

CATEGORIES CORONARY: Hemodynamic Support and Cardiogenic Shock

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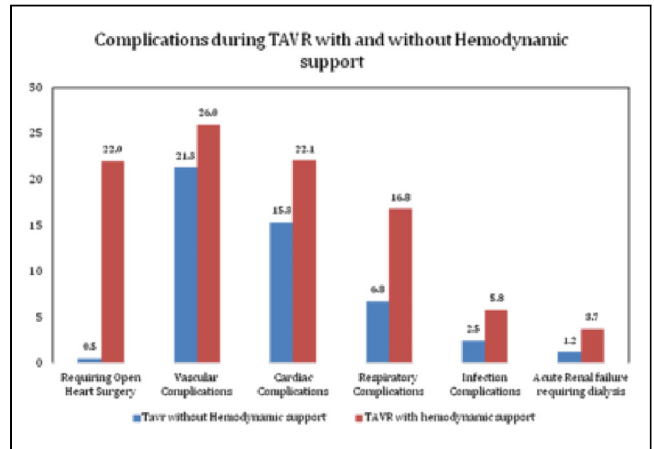
Mechanical Circulatory Support Devices and Transcatheter Aortic Valve Replacement: A Multicenter experience

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BACKGROUND Use of mechanical circulatory support (MCS) devices in cardiogenic shock (CS), acute Myocardial Infarction (MI), high-risk percutaneous coronary interventions (PCI) has been extensively studied. High-risk surgical patients with valvular heart diseases undergoing percutaneous treatment such as transcatheter aortic valve replacement (TAVR) represent an emerging population which may benefit from short term use of MCS.

METHODS We analyzed data from Nationwide Inpatient Sample (2011 and 2012) using the ICD, 9th Revision, Clinical Modification procedure codes.

RESULTS A total of 1,794 TAVR procedures (375 hospitals in the US) were identified of which 190 (10.6 %) utilized a MCS device (MCS group) and 1,604 (89.4%) did not (non-MCS group). A higher percentage of patients in MCS group underwent trans-apical TAVR (54% vs 13%, $p < 0.01$), had AMI (6.4% vs. 2.1%, $p < 0.01$), underwent percutaneous coronary intervention (5.4% vs. 2.1%, $p < 0.01$), had cardiac arrest (10% vs. 2.3%, $p < 0.01$) (including ventricular fibrillation: 8% vs. 1%, $p < 0.01$) and cardiogenic shock (16.8% vs. 2.9%, $p < 0.01$) when compared to the non-MCS group. On the other hand the patients in non-MCS group were older (71% vs. 37% >80 years old, $p < 0.01$) and had a higher mean Charlson's comorbidity score (2.65 ± 0.04 vs. 2 ± 0.1 , $p < 0.01$). The use of MCS devices with TAVR was associated with significant increase in the in-hospital mortality (14.9% vs. 3.5%, $p < 0.01$). The mean length (11.8 ± 0.8 vs. 8.1 ± 0.2 days, $p < 0.01$) and cost ($\$68,997 \pm 3,656$ vs. $\$55,878 \pm 653$, $p = 0.03$) of hospitalization were also significantly higher in MCS group. Ventricular fibrillation arrest, trans-apical access for TAVR and cardiogenic shock, were the most significant predictors of MCS use during TAVR. In the multivariate model, use of any MCS device was found to be an independent predictor of increased mortality (OR 3.5, 95% CI 2.6-4.6, $p < 0.0001$) and complications (OR 3.3, 95% CI 2.8-3.9, $p < 0.0001$) Figure 1. The propensity score matched analysis ($n = 160$ in each group) also showed a similar result.



CONCLUSIONS The unacceptably high rates of mortality and complications coupled with a significant increase in the length and cost of hospitalization should raise concerns about utility of MCS devices during TAVR in this prohibitive surgical risk population.

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KEYWORDS Mechanical circulatory support, Outcomes, TAVR

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Percutaneous coronary interventions and hemodynamic support in the USA: A 5 years' experience

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BACKGROUND Intra-aortic balloon pump (IABP) is the most commonly utilized mechanical support device in the cardiac catheterization laboratories. The last decade has witnessed the development and Food and Drug Administration approval of alternative percutaneous ventricular assist devices (PVADs) such as Impella (Abiomed, Danvers, MA, USA) and TandemHeart (Cardiac Assist, Inc., Pittsburgh, PA). Despite the lack of clear evidence of superiority, the utilization of PVAD has increased substantially in the last decade. The present study was designed to provide further insights into PCIs performed with hemodynamic support (IABP or PVAD) using the nation's largest available hospitalization database.

METHODS This was a cross sectional study using the Nationwide Inpatient Sample database between the years 2008-2012. Procedures were identified through appropriate clinical modification of International Classification of Diseases, ninth edition (ICD-9-CM) codes for PCI, PVAD and IABP placement. We used propensity-scoring method to establish matched cohorts in order to control for imbalances of patients' and hospitals' characteristics between the studied groups which may have influenced the primary outcome.

RESULTS A total of 18,094 procedures were identified over the five year study period between 2008 through 2012. IABP was the most commonly utilized hemodynamic support device (93%, $n = 16,803$) whereas 6% ($n = 1069$) were performed with PVADs and 1% ($n = 222$) utilized both IABP and PVAD. Patients in the PVAD group were older in age and had greater burden of co-morbidities when compared to those in the IABP group. A higher proportion of patients in the PVAD group were admitted emergently whereas IABP group had higher percentage of patients with cardiac arrest. We observed an in-hospital mortality rate of 20.1% for IABP, 12% with PVAD and 41% in IABP+PVAD group. Overall complications rate for this patient population was 36% for IABP vs. 26% for PVAD vs. 52% for the IABP+PVAD group. The use of PVADs was a significant predictor of reduced mortality (OR 0.16, 0.07-0.36, $p < 0.0001$), as well as complications rate (OR 0.45, 0.32-0.64, $p < 0.001$) when compared to IABP only in the sub-group of patients without AMI or cardiogenic shock. Propensity score matched analysis also showed a significantly lower mortality (9.9% vs. 15.1%; OR 0.62, 0.55-0.71, $p < 0.001$) and complications (24.8% vs. 31.5%; OR