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Psychosocial Evaluation in Patients Undergoing Left Ventricular Assist Device Implantation Using the Transplant Evaluation Rating Scale

Gardner L. Yost, M.S., Geetha Bhat, Ph.D., M.D., Kamel N. Ibrahim, M.B.B.Ch., Angela G. Karountzos, B.S., Mercy Chandrasekaran, M.D., Edward Mahoney, Psy.D.

Background: It has been recommended that all candidates for left ventricular assist device (LVAD) implantation undergo preoperative psychologic evaluation for risk assessment. **Objective:** We used the transplant evaluation rating scale (TERS) that was established for pretransplant evaluation to investigate the psychosocial assessment of patients undergoing LVAD implantation. **Methods:** This study retrospectively analyzed data from 125 patients with advanced heart failure who were evaluated by the TERS before LVAD implantation. Postoperative follow-up included survival, total length of hospital stay, readmissions, and post-LVAD out-of-hospital days after discharge. The cohort was stratified according to the TERS scores into low-, moderate-, and high-risk groups. The outcomes were analyzed to evaluate whether the TERS

score was associated with post-LVAD adverse events. **Results:** The TERS, when stratified into 3 risk groups showed significant difference in 8 of the 10 psychosocial domains ($p < 0.001$). The mean number of outpatient days after discharge was significantly different between the low-, moderate-, and high-risk groups ($p < 0.001$). All other outcomes were not significantly different. **Conclusions:** This study showed that the TERS is successful in stratifying our patients with an LVAD into 3 risk groups, indicating the internal validity of this test. The number of out-of-hospital (outpatient) days after discharge was significantly shorter in the TERS high-risk group, which may affect the quality of life and cost of post-LVAD care.

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INTRODUCTION

Left ventricular assist devices (LVAD), an accepted method of treatment for patients with refractory heart failure, provide effective hemodynamic support with significant improvements in functional status and survival after implantation.¹ The use of continuous-flow LVADs has greatly improved quality of life, whether implanted as a bridge to transplant or as destination therapy, for those who are ineligible for transplantation.² Although the latest generation of LVADs are small, reliable, and durable, adverse events can be common.³

Clinical complications associated with LVAD support include, but are not limited to, gastrointestinal bleeding, infection, stroke, and device malfunction, all

Received June 17, 2015; revised July 30, 2015; accepted July 30, 2015. From Advocate Christ Medical Center, Center for Heart Transplant and Assist Devices, Oak Lawn, IL (GLY, GB, KNI, AGK, EM); Division of Cardiology, Advocate Masonic Medical Center, Chicago, IL (MC). Send correspondence and reprint requests to Geetha Bhat, Ph.D., M.D., Heart Institute, Outpatient Pavilion, 4440 West 95th Street, Administration, 6th Floor, Oak Lawn, IL 60453; e-mail: geetha.bhat@advocatehealth.com

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of which are significant causes of morbidity and mortality.⁴ Furthermore, all patients with an LVAD must maintain active anticoagulation to decrease the risk for the formation of pump thrombus. Appropriate management of anticoagulation requires close monitoring by both the patient and the clinicians. Living with an LVAD requires significant effort, adjustment, and self-care on the part of the patient.

Currently, there are limited data on preimplant psychosocial assessment of candidates with LVADs.⁵ Cognitive and psychosocial aptitude is critical in the outpatient setting when patients must manage medications, sterile dressing changes, and power source changes associated with the LVAD. Preoperative and postoperative psychologic evaluation would allow clinicians to assess the patient's ability for independent management of health status. Usually, psychologic selection criteria are center specific and are poorly defined. Little literature is available on the effect of psychologic factors or clinical outcomes after LVAD implantation.⁶

The goal of our study was to use the transplant evaluation rating scale (TERS) to explore the relationship of psychologic functioning before LVAD implantation and postimplantation outcomes. The TERS was developed in 1993 by Twillman et al.⁷ and has demonstrated efficacy as a pretransplant predictor for outcomes in patients receiving bone marrow, heart, lung, or liver transplants.^{8,9} It is conducted by a mental health professional and tests 10 separate psychosocial domains. Domains have variable weighting and are assessed by a psychologist on a 3-point scale. Domain subtotals are added together to reach a final score, with a maximum score of 79.5. The 10 domains are psychiatric history with axis 1 or 2 disorders, substance use/abuse, compliance, health behaviors, quality of family and social supports, history of coping, dealing with disease and treatment, quality of affect, and mental status.⁷

A higher TERS final score indicates a poorer psychologic evaluation rating. TERS can be used to classify patients into low-, moderate-, or high-risk groups.

METHODS

This retrospective study was performed with approval by our Institutional Review Board. A total of 237 candidates were evaluated for LVAD implantation from January 2011 to June 2014. Of these patients, 125 underwent LVAD implantation and had complete

TERS scores available. Of the 112 patients who were excluded, 86 did not undergo LVAD implantation and 26 patients did not have a complete TERS assessment in their files.

The TERS scoring was performed by a clinical psychologist, within the week before LVAD implantation and patients were stratified, as per a previous validation study, according to their score into low-, moderate-, and high-risk groups with scores 26.5–29, 29.5–37, and 37.5–79.5, respectively.⁹

POSTIMPLANTATION OUTCOMES

Outcomes following LVAD implantation were analyzed to assess the prognostic value of the TERS scoring system. The outcome assessment included postoperative length of stay, days to death (number of days alive with an LVAD), nonhospitalized (outpatient) days after implant, need for LVAD exchange for thrombus, total readmissions (number, duration, rate, cause, and time after implant), and total length of hospital stay. The adverse events that were included in this study were infection of the LVAD (whether driveline or device), gastrointestinal bleeding, non-gastrointestinal bleeding (bleeding from sites other than gastrointestinal source), LVAD thrombosis, hemolysis, and heart failure. The readmission rate was calculated as follows: readmission rate = (total readmissions/time since discharge) × 365.

STATISTICAL ANALYSIS

Outcomes data were compared between the 3 risk groups using Kruskal–Wallis tests for continuous variables and chi-square tests for categorical variables.

Statistical analyses were performed using SPSS version 20 for windows (SPSS, Inc., Chicago, IL).

RESULTS

The mean age for our study cohort was 55.9 ± 13.4 years, of whom 76% were men. Overall, 70.4% underwent implantation as destination therapy (Table 1). Our patient cohort had severe advanced heart failure, as indicated by preimplantation laboratory and echocardiography values in Table 1. The total population ($n = 125$) was stratified according to their TERS scores into a low-risk group ($n = 41$) with a mean TERS score of 27.88 ± 1.06 , moderate-risk group ($n = 56$) with a

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