

EXPLANTATION OF LEFT VENTRICULAR ASSIST DEVICE AS  
BRIDGE THERAPY IS ASSOCIATED WITH DIAPHRAGM  
DYSFUNCTION AFTER HEART TRANSPLANTATION



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OBJECTIVE

Diaphragm dysfunction due to phrenic nerve injury following cardiac surgery has been attributed to surgical trauma or topical hypothermia. The close proximity of the left phrenic nerve to the adjacent left ventricle makes it particularly vulnerable to insult following left ventricular assist device (LVAD) explantation during heart transplantation (HT). We aimed to evaluate the incidence of diaphragm dysfunction in patients after HT and correlate to LVAD support.

METHODS

A review of the HT patients at our Center in 2000–2019 identified those with postoperative diaphragm dysfunction, diagnosed by chest X-ray or ultrasound during the two months following HT. Patients with diaphragm dysfunction pre-HT were excluded from the analysis.

RESULTS

Of the 204 HT patients, 54 were bridged with LVAD and 150 were not (NoLVAD). In the LVAD group, there was a higher history of smoking (56 vs 35%,  $p=0.013$ ), more men (89 vs 75%,  $p=0.047$ ), and more re-do operations (mean/patient 1.1 vs 0.24,  $p<0.001$ ). Donor characteristics were similar. Diaphragm dysfunction was diagnosed in a significantly higher number of LVAD patients [21(49%) LVAD vs 2 (1.5%) NoLVAD;  $p<0.001$ ]. Most of the patients had isolated left (19, 82.6%) vs isolated right (2, 8.7%) or bilateral (2, 8.7%) diaphragm dysfunction. Multivariate analysis, adjusted for potential confounders, showed LVAD support to be independently associated with a significant ~50-fold increased risk for diaphragm dysfunction (OR 46.62, 95%CI 11.93–313.2,  $p<0.001$ ). No differences in early and late clinical outcomes were found between the diaphragm dysfunction and no diaphragm dysfunction groups (Table).

	Diaphragm dysfunction n=23	No diaphragm dysfunction n=181	p-Value
Patients			
Recipient age (years)(mean(SD))	53 (12)	51 (13)	0.440
Recipient gender (female)(%)	2 (9)	40 (23)	0.185
Left ventricular assist device (LVAD) (%)	21 (91)	33 (18)	<0.001
Outcomes			
30-day mortality (%)	0 (0)	20 (11)	0.191
Cardiac allograft vasculopathy (%)	5 (29)	42 (28)	1.0
Primary graft dysfunction (PGD) (%)	12 (52)	61 (34)	0.131
Left ventricle PGD severity (%):			0.523
Mild	7 (78)	28 (61)	
Moderate	2 (22)	14 (30)	
Severe	0 (0)	4 (9)	
Right ventricle PGD (%)	3 (25)	15 (25)	1.000
Prolonged Inotropic support (%)	10 (48)	60 (34)	0.335
Hospital stay (days)	30 (28)	24 (29)	0.376

CONCLUSIONS

Phrenic nerve injury is a relatively common complication in HT recipients bridged with LVAD. However, the resulting diaphragm dysfunction is not associated with untoward early and late outcomes.

No Disclosures