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Reviews:

Impella CP versus Intra-Aortic Balloon Pump in Acute Myocardial Infarction Complicated by Cardiogenic Shock: The IMPRESS trial

Ouweneel DM, Eriksen E, Sjauw KD et al. J Am Coll Cardiol Oct 2016

<https://www.ncbi.nlm.nih.gov/pubmed/27810347>

Cardiogenic shock (CS) complicating acute myocardial infarction (AMI) develops in approximately 6% of patients presenting with STEMI and is associated with a very high mortality. Over the last 2 decades the cardiology community has attempted to develop a strategy to improve the survival of these patients. The SHOCK trial (1999) determined that patients presenting with AMI and CS had a 30 days mortality of ~50%, but there was an improved survival at 6 months in patients who underwent early revascularization. In 2012, the IABP-SHOCK II trial randomized ~600 patients with AMI and CS to IABP support or medical therapy. There were no differences in 30 days mortality (~40%) between groups. With the development of percutaneous ventricular assist devices in general, and Impella 2.5[®] in particular, there were hopes that we could improve the dismal survival in patients with AMI and CS. Unfortunately, the small ISAR-SHOCK trial, which compared Impella 2.5[®] and IABP in the management of AMI and CS, showed no difference in survival at 30 days (~ 46%). It became clear to the cardiovascular community that Impella 2.5[®] did not offer enough hemodynamic support for this critically ill population. With the development of Impella CP[®], which can be inserted percutaneously and provides up to 3.5 L of support, renewed hopes occurred for the management of these patients

Ouweneel et al, performed an open label, multicenter trial in which 48 patients with AMI and severe CS were randomized to IABP or Impella CP[®]. The definition of severe CS included a SBP < 90mmHg or the need of inotropes/vasopressor and mechanical ventilation. As a result of these inclusion criteria, the studied population was remarkably ill. Ninety two percent of patients had cardiac arrest prior to randomization, 96% were receiving catecholamines, and the pH at the time of randomization was ~7.16. 30% of patients received renal replacement therapy and 75% were treated with hypothermia protocol. The LAD was the infarct related artery in 65% of cases and 98% of patients received primary PCI with stent deployment. The mean duration of support was ~ 2 days in both groups. At 30 days the mortality was similar in both groups: 50% (IABP) and 46% (Impella CP[®]) (p=0.92). The mortality at 6 months was 50% for both groups. Brain damage was the primary cause of death in 46% of patients whereas refractory cardiogenic shock was present in 29%. The frequency of bleeding that required transfusion was 33.3% in the Impella CP[®] group compared with 8.2% in the IABP one.

The population enrolled in this study was sicker than initially anticipated and sicker than previous trials (SHOCK-IABP II or ISAR-SHOCK). As a result, during an interim analysis it was determined that the study was underpowered to show a difference in mortality, but it was allowed to continue as exploratory data. In spite of its limitations, this study underlines the contemporarily persistently poor

prognosis in patients presenting with AMI and CS and the challenges in their management. Other temporary support devices than Impella CP® may be needed to rescue these patients and further studies are needed to clarify this issue.

Risk factors, mortality and timing of ischemic and hemorrhagic stroke with left ventricular assist devices.

Frontera JA, Starling RC, Cho SM, et al. JHLT Dec 2016

<https://www.ncbi.nlm.nih.gov/pubmed/?term=28110971>

Stroke is a serious and frequent complication in patients who are supported with continuous flow left ventricular assist devices (CF-LVAD). In fact, the stroke rates in CF-LVAD patients is approximately 20 times higher than the general population and higher than patients with other cardiovascular conditions such as atrial fibrillation or mechanical heart valves. Stroke in LVAD patients is associated with increased mortality and decreased transplantation rates. The risk factors associated with stroke in the general population are very well known. However, the data in CF-LVAD patients is scarce and frequently contradictory.

Frontera et al. performed a retrospective analysis of 402 patients who received CF-LVAD. Sixty one percent of patients received LVADs as BTT and the remaining as DT. The mean age at the time of implantation was 57 years old and most patients were males (~80%) and white. The median follow up time was 342 days accounting for a total follow-up of 590 patient-years. Strokes were classified as **early** (if occurred within the index hospitalization) or **late** (if occurred after discharge from index hospitalization) and **ischemic** (TIA, ischemic stroke or hemorrhagic conversion from ischemic stroke) or **hemorrhagic** (sub-arachnoid hemorrhage (SAH), intracranial hemorrhage (ICH), subdural hematoma and intra-ventricular hemorrhage). A total of 83 strokes occurred in 69 patients, 52% were ischemic and 48% were hemorrhagic. The overall frequency of stroke was 4%, 3% for early ischemic and hemorrhagic stroke and 6% and 7% for late ischemic and late hemorrhagic stroke respectively. The overall rate of stroke was 0.14 strokes per patient year. The risk for any stroke was highest immediately after LVAD implantation and increased gradually again around 9-12 months. Only 10/43 (23%) of patients with ischemic stroke demonstrated a large vessel occlusion amenable of clot retrieval. Fifty percent of early hemorrhagic strokes were SAH, whereas late hemorrhagic strokes were more commonly ICH. 7/23 patients required evacuation or hemi-craniotomy.

Stroke was the second leading cause of death in this cohort and early hemorrhagic, late hemorrhagic and late ischemic strokes were independent predictors of death with hazard ratios of 4.3, 3.2 and 3.7 respectively.

Multivariate analysis showed that any infection was an independent risk factor for early ischemic stroke. Pump infection, pump thrombosis and tobacco abuse were independent predictors of late ischemic stroke whereas hypertension and blood stream infections were independent predictors of late hemorrhagic stroke.

In summary, this manuscript provides important and significant information and contributes to understand the risk factors associated with stroke in LVAD supported patients.

Other publications:

Journal of Cardiac Failure

Ventricular Assist Device Therapy in Older Patients with Heart Failure: Characteristics and Outcomes

Kim JH, Singh R, Pagani FD, et al. J Card Fail Epub Oct 2017.

<https://www.ncbi.nlm.nih.gov/pubmed/27765670>

Preoperative Determinants of Quality of Life and Functional Capacity Response to Left Ventricular Assist Device therapy.

Kiernan MS, Sudareswaran KS, Pham DT, et al. J Card Fail 2016 Oct;22(10) 797-805.
<https://www.ncbi.nlm.nih.gov/pubmed/26777757>

Outcomes for Patients With Diabetes After Continuous-Flow Left Ventricular Assist Device Implantation.
Vest AR, Mistak SM, Hachamovitch R et al. J Card Fail 2016 Oct; 22 (10); 789-96.
<https://www.ncbi.nlm.nih.gov/pubmed/26924520>

Annals of Thoracic Surgery

Survival After Orthotopic heart Transplantation in Patients undergoing Bridge to Transplantation With the HeartWare HVAD versus the Heartmate II.
Magruder JT, Grimm JC, Crawford TC et al. Ann Thorac Surg Oct 17 2016.
<https://www.ncbi.nlm.nih.gov/pubmed/27765177>

Duration of Left Ventricular Assist Devices Support Does Not Impact Survival After US Heart Transplantation.
Grimm JC, Magruder JT, Crawford TC, et al. Ann Thorac Surg 2016 Oct;102(4):1206-12.
<https://www.ncbi.nlm.nih.gov/pubmed/27319984>

Left Ventricular Assist Device Design Reduces von Willebrand Factor Degradation: A Comparative Study Between the HeartMate II and the EVAHEART left ventricular assist System.
Bartoli CR, Kang J, Zhang D et al. Ann Thorac Surg Oct 4.
<https://www.ncbi.nlm.nih.gov/pubmed/27717422>

Circulation heart failure

Impact of Socioeconomic status on Patients Supported with a Left Ventricular Assist Device: An analysis of the UNOS Database (United Network for Organ Sharing).
Clerkin KJ, Garan AR, Wayda B et al. Circ heart Failure Oct 9 (10).
<https://www.ncbi.nlm.nih.gov/pubmed/27758810>

Dying with a left ventricular assist Device as Destination Therapy
Dunlay SM, Strand JJ, Wordingham Se, et al. Circ Heart Failure 2016 Oct;9(10).
<https://www.ncbi.nlm.nih.gov/pubmed/27758809>

Journal of American College of Cardiology

Impact of Ischemic Heart Failure Etiology on Cardiac Recovery During Mechanical Unloading.
Wever-Pinzon J, Selzman CH, Stoddard G, et al. JACC Oct18;68(16)1741-1752.
<https://www.ncbi.nlm.nih.gov/pubmed/27737740>

Cardiac Recovery During Long-Term Left Ventricular Assist Device Support.
Wever-Pinzon O, Drakos SG, McKellar SH, et al. JACC 2016 Oct 4;68 (14): 1540-53.
<https://www.ncbi.nlm.nih.gov/pubmed/27687196>

Diagnosis and treatment algorithm for blood flow obstructions in patients with left ventricular assist device.
Scandroglio AM, Kaufmann F, Pieri M, Kretzschmar A et al. JACC; 67(23):2758-68.
<https://www.ncbi.nlm.nih.gov/pubmed/?term=27282897>

JACC heart failure

The Impact of Obesity on Patients Bridged to Transplantation With Continuous-Flow Left Ventricular Assist Devices.
Clerkin KJ, Naka Y, Mancini DM et al. JACC Heart Fail 2016 Oct;4(10): 761-8.
<https://www.ncbi.nlm.nih.gov/pubmed/27614942>

ASAIO

Surgical treatment of mediastinitis with omentoplasty in ventricular assist device patients: Report of referral center experience.

Pieri M, Muller M, Scandroglia AM, et al. ASAIO 62(6): 666-670.

<https://www.ncbi.nlm.nih.gov/pubmed/?term=27465093>