

Benefits of physical training on exercise capacity, inspiratory muscle function, and quality of life in patients with ventricular assist devices long-term postimplantation.

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Abstract

BACKGROUND:

Capacity to exercise may not be fully restored in patients with heart failure even in the long term after ventricular assist device (VAD) implantation. The benefits of exercise training in patients with VAD are unknown.

DESIGN AND METHODS:

Fifteen patients, aged 38.3 ± 15.9 years, bridged to heart transplantation with left ventricular assist device or biventricular assist device were randomized at a ratio of 2 : 1 to a training group (TG, $n = 10$) or a control group ($n = 5$), 6.3 ± 4 months after implantation. Both the groups were advised to walk 30-45 min/day. TG also underwent moderate-intensity aerobic exercise using a bike or treadmill for 45 min, three to five times a week, combined with high-intensity inspiratory muscle training using a computer-designed software to respiratory exhaustion, two to three times a week for 10 weeks. The patients were tested using cardiopulmonary exercise testing, 6-min walk test, spirometry and electronic pressure manometer for inspiratory muscle strength (Pimax) and endurance (sustained Pimax) measurement. Quality of life was assessed with the Minnesota Living with Heart Failure questionnaire.

RESULTS:

TG improved peak oxygen consumption (19.3 ± 4.5 vs. 16.8 ± 3.7 ml/kg per min, $P = 0.008$) and VO_2 at ventilatory threshold (15.1 ± 4.2 vs. 12 ± 5.6 ml/kg per min, $P = 0.01$), whereas the ventilation/carbon dioxide slope decreased (35.9 ± 5.6 vs. 40 ± 6.5 , $P = 0.009$). The 6-min walk test distance increased (527 ± 76 vs. 462 ± 88 m, $P = 0.005$) and quality of life was improved (38.2 ± 11.6 vs. 48.9 ± 12.8 , $P = 0.005$), as well as Pimax (131.8 ± 33 vs. 95.5 ± 28 cmH₂O, $P = 0.005$), sustained Pimax (484 ± 195 vs. 340 ± 193 cmH₂O/s/103, $P = 0.005$), and inspiratory lung capacity (2.4 ± 0.9 vs. 1.7 ± 0.7 L, $P = 0.008$) were improved. No significant changes were noted in the control group.

CONCLUSION:

Our findings indicate that exercise training may improve the functional status of VAD recipients even at a later period after implantation and thus, may have additional importance in cases of destination therapy.