

What's new in Mechanical Circulatory Support, February 2015



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Reviews

1. Nassif ME, Patel JS, Schuster JE, Raymer DS, Jackups R, Novak E, Gage BF, Prasad S, Silvestry SC, Ewald GA, LaRue SJ. [Clinical outcomes with use of erythropoiesis stimulating agents in patients with HeartMate II left ventricular assist device](#). J Am Coll Cardiol HF 2015;3:146-153.

This is a single center retrospective study of the use of erythropoiesis stimulating agents (ESAs) in patients who underwent implant of HeartMate II. Anemia is a common problem after LVAD implant, and circulating erythropoietin levels are lower expected. Furthermore, utilization of transfusions is concerning in bridge-to-transplant patients who are at risk for allosensitization. Thus, the use of ESAs represents an interesting strategy.

A total of 221 patients underwent HeartMate II implant (without concurrent RVAD, ECMO, or previous LVAD implant) between January 2009 and June 2013. The primary outcome of interest was incidence of suspected pump thrombosis at 180 days (defined as LDH > 1000 mg/dL or plasma free hemoglobin level > 40 mg/dL, in addition to heart failure symptoms). Secondary outcomes included rates of stroke and all-cause mortality.

There were 100 subjects who received ESAs and 121 subjects who did not receive ESAs. Interestingly, both groups had a median transfusion requirement of 9 units. At 180 days, the survival free of primary outcome (suspected pump thrombosis) was 94.5 in the no ESA cohort and 78.6 in the ESA cohort ($p < 0.001$). ESA use was associated with higher rates of suspected pump thrombosis with a hazard ratio of 2.35 (95% CI 1.38 – 4.0, $p = 0.002$). Furthermore, for every 100-unit increase in equivalent ESA dose (using darbopoeitin dose as standard measure), there hazard of suspected pump thrombosis increased by 10% ($p < 0.001$). There was no significant difference in unadjusted all-cause mortality or stroke.

Use of ESAs after LVAD implant is associated with increased risk of pump thrombosis. The mechanisms that cause LVAD pump thrombosis are multifactorial and complex, and may include prothrombotic state

and platelet hyper reactivity in patients receiving ESAs. The major limitation of this study is the lack of randomization or understanding of why some patients received ESAs while others did not. Post-operative and long term anticoagulation strategies were also not included in this analysis. However, based on this study, caution is advised before using ESAs after LVAD implant.

2. Wever-Pinzon O, Givens RC, Flannery M, Naka Y, Jorde UP. [Repetitive HeartMate II pump stoppage induced by transitioning from battery to main power source: the short-to-shield phenomenon](#). J Heart Lung Transplant 2015;34:270-271.

This is a case report of a patient with recurrent pump stoppages and red heart alarms on HeartMate II support. This would occur consistently when switching the power source from batteries to the power base unit. This article describes important fundamental properties of the HeartMate II driveline. In this case, there was no fracture of the individual wires. However, breakdown of the insulation of one of the wires resulted in physical contact of the wire and the metallic shielding that surrounds the set of 6 wires in the driveline. When connected to a grounded circuit/cable (which can only occur on the power base unit), this results in the short-to-shield phenomenon and pump stoppages.

Short term solutions include keeping patients on battery support or using an ungrounded cable with the power base unit. Long term treatment depends on the location of the driveline dysfunction. If the driveline dysfunction is external, it can be repaired. However, this patient required a pump exchange. Finally, at our institution, we have had a patient with an internal driveline short-to-shield fracture, who has been on support with batteries and an ungrounded cable at home for more than 18 months without recurrent pump stoppages. The safety of this approach cannot be assured in all patients.

In summary, this case anecdote demonstrates the importance of understanding driveline technology in clinical care.

ARTICLES:

Journal of Heart and Lung Transplant

1. Cowger J, Rao V, Massey T, Sun B, May-Newman K, Jorde U, Estep JD. Comprehensive review and suggested strategies for the detection and management of aortic insufficiency in patients with a continuous-flow left ventricular assist device. *J Heart Lung Transplant* 2015;34:149-157. [Rate **]
2. Clerkin KJ, Thomas SS, Haythe J, Schulze PC, Farr M, Takayama H, Jorde UP, Restaino SW, Naka Y, Mancini DM. Mechanical circulatory support as a bridge to cardiac retransplantation: a single center experience. *J Heart Lung Transplant* 2015;34:161-166. [Rate *]
3. Grady KL, Naftel DC, Myers S, Dew MA, Weidner G, Sertus JA, Idrissi K, Lee HB, McGee EC, Kirklin JK. Change in health-related quality of life from before to after destination therapy mechanical circulatory support is similar for older and younger patients: Analyses from INTERMACS. *J Heart Lung Transplant* 2015;34:213-221. [Rate *]
4. Wever-Pinzon O, Givens RC, Flannery M, Naka Y, Jorde UP. Repetitive HeartMate II pump stoppage induced by transitioning from battery to main power source: the short-to-shield phenomenon. *J Heart Lung Transplant* 2015;34:270-271. [Rate **]

Annals of Thoracic Surgery

5. Schechter MA, Patel CB, Blue LJ, Welsby I, Rogers JG, Schroder JN, Milano CA. Improved early survival with a nonsternotomy approach for continuous-flow left ventricular assist device replacement. *Ann Thorac Surg* 2015;99:561-566. [Rate *]
6. Adachi I, Khan MS, Guzman-Pruneda FA, Fraser CD, Mery CM, Denfield SW, Dreyer WJ, Morales DLS, McKenzie ED, Heinle JS, Fraser CD. Evolution and impact of ventricular assist device program on children awaiting heart transplantation. *Ann Thorac Surg* 2015;99:635-640. [Rate *]

Journal of the American College of Cardiology: Heart Failure

7. Nassif ME, Patel JS, Schuster JE, Raymer DS, Jackups R, Novak E, Gage BF, Prasad S, Silvestry SC, Ewald GA, LaRue SJ. Clinical outcomes with use of erythropoiesis stimulating agents in patients with HeartMate II left ventricular assist device. *J Am Coll Cardiol HF* 2015;3:146-153. [Rate **]

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8. Lawler PR, Silver DA, Scirica BM, Couper GS, Weinhouse GL, Camp PC. Extracorporeal membrane oxygenation in adults with cardiogenic shock. *Circulation* 2015;131:676-680. [Rate *]

European Heart Journal

None

Journal of Cardiac Surgery

9. Stone ML, LaPar DJ, Benrashid E, Scalzo DC, Ailawadi G, Kron I, Bergin JD, Blank RS, Kern JA. Ventricular assist devices and increased blood product utilization for cardiac transplantation. *J Card Surg* 2015;30:194-200. [Rate *]

10. Heim C, Kondruweit M, Weyand M, Tandler R. Amphetamine abuse as a rare cause of recurrent LVAD pump thrombosis. *J Card Surg* 2015;30:215-216. [Rate]