

INPLASY PROTOCOL

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Effectiveness of Exercise-Based Cardiac Rehabilitation for children With Left Ventricular Assist Device: A Systematic Review and Meta-Analysis

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Review question / Objective: Exercise-based cardiac rehabilitation (EBCR) has been demonstrated to improve functional capacity in heart failure (HF). However, there are limited data on the effect of EBCR in children with advanced HF and left ventricular assist devices (LVADs). This meta-analysis sought to evaluate the effects of EBCR on functional capacity in patients with LVAD.

Condition being studied: Left ventricular assist devices (LVADs) are being increasingly used to support children with advanced heart failure (HF), both as a bridge to recovery and as destination therapy. It is well-known that LVADs improve survival, functional capacity, and quality of life (QOL) in children with advanced HF. However, compared with recipients of heart transplants, many patients with LVADs continue to experience exercise intolerance. Exercise-based cardiac rehabilitation (EBCR) has been shown to be safe and effective in patients with HF. Exercise-based cardiac rehabilitation improves peak oxygen uptake (V_{O_2}), functional capacity, and QOL and reduces HF symptoms and hospitalizations. However, there are very limited data on the safety and efficacy of EBCR in child patients with LVADs. We therefore systematically reviewed the literature and performed a meta-analysis to evaluate the impact of EBCR in LVAD child recipients.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 30 May 2023 and was last updated on 30 May 2023 (registration number INPLASY202350112).

INTRODUCTION

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METHODS

Search strategy: We separately searched PubMed, Web of Science, CINAHL, and Cochrane Library databases for studies assessing the effect of cardiac rehabilitation in patients following LVAD implantation from January 1966 through May 2023. We used the following key words in various combinations: heart assist device; ventricular assist device ; pediatric cardiac rehabilitation.

Participant or population: Pediatric patients with implanted ventricular assist devices due to heart failure.

Intervention: Exercise Therapy.

Comparator: Exercise Therapy.

Study designs to be included: Cohort study and RCT.

Eligibility criteria: peak VO_2 or 6-minute walk distance (6MWD) 6MWD.

Information sources: Pubmed Embase Cochrane Library CBM.

Main outcome(s): 6-minute walk distance (6MWD); peak VO_2 .

Quality assessment / Risk of bias analysis: Cochrane Quality Evaluation Tool.

Strategy of data synthesis: For data analysis with revman, random effects model is used if I-square is greater than 50%, and fixed effects model is used if I-square is less than 50%.

Subgroup analysis: They were divided into three subgroups according to the age of 0-6 years old, 6-12 years old and 12-18 weeks old.

Sensitivity analysis: Stata software was used for sensitivity analysis to analyze whether the effect size changed after excluding one of the articles.

Country(ies) involved: China.

Keywords: heart assist device; ventricular assist device ; pediatric cardiac rehabilitation.

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