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Characterizing Outflow Graft Narrowing over Time

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5.0%, p=0.43) at 1-year after listing with HM 3 LVAD was comparable in the new vs. old allocation system. However, 1-year post-transplant survival after bridging with HM 3 was significantly lower in the new vs. old heart allocation system (87.3% vs. 93.6%, p<0.001) (figure). Multivariable analysis revealed, old age (> 60), ischemic etiology of HF, poor functional status, elevated creatinine (> 1.8 mg/dL), pulmonary hypertension (PVR > 3 WU), and listing in the new allocation system as significant predictors of post-transplant graft survival.

Conclusion: While the utilization of durable devices as BTT have declined under the new heart allocation system, bridging with HM 3 LVAD remains a safe strategy.

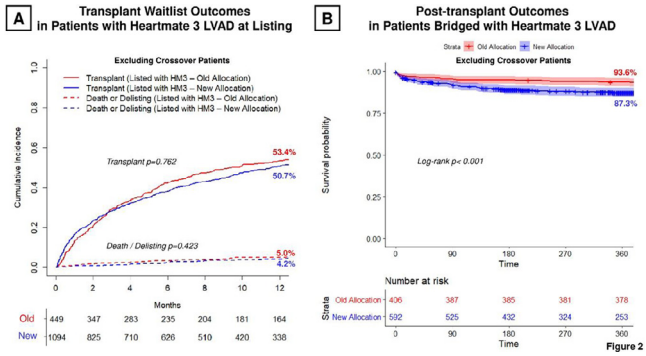

Figure 2

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Predictors of Failure to Rescue After Left Ventricular Assist Device Implantation

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Purpose: Failure to rescue (FTR), defined as death after a complication, is an established hospital quality metric for coronary and valve surgery. While prior work has documented interhospital variability in FTR after durable left ventricular assist device (LVAD), less is known about patient and complication-specific predictors of FTR in this setting.

Methods: Patients undergoing primary LVAD implantation from 2012-2017 were selected from the INTERMACS database. The cohort was divided into two groups and compared based on patient survival following complications and FTR. FTR was defined as patient in-hospital mortality after experiencing at least one of the following major complications: severe right heart failure, respiratory failure, renal failure requiring dialysis, major infection, device malfunction, and bleeding requiring reoperation. Multivariable logistic regression was used to evaluate both preoperative patient and complication specific predictors of FTR. Stepwise selection was used to arrive at the final model.

Results: Of the 13,617 patients in the sample, 4,839 (35.5%) experienced a major complication of which 854 (17.6%) died (i.e., FTR). Patients in the FTR group were more likely to be older (61.3 +/- 11.5 vs 56.9 +/-12.9, p<0.001), INTERMACS Profile 1 (30.9% vs 20.9%, p<0.0001), and Destination Therapy (55.6% vs 48.3%, p=0.0003). Significant predictors of FTR included: a history of prior CABG (OR = 1.54, CI95%: 1.31-1.82), valve surgery (OR = 1.50, CI95%: 1.07-2.11), preoperative dialysis (OR = 2.29, CI95%: 1.70-3.08) and preoperative ECMO (OR=4.27, CI95%: 3.01-6.04). Patients developing right heart failure had the highest complication-specific FTR rate (75.3%) followed by reintubation (45.1%), Table 1.

Conclusion: This study identified four significant preoperative predictors of FTR after durable LVAD placement. Future work should focus on identifying patients at highest risk of FTR, as well as early recognition and management of complications.

Table 1. Complications in Patients Who Survived vs. Patients Who Died

Postoperative Complication	Survived after complication (n=3985)	FTR (n=854)	p-value
RHF	2,296 (57.6%)	643 (75.3%)	p<0.0001
Device malfunction	232 (73.4%)	84 (26.6%)	p<0.0001
Stroke	289 (7.3%)	166 (19.44)	p<0.0001
Reintubation	1,077 (27.0%)	385 (45.1%)	p<0.0001
Renal dysfunction w/ dialysis	346 (8.7%)	286 (33.5%)	p<0.0001
Major infection	1,091 (27.4%)	341 (39.9%)	p<0.0001
Major bleeding requiring reoperation	838 (21.0%)	210 (24.6%)	p=0.02

RHF = Right heart failure
FTR = Failure to Rescue
*Patients can experience more than one complication

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Purpose: Cases of pump dysfunction due to outflow graft (OG) anastomosis obstruction related to serous fluid accumulation have been reported but the rate of occlusion and actual frequency of asymptomatic OG diminution is not known.

Methods: This was a multicenter retrospective analysis of patients on HeartMate II (HMII) or HeartMate 3 (HM3) support surviving at least 180 days with at least one chest computed tomography (CT) scan at 6 months, 1, 2, and/or 3 years postoperative. Patients with OG obstruction due to torsion were excluded. The outflow graft (OG) diameter was measured at its narrowest region; region was categorized as external outflow graft (EOG), mid-graft, or within 2 cm of the aortic anastomosis. Mixed models with repeated measure linear regression was used to assess OG diameter change over time, with 14 mm as reference. Using the narrowest measure, OG diameter was modelled for freedom from death, admission for HF and low flow alarms with hazard ratio [95% CI presented].

Results: Of 71 patients included herein, 25% and 75% were on HMII and HM3 support for a median [25th, 75th] 1230 [703,1592] days. The median CT count was 2 [1,2] per patient. At follow-up, small (1-3 mm, table), but statistically significant reductions in OG diameter were noted (Figure). The median OG narrowing was 7% [0%, 20%]. Time from device implant was the most significant contributing factor (p<0.001) while wrapping of the outflow was nonsignificantly correlated with OG narrowing (p=0.071). Device model was not correlative (p=0.16). OG diameter was not correlated with survival (HR 1.04 [0.81-1.3]), stroke (HR 0.94 [0.78-1.1]) or admissions for heart failure (HR 1.06 [0.88-1.3]), or VAD alarms (HR 0.93 [0.79-1.1]).

Conclusion: Minor narrowing of the OG was noted over time, irrespective of LVAD model. The observed degrees of non-twist related-OG narrowing herein did not lead to increase mortality or events. OG wrapping may be associated with OG narrowing over time. Larger sample analyses aim to define degrees of narrowing that elicit device dysfunction.