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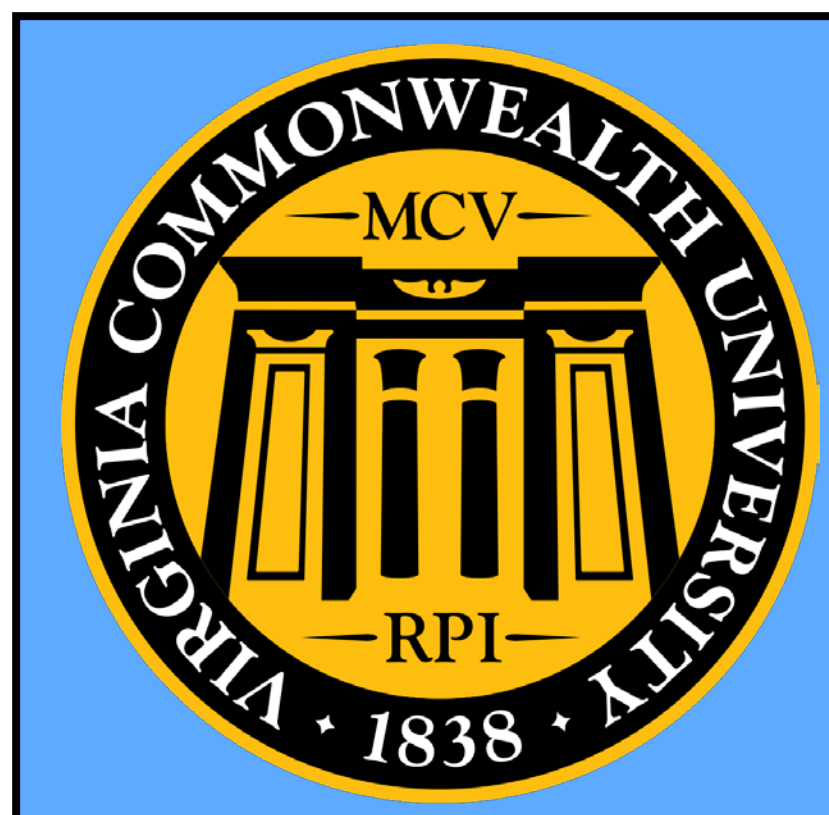


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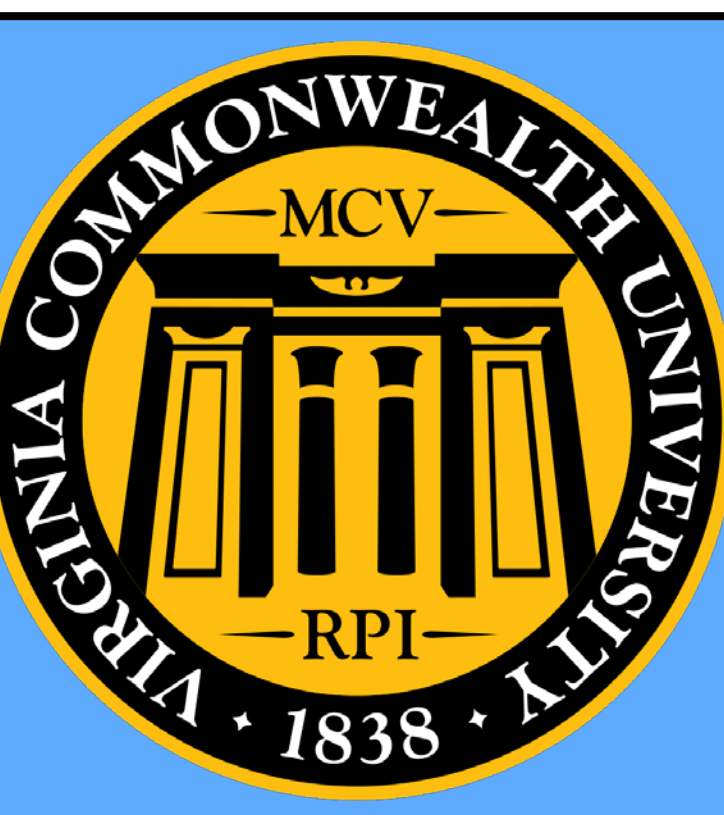
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Impact of Morbid Obesity on Left Ventricular Assist Device Support and Heart Transplantation

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Introduction

The current standard of treatment for patients with end stage heart failure is cardiac transplantation, however, the pool of viable donor hearts is not adequate to meet the needs of patients with end stage heart failure¹. This discrepancy has led to the increasing use of continuous flow (CF) left ventricular assist devices (LVADs) as a bridge to transplant (BTT)². Patient selection is an important predictor of outcomes for both LVAD support and Heart Transplantation. Morbid obesity, which is a BMI ≥ 40 , or a BMI ≥ 35 with comorbidities³, carries increased risk for LVAD placement⁴ and is a relative contraindication for heart transplantation⁵. A higher BMI puts patients at increased risk for postoperative complications⁶. To better understand how to best treat heart failure in the morbidly obese, we analyzed data from patients receiving a CF LVAD and heart transplantation to assess the association between BMI, complications, wait time for transplantation and survival.

Methods

The study was comprised of 157 patients with advanced heart failure who received a CF LVAD at Virginia Commonwealth University Hospital from December 2008 through January 2014. We retrospectively collected data on each patient from the Society of Thoracic Surgeons (STS) and Interagency Registry for Mechanically Assisted Circulatory Support (INTERMACS) databases. The data was analyzed by dividing patients into two groups, BMI ≥ 35 and BMI < 35 .

Results

- 157 LVADs implanted, 121 (77%) BMI < 35 and 36 (23%) BMI ≥ 35 .
- BMI ≥ 35 group was of 7 years younger, had higher hemodynamics and had fewer prior myocardial infarctions, arrhythmias, and cardiac surgeries.
- Both groups had comparable preop morbidities, INTERMACS class, LVAD type and implantation designation.
- Postop and device specific complications were higher in BMI ≥ 35 group, but only bleeding requiring reoperation and frequency of driveline infections were statistically significant.
- Operative mortality higher in BMI ≥ 35 group but wasn't statistically significant (19.5% vs 11%).
- Patients with a BMI ≥ 35 spent an average of 216 more days on the wait list, with an average of (619 \pm 372 vs 403 \pm 342 days) and fewer patients received a HTx (19% vs. 33% p = 0.15)
- After HTx, BMI ≥ 35 group had higher postop bleeding requiring reoperation (57% vs 15%).
- HTx survival and graft survival was comparable in both groups.

Table I. Pre-operative Patient Characteristics

	BMI ≥ 35 kg/m ² n=36 (23%)	BMI < 35 kg/m ² n=121 (77%)	P-value
Age in years	47 \pm 12.7	55 \pm 13.4	0.001
BMI	41.6 \pm 5.5	27.8 \pm 4.1	
Preoperative Comorbidities			
Cerebrovascular Disease	5.6%	17%	0.11
Diabetes	44%	47%	0.85
Prior MI	22%	46%	0.01
Cardiac Arrhythmia	36%	63%	0.01
Implantation Designation			
Bridge to Transplant	61%	61%	
Bridge to Recovery	3%	7%	
Destination	36%	31%	
Hemodynamics (mmHg)			
Right atrial pressure	18.3 \pm 8.8	13.3 \pm 5.7	0.004
PCWP	32.4 \pm 9.0	27.8 \pm 8.0	0.01
Mean PAP	44.7 \pm 7.9	38.7 \pm 9.6	0.001

BMI, body mass index; LVAD, left ventricular assist device; PCWP, pulmonary capillary wedge pressure; PAP, Pulmonary artery pressure

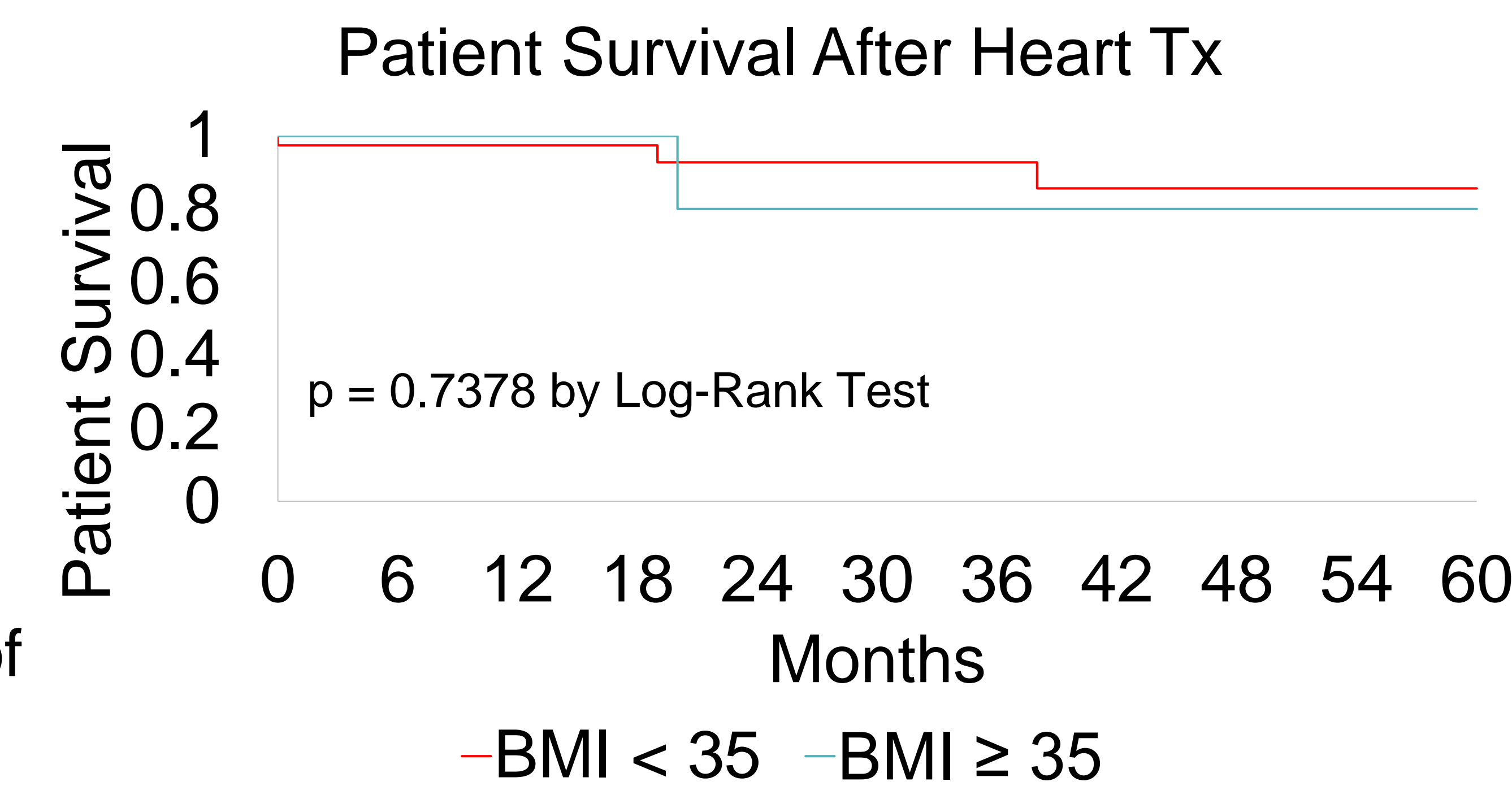
Table III. Heart Transplantation

	BMI ≥ 35 kg/m ² n=7	BMI < 35 kg/m ² n=41	P-value
Heart Transplant received in	19%	33%	0.15
Bleeding requiring reoperation	57%	15%	0.03
Length of Hospital Stay (days)	45 \pm 43	27 \pm 21	0.42
HTx survival at 2.3 \pm 1.6 yrs follow up	86%	93%	0.49

Table II. Post-operative Outcomes and Device Related Complications

	BMI ≥ 35 kg/m ² n=36	BMI < 35 kg/m ² n=121	P-value
Bleeding requiring reoperation	42%	22%	0.03
Operative mortality	19.5%	11%	0.25
Device Related Complications	65%	62%	0.84
Driveline Infection Frequency	2.4 \pm 1.7	1.2 \pm 0.5	0.02
Driveline Infection	24%	26%	1
Device Thrombosis	26.5%	12%	0.056
Hemolysis	26%	11%	0.05
Stroke	24%	12%	0.10
GI Bleed	20%	26.5%	0.51
Wait time to transplant (days)	619 \pm 372	404 \pm 342	0.10

Results



Discussion

Morbidly obese patients requiring LVAD support encounter higher postoperative complications and wait longer for heart transplantation, however heart transplant and graft survival is comparable.

Our study suggests that carefully selected morbidly obese patients should undergo LVAD placement and heart transplantation. However, our study was limited by a very small sample size and by the biases inherent to a retrospective data analysis.

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