Does INTERMACS Classification Predict Outcomes after LVAD Implantation?

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Purpose: INTERMACS profiles are used to predict outcomes after continuous-flow left ventricular assist device implantation (CF-LVAD). Reports suggest variability in reporting preoperative INTERMACS category. We performed a multicenter analysis validating the predictive ability of INTERMACS profiles for outcomes.

Methods: From May 2004 to May 2015, 997 patients (801 males, median age 59 years) underwent primary CF-LVAD implantation at our institutions. HeartMate II (HMII) was implanted in 744 patients (75%) and HeartWare VAD (HVAD) in 253 (25%). INTERMACS profile was assigned based on the level of illness. Kaplan-Meier curves and multivariable models were used to compare survival and adverse events.

Results: INTERMACS profile distribution revealed 57 patients (6%) in profile 1, 247 patients (25%) in 2, 421 (42%) patients in 3, and 272 patients (27%) in 4-7 (p<0.001). Profile 1 patients were sicker and INTERMACS 3 patients were more likely to be implanted as destination therapy. No difference was observed in device type utilization between profiles. In-hospital mortality was highest in INTERMACS 1 patients (20% vs. 6%; 5%, and 6%, p<0.001). Unadjusted survival was comparable between profiles (p=0.12). Survival-free of adverse events (AEs) was further comparable between profiles (p=0.06, Figure 1). Multivariable analysis showed only advanced age (HR=1.92), creatinine (HR=1.64) and INTERMACS profile (HR=0.49) predicted mortality. Interestingly, age predicted gastrointestinal bleeding (HR=2.30), while only HVAD and ischemic etiology were associated with stroke (HR=1.53, and HR=1.55).

Conclusion: INTERMACS profile describes appropriately the level of illness and important differences existing between profiles. While this report supports its ability to predict mortality after CF-LVAD, other important objective characteristics should be prioritized when predicting adverse events after implant.

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Performance of Continuous Flow Left Ventricular Assist Devices for the Smaller Size Patient Population

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Purpose: Since continuous flow left ventricular assist devices (CF-LVAD) became a standard care for end-stage heart failure patients, it is still a challenge to implant CF-LVAD for smaller size patients. We analyzed mid-term outcomes of these patients.

Methods: CF-LVADs were implanted in 73 patients (15 female, 40±13 year-old, 51 dilated cardiomyopathy) for the purpose of bridge to heart transplantation (HTx) (BTT) and implanted devices were HeartMateII in 36, EVAHEART in 17, Jarvik2000 in 10, DuraHeart in 9 and HeartWare in 1. The average body surface area (BSA) was 1.65±0.19 m2 (1.22-2.07). These patients were divided into two groups, standard group (BSA>1.6m2, n=43) and small group (BSA<1.6m2, n=30). Mid-term clinical outcomes and data collected from post-implant echocardiography and catheter examination (obtained from 63 patients) were compared between two groups. Optimal LVAD pump speed was set by clinical parameters including echocardiography.

Results: The average support period was 1.7±1.1 years (0.1-4.3). Post-implant catheter data showed no significant difference between two groups in cardiac index (2.9±0.6L/m2 in small group, 2.8±0.5L/m2 in standard group, p=0.27) and mean pulmonary pressure 14±4 mmHg, 16±6 mmHg, p=0.10). Echocardiography at 1 month showed left ventricular dimension was significantly reduced in both group and there were no significant difference between two groups (18±15%, 14±17%, p=0.29). There were no operative deaths and 4 late deaths due to cerebrovascular accident (CVA) in 3 and right heart failure in 1. One- and 2-year survival rate (censored by HTx and recovery) for overall patients were 97% and 95%, respectively, and there were no significant difference between two groups (Log-rank test, p=0.59). CVA were recorded in 24 patients and 1- and 2-year freedom from CVA were 68% and 62%, respectively, and there were no significant difference between two groups (p=0.49). Serial echocardiography showed that 1- and 2-year freedom from mild or greater aortic regurgitation were 84% and 63% and there were no significant difference between two groups (p=0.60).

Conclusion: CF-LVAD provided excellent clinical outcomes for small size patients in terms of survival and hemodynamics. There were no significant difference between small size patients and standard size patients.

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Combined Renal Risk Score Predicts Post-Implant Renal Failure in Continuous-Flow Left Ventricular Assist Device (CF-LVAD) Patients

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Purpose: Acute kidney injury failure requiring renal replacement therapy (RRT) effects morbidity and mortality of patients on CF-LVAD support. Currently available MCS guidelines do not offer a decision-making algorithm for CF-LVAD candidates with poor baseline renal function.

Methods: We reviewed records of 389 CF-LVAD patients implanted between January 2004 and August 2015 at a large academic institution. We compared preoperative renal function between those who did or did not require postoperative RRT, using serum creatinine (SCr), dipstick proteinuria, urine protein-creatinine ratio (UPCR) and estimated glomerular filtration rate (eGFR) by the MDRD equation. Patients were categorized based on requirement for RRT following CF-LVAD implantation. ROC curve analysis was performed to define appropriate cut-offs for significant risk factors.

Results: Overall, 44 CF-LVAD patients (11.6%) required post-implant RRT. Patients requiring RRT had significantly worse preoperative renal function than those who did not, as indicated by mean SCr (2.2 vs. 1.4 mg/dL, p<0.05)