the symptoms. In the early stages, patients may be asymptomatic, or unaware of the importance of symptoms.

Risk factors

Cigarette smoking is the most important cause of COPD.^{6,7} About half of all smokers develop airflow limitation, and 15 to 20% develop significant clinical disability.⁶ COPD should be considered in all smokers and ex-smokers over the age of 35 years, and in all patients with other smoking-related conditions.

Other risk factors include exposure to occupational or environmental pollution, alpha-1 antitrypsin deficiency, genetic predisposition, recurrent respiratory tract infections in childhood and bronchial hyperresponsiveness.⁸

Spirometry

Spirometry is the gold standard for diagnosing, assessing and monitoring COPD. Airflow limitation is nonreversible when the post-bronchodilator ratio of forced expiratory volume in one second (FEV₁) to the forced vital capacity (FVC) is below 0.70 and the FEV₁ is below 80% of the predicted value. Fully reversible airflow limitation should be treated as asthma.

Spirometry is the most reproducible, standardised and objective indicator of airflow limitation, and FEV₁ is directly associated with prognosis.⁹ The grades of severity according to post-bronchodilator FEV₁ are:

- mild COPD – FEV₁ 60 to 80% predicted
- moderate COPD – FEV₁ 40 to 59% predicted
- severe COPD – FEV₁ less than 40% predicted.

Clinical symptoms are an important guide to severity, but are less reliable than the determination of the degree of airflow limitation by spirometry. The impact of breathlessness on the activities of daily living should be assessed using the Medical Research Council dyspnoea scale.¹⁰

Lung function tests and CT scan

More complex lung function testing and a high resolution CT scan of the lungs may

help confirm or exclude a diagnosis of COPD, as well as evaluate some complications and comorbidities. Referral to a respiratory specialist is advised for patients with moderate to severe COPD, those with an uncertain diagnosis and those with serious complications or comorbidities.

O: Optimise function

Effective management and treatment can relieve symptoms, improve lung function and help reduce aggravating factors and complications.

Symptom relief

Symptoms of COPD can be relieved with medications and pulmonary rehabilitation.

Bronchodilators

Inhaled bronchodilators (selective β -adrenoceptor agonists, anticholinergic agents) relieve symptoms and increase exercise tolerance to some degree.^{11,12} However, the improvements in symptoms and quality of life do not closely correlate with improvements in lung function testing. Overdosing should be avoided. Combining a β -agonist with an anticholinergic may be more effective than increasing the dose of either medication alone, and results in fewer side

effects. Metered dose inhalers and spacers and dry powder inhalers are used for delivery; nebulisers are not recommended for routine use in stable disease as they are expensive and cumbersome alternatives to inhalers and provide no better relief.¹

Long acting β -agonists (LABAs) provide sustained relief for patients with moderate-to-severe COPD.^{13,14} The new long-acting anticholinergic agent tiotropium (Spiriva) reduces dyspnoea and exacerbation rate and improves health status, compared with the short-acting anticholinergic ipratropium.¹⁵ Tiotropium has a restricted listing on the PBS for COPD while LABAs and LABA–glucocorticoid combinations are restricted under the PBS to patients with frequent episodes of asthma.

Theophyllines are rarely used now because of their narrow therapeutic window.

Glucocorticoids

Short-course (two weeks) oral glucocorticoid therapy may be useful for some patients with intractable symptoms, but the long term use of systemic glucocorticoids is not recommended.¹⁶ The response to therapy should be determined by spirometry or functional assessment. Inhaled glucocorticoids should be considered for continued treatment in patients with a demonstrated response or for those with severe COPD and frequent exacerbations.¹⁷

Optimise inhaler technique

The correct inhaler technique is vital for patients to achieve optimal benefit from their medication. The correct technique to be used with a device should be explained and demonstrated initially, and then checked regularly.

Aggravating factors and complications

Aggravating factors include sleep apnoea, gastro-oesophageal reflux, aspiration,



Figures 1a and b. Pulmonary rehabilitation, one of the most effective interventions in COPD, involves patient education (a, left) and exercise training (b, right), and also psychosocial support.

and alcohol and sedative use. Complications include pulmonary hypertension and cor pulmonale. Severe COPD and long term use of glucocorticoids increase the risk of osteoporosis, and at risk patients should be considered for prophylactic treatment.

Pulmonary rehabilitation

Pulmonary rehabilitation is a structured multidisciplinary program to improve symptoms and reduce the disability associated with respiratory disorders, and should be offered to all patients with moderate to severe COPD. It is one of the most effective interventions in COPD, with the following documented benefits:

- improved cardiovascular fitness, muscle function and exercise tolerance
- enhanced self-confidence and coping strategies, and improved adherence to medication and use of respiratory treatment devices
- controlled COPD-associated anxiety and depression and reduced social impediments.

Pulmonary rehabilitation includes exercise training, patient and carer education (including assistance with smoking cessation) and psychosocial support (Figure 1). Chest physiotherapy may assist sputum removal. Nutritional advice for weight management is also recommended

as progressive weight loss is a poor prognostic factor in COPD and excess weight contributes to hypoventilation and obstructive sleep apnoea.

P: Prevent deterioration Smoking cessation

Stopping smoking is the most effective way to reduce the risk of developing COPD and to slow the progressive decline in lung function.^{6,18} In contrast, medication has not been shown to slow the progression of COPD.

Treatment of nicotine dependence and smoking habit is effective and should be offered to smokers in addition to counselling.¹⁹ Pharmacotherapies and behavioural techniques help prevent smoking relapse.¹⁹ QuitLine is one of several useful services (phone 131 848).

Infection and exacerbation prevention

Annual influenza vaccination (Fluarix, Fluvax, Influvac, Vaxigrip) reduces the rate of complications, hospitalisations and death associated with respiratory disease,²⁰ and is recommended for all patients with moderate and severe COPD. Pneumococcal vaccination (Pneumovax 23) is recommended every five years for patients with COPD.

Inhaled corticosteroids have been shown to reduce the rate of acute

exacerbations of COPD and slow the rate of decline in quality of life in patients with severe COPD, and are indicated for patients with frequent exacerbations.

Although there is little evidence that long term antibiotic use prevents exacerbations of COPD, antibiotics should be used when infective exacerbations occur. Mucolytic drugs may help to reduce exacerbation rates in some patients who experience difficulty expectorating sputum.

Regular review

Even with the best care, COPD is usually a progressive disease with a tendency to increasing frequency and severity of exacerbations. Regular review is recommended to monitor for complications and comorbidities and to adjust treatment or refer for further investigations.

Oxygen therapy

Domiciliary oxygen for more than 15 hours daily has been shown to reduce mortality in patients with COPD.²¹

Long term continuous oxygen therapy

Long term continuous therapy (at least 15 hours a day) is indicated in awake patients with stable COPD with an arterial oxygen tension (PaO₂) consistently ≤55 mmHg when breathing air at rest after all potentially reversible factors have been treated. It is also indicated for patients with

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secondary polycythaemia, pulmonary hypertension or right heart failure if the stable PaO₂ is 55 to 59 mmHg.

Intermittent oxygen therapy

Intermittent therapy is indicated during

exercise in patients who desaturate on exertion. It is also appropriate in those patients awaiting medical attention or transport to hospital who live in remote areas or who are prone to sudden life-threatening episodes, and during air travel.

Nocturnal oxygen therapy

Nocturnal therapy is indicated in patients with clinically significant nocturnal hypoxaemia (below 88% arterial oxygen saturation), which should be considered in patients who have satisfactory arterial gas tensions while awake but who have daytime somnolence, polycythaemia or right heart failure. Sleep apnoea should also be considered.

D: Develop support network and self-management plan

COPD imposes a handicap that affects both patients and carers. Psychiatric morbidity is high and some patients may also show signs of cerebral dysfunction. Simple scales can be used to assess anxiety and depression as well as cognitive function. Carers may require some form of intervention because of the strain they are under.

Pulmonary rehabilitation increases the knowledge base of both patients and carers, reduces carer strain and creates a positive attitude toward self-management and physical activity.²² Its aim is to help the patient achieve the highest possible level of independent functioning.

Support network

Improving the quality of life and reducing the burden of COPD requires a multidisciplinary support team. The GP plays a central role in the management of patients with COPD, being uniquely placed to encourage smokers to quit, diagnose COPD in its early stages and coordinate care as the disease progresses. The respiratory physician may be consulted to intervene in moderate-to-severe disease, and additional disciplines may be involved as necessary.

Multidisciplinary care plans and self-management plans

Patients with COPD may benefit from enhanced primary care initiatives, such as multidisciplinary case conferencing or care plans.

Self-management training improves health outcomes and reduces health care costs in patients with chronic illness. Patients with COPD should be encouraged to take responsibility for their own management and to develop a self-management plan with their GP and respiratory physician. A self-management plan for COPD would include instructions for maintenance therapy and for managing exacerbations and crises. The plan should be reviewed after an exacerbation to determine whether any adjustments are necessary.

Support groups

Patients with COPD should be referred to support groups, which empower patients to be more actively involved in their own management and thereby help to reduce the psychosocial impact of COPD. [The full guidelines as published by the *Medical Journal of Australia* do not mention specific COPD support groups. The Australian Lung Foundation has a register of about 75 'LungNet' support groups (www.lungnet.com.au and toll-free phone 1800 654 301), and there are many other similar groups in each State and Territory.]

End-of-life issues

Most patients with end-stage COPD want to participate in end-of-life decisions. A frank discussion about advance health directives (such as intubation and resuscitation) can be beneficial although difficult and distressing. It is often easier to discuss these issues in a stable clinic setting than in acute life-threatening situations.

X: Manage eXacerbations

Patient and carer education can assist in the early recognition of exacerbations. A

Table. Indications for referral

Specialist referral

- Pulmonary function testing
- Sudden deterioration
- Long term oral glucocorticoid use
- Development of new symptoms
- Consideration for pulmonary rehabilitation or supplemental oxygen

Hospital admission/assessment

Acute exacerbation plus one or more of:

- Marked increase in intensity of symptoms
- Poor response to outpatient therapy
- Inability to walk when previously mobile
- Dyspnoea inhibiting eating or sleeping
- Inability to manage at home, despite home-care resources
- High risk comorbidity condition
- Altered mental state suggestive of hypercapnia
- Worsening hypoxaemia or cor pulmonale
- Development of arrhythmia

Increased respiratory support or intensive care unit admission

- Severe dyspnoea with an inadequate response to initial emergency therapy
- Confusion, lethargy or evidence of hypoventilation
- Worsening or persistent hypoxaemia, despite supplemental oxygen; worsening hypercapnia (PaCO₂ >70 mmHg); severe or worsening respiratory acidosis (blood pH <7.3)
- Assisted mechanical ventilation requirement

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self-management plan can instruct the patient on how to step up treatment in an exacerbation and should include details on how to arrange rapid assessment by the patient's GP or community nurse.

Prompt assessment of severity followed by treatment to relieve airflow limitation may avert a crisis situation. The signs of significant deterioration include increased breathlessness, change in exercise tolerance or ability to perform activities of daily living, change in sputum volume, colour or viscosity, audible wheeze, chest tightness, overuse of accessory muscles to assist breathing, development of right ventricular failure or cyanosis, and confusion or decreased consciousness.

Optimise treatment

Relief of airflow limitation is the main goal of treatment of acute exacerbation and

leads to more effective cough and expectoration. Treatment should be aimed at the underlying cause of the exacerbation.

Bronchodilators

Inhaled β -agonists and anticholinergics may be delivered by metered dose inhaler and spacer, or by nebuliser. (It has been shown in asthma that delivery is as effective by metered dose inhaler and spacer as by nebuliser – this may be applicable in COPD also.) The immediate effect of β -agonists is small, but the symptomatic effect on patients with severe airflow limitation may be significant. The addition of an anticholinergic may be beneficial for severe patients. If the β -agonist response is inadequate, the patient should be changed to an anticholinergic.

Glucocorticoids

Systemic glucocorticoid therapy for up to

two weeks has been shown to improve clinical outcomes in acute COPD exacerbations.²³ An appropriate dose of oral prednisolone (Panfocortelone, PredMix, Redipred, Solone) for most patients is 30 to 50 mg/day. Patients on intravenous therapy should be changed to oral therapy within 48 hours. Blood glucose levels should be monitored as hyperglycaemia is a significant side effect of high-dose glucocorticoids. Older patients on long term glucocorticoids are at risk of corticosteroid-induced osteoporosis and screening and treatment for this should be considered.

Antibiotics

Antibiotics are appropriate in exacerbations in which bacterial infection has a primary or secondary infective role. A recent meta-analysis suggests that antibiotics have a small but significant beneficial

effect in COPD.²⁴ The duration of empirical oral antibiotic therapy depends on the clinical response (usually seven to 10 days). Parenteral antibiotics should be reserved for those patients unable to take oral antibiotics.

Oxygen therapy

Controlled oxygen therapy is indicated for hypoxaemic patients to increase oxygen saturation to over 90% (PaO₂ greater than 60 mmHg).

Ventilatory assistance

Ventilatory assistance, preferably by non-invasive positive pressure ventilation, is indicated for patients with increasing hypercapnia and acidosis.

Refer appropriately

Prompt and appropriate referral optimises patient outcomes. The risk of death from

exacerbations increases with respiratory acidosis, significant comorbidities and complications. Referral may be necessary for urgent specialist review, hospital assessment and/or admission to a high-dependency or intensive care unit (Table).

Monitor and review

The effectiveness of ongoing treatment is assessed by monitoring clinical signs and symptoms by clinical examination (wheeze, accessory muscle use and respiratory rate distress), arterial blood gas measurement and/or oximetry, and respiratory function testing (spirometry).

Discharge and follow up

Discharge planning is multidisciplinary and should be commenced soon after admission. Social supports and domestic arrangements should be assessed and any necessary home supports organised. Short

and long term oxygen needs should be assessed, and provided as required. Referral to a comprehensive pulmonary rehabilitation program should be considered before discharge, preferably with the involvement of the patient's GP.

On discharge, patients should be provided with a pack that includes general information on COPD, instructions on the use of medication and inhalation and oxygen devices, and a plan for management of worsening symptoms. Dietary advice should also be included for those who are underweight or undernourished.

Follow up care allows further discussion of self-management plans and future monitoring. A first review by the GP is recommended within seven days of discharge after a hospital admission. **MT**

A list of references is available on request to the editorial office.

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