

What's New in MCS

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Reviews:

[Health-related quality of life in mechanical circulatory support: Development of a new conceptual model and items for self-administration](#). Grady KL, Magasi S, Hahn EA, Buono S, McGee EC, Yancy C. *J. Heart Lung Transplant*. 2015;34(10):1292-1304.

Patients with advanced heart failure (HF) have very poor outcomes. Recently, mechanical circulatory support (MCS), emerged as a treatment option in patients with refractory end-stage HF. Patients awaiting transplant may be bridged with MCS, whereas those who are not eligible may be offered permanent MCS (i.e. destination therapy). As the MCS technology evolves, survival has improved, and the risk of adverse events has decreased. However, future use of MCS will depend not only on survival and the risk of adverse events but also on health-related quality of life (HRQOL), which is less well defined.

Generic and HF-specific HRQOL instruments do not address unique burdens of MCS. In this report, Grady et al., describe a conceptual model of adjustment to MCS and HRQOL, define new set of items to assess adjustment and HRQOL and establish content validity of the new model and items. Data were obtained from the interviews with 15 expert clinicians, 16 patients with advanced HF, and 48 MCS patients. Patients described how having HF and MCS affected their daily lives. Three concepts regarding adjustment to MCS and its relationship to HRQOL emerged: (1) effect of disease and treatment (satisfaction with treatment, symptoms, and self-efficacy regarding self-care), (2) resources, and (3) implant strategy. The authors developed a set of 239 items across the 3 HRQOL domains of physical, mental and social.

Patients were generally satisfied, positive, and grateful after having undergone MCS implantation. Symptoms of HF abated relatively soon after implantation. Patients reported less shortness of breath, paroxysmal nocturnal dyspnea, peripheral edema, abdominal bloating, and weakness, and a better appetite. Some symptoms of HF persisted for weeks to months after implant; notably, fatigue, reduced level of energy, and decreased strength. New MCS-specific symptoms emerged, including bleeding, dizziness/syncope, and drainage at the drive line exit site. Patients also discussed self-efficacy regarding MCS self-care, commenting on the challenges of learning about changing power sources, responding to alarms, changing controllers, and incorporating pump management into their daily lives.

Resources were important in the adjustment to having MCS and in HRQOL outcomes. Caregivers played a pivotal role in providing emotional, instrumental, and informational support. Some patients felt a loss of autonomy due to their caregiver's surveillance and over-protectiveness.

Implant strategy also affected treatment satisfaction and HRQOL. Bridge-to-transplant patients were anxious to "get on with life" and about the uncertainty of how long they would wait for a donor heart. Destination therapy patients were uncertain about life expectancy and concerned about what it would be like to die while on a VAD.

MCS patients noted an overall improvement in physical function. Although many patients expressed gratefulness for being alive, depression and anxiety were reported early after MCS. Most patients adjusted to living with MCS and self-care activities and reported less anxiety later after implant. Return to work was related to the type of work and age and most MCS patients were satisfied with returning to their social activities.

This paper represents an important step towards the development of an objective tool designed to assess issues relevant to quality of life in patients "living with MCS". It also provides a unique insight on how patients on VAD perceive their own quality of life. The study findings enhance our understanding of the complex relationship between HF, MCS, satisfaction with MCS, symptoms, self-efficacy in MCS self-care, implant strategy, resources, and HRQOL.

[Outcomes of heart transplant after left ventricular assist device specific and related infection.](#)

Tong MZ, Smedira NG, Soltesz EG, Starling RC, Koval CE, Porepa L, Moazami N. *Ann Thorac Surg.* 2015;100:1292-7

The LVAD related infections remain an Achilles heel of long-term LVAD therapy as it leads to significant morbidity and mortality. Conservative treatment with antibiotics and local incision and drainage leave behind an infective hardware and does not fully eradicate the infection as the presence of biomaterials reduces the penetration of antibiotics. More aggressive treatment with pump exchange and soft tissue coverage also has limited success.

In this study the authors summarized in a retrospective observational analysis their experience with device specific and related infection and the impact on transplant rate and post-transplant survival of patients with infection in comparison to infection-free counterparts. In a cohort of 170 HeartMate II recipients, implanted between 2004 and 2012, 36% developed a culture positive driveline infection, pump pocket infection, bacteremia, or a combination of these. Twenty-six out of 61 patients with an infection and 49 out of 109 patients without an infection went on to receive a heart transplant. The 1- and 3-year freedom from LVAD infection was 60% and 32%, respectively. The 1-year likelihood of receiving a transplant in the patients with an LVAD infection group was 37%, compared with 43% in patients without an infection ($p=0.36$). One-year survival to transplantation was 76% in patients with infection compared with 81% without ($p=0.33$). The 1- and 3-year post-transplant survival in patients with an LVAD infection was 96% and 91%, respectively, compared with 92% and 88% in patients without an infection ($p=0.48$). Looking more closely at the group of 26 patients who were transplanted after LVAD infections, 20 had no episodes of rejection. Five had 2R rejection on biopsy that was readily treated with steroids. One had antibody-mediated rejection and ultimately died of severe coronary vasculopathy 1 year after transplant. The other mortality was in a patient who died at 3 months from a hemorrhagic event.

Patients with LVAD infections pose a significant therapeutic challenge for the whole MCS team. They also incur an extra financial cost related to the repeat hospital admissions, administration of antibiotics and additional surgical procedures. Over the years several surgical strategies including double tunnelling technique have been devised with a varying success in preventing drive line infections. The long-term survival is exceedingly poor, and patients are at high risk for embolic stroke and sepsis leading to multiorgan failure. Given the inherent limitations of treating an infection in the presence of foreign material, complete device explant or transplantation remain the only means of definitive therapy. The fact that patients with controlled LVAD infection had non-inferior early and late post-transplant survival when compared to patients without an infection led authors to the conclusion that LVAD infection should be an indication for transplantation as long as they have preserved organ function and otherwise meet the eligibility criteria.

[The HVAD left ventricular assist device – Risk factors for neurological events and risk mitigation strategies](#). Teuteberg JJ, Slaughter MS, Rogers JG, McGee EC, Pagani FD, Gordon R, Rame E, Acker M, Kormos R, Salerno C, Schleeter TP, Goldstein DJ, Shin J, Starling RC, Wozniak T, Malik AS, Silvestry S, Ewald GA, Jorde UP, Naka Y, Birks E, Najarian KB, Hathaway DR, Aaronson KD. *J Am Coll Cardiol HF*. 2015;3:818-28

The current generation of continuous flow devices provides excellent survival and quality of life, affords greater durability, and allows for less extensive surgical dissection and implantation in a wider variety of patients in comparison to the previous pulsatile flow devices. Despite clinical success and recent advances, patients remain at risk for serious adverse events such as infection, bleeding, thrombus and stroke.

Teuteberg et al. published in October issue of JACC: Heart Failure the analysis of the prevalence and risk factors for ischemic cerebrovascular accidents (ICVA) and hemorrhagic cerebrovascular accidents (HCVA) in patients from an ADVANCE (Evaluation of the HeartWare Left Ventricular Assist Device for the Treatment of Advanced Heart Failure) trial. A total of 382 recipients were included. Patients had a mean age of 53.2 years; 71.2% were male, and 68.1% were white. Thirty-eight percent had ischemic heart disease, and the mean duration of support was 422.7 days. The overall prevalence was 6.8% for ICVA and 8.4% for HCVA. Pump design modifications (larger diameter coring tool and texturing of the segment of an inflow cannula in mid-2011) and a protocol-driven change in the antiplatelet therapy (target INR of 2.0 to 3.0 and higher dose of aspirin of 325 mg daily after an investigator meeting in March 2011) reduced the prevalence of ICVA from 3.3% to 2.7% ($p=0.21$) but had a negligible effect on the prevalence of HCVA (8.8% vs. 6.4%; $p=0.69$). Multivariable predictors of ICVA were aspirin ≤ 81 mg and atrial fibrillation; predictors of HCVA were mean arterial pressure > 90 mm Hg, aspirin ≤ 81 mg and INR > 3 .

CVAs, particularly HCVAs, often account for a significant proportion of deaths in patients on VAD support. This paper is a comprehensive analysis of neurologic events from the HeartWare BTT trial and continued access protocol (CAP). The authors also assessed the impact of changes to device design on CVAs and identified several modifiable risk factors. They concluded that attention to anticoagulation, antiplatelet therapy, and blood pressure management can have a substantial impact on the occurrence of serious neurological events.

Journal of Heart and Lung Transplantation

★★ Grady KL, Magasi S, Hahn EA, et al. Health-related quality of life in mechanical circulatory support: Development of a new conceptual model and items for self-administration. *J. Heart Lung Transplant*. 2015;34(10):1292-1304. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/26111595>

Annals of Thoracic Surgery

★★ Tong MZ, Smedira NG, Soltesz EG, et al. Outcomes of heart transplant after left ventricular assist device specific and related infection. *Ann Thorac Surg*. 2015;100:1292-7. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/26188972>

★ Bortolussi G, Lika A, Bejko J, et al. Left ventricular assist device end-to-end connection to the left subclavian artery: An alternative technique. *Ann Thorac Surg*. 2015;100:e93-5. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/26434488>

★ Cork DP, Tran HA, Silva J, et al. A case series of biventricular circulatory support using two ventricular assist devices: A novel operative approach. *Ann Thorac Surg.* 2015;100:e75-7. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/26434483>

JACC: Heart failure

★ ★ Teuteberg JJ, Slaughter MS, Rogers JG, et al. The HVAD left ventricular assist device – Risk factors for neurological events and risk mitigation strategies. *J Am Coll Cardiol HF.* 2015;3:818-28. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/26450000>

Journal of Cardiac Surgery

★ Hermsen JL, Smith JW, Pal JD, et al. Late surgical bleeding following total artificial heart implantation. *J Card Surg.* 2015;30(10):771-4. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/26286927>

★ Klodell CT, Massey HT, Adamson RM, et al. Factors related to pump thrombosis with the HeartMate II left ventricular assist device. *J card Surg.* 2015;30(10):775-80. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/26283153>

★ Anselmi A, Ruggieri VG, Letheulle J, et al. Extracorporeal membrane oxygenation in pregnancy. *J Card Surg.* 2015;30(10):781-6. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/26307595>

Circulation

No mechanical circulatory support articles in October

European Heart Journal

No mechanical circulatory support articles in October