

What's New in MCS

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Ventricular reconditioning and pump explantation in patients supported by continuous-flow left ventricular assist devices. Frazier, et al. *J Heart Lung Transplant.* 2015;34(6):766-72. <http://www.ncbi.nlm.nih.gov/pubmed/25447571>

Significant interest remains in the ability of the left ventricle (LV) to recondition/recover in left ventricular assist device (LVAD) therapy. Many institutions have developed protocols and published their experience. Dr. Frazier and colleagues share their experience in this manuscript.

Thirty patients were identified as potential candidates for reconditioning and possible explant. Hemodynamic and echocardiographic data were used to assess the capability of weaning. LVAD weaning candidacy was attempted in the setting of aggressive medical management. If the aortic valve opening time >10% of the cardiac cycle at 6,000 rpm, the maintenance speed was gradually decreased if LV dimensions and mitral regurgitation did not significantly worsen. This was done during all outpatient visits and individualized to the patient. Over time, if the aortic valve opening time was ~33% of the cardiac cycle at 6,000 rpms and LV end diastolic dimension remained <6cm without significant mitral regurgitation, patients underwent exercise testing and myocardial oxygen consumption measurements. Of the 30 patients identified, 27 met these criteria and eventually underwent explant. Most of the patients were implanted with HeartMate II LVADs. The other 3 patients were eventually transplanted.

In this cohort, the patients tended to be younger (37.5 ± 12.5 years old), have a non-ischemic etiology for their heart failure, and had a mean duration of support of 532.5 ± 423.6 days. Of these explanted patients, 2 patients expired: one died of sepsis due to a persistent pump pocket infection, and the other suddenly (theorized to be of a cardiac cause). The remaining patients have been followed up for an average of 1172 ± 948 days, and remain in New York Heart Association classes I to II with medical management alone.

In summary, the authors conclude that an aggressive approach to ventricular reconditioning with optimal heart failure therapy can result in eventual LVAD explantation, and that younger patients with non-ischemic cardiomyopathy will have a higher likelihood of success with this approach.

Reduction in driveline infection rates: Results from the HeartMate II Multicenter Driveline Silicone Skin Interface (SSI) Registry. Dean, et al. *J Heart Lung Transplant.* 2015;34(6):781-9. <http://www.ncbi.nlm.nih.gov/pubmed/25735901>

Device-related infections are among the most commonly reported adverse events in patients with LVAD support. The Allegheny group proposed a change in the surgical technique for driveline (DL) placement to reduce these potentially costly events. Many single center experiences have been reported, but this manuscript from the HeartMate II Multicenter Driveline Silicone Skin Interface (SSI) Registry is the most comprehensive look thus far at DL implantation techniques to reduce infection; specifically, whether keeping the entire velour length inside the subcutaneous tunnel helps with reducing infection rates.

This prospective, multicenter registry compared 200 patients in the SSI group to 201 control patients implanted as part of the Destination Therapy (DT) mid- and continuous access protocol trials between 2007 and 2009. DL infection occurred significantly less frequently ($p < 0.001$) in the SSI group at both 1 year (9% vs. 19%) and 2 years (23% vs. 35%) post-implant. Based on a multivariate analysis, younger age and DL exit site on the right were the only independent variables associated with infection. In the discussion, the authors raise the possibility of less inflammation in the SSI group as a possibility for less infection. In addition, they point out more trauma may explain why younger patients and right-handed predominant patients with right-sided DL's were more prone to infection. The clear message from this manuscript is that complete burial of the velour is an important strategy to reduce DL infection rates.

Temporal Differences in Causes of Mortality After Left Ventricular Device Implantation. Stulak, et al. *Ann Thorac Surg.* 2015;99(6):1969-74. <http://www.ncbi.nlm.nih.gov/pubmed/25865761>

Little data exists on the causes of death as related to the time interval after LVAD implantation. Understanding these associations may help identify specific risks that can be mitigated to avoid morbidity and mortality, and thereby improve long-term outcomes after LVAD placement. Stulak, et al. examined these findings in a cohort of continuous-flow (CF) LVAD patients implanted at the University of Michigan and Mayo Clinic.

Between October 2004 and February 2013, a total of 493 patients underwent CF LVAD implantation, 301 of whom were as a bridge to transplantation (BTT). Follow-up was available for a total of 717 patient-years of support at a median of 13 months. The 132 deaths during follow-up were grouped into early (30-day or index hospitalization, or 26% of this cohort), hospital dismissal and 6 months (22%), 6 months to 1 year (11%), and after 1 year (42%). The causes of death during each time period varied, but in the early period, the most common cause was right ventricular failure/multisystem organ failure (RVF/MSOF). Neurologic events and infection were also common reasons for death. Specifically, embolic stroke was the second most common reason for death in the early period, and was 3rd most common in all other periods. Intracranial hemorrhage was the 2nd most common cause outside of the early period. RVF/MSOF was the most common early reason for death in both BTT and DT patients, while the 2nd most common cause in BTT patients was embolic stroke, and was intracranial hemorrhage in the DT patients.

The authors surmise the predilection for younger patients to have more thromboembolic events and older patients to have more bleeding events may aid in tailoring anticoagulation strategies depending upon the population. They also state that anecdotally, younger BTT patients tend to live a more active lifestyle, possibly threatening DL stability and therefore increasing their risk for infection, and older patients tend to be more predisposed to infection due to a higher prevalence of comorbid conditions such as diabetes or obstructive lung disease. This could result in being more aggressive about offering pump exchange for the younger BTT patient, as opposed to the older persons implanted for DT.

In summary, the authors describe the causes of death for various subgroups in an attempt to provide insight to understand what risks exist after LVAD implantation based on the post-operative time period. These findings may assist in developing specific interventions and protocols to assist in reducing adverse events after LVAD placement.

The Journal of Heart and Lung Transplantation

★★★ Frazier OH, Baldwin AC, Demirozu ZT, Segura AM, Hernandez R, Taegtmeier H, Mallidi H, Cohn WE. Ventricular reconditioning and pump explantation in patients supported by continuous-flow left ventricular assist devices. *J Heart Lung Transplant*. 2015;34(6):766-72. <http://www.ncbi.nlm.nih.gov/pubmed/25447571>

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Borden M, Kiernan MS, Pham DT, DeNofrio D, Sylvia L. Bridging with half-therapeutic dose enoxaparin in outpatients with left ventricular assist devices and sub-therapeutic international normalized ratios. *J Heart Lung Transplant*. 2015;34(6):860-2. <http://www.ncbi.nlm.nih.gov/pubmed/25841651>

★ Kamdar F, Hutchins J, Missov E. Percutaneous thoracic paravertebral block reduces refractory ventricular tachyarrhythmias after left ventricular assist device implantation. *J Heart Lung Transplant*. 2015;34(6):866. <http://www.ncbi.nlm.nih.gov/pubmed/25749242>

Annals of Thoracic Surgery

Schumer E, Zoeller K, Linsky P, Monreal G, Choi Y, Giridharan G, Sobieski M, Slaughter M, van Berkel V. Feasibility Study of Pulsatile Left Ventricular Assist Device for Prolonged Ex Vivo Lung Perfusion. *Ann Thorac Surg*. 2015;99(6):1961-8. <http://www.ncbi.nlm.nih.gov/pubmed/25921254>

★★ Stulak J, Mehta V, Schirger J, Aaronson K, Joyce L, Daly R, Pagani F, Maltais S. Temporal Differences in Causes of Mortality After Left Ventricular Device Implantation. *Ann Thorac Surg*. 2015;99(6):1969-74. <http://www.ncbi.nlm.nih.gov/pubmed/25865761>

Journal of the American College of Cardiology – Heart Failure

No mechanical circulatory support articles in June 2015.

Circulation

No mechanical circulatory support articles in June 2015.

European Heart Journal

No mechanical circulatory support articles in June 2015.

Journal of Cardiac Surgery

★ Karimi A, Daigle S, Smith W, Janelle G, Klodell C. Efficacy and Safety of Recombinant Factor VII as Rescue for Severe Perioperative Bleeding in HeartMate II Recipients. *J Cardiac Surgery*. 2015;30(6): 500-5. <http://www.ncbi.nlm.nih.gov/pubmed/25939953>

★ Hobbs R, Korutla V, Suzuki Y, Acker M, Vallabhajosyula P. Mechanic Circulatory Support as a Bridge to Definitive Surgical Repair After Post-Myocardial Infarct Ventricular Septal Defect. *J Cardiac Surgery*. 2015;30(6): 535-40. <http://www.ncbi.nlm.nih.gov/pubmed/25940559>