**Great first draft Gun, I think this is a great opportunity and we can publish something meaningful about the interplay between using IABP and PVAD. A couple of points and suggestions on things to explore further. I am still flying around (am on my way to New York today, but we should catch up some time next week if you are free. IABP and PVAD are both temporary mechanical support but PVAD provides much more support than IABP (the Impella (PVAD) provides 3 – 5L/minute or support while IABP only provides 0.5 – 1L/min of support), as such the use cases are very different and a direct comparison would not make sense. Sometimes the IABP is placed c for more transient cardiogenic shock/hypotension during because PCI because there is some thought that improves diastolic coronary artery perfusion (but I think that is more suggested based on physiology rather than outcomes data). By definition, they are all placed require more circulatory support (which is cardiogenic shock) and it could be more transient for the IABP patients (it is less support) and might not be billed as such. As such, I feel a little less confident about using the diagnosis of cardiogenic shock as a way to dichotomize patients to look at outcomes. Dr. Banerjee, what are your thoughts on this?  
  
Because there is such a big difference in the type of support between IABP vs. PVAD, they are often not interchangeable choices in the same clinical scenario, and as such, a direct comparison is often challenging. Because we have timing data, interesting questions might be if a patient received both IABP and PVAD (almost always will be IABP first), whether they would have benefited more from going straight to PVAD – although it would be a stretch claim that IABP+PVAD group is a good comparison against just PVAD patients. Rather than contrasting them, another angle could also be to comparing them (“Delayed mechanical support with either IABP or PVAD results in worse outcomes”). And finally, I think the lowest hanging fruit would not be a comparison, but an exploration of the timing and mortality data on just one of modalities (or both as two separate abstracts). I think you mentioned before that there is a strong relationship on timing and volume for PVAD, and that hasn’t been characterized before. I fully support you regardless which direction you think we should go, but these are my initial thoughts. Dr. Banerjee, what do you think?  
  
David**

**Differential survival benefit of IABPs and PVADs by procedural timing and clinical indication**

**Background**: Temporary mechanical circulatory support with intra-aortic balloon bumps (IABPs) and percutaneous ventricular assist devices (PVADs) are used to support patients in cardiogenic shock and patients undergoing high risk percutaneous coronary interventions. There is limited data comparing the optimal timing and practice patterns between IABPs and PVADs.

**Methods**: Adult patients who received an intra-aortic balloon bump (IABP) or percutaneous ventricular assist device (PVAD) between 2005 and 2011 and for whom information on procedural timing was available were identified in the National Inpatient Sample using ICD-9 procedure codes. We compared in-hospital mortality between PVAD and IABP by post-admission day of procedure placement and clinical diagnosis on hospitalization.

**Results:** Patients receiving IABPs and PVADs were modestly older (65.1 ± 12.6 years vs. 63.9 ± 15.0 years ), more likely female (31.4% vs. 26.1%), and more likely Caucasian (66.7% vs. 73.9%) than PVAD patients. Median hospital length of stay for both IABP and PVAD patients was 8 days (range: 0-261 days vs. 8 days; range: 0-81 days), and the median day of procedure placement for both IABP and PVAD was on the day of admission (range: 0-197 days vs. 0-82 days). IABP patients were more likely to have cardiogenic shock (39.1% vs. 29.7%) and acute myocardial infarction (AMI) without cardiogenic shock (37.8% vs. 27.5%), but less likely to have had percutaneous coronary intervention (PCI) without AMI and cardiogenic shock (3.4% vs. 33.3%) compared to PVAD patients (p < 0.001 for all). In patients diagnosed with cardiogenic shock, IABP increased mortality compared to PVAD when placed within 1 day of admission (≤ 1 day post-admission, 30.2% vs. 20.5%, p-value = 0.0111). However, this difference diminished when circulatory support was placed later during the hospitalization (> 7 days post-admission, 33.8% vs. 34.1%, p-value = 0.9604). On the contrary, in patients diagnosed with AMI without cardiogenic shock, IABP significantly decreased mortality compared to PVAD when placed within 1 day of admission (≤ 1 day post-admission, 10.7% vs. 32.9%, p-value = 0.0001), and this difference also diminished when the devices were placed later in the hospitalization (>7 days post-admission, 26.8% vs. 27.5%, p-value 0.9147). Moreover, in patients who received PCI without a diagnosis of AMI or cardiogenic shock, IABP consistently decreased mortality compared to PVAD irrespective of device timing (≤ 1 day post-admission, 6.4% vs. 25.8%, p-value = 0.0001; >7 days post-admission, 10.9% vs. 35.7%, p-value = 0.0005).

**Conclusions**: The survival benefit of IABPs versus PVADs in heart failure patients is influenced by the timing of the procedure and the clinical indication for placement.