

# What's New in MCS

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## Journal of Heart and Lung Transplantation August, 2013

1. \*Vivo RP, Cordero-Reyes AM, Qamar U, Garikipati S, et al. Increased right-to-left ventricle diameter ratio is a strong predictor of right ventricular failure after left ventricular assist device. JHLT 792-799
2. \*Geens JH, Jacobs S, Claus P, et al. Partial mechanical circulatory support in an ovine model of post-infarction remodeling. JHLT 815-822
3. \*Di Chiara L, Ricci Z, Brancaccio G, et al. Left ventricular retraining after arterial switch operation facilitated by mechanical circulatory support. JHLT 842-843. (*pediatrics*)
4. Orr Y, Jeewa A, et al. Upsizing of a Berlin EXCOR pediatric left ventricular assist device to achieve adequate flow requirements. JHLT 845-846. (*pediatrics*)
5. \*Robertson JO, Okada S, Joseph SM, et al. Left ventricular assist device related hemolysis and acute pancreatitis: A case series. JHLT 846-848.

## Annals of Thoracic Surgery August 2013

1. \*Jiritano F, Serraino GF, Rossi M, et al. Ventricular assist device driveline infection: Treatment with platelet-rich plasma. (e37-e38 ).(Case report)
2. \*Neely RC, Davis RP, Stephens EH, et al. Ventricular Assist device for failing systemic ventricle in an adult with prior mustard procedure.(691-693). (Case report)
3. \*Gerosa G, Gallo M, Tarzia V, et al. Less invasive surgical and perfusion technique for implantation of the Jarvik 2000 left ventricular assist device. (712-714).( Case report)

## Journal of Cardiac Surgery September 2013

1. \*Lalonde SD, Alba AC, Rigobon A, et al. Clinical Differences between continuous flow ventricular assist devices: A comparison between Heartmate II and Heartware HVAD (604-610).
2. \*Said SM, Salhab, et al. Management of peripheral pulmonary emboli with the use of transvenous catheter directed thrombolysis and right ventricular assist device (611-615).( Case report)
3. \*Bartoli CR, Vessels KM, McCants KC. Increased intrathoracic impedance predict adverse events in LVAD patients. (616-618).(Case report)

## REVIEWS:

### **\* Clinical Differences between continuous flow ventricular assist devices: A comparison between Heartmate II and Heartware HVAD. Journal of Cardiac Surgery 604-610.**

This retrospective cohort study aimed to compare and contrast their single center experience with implantation of mechanical assist devices, primarily Heartmate II (HM II) and Heartware (HVAD). It enrolled 46 consecutive patients 33 patients had HM II device and 13 were implanted with HVAD.

Both groups were well matched for age, severity of their disease, etiology of their cardiomyopathy, and indication for an LVAD, mostly BTT. Patient's sex varied widely between the two groups with 25 out of 33 (76%) patients in HMII group being male as compared to 3 out of 23 (23%) in HVAD.

With respect to the outcomes the 1-year survival was comparable between the two groups 75% for HVAD and 82% for HM II patients (p=0.91). The difference between the two groups came in the

incidence of stroke (a combination of ischemic, hemorrhagic and TIA) and GI bleeding. 44% of patients in HVAD group and 10% in HM II group had stroke. HVAD group had higher propensity for hemorrhagic stroke 3/5 vs. 1/3. Patients with HVAD had a higher incidence of GI bleeding compared to HM II group (31% in HVAD vs. 0% in HM II).

This is a small single center study that corroborates prior data on comparable survival for both pumps. However, the stroke rate and GI bleedings was significantly different and higher in the HVAD group as compared to the HM II patients. This might be a reflection of patients' demographic with 77% of HVAD patients in the current trial being female as compared to 25% in the HM II group; and device management i.e. blood pressure control, anticoagulation targets and achieved pulsatility/ aortic valve opening on the device, this data is not provided to us. The rate of GI bleed in this trial does not seem to reflect suprathreshold anticoagulation targets, but the numbers are very small making it difficult to draw meaningful conclusions.

The rate of stroke in the HVAD group is also significantly higher than what was recently reported in the ADVANCE trial, 44% vs. 15% respectively. Whether this is a manifestation of a change in anticoagulation regimen that occurred in March 2011 with recommended INR goal 2-3 and raise in ASA dose to 325mg daily is not clear.

As the authors pointed out, the recently completed ENDURANCE DT pivotal trial enrolled 450 patients might be able to provide a more robust data as to the differences and similarities between the two currently available continuous flow devices.

**\* Increased right-to-left ventricle diameter ratio is a strong predictor of right ventricular failure after left ventricular assist device. JHLT 792-799.**

The goal of this study was to obtain quick and easily measurable echocardiographic parameter in patients undergoing LVAD evaluation that would serve as a predictor of right ventricular failure (RVF) postoperatively.

The authors retrospectively reviewed a prospectively collected database of medical records and TTEs of all patients receiving continuous flow devices (CF-LVAD) with 109 comprising the final cohort, 85% of patients received HM II. The primary outcome was RVF within 30 days of LVAD implantation, defined as requirements of an RVAD or  $\geq 14$  consecutive days of inotropic support, whereas the secondary outcome was the combined end-point of 30-day RVF and death.

The cohort was divided into two groups, patients who had developed RVF, - 25 patients, 22.9% and those who did not- 84 patients, 77.1%. Of all echocardiographic variables that were measured only 2 were significantly different between the groups: cardiac index calculated across the RVOT was lower ( $1.39 \pm 0.3$  liters/min/m<sup>2</sup> vs.  $1.74 \pm 0.6$  liters/min/m<sup>2</sup>) and the RV/LV diameters ratio was larger ( $0.84 \pm 0.2$  vs.  $0.73 \pm 0.1$ ;  $p = 0.002$ ). Based on the ROC curve analysis, an RV/LV diameter ratio of  $\geq 0.75$  (AUC=0.68) predicted primary composite outcome, with a sensitivity of 57% and specificity of 73%. It had an additive values to currently existing Matthews and Kormos scores.

Tricuspid regurgitation (TR) severity was not associated with primary outcome in this study; however 32% of patients in the RVF group had  $\geq$  moderate TR whereas only 14% in non RVF group had that degree of regurgitation. Despite that discrepancy 7% of patient in non RVF group had TV repair compared to 0% in RVF group. Total of 8 patients had severe TR in the entire cohort, 6 underwent TV repair all in non RVF group, the remaining 2 died within 30 days.

In conclusion, RV/LV diameter is a surrogate marker for predicting RVF postoperatively. These findings add to the existing body of literature that adverse RV remodeling as measured by RV dimensions, TV annular size and velocity, out of proportion to LV is a harbinger of advanced disease and bad prognosis. As the authors correctly pointed out this should be used as an additional tool and in combination with clinical and hemodynamic parameters when assessing patient's eligibility for an LVAD therapy.