Discussion:

We assessed the impact of the duration of pre-procedural hemodynamic monitoring, timing of LVAD implantation, and wait time for OHT on the in-hospital mortality of 2200 LVAD patients from the National Inpatient Sample. Our data suggest that longer durations of pre-procedural hemodynamic monitoring by Swan-Ganz catheterization, delayed timing of LVAD implantation, and longer wait times for OHT are associated with improved in-hospital outcomes for LVAD patients. In fact, we found that patients with shorter durations of pre-procedural Swan-Ganz catheterization or shorter wait times for OHT did not experience any mortality benefit over patients who did not even receive Swan-Ganz catheterization or OHT. Few studies have looked at the optimal timing of LVAD implantation or duration of Swan-Ganz catheterization, but existing evidence on optimal wait time for OHT after LVAD implantation are consistent with what we have reported here. Gammie et al. showed that mortality is significantly higher when transplantation is performed within 2 weeks of ventricular assist device implantation compared to when transplantation is performed later (25.8% vs 15.8%). Similarly, in our study sample of 164 LVAD patients bridged to same-admission OHT, mortality rates in patients transplanted within 7 days of LVAD implantation was 26.8% compared to 12.2% in patients transplanted later.

We also studied national trends in incidence and in-hospital mortality for LVAD implantation by age, gender, race, income status, year, concomitant diagnosis, hospital type, and the surgical procedures performed.

Validations for Table 1:

Age: The average age of adult LVAD recipients for all indications in the United States is 51 years. Mortality trends also consistent (http://circ.ahajournals.org/content/123/14/1559.full)

Gender: male to female ratio (http://openheart.bmj.com/content/1/1/e000109/T1.expansion.html)

Race: most common in white, black second, consistent (http://openheart.bmj.com/content/1/1/e000109/T1.expansion.html)

Income status:

Year: There were substantial declines in in-hospital (57.9–6.0%), 30-day (52.3–9.0%) from 2004 to 2011 and in 1-year mortality rates (69.2–31.2%) from 2004 to 2010, all p values <0.01 for linear trends (http://openheart.bmj.com/content/1/1/e000109/T1.expansion.html)

Concomitant diagnosis: Need to find

Hospital type:

OHT+ mortality: not consistent likely because it is in-hospital transplantation rather than long-term stuff

OHT- mortality:

LVAD in-hospital mortality = 26.8%, consistent with LVAD in-hospital mortality reported in (discussion section: <http://circ.ahajournals.org/content/116/5/497.long>)

Length of stay: No significant changes were noted for the overall LOS (23.6 days in 2004–27.3 days in 2011)

Bride to transplant in hospital mortality not much data out there.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2607106/>

<http://www.ncbi.nlm.nih.gov/pubmed/16836733/>

<http://www.ncbi.nlm.nih.gov/pubmed/23321132> (OHT+ but for long term LVAD)

Timing of OHT:

http://www.ncbi.nlm.nih.gov/pubmed/18539472/

<http://www.ncbi.nlm.nih.gov/pubmed/15173738/> (this is the most relevant one)

<http://www.ncbi.nlm.nih.gov/pubmed/20447659/>

Limitations

From http://cdn.intechopen.com/pdfs-wm/15756.pdf:

The plausible explanation underlying this finding is when a patient requires a VAD usually they are in decompensated state of heart failure. In this state, there often maintain a similar degree of other end-organ injury mainly renal dysfunction. Weeks of hemodynamic support are required to achieve normalization of end-organ function and are concordant with prior reports that have demonstrated improvement of both hepatic and renal function during long-term VAD support (Gammie). Therefore the general rule is to wait a few weeks between time of VAD insertion and before heart transplantation.

<http://www.ncbi.nlm.nih.gov/pubmed/15173738> (Gammie et al, Optimal timing of cardiac transplantation after ventricular assist device implantation using data from United Network for Organ Sharing)

LVAD definition fromhttp://openheart.bmj.com/content/1/1/e000109/T1.expansion.html

We defined LVAD implantations as hospital discharges that included the ICD-9-CM procedure code for LVAD implantation (37.66). To isolate LVADs placed for long-term therapy, we excluded codes 37.62, 37.65 and 37.68 used for temporary non-implantable, or external or percutaneous external assist devices.