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A Bill of “Rights” for patients with COPD: the “right” therapy for the “right” patient at the “right” time

Linda Nici

Chronic obstructive pulmonary disease (COPD) is a major cause of morbidity and mortality and poses significant burdens on patients, their families and the healthcare system. It is currently the fourth leading cause of death in the USA and is projected to rank fifth in burden of disease globally by 2020.¹ Pulmonary rehabilitation (PR) for COPD is an effective therapeutic intervention that reduces breathlessness, increases exercise capacity and improves health-related quality of life.^{2,3} Emerging evidence also supports its effectiveness in reducing healthcare utilisation, decreasing frequency and severity of acute exacerbations and improving survival.^{4–7}

Despite the robust evidence on the effectiveness of this intervention, the availability of PR remains dismal worldwide, with various estimates suggesting 1–14% of patients with COPD are actually referred for the service.^{8–10} This partly has to do with the fact that PR is most often delivered as an outpatient and hospital-based programme. If PR could be delivered effectively in the home setting, this could vastly increase the number of patients receiving this important therapy. Simply put, the right therapy for the right patient at the right time.

Few studies have looked at the efficacy of home-based rehabilitation, but the

programmes vary widely, making comparisons difficult. One study from the Netherlands looked at a 12-week programme using community-based healthcare personnel and visits to local physiotherapists.¹¹ While the study did demonstrate feasibility of the programme, high exercise compliance as assessed by patient diaries and some improvement of exercise tolerance, patients attended supervised exercise training twice weekly. This is very similar to traditional outpatient programmes in the USA.

In contrast, a study from Spain looked at the effects of an 8-week supervised versus self-monitored exercise training programme.¹² Both groups improved exercise tolerance, but the magnitude of physiological improvement was greater in supervised patients. This study, while truly home-based, had no other components of PR so the results are difficult to compare with traditional comprehensive programmes.

A more recent study from Canada delivered a self-management education programme prior to either a standard outpatient hospital-based exercise programme or a home-based self-monitored exercise programme.¹³ This study showed similar improvements in dyspnoea and health status measurements but, while closer to a comprehensive home-based programme than the two previously mentioned studies, patients received the education component outside of the home; therefore the results reflect effectiveness of home-based exercise.

Clearly, more work is needed to develop and evaluate PR programmes that can

deliver the essential components of exercise and education, yet allow for easy accessibility of this service in the home setting where compliance and long-term adherence may be higher.

Another consequence of the lack of availability of PR is that it is often reserved as a “last ditch” effort in patients with severe and very severe COPD. The good news is that these severely impaired patients derive substantial benefit from PR.¹⁴ However, long-term maintenance of benefits can be hampered by increased frailty, making adherence to healthy behaviours including regular exercise increasingly difficult.

This provides yet another challenge to the PR specialist—to provide and encourage PR in patients with milder disease. If patients are exposed to therapeutic interventions that promote self-efficacy early in the course of a chronic disease, then there may be a real and measurable impact on disease progression. Strategies employed during comprehensive PR such as smoking cessation, exercise training and teaching self-care could be delivered individually or as a package over the life time of the patient with COPD. Again, the right therapy for the right patient at the right time.

In addition to this theoretical argument to provide PR through a continuum of care to optimise chronic disease management, there is another strong argument to provide PR to patients with milder disease. There are significant systemic effects of COPD even in patients who are deemed mild or moderate by forced expiratory volume in 1 s (FEV₁) staging criteria. Effects such as skeletal muscle dysfunction, body composition abnormalities and poor self-management skills are targeted by the components of PR. Unfortunately, the need for PR is often overlooked when patients are assessed by physiological parameters alone.

Impaired exercise capacity has been shown to be a significant determinant of disease burden, not only in patients with severe and very severe COPD but also in those with moderate disease.¹⁵ Differences in body composition can already be seen

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in early COPD where patients are not yet considered to have a wasting disorder due to their pulmonary disease.¹⁶ Patients with relatively mild symptoms (dyspnoea grade 1–2 as measured by the MRC scale) have been shown to have lower 6-minute walk distance (6MWD), lower fat-free mass and lower health-related quality of life (HRQL) scores than age-matched controls.¹⁷ However, few studies have examined the effects of PR in this patient population.

In this issue of *Thorax* van Wetering and colleagues ambitiously attempt to address both the efficacy of home-based PR and the efficacy of PR in patients with moderate COPD (see page 7).¹⁸ They report on the short- and long-term efficacy of a community-based PR programme in patients with moderate COPD. One hundred and ninety-nine patients with moderate COPD and impaired exercise capacity were randomised to usual care or the INTERCOM (INTERdisciplinary COMMunity-based COPD management) programme. This programme consisted of a 4-month intensive rehabilitation phase followed by a 20-month maintenance phase. During rehabilitation, patients were visited by the local physiotherapist twice weekly for endurance and strength training and instructed to perform daily exercise including walking and cycling outside. Patients also received an individualised education programme. During the maintenance phase, patients visited the physiotherapist once monthly to monitor adherence and provide encouragement.

Primary outcomes were HRQL and total number of exacerbations. Secondary outcomes included changes in subscores of HRQL, dyspnoea and exercise performance. The HRQL total score improved in the treatment group and remained stable in the usual care group. The number of exacerbations did not differ between groups although, given the degree of airflow obstruction and low number of baseline exacerbations (1–1.2 in the previous 12 months), this is not surprising. Cycle endurance time improved in the treatment group compared with usual care, and significant differences in favour of the treatment

group were also found in peak exercise capacity, walking distance and fat-free mass.

One interesting finding was that the 6MWD did not improve in the treatment group but declined progressively in both groups, although less so in the treatment group. While the authors propose that lack of encouragement during the walking test may be the cause for lack of improvement, it seems more likely that patients with milder disease may have higher pretraining 6MWD and may be limited in their ability to demonstrate improvements in distance. Mechanical factors such as stride length may limit performance and give rise to a ceiling effect for the test.¹⁹ Nonetheless, this finding remains surprising.

Despite the positive outcomes and the novel approach to delivering PR, this programme required community resources and healthcare personnel not readily available in all countries. The semantic difference between home and community becomes important when trying to adapt these methods to a different healthcare delivery system and when trying to evaluate cost-effectiveness. We commend the authors for addressing costs in a separate publication.

This paper addresses important challenges we face in delivering quality care to patients with COPD. Where resources are scarce and disease prevalence and impact are high, clinicians, researchers and policy makers must think innovatively about efficient and effective ways to deliver care. Or simply put, how do we deliver the right therapy to the right patient at the right time?

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