Implantable heart pumps improve functional independence in patients with advanced heart failure

The syndrome of advanced heart failure (AHF) occurs when the muscle of the heart loses its ability to effectively pump blood to the body. This results in poor delivery of oxygen and other nutrients to many organs, including skeletal muscle, the brain, kidneys, liver, and the gastrointestinal system. As a result, many patients with AHF experience symptoms characterized by decreased function of the end organs, fluid retention and swelling of the lower legs and abdomen, shortness of breath, exhaustion, and cognitive impairment. These effects can make simple daily tasks such as getting to work, cooking, or cleaning very difficult.

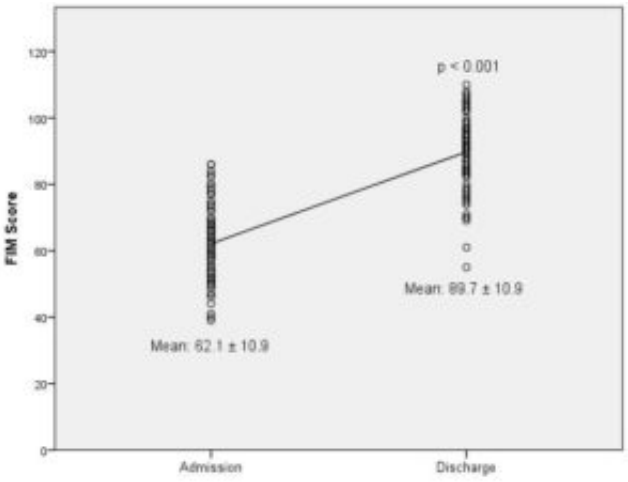

Fig. 1. Comparison of FIM scores at admission and discharge from inpatient rehabilitation unit (n=90). Mean admission score = 62.1 ± 10.9, mean discharge score = 89.7 ± 10.9

Left ventricular assist devices (LVADs) are surgically implanted heart pumps which use electric motors to supplement the output of the heart in order to treat AHF. Modern LVADs are capable of delivering up to 10 liters per minute of oxygenated blood to the systemic circulation; often alleviating many of the debilitating symptoms of heart failure. While numerous studies have characterized improvements in the symptoms of heart failure following LVAD implantation, in this study we sought to evaluate postoperative changes in the functional status of LVAD patients. Functional status has been quantified in other patient populations using the Functional Independence Measure (FIM) score, a tool which measures a patient's disability and the level of assistance required to carry out activities of daily living (ADLs). The ADLs assessed by the FIM include include eating, grooming, mobility, cognition, and bladder and bowel management.

Our study measured FIM scores at admission for LVAD surgery, and postoperatively, prior to

discharge. LVAD implantation is a major surgery which requires 2-3 weeks of postoperative recovery and rehabilitation before the patient is ready to be discharged. During this postoperative hospitalization, patients participated in daily therapy sessions with physical, occupational, and speech therapists which emphasized improving mobility and the ADLs. The average time spent in postoperative rehabilitation in this study was 16.2 ± 6.9 days. During this time, the average FIM score improved from 62.1 ± 10.9 to 89.7 ± 10.9, a gain of 27.6 points (Fig. 1). This amounts to an average FIM gain of 1.94 ± 1.0 points every day, and represents significant improvement in the ability to complete the functional tests measured by the FIM which include many of the tasks necessary to return to normal life.

The use of LVADs as a treatment option for advanced heart failure has become more acceptable and increasingly common in both Europe as well as the United States. Despite this increased clinical exposure, there remains a lack of familiarity with the care of LVAD patients in acute and sub-acute rehabilitation centers. This study and others have indicated the safety and efficacy of postoperative physical, occupational, and speech therapy for patients with LVADs. The importance of rehabilitation and exercise in these patients is to facilitate the reversal of progressive deconditioning due to chronic heart failure and to improve clinical outcomes including survival and quality of life. In spite of the clear benefits conferred by postoperative rehabilitation in the LVAD patient population, at this time there remains a need for well-trained acute and sub-acute rehabilitation facilities with improved clinical protocols in the postoperative care and rehabilitation of LVAD patients.

Gardner Yost, Geetha Bhat
Advocate Christ Medical Center, Heart Institute, Oak Lawn, IL, USA

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