Reviews:

**JOURNAL OF CARDIAC FAILURE**


Cardiogenic shock is a clinical problem with an increasing number of solutions. While more choices are sometimes better, it is not always clear which choice is best for a given patient. As additional percutaneous options become more widespread, the routine use of IABP as first line mechanical circulatory support (MCS) is under increasing scrutiny. The IABP-SHOCK II trial added significantly to the controversy by concluding that there is no benefit to the routine use of IABP in myocardial infarction with cardiogenic shock. Some heart failure specialists may be ready to throw in the towel for IABP.

In this single center review, Sintek *et al.* attempt to add clarity to the decision process. They reviewed all patients that received an IABP prior to LVAD at Barnes Jewish Hospital from 1998 to 2013. Of the 54 patients included in the study, 31 patients were deemed to have stabilized with IABP and 23 decompensated. While it is impossible to control for selection bias in a retrospective review, the baseline characteristics of the study group indicate a sick group of patients. The average patient was on a single inotrope before IABP, the average ejection fraction was 17%, and the average LV end-diastolic dimension was between 6.8 and 7.1 cm. Criteria for decompensation were stringent and included any of the following: 1. any additional MCS device, 2. any increase in vasopressor or inotrope requirement, 3. initiation of renal replacement therapy, 4. initiation of mechanical ventilation, 5. worsening ventricular arrhythmia, 6. persistently severe or worsening metabolic acidosis. In short, if there was any significant clinical worsening, then the patients fell into the decompensated category.

Segregating responders and non-responders to IABP, and examining a wide range of hemodynamic variables, allowed the authors to identify a few parameters associated with IABP success. These included RV cardiac power index (mean PA pressure x cardiac index/451), LV cardiac power index (mean arterial pressure x cardiac index/451), pulmonary arterial systolic pressure, RV stroke work index. Receiver operator curves were constructed for each variable and cut-points were established. If either RV or LV power indices were above the ROC cutpoint (RV = 0.13 W/m² and LV = 0.33 W/m²), there was an 82% positive predictive value for stabilization. The authors hypothesize that LV and RV power index may reflect contractile reserve, an advantage that we realize by using the IABP to further reduce afterload.

Why is it important to determine if a patient will be an IABP responder? In this group, responders spent much less time intubated after LVAD (4 days vs. 20 days) and much less time in the ICU after LVAD (8...
days vs. 25 days). In short, if we can identify the right patient, the IABP remains an invaluable member of the team.

**JOURNAL OF THORACIC AND CARDIOVASCULAR SURGERY**


This study is a follow-up to a previously published study by the Bartley Griffith group at the University of Maryland. In the study, the authors treated myocardial infarction in pigs with an Impella 5.0 device for 2 weeks. During this time, the Impella flow was set at about 2 lpm, or roughly half of the animals’ total cardiac output. Animals were allowed to recover for an additional 10 weeks before sacrifice and tissue analysis. From the original cohort of animals, tissue from 3 control animals, 3 infarct animals, and 3 Infarct + Impella animals, was available for analysis of RNA and protein. Pathway analysis was performed with protein level corroboration, and animal results were correlated with strain data available from the earlier study.

Clinically, at 12 weeks, there was a significant reduction in diastolic strain in the LVAD treated group in the area adjacent to the infarct, but not in areas remote to the infarct. Not surprisingly, transcripts of heart failure associated genes like NPPA were also greater in territories adjacent the infarct if untreated with LVAD. The main finding of the study is that although LVAD support was largely associated with beneficial effects, there were some potentially negative effects as well. For example, there was less β-arrestin mediated signaling in the LVAD group, something that is normally believed to be cardioprotective. These findings have important implications for the development of coordinated medical and mechanical support strategies.

**ASAIO JOURNAL**


With the controversy surrounding the REVIVE-IT trial, there is renewed emphasis on understanding and study of thrombosis in the LVAD population. In this article, the team at the University of Alabama reviewed their population and identified 23 out of 115 patients that had a primary thromboembolic event. Detailed examination of patient characteristics demonstrated that elevated LDH on the day of implant, increased LDH within the first month of implant, and eGFR <30 were all associated with increased risk of thromboembolism. Percent of time in target range INR (PTTR) >60% was protective against embolic events. Importantly, the CHADS2 and CHA2DS2-VASC scores that are commonly used to estimate thrombosis risk in atrial fibrillation patients were not predictive. This study re-iterates caution in patients with poor renal function and adds to the growing evidence supporting tight INR control in the outpatient LVAD population.


CIRCULATION HEART FAILURE
No MCS articles in November

EUROPEAN JOURNAL OF HEART FAILURE
No MCS articles in November

JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY
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