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Appraisal

Critically appraised paper: In adults with idiopathic pulmonary fibrosis, long-term pulmonary rehabilitation did not improve 6-minute walk distance, but improved endurance time compared with usual care

Synopsis

Summary of: Kataoka K, Nishiyama O, Ogura T, Mori Y, Kozu R, Arizono S, et al. Long-term effect of pulmonary rehabilitation in idiopathic pulmonary fibrosis: a randomised controlled trial. *Thorax*. 2023;78:784–791.

Question: In patients with idiopathic pulmonary fibrosis treated with nintedanib, what is the effect of long-term pulmonary rehabilitation on exercise capacity compared with usual care? ***Design:*** Randomised controlled trial with concealed allocation. ***Setting:*** Nineteen institutions in Japan. ***Participants:*** Adults (aged 40 to 79 years) with stable idiopathic pulmonary fibrosis (ie, no acute exacerbation within the past 3 months), a 6-minute walk distance between 200 and 600 m, receiving nintedanib for ≥ 4 weeks and able to receive the drug for a further 12 months. Exclusion criteria were attending pulmonary rehabilitation in the past 12 months, pirfenidone, prednisolone and/or immunosuppressive medication administration in the past 3 months, and severe pulmonary hypertension. Randomisation of 88 participants allocated 45 to long-term pulmonary rehabilitation and 43 to the control group. ***Interventions:*** Participants in the long-term pulmonary rehabilitation group underwent an initial 12-week outpatient pulmonary rehabilitation program delivered twice a week, that included aerobic and resistance exercises, and were instructed to perform home-based exercises at least twice a week. The initial program was followed by a 40-week maintenance program that included home-based exercise 4 days/week and additional outpatient pulmonary rehabilitation ≥ once every 4 weeks). The control group received usual care, which did not include pulmonary rehabilitation. ***Outcome measure:*** The primary outcome was the change in 6-minute walk distance. Secondary outcome measure included change in endurance time, measured using cycle ergometry. ***Results:*** A total of 74 participants completed the study (38 in the experimental and 36 in the control group). At completion of the intervention window, there was no clear between-group difference in 6-minute walk distance (MD 21 m, 95% CI −25 to 66). Endurance time was longer in the experimental group compared with the control group (MD 187 seconds, 95% CI 34 to 153). ***Conclusion:*** In adults with idiopathic pulmonary fibrosis treated with nintedanib, long-term pulmonary rehabilitation did not improve 6-minute walk distance, but improved endurance time.

Provenance: Invited. Not peer reviewed.

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Commentary

How far can a paper airplane fly?

Pulmonary rehabilitation can significantly improve outcomes for patients with idiopathic pulmonary fibrosis.[1] Similar to a paper airplane, which exhibits a rapid initial ascent but a limited flight time, the benefits of pulmonary rehabilitation often diminish quickly after the initial intervention.[2] The rapid disease progression likely contributes to this phenomenon, but the specific factors influencing the long-term sustainability of benefits in this population remain unclear.

Kataoka et al conducted the first randomised controlled trial to investigate the long-term effects of pulmonary rehabilitation in patients receiving nintedanib.[3] Eighty-eight patients were randomly assigned to either a 12-week induction pulmonary rehabilitation program followed by 40 weeks of home-based exercise, or usual care only for 52 weeks. As expected, pulmonary rehabilitation improved both 6-minute walk distance and endurance time in the intervention arm. Of note, the authors reported a somewhat small between-group difference in the change in 6-minute walk distance at 12 weeks (22 m) and a lack of significant or clinically relevant benefits of their pulmonary rehabilitation program on quality of life, health status, dyspnoea, symptoms of anxiety and depression and daily steps. Despite that, the experimental group managed to sustain 6-minute walk distance gains at week 23. The gains were further extended to 52 weeks, when endurance time was considered. This is the first study to show the effects of long-term maintenance of pulmonary rehabilitation in this population. Notably, patients with higher adherence to the program experienced a slower decline in benefits over time.

The combined intervention from Kataoka et al functioned similarly to aerodynamic modifications that enhance a paper airplane's flight range, leading to extended duration of benefits from pulmonary rehabilitation in patients with idiopathic pulmonary fibrosis.

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