

COPD Rehabilitation: Beneficial Over the Long Term?

Guell R, Casan P, Belda J, Sangenis M, Morante F, Guyatt GH, Sanchis J. Long-term effects of outpatient rehabilitation of COPD: a randomized trial. *Chest* 2000;117:976-83.

Study Overview

Objective. To determine the effects of a moderate-intensity pulmonary rehabilitation program on clinical and physiologic outcomes and utilization over the long term.

Design. Randomized controlled trial.

Setting and participants. 65 consecutive patients with moderate to severe chronic obstructive pulmonary disease (COPD) who were interested in and deemed suitable for pulmonary rehabilitation were recruited from a single hospital outpatient clinic in Spain; 60 agreed to participate. All patients were 75 years or older, had a forced expiratory volume (FEV₁) < 70% of predicted values, FEV₁/FVC (forced vital capacity) < 65%, and a partial pressure of oxygen in the alveoli (PAO₂) > 55 mm Hg at rest. (No indications for home oxygen therapy were mentioned). No patients had clinically apparent heart disease or "relevant" bone or joint disease; the latter criterion was not further defined, but it presumably referred to disease that may have limited exercise capacity.

Intervention. All patients were first stabilized on "conventional therapy," which included salbutamol, ipratropium bromide, and inhaled budesonide at "usual doses" (not defined). Thirty patients were randomized to a control group; these patients received standard care (described by the authors as medical therapy). The remaining 30 patients were assigned to a 3-phase pulmonary rehabilitation program. Participants who experienced exacerbations were treated with β lactam or macrolide antibiotics if infection was present and with oral prednisone if dyspnea worsened and then were returned to their group. For the first 3 months, patients in the rehabilitation group attended two 30-minute breathing retraining sessions per week. They were educated on the respiratory system and the nature of their disease, were advised to begin a simple home-exercise program, and received chest physiotherapy as indicated. The next 3 months focused on a supervised exercise program consisting of 5 sessions per week. At these sessions, patients completed 30 minutes of progressive exercise (based on a baseline progressive exercise test) on a cycle ergometer without supplemental oxygen. Subjects were also advised to exercise for 30 minutes on the stationary bike

or walk for 1 hour at home. The final phase lasted 6 months and consisted of a weekly small-group maintenance program where the patients performed breathing and arm-leg coordination exercises. Patients were not prescribed a specific exercise program after the first 6 months but were instructed to continue their home programs.

Main outcome measures. Clinical outcomes were assessed using the 6-minute walk test, the Chronic Respiratory Questionnaire, a visual analogue and the Medical Research Council dyspnea scales, and number of exacerbations. Physiologic outcomes were measured using spirometry, lung volumes, and a progressive symptom-limited exercise test. Utilization measures included hospitalizations and oxygen therapy prescriptions. Patients were followed for 2 years after enrollment.

Main results. All patients completed the first 6 months of the study, and the rehabilitation patients completed 92% of their sessions. Subsequently, 7 patients dropped out of the control group and 6 patients dropped out of the rehabilitation group. Dropout data included 3 deaths among the controls and 5 deaths among the rehabilitation patients.

Rehabilitation patients demonstrated an approximately 25% increase in their 6-minute walk test distance compared with controls, a finding that persisted through the 2-year follow-up. Controls had substantial declines in their dyspnea scores, while the rehabilitation patients maintained or slightly increased their scores. Rehabilitation patients had a small but clinically significant improvement in all health-related quality-of-life scores (Dyspnea, Fatigue, Emotional Function, and Mastery) and significantly fewer exacerbations and home oxygen prescriptions compared with controls. Rates of hospitalizations in both groups were similar.

"Outcomes Research in Review" is co-edited by Adam Jonas, MD, MPH, Medical Director for Health Services, Washington State Department of Corrections, Olympia, WA; Dr. Jonas prepared reviews 1 through 5. Guest co-editor Malathi Srinivasan, MD, NRSA Fellow, Department of Medicine, Indiana University School of Medicine, Indianapolis, IN, prepared the sixth review.

Conclusion

The effects of pulmonary rehabilitation appear to last for at least 1 year after all interventions end.

Commentary

Although this study was randomized, there were several flaws that diminish the internal validity of its conclusions. First, because randomization was not concealed, patient selection may have been biased to favor a positive effect of the intervention. The major significant results may also have been influenced by the different attention the 2 groups received. Though the authors do not directly discuss the care of control patients, it is implied that these patients received only standard medical care, including standard clinic visits. The study results would have been much stronger had the controls received more frequent contact such as further education regarding anatomy, physiology, and natural history (which is unlikely to have a substantial impact on its own) or simply periodic phone calls.

Furthermore, it is difficult to ascertain the effect that the breathing retraining and exercise components had individually or in combination. Most of the effects seemed to peak at 3 months prior to the formal exercise intervention, but these results were only slightly diminished at 2 years. The relatively small number of participants would not have allowed researchers to use a design with different interventions to

extract the relative value of each component. In addition, the number of patients in each group who exercised at home was not reported. Since maintaining self-monitored exercise could have substantially affected outcomes, this information would be valuable in understanding the study results. Finally, the authors did not report the level of oral steroid use in either group. The rates of exacerbation suggest that the control group received more; however, the exact data are important because such medications could have a significant impact on the outcome measures.

Applications for Clinical Practice

This study provides worthwhile information when considered in the context of the well-documented short-term benefits of pulmonary rehabilitation and a recent, larger study [1] that showed similar results at 1 year. With the paucity of effective therapeutic options, it is reasonable to refer motivated patients with moderate to severe COPD to available rehabilitation programs. Conclusive information regarding effects on utilization and cost-effectiveness await more detailed studies.

References

1. Griffiths TL, Burr ML, Campbell IA, Lewis-Jenkins V, Mullins J, Shiels K, et al. Results at 1 year of outpatient multidisciplinary pulmonary rehabilitation: a randomised controlled trial. *Lancet* 2000;355:362-8.

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