

Domiciliary oxygen therapy services: clinical guidelines and advice for prescribers.

SUMMARY OF A REPORT OF THE ROYAL COLLEGE OF PHYSICIANS

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ABSTRACT – The criteria for the use of long-term oxygen therapy in chronic obstructive pulmonary disease are well established, but there is variability in prescribing habits, poor adherence to guidelines, and lack of organised follow-up and monitoring arrangements. This report gives new guidance on the use of domiciliary oxygen in adult patients with chronic respiratory disease and indications for its use in paediatrics, cardiology and palliative medicine. New methods of prescribing are also recommended.

Background

Oxygen therapy is prescribed to correct chronic hypoxaemia, reduce transient oxygen desaturation and exercise hypoxaemia and decrease breathlessness. The prescription of oxygen therapy for use in the home environment has developed over the past 50 years. Long-term oxygen therapy (LTOT) refers to daily treatment at home for chronic hypoxaemia (PaO₂ below 7.3kPa) and is sufficient to raise the waking PaO₂ to above 8kPa. Once started, this therapy is likely to be lifelong. Early experience in small uncontrolled studies led to the establishment of two major randomised controlled trials of the effects of LTOT by the British Medical Research Council Working Party¹ and the Nocturnal Oxygen Therapy Trial Group². Both trials, published in the 1980s, showed that domiciliary LTOT, for at least 15 hours a day, improved survival in patients with hypercapnic chronic obstructive pulmonary disease (COPD). This led to the introduction of the domiciliary oxygen concentrator service in 1985, which facilitated prescription of LTOT. Since that time the numbers of patients treated with oxygen concentrators, not only for COPD but also for other respiratory and cardiac conditions, has increased to an estimated 18,000 in the UK (personal communication).

A number of studies have reviewed the prescription of oxygen concentrators and have shown variability in assessments and prescribing habits, poor adherence to present

guidelines and lack of any organised follow-up and monitoring arrangements³⁻⁷. Up to 45% of LTOT patients may be housebound, yet communication between primary care and hospital specialists was found to be poor⁶. Furthermore, many patients with chronic hypoxaemia who might potentially be suitable for LTOT are not being identified⁸.

In England and Wales, the annual cost of the domiciliary oxygen service is rising steadily. Although it was originally envisaged that the availability of oxygen concentrators would lead to a fall in the need for oxygen cylinders, £10,400,000 was spent on the provision of oxygen concentrators in 1995, and a further £18,900,000 was spent providing oxygen cylinders (Prescription Pricing Authority). A review of home oxygen cylinder prescription showed that most oxygen cylinders were used only occasionally for short periods for symptomatic relief of breathlessness (short-burst oxygen therapy), largely in patients with COPD⁹. Despite their widespread use in other countries, small oxygen cylinders for ambulatory use are used variably in the UK, with no agreed guidelines or methods of assessment. There is no provision for liquid oxygen for ambulatory use in the UK and most of the devices for the provision of ambulatory oxygen therapy are not available on prescription; they are currently purchased either by specialist hospital units or by patients themselves.

Faced with these issues concerning the provision of home oxygen therapy, the Department of Health asked the Royal College of Physicians to lead a multidisciplinary group to devise new guidance for the use of domiciliary oxygen. The Working Party for Domiciliary Oxygen Therapy Services had the following terms of reference:

to review the current arrangement for the provision of domiciliary oxygen, and to provide guidelines for whom, and under what circumstances, domiciliary oxygen should be prescribed.

The report¹⁰ reviews and makes recommendations for home oxygen therapy for adult patients with chronic respiratory disease, and for use in paediatrics, cardiology and palliative medicine. Technology for the provision of home oxygen therapy was reviewed together with issues concerning travel for patients on domiciliary oxygen therapy. The views of users of domiciliary oxygen therapy were also incorporated.

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Recommendations

Long-term oxygen therapy (LTOT)

In patients with COPD, LTOT can be prescribed after appropriate assessment, when the PaO₂ is less than 7.3kPa while breathing air during a period of clinical stability. The level of PaCO₂ does not influence the need for LTOT prescription in COPD. LTOT can be prescribed in COPD patients when the clinically stable PaO₂ is between 7.3kPa and 8kPa, together with the presence of one of the following: secondary polycythaemia, nocturnal hypoxaemia, peripheral oedema or evidence of pulmonary hypertension. Similar guidelines apply to patients with cystic fibrosis or heart failure who have chronic hypoxaemia. It is not recommended that LTOT be prescribed in COPD patients with a PaO₂ above 8kPa. LTOT can be prescribed in patients with interstitial lung disease and pulmonary hypertension with hypoxia when the PaO₂ is less than 8kPa. LTOT should be considered in patients with neuromuscular or skeletal disorders, either in combination with ventilatory support or alone, though assessment in this situation requires referral to a physician with a specialist interest in these disorders. Domiciliary oxygen therapy can be prescribed for palliation of dyspnoea in pulmonary malignancy and other causes of disabling dyspnoea due to terminal disease. In all indications for LTOT, there must have been optimum medical management of the particular condition and clinical stability prior to assessment. To qualify for LTOT prescription, arterial blood gas tensions should be measured on two occasions not less than three weeks apart to ensure clinical stability.

Indications for ambulatory oxygen therapy

Ambulatory oxygen therapy can be prescribed in patients on LTOT who are mobile and need to, or can, leave the home on a regular basis. The type of portable device provided will depend on the patient's mobility. Patients without chronic hypoxaemia and LTOT should be considered for ambulatory oxygen therapy if they show evidence of oxygen desaturation on exercise, improvement in exercise capacity with ambulatory oxygen therapy and the motivation to use ambulatory oxygen outside the house. The presence of exercise desaturation itself is not an indication for ambulatory oxygen. Ambulatory oxygen therapy is not recommended in COPD patients with mild hypoxaemia and no exercise desaturation. However, it can be prescribed in patients with interstitial lung disease and cystic fibrosis, who show desaturation on exercise even with moderate hypoxaemia at rest. Ambulatory oxygen therapy should be considered in patients with chest wall and neuromuscular disorders, who have exercise desaturation and are limited by dyspnoea. However, it is not recommended in heart failure. Ambulatory oxygen therapy should be prescribed only after the appropriate assessment has been performed by the hospital specialist.

Appropriate equipment for the provision of ambulatory oxygen should be made available on the Drug Tariff. The nature of the equipment prescribed will depend on the hours of ambulatory oxygen use required by the patient. Patients with considerable outside use will need portable liquid oxygen systems or lightweight cylinders with oxygen-conserving devices, while patients with occasional use outside the home will need small portable cylinders only.

Indications for short-burst oxygen therapy

Despite extensive prescription of short-burst therapy, there is no adequate evidence available on which to base firm recommendations and further research is required. Short-burst oxygen should be considered for episodic breathlessness that is not relieved by other treatments in patients with severe COPD, interstitial lung disease or heart failure and those in palliative care. Short-burst oxygen can be prescribed only if an improvement in breathlessness and/or exercise tolerance can be documented.

Organisation of home oxygen services

Prescription for all types of domiciliary oxygen therapy should be on a standardised 'Domiciliary Oxygen Record' form (DOR), that will also be used for recording assessments. Completion of this form by the hospital specialist, with measurement of blood gases and/or exercise tests for ambulatory oxygen assessments, will be a prerequisite for domiciliary oxygen prescription. Prescription of long-term oxygen therapy should be avoided on discharge from hospital when patients are recovering from an exacerbation, but should be reviewed when patients are clinically stable. Following the decision to provide domiciliary oxygen therapy, it is recommended that the patient receives education and some written information about the principles of oxygen therapy and reason for oxygen prescription.

Formal arrangements are required for the follow-up on patients using domiciliary oxygen therapy to ensure that LTOT adequately corrects hypoxaemia, that there is good compliance with oxygen therapy, to detect clinical deterioration and to assess continuing requirement for domiciliary oxygen. Adequate resources will have to be identified for a follow-up programme. All patients on domiciliary oxygen therapy should have arterial blood gases checked at least yearly. Patients should be referred to the hospital specialist for reassessment when there is clinical deterioration, under-correction of the SaO₂ with LTOT, or symptoms of worsening hypercapnia, eg morning headache.

Indications for oxygen therapy in infants and children

Infants and children may require domiciliary oxygen for a limited time, as conditions causing hypoxaemia in childhood often have a favourable prognosis. Specific equipment for domiciliary use should be made available which allows very low oxygen flows to be delivered, particularly to

infants. There is an important need for the provision of ambulatory oxygen therapy for children and young people. Equipment must be appropriately designed for children.

New prescribing arrangements

An important recommendation of the report is that a new oxygen record and prescription form (DOR) be introduced. Use of such a form would emphasise the importance of arterial blood gas measurement for assessment for LTOT and the need for ambulatory oxygen therapy assessment. The proposed form would require piloting before introduction. In most cases blood gases will be measured in hospital and thus it is recommended that the DOR form will be completed by the hospital specialist. However, where the prescription is undertaken by the general practitioner, he should be responsible for completing the form after appropriate assessments and blood gas data have been recorded. The requirement for full assessment, which will generally be performed in hospitals, and wider application of oxygen provision including ambulatory oxygen therapy, may justify a change in domiciliary oxygen prescribing from primary care to hospital specialists. In Scotland, unlike the situation in the rest of the UK, LTOT can only be prescribed by a respiratory physician.

Implications for service provisions, funding, review and follow-up

The report supports the introduction of formal provision for ambulatory oxygen therapy and sets out new guidelines for the assessment and provision of ambulatory oxygen in a number of circumstances. This guidance will need to be communicated to staff in primary care and hospital. Funding will also have to be identified for an ambulatory oxygen service. Review of prescription of oxygen cylinders currently in use mainly for short-burst oxygen therapy could possibly release funds for ambulatory oxygen therapy. However, more research is required on the benefits and assessment of short-burst therapy. An economic evaluation of available oxygen delivery systems will be required to ensure that the most cost-effective systems are provided for ambulatory oxygen appropriate to the needs and mobility of the individual patient.

There is also a need for an organised follow-up programme for patients on oxygen therapy, especially as a large number of patients are elderly and housebound. Currently, follow-up of patients on domiciliary oxygen varies around the country and depends on local initiatives. Adequate resources will have to be identified for a follow up

programme for all patients on domiciliary oxygen therapy. Appropriate advice and support for patients and carers is required, including advice on travel with oxygen.

The lack of high quality evidence on domiciliary oxygen services emphasises the need for well designed randomised controlled trials on aspects of follow-up, ambulatory and short-burst oxygen therapy. The guidance in this report will enable appropriate provision and development of domiciliary oxygen therapy to benefit a wider group of patients with chronic hypoxaemia.

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