

What's New in MCS

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Reviews:

Journal of the American College of Cardiology

- [Trends in the use and outcomes of ventricular assist devices among Medicare beneficiaries, 2006 through 2011](#). Khazanie P, Hammill BG, Patel CB, Eapen ZJ, Peterson ED, Rogers JG, Milano CA, Curtis LH, Hernandez AF. *J Am Coll Cardiol*. 2014 Apr 15;63(14):1395-404.

The group at Duke Clinical Research Institute had previously reported long-term outcomes and costs of ventricular assist devices among Medicare beneficiaries who received VAD between 2/2000 and 6/2006 (*JAMA*. 2008 Nov 26;300(20):2398-406). In the current study, they used a 100% sample of Medicare inpatient claims to investigate trends in outcomes, volume-outcome relationship and costs among all fee-for-service Medicare beneficiaries who received VAD between 1/2006 and 12/2011. The results are listed as follows:

- Between 2006 and 2011, a total of 2507 Medicare beneficiaries received an implantable VAD. Procedure volume increased from 192 implants in 2006 to 622 in 2011.
- Compared to the earlier period, patients who received VAD in 2011 had more comorbidity; most notably, 51% of the patients were diabetic, 67% had renal disease and 72% were diagnosed with COPD.
- There was significant reduction over time in both in-hospital mortality (30% to 10%) and 1-year mortality (42% to 26%). Post-procedure length of stay also decreased over time from a median of 23 days to 18.5 days.
- In 2011, the 1-year all-cause and cardiovascular readmission rates were 81% and 43%, respectively, and both remained statistically unchanged over the study period.
- After multivariate adjustment, gender was not a significant predictor of in-hospital and 1-year mortality or the all-cause readmission rate at 1 year.

- In 2006, 73% of the hospitals were low-volume centers (1-3 implants per year), 20% were medium-volume centers (4-8 implants per year) and 6% were high-volume centers (≥ 9 implants per year). In 2011, 34% were low-volume, 43% were medium-volume, and 23% were high-volume centers.
- Low- and medium-volume hospitals had higher inpatient mortality compared with the high-volume hospitals. The 1-year mortality was also higher in low-volume hospitals but the medium-volume centers had similar 1-year mortality compared to the high-volume centers.

This study serves as a large post marketing surveillance effort and provides invaluable information about the trend in the use and outcomes of VAD therapy in the modern era. Although the study population included only Medicare beneficiaries, authors cited national statistics that Medicare paid for 48% of VAD implantations in 2011, suggesting that the results provide important information from the perspective of the predominant payer. Moreover, this is the first study to explore the association between center volume and outcomes in the Medicare population. The findings suggest that patients receiving VADs at low-volume centers have a significantly higher risk of in-hospital and 1-year mortality compared with those receiving VADs at high-volume centers. The authors propose that as new VAD centers develop, it will be important for them to link to leading centers to easily disseminate best practices and leverage experience.

Journal of Thoracic and Cardiovascular Surgery

- [Management of severe ischemic cardiomyopathy: left ventricular assist device as destination therapy versus conventional bypass and mitral valve surgery.](#)

Maltais S, Tchantchaleishvili V, Schaff HV, Daly RC, Suri RM, Dearani JA, Topilsky Y, Stulak JM, Joyce LD, Park SJ. *J Thorac Cardiovasc Surg.* 2014 Apr;147(4):1246-50.

Surgical management of patients with severe ischemic mitral regurgitation (IMR) and severe ischemic cardiomyopathy (ICM) is challenging, controversial and at best, receives a class IIa recommendation with level of evidence C in both ESC and the latest AHA/ACC guidelines. Question remains whether this particularly high-risk population would ultimately benefit more from options such as durable mechanical circulatory support or heart transplantation. This retrospective study was conducted to understand the surgical results and to compare the effectiveness of conventional surgery (CABG + MV surgery) versus LVAD as DT indication in patients with severe ischemic LV dysfunction (LVEF $\leq 25\%$) and severe IMR.

Cardiac surgery database at the Mayo Clinic was reviewed to identify patient with severe ICM (LVEF of $\leq 25\%$) and severe IMR who underwent combined CABG and MV surgery between 1993 and 2009. Same database was used to identify patients with severe ICM and severe MR who underwent implantation of HeartMate II LVAD as DT between 2007 and 2011. LVAD DT was offered only to those who were deemed inappropriate for conventional surgery (CS) based on poor or no coronary target vessels to improve myocardial ischemia. The results are listed as follows:

- 88 patients had concomitant severe ICM and severe IMR. 55 patients underwent CS (80% MV repair, 20% MV replacement) and 33 patients received HeartMate II LVAD (12% INTERMACS I or II).
- Patients in the LVAD group had a higher incidence of preoperative renal failure (70% vs 15%, $P < 0.001$), a higher rate of preoperative IABP (79% vs 13%, $P < 0.001$), and a higher rate of preoperative inotrope dependency (58% vs 15%, $P < 0.001$).
- Patients in the LVAD group were more likely to undergo reoperation for bleeding (64% vs 4%, $P < 0.001$) and their median length of stay was longer (18 vs 10 day, $P < 0.001$).
- 30-day mortality was 7% vs 3% ($P = 0.65$) and 1-year mortality was 22% vs 15% ($p = 0.58$) between the CS and LVAD groups, respectively.
- In the propensity-matched analysis, the difference in survival did not reach statistical significance ($P = 0.171$) but there was a trend favoring the LVAD DT subgroup.

With the recent paradigm shift in the use of durable MCS, more patients with end-stage ICM and severe MR are referred for durable LVAD, primarily due to poor coronary targets or nonviable myocardium. In this study, despite the fact that patients in the LVAD group were sicker at baseline, the outcomes were comparable and within propensity-matched population there was a trend towards improved survival for the LVAD group. This is an important hypothesis-generating study; authors suggest that LVAD DT might be preferable over conventional surgery in some appropriately selected subgroup of patients with advanced ICM. They conclude that for patients who are inoperable or have prohibitive risks for surgery, LVAD DT can be offered with similar outcomes.

Articles

➤ **Journal of Thoracic and Cardiovascular Surgery**

** [Management of severe ischemic cardiomyopathy: left ventricular assist device as destination therapy versus conventional bypass and mitral valve surgery.](#)

Maltais S, Tchantchaleishvili V, Schaff HV, Daly RC, Suri RM, Dearani JA, Topilsky Y, Stulak JM, Joyce LD, Park SJ. *J Thorac Cardiovasc Surg.* 2014 Apr;147(4):1246-50.

[Computational fluid dynamics in patients with continuous-flow left ventricular assist device support show hemodynamic alterations in the ascending aorta.](#)

Karmonik C, Partovi S, Loebe M, Schmack B, Weymann A, Lumsden AB, Karck M, Ruhparwar A. *J Thorac Cardiovasc Surg.* 2014 Apr;147(4):1326-1333.

➤ **Journal of the American College of Cardiology**

**[Trends in the use and outcomes of ventricular assist devices among Medicare beneficiaries, 2006 through 2011](#). Khazanie P, Hammill BG, Patel CB, Eapen ZJ, Peterson ED, Rogers JG, Milano CA, Curtis LH, Hernandez AF. *J Am Coll Cardiol*. 2014 Apr 15;63(14):1395-404.

➤ **European Journal of Heart Failure**

[Effect of increasing pump speed during exercise on peak oxygen uptake in heart failure patients supported with a continuous-flow left ventricular assist device. A double-blind randomized study](#). Jung MH, Hansen PB, Sander K, Olsen PS, Rossing K, Boesgaard S, Russell SD, Gustafsson F. *Eur J Heart Fail*. 2014 Jan 8.

➤ **Journal of Cardiac Failure**

None

➤ **Circulation Heart Failure**

March issue previously reviewed by Dr. Maltais; next issue in May.

➤ **ASAIO J**

“March-April” issue previously reviewed by Dr. Maltais; next issue “May-June”.