Pulmonary rehabilitation improves exercise tolerance in patients with bronchiectasis

Synopsis


**Question:** For patients with bronchiectasis, does pulmonary rehabilitation either with or without inspiratory muscle training (IMT) improve exercise tolerance? **Design:** Randomised controlled trial. **Setting:** Outpatient-based pulmonary rehabilitation program of a UK hospital. **Patients:** Patients with bronchiectasis confirmed by high-resolution computer tomography. Exclusion criteria included concomitant emphysema, an acute exacerbation in the previous six weeks, long-term oral corticosteroid use, and significant co-morbidities. Thirty-two patients were randomised to pulmonary rehabilitation plus IMT (PR-IMT) (n = 12), pulmonary rehabilitation plus sham IMT (PR-Sham) (n = 11), or a control group with no intervention (n = 9). **Interventions:** Pulmonary rehabilitation consisted of exercise training and multidisciplinary education sessions for eight weeks. Exercise consisted of three 45-minute periods per week with a target exercise intensity of 80% of the peak heart rate achieved on an initial maximal incremental exercise test. Two sessions per week were performed at the hospital and involved cycling, treadmill walking, and stair climbing. A third session of walking was performed at home, using the Borg dyspnoea scale to guide intensity. IMT was performed for 15 minutes twice daily over the eight-week period using a pressure threshold device. Pressure was set at 30% of the patient’s maximal inspiratory pressure and increased by 5% each week to a maximum of 60%. Sham IMT followed the same regimen except that the pressure was always 7 cmH₂O. **Outcomes:** The change in health status according to the St George Respiratory Questionnaire was significantly better in the PR-IMT group than the control group. Interestingly, the change in health status according to the St George Respiratory Questionnaire was significantly better in the PR-IMT group (by 86 m, 95% CI 42 to 130) than the control group. Similarly, change in endurance exercise capacity was significantly better in the PR-IMT group (by 95% CI 10 to 36) and the PR-Sham group (by 14 cmH₂O, 95% CI 2 to 25) than that seen in the control group. The inclusion of IMT did not produce a statistically significant benefit over pulmonary rehabilitation alone for these outcomes during the training period. **Conclusion:** Pulmonary rehabilitation with or without IMT improves exercise tolerance and inspiratory muscle strength in subjects with bronchiectasis.

Effect sizes calculated by CAP editor based upon original data in paper.

Commentary

There are clear evidence-based guidelines regarding PR for chronic obstructive pulmonary disease (COPD). At present the recommendation to offer PR in other respiratory diseases is based on expert opinion rather than sound scientific evidence. This study makes an important contribution to the current PR literature as it provides evidence from a rigorously designed clinical trial in support of PR for bronchiectasis. The sample size in the study is small and therefore confirmation of study findings in further trials is essential. Despite this there are a number of key messages for clinicians involved in the delivery of PR.

Although the components of treatment were different in the two PR groups, both approaches improved exercise capacity during the training period. The incorporation of intensive IMT into PR did not significantly improve this immediate effect on exercise capacity. This suggests that the format and content of the PR program can be varied to meet the needs of the patient provided patients adhere to a minimum amount of exercise training. The two PR groups were also followed up three months after the training period. Exercise capacity had declined marginally in the PR-IMT group and significantly in the PR-Sham group. This suggests that there is a need for a maintenance process after PR in bronchiectasis and that intensive IMT may prolong the benefits of PR.

The change in health status according to the St George Respiratory Questionnaire was significantly better in the PR-IMT group than the control group. Interestingly, the authors do not compare the PR groups for this outcome. Calculating from data in the paper, the change in health status at the end of training is significantly better in the PR-IMT group than the PR-Sham group (difference 10 units, 95% CI 4.2 to 15.8). This exceeds the minimum clinically important difference for patients with COPD estimated by Jones (2005). A number of patients dropped out of this study due to exacerbations. PR programs need to develop strategies to enable patients to modify their exercise training during an exacerbation and build up exercise tolerance during recovery.

Evidence to support the benefit of PR in specific disease populations is essential especially since demand for PR is likely to exceed resources in many centres. Clinicians need information to direct selection of respiratory patients and the essential components of PR and to develop strategies to maintain long-term benefit. This study provides such evidence.

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Reference