Regular training in a hospital in patients with left ventricle assist device (LVAD): influence on exercise capacity, muscular strength and complex coordination

E. Smolis-Bak, T. Chwyczko, E. Noszczak, M. Bogucki, L. Zalucka, I. Kowalik, A. Mierzynska, E. Piotrowicz, J. Szymanski, T. Zielinski, M. Sobieszczanska-Malek, M. Kusmierczyk, R. Dabrowski, H. Szwed, R. Piotrowicz

National Institute of Cardiology, Warsaw, Poland

Funding Acknowledgement: Type of funding source: Public grant(s) – EU funding. Main funding source(s): NATIONAL RESEARCH AND DEVELOPMENT CENTER

Heart failure (HF) significantly reduces physical capacity and harms the overall functioning. In the end-stage cases of HF, the only options are surgical procedures including left ventricular assist devices (LVAD) implantation and heart transplant. Due to the insufficient number of available organs for transplantation, LVAD are used more and more frequently. Rehabilitation of patients with LVAD is a crucial element of therapy because of long-term immobilization of patients awaiting transplant or heart muscle regeneration.

Purpose: The aim of the study was to evaluate the impact of early hospital rehabilitation on exercise tolerance, muscles strength and complex coordination in LVAD patients.

Methods: The total of 20 LVAD patients were recruited to the study (all male, aged 19–66 years). All patients underwent standard cardiac rehabilitation in the postoperative and medical treatment wards. After the end of hospitalization, patients were admitted to the rehabilitation department for 4–5 weeks. During that period they performed endurance training, conditioning exercises with elements of resistance and coordination exercises. All patients were tested before and after the rehabilitation program using ergospirometry (CPX), 6-MWT, upper and lower limbs muscle strength (30 Second Chair Stand) and complex coordination (Up&Go test).

Results: A significant increase in the values of most of studied parameters was observed after exercise training in comparison to the results before rehabilitation process (VO2 peak) [ml/kg/min]: 11.1±2.2 vs. 12.5±2.7, $p<0.001$; Watt: 42.6±12.4 vs. 54.1±13.1, $p<0.0001$; 6- MWT [m]: 300.1±102.2 vs. 404.8±105.9, $p<0.0001$; 30 Seconds Chair Stand [number of stands] 8.4±3.3 vs. 11.6±4.8, $p<0.0001$; Up&Go [sec] 9.0±1.7 vs. 7.1±1.5, $p<0.0001$; left hand grip strength [kg]: 31.5±8.4 vs. 34.8±8.1, ns; right hand grip strength [kg]: 33.6±11,2 vs. 36.0±9.0, ns. No adverse effects were observed during rehabilitation process.

Conclusions: Hospital-based rehabilitation is safe and effective in LVAD patients. Rehabilitation after LVAD implantation brings significant benefits in terms of exercise capacity and tolerance, muscle strength and complex coordination in this group of patients.