# What's New in MCS

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**Predicting Right Ventricular Failure in the Modern, Continuous Flow Left Ventricular Assist Device Era,** Atluri et al, The Annals of Thoracic Surgery 2013 (Volume 96 issue 3 Pages 857-864)

Right ventricular dysfunction in the setting of left ventricular failure both pre and post VAD implantation is a major issue, contributing both to morbidity and mortality in these patients.

Appropriate and early implantation of BiVAD may alleviate some of these morbidities. However, patient selection and prediction of need for RV support is challenging. Various attempts have focused on developing predictive modeling for this purpose.

Atluri et al present a simple way of predicting need for BiVAD support in patients with heart failure.

They reviewed clinical data on 218 patients that underwent VAD implantation, including 51 patients that needed BiVAD support. Based on statistical modeling, they were able to develop a simple model (CRITT model) that includes **C**VP (>15 mmHg), **R**V dysfunction, need for preoperative **I**ntubation, **T**ricuspid regurgitation (severe) and **T**achycardia (>100 bpm). Each of these is assigned a binary value of 1 if present and 0 if absent, thus a total maximum score of 5. A score of less than 2 predicts need for LV support only while a score of > 4 predicts the need for additional RV support. Score of 2 and 3 may predict need for 'temporary' RV support and reassessment. Overall, the model fit and predictive power were very good with c statistic of 0.8.
This model compares favorably to previously described models including one by Mathews et al.

This simple model should aid clinicians in assessing and anticipating need for RV support with LVAD implantation. Intermediate scores (CRITT of 2 or 3) may warrant taking other laboratory parameters into account (such as elevated LFTs, creatinine, INR) to further predict the need for RV support. We should anticipate further insight into this issue with the ongoing INTERMACS project (Kiernan et al, INTERMACS current projects, 2012).

Lastly, although the title suggests otherwise, a significant portion of patients in this study were actually supported by pulsatile devices (Thoratec PVAD).

**Post- transplant Outcomes of Children Bridged to Transplant With the Berlin Heart EXCOR Pediatric Ventricular Assist Device,** Eghtesady et al. Circulation 2013; 128:S24-S31

Recently, a look back at wait times for pediatric transplants revealed that the wait times for transplantation were increasing across the age groups. As we continue to palliate complex congenital heart diseases as well as improve our management of cardiac failure, we will be faced with a large cohort of patients, waiting as IA for a transplant. This has increased the possibility that increasing number of patients may need to be supported with a mechanical support. Currently, Berlin EXCOR is the only FDA approved pediatric ventricular assist device. However, once these patients (supported with Berlin) do get transplanted, their outcomes were unknown and therefore there has been some trepidation with regards to aggressive utilization of Berlin support.

In this important paper from Eghtesady et al, some of these concerns are addressed. They reviewed the post-transplant outcomes of pediatric patients supported with Berlin EXCOR pre-transplant and compared them to outcomes from age-matched patients from OPTN database.

Between 2007 and 2010, there were 106 patients supported with Berlin. The 12-month post-transplant survival (88.7% ) was similar to survival of 90.5% in 1021 OPTN patients. These Berlin patients were then compared to various sub-categories of these OPTN patients including IA listed patients, patients on ventilator as well as patients with congenital heart disease. The survival was similar in all these groups.

There were some important differences noted when it came to ECMO and IB patients. OPTN IA patients that were supported with ECMO pre-transplant had significantly lower post-transplant survival (60%) compared to the Berlin group (88.7%).

On the other hand OPTN patients listed IB had significantly better post-transplant survival (96.1%) compared to Berlin patients.

There are important differences as far as the reasons for mortality are concerned. 50% of the Berlin group mortality was related to rejection (compared to only 12% in the OPTN group). This is an important finding with unclear explanation and a limitation of the study. The granularity needed to analyze this further did not exist in the dataset. Possible explanation could be presensitization related to the device. However, this is controversial and needs further studies.

The common causes of mortality in the OPTN group were multi-system organ failure, graft failure and infection. This study may also hint at the possibility of end-organ recovery and support provided by Berlin leading to essentially no events of post-transplant multi organ failure.

This study provides some important comparison points. It is reassuring to see that overall, Berlin supported patients had survival comparable to IA OPTN patients. However, the high number of post-transplant rejection related mortality needs to be investigated and mitigated in order to support wide spread use of the device as a bridge to transplant.

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