

# CARDIAC RECOVERY IN PATIENTS WITH ADRIAMYCIN-INDUCED CARDIOMYOPATHY AFTER LEFT VENTRICULAR ASSIST DEVICE SUPPORT

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Results

Introduction

Mechanical unloading with left ventricular assist device (LVAD) can facilitate recovery of the failing ventricle

INTERMACS data suggests that patients with adriamycin-induced cardiomyopathy have higher rates of cardiac recovery than other etiologies of heart failure (21.7% vs 9.8%).<sup>1</sup>

The clinical and biologic mechanisms of this difference have not yet been examined.

## Objectives

To examine the clinical characteristics of patients with adriamycin-induced cardiomyopathy who had cardiac recovery (CR), and compare them to those without recovery

- **Materials and Methods**
- Retrospectively reviewed the charts and identified patients at our center who received LVAD therapy with an indication of adriamycin-induced cardiomyopathy
- Among these patients, we identified those with complete or partial CR, which was defined as LVAD explantation or measured LVEF >40% while on LVAD support
- Clinical, hemodynamic and echocardiographic parameters were comparatively analyzed • among patients with and without CR
- Comparisons were performed using Fisher's exact test and Wilcoxon signed rank test, and are represented as median (interguartile range)

Twenty patients underwent LVAD therapy for adriamycin-induced cardiomyopathy, with 6 patients (30%) showing evidence of CR

- · The median time to CR after LVAD implantation was 37.5 days (IQR 17-178 days).
- There was no significant difference in age, body surface area, co-morbidities, pre-LVAD hemodynamics, or duration of heart failure prior to LVAD insertion among patients with and without CR.
- Patients with CR had smaller baseline LVEDD (5.2 vs. 6.4 cm, p=0.001) and were more likely to be female (100% vs. 64.3%, p=0.01) and to have a diagnosis of breast cancer (66.7% vs. 14.3%, p=0.04) than patients without CR.
- · Patients with CR had chemotherapy more recently, though this difference did not reach statistical significance (3.5 vs. 14.8 years, p=0.17).
- Among the entire cohort, 5 patients, all of whom had lymphoma, received more than 1 course of adriamyin-containing chemotherapy, usually for recurrence or for treatment of a new primary
- Among patients with CR, 1 patient had LVAD explanted, and 2 patients underwent cardiac transplantation. One patient with CR died, and two remain on LVAD therapy.

#### **Types of Cancer**

Breast



#### **Changes in Echo Parameters**

A. Patients with Cardiac Recovery

	Pre-VAD	2 months	6 months	1 year		
EF (%)	15 (14-16)	40.0 (33-53)***	45.0 (39-59)***	40 (38-55)***		
LVEDD (cm)	5.2 (4.6-5.7)	3.9 (3.4-4.1)***	3.8 (3.1-3.9)**	3.9 (3.6-4.2)**		
LVES (cm)	4.8 (4.6-5.6)	2.7 (2.6-3.2)***	3.1 (1.6-3.3)***	2.7 ((1.0-3.1)**		
IVS (cm)	0.9 (0.7-1.1)	0.9 (0.8-1.1)	0.8 (0.7-0.8)	0.8 (0.6-0.9)		
Patients without Cardiac Recovery ***p<0.001, **p<0.01, *p<0.0						

B. Pat	ients witho	ut Cardiac Re	***p<0.001, **p<0.01,		
		Pre-LVAD	2 months	6 months	1 year
	EF (%)	16 (10-20)	20 (15-25)	15 (10-30)	18.8
	LVEDD (cm)	6.4 (6.0-6.9)	5.1 (4.2-5.8)***	5.5 (4.5-6.0)**	5.6*
	LVES (cm)	5.9 (5.2-6.8)	4.6 (3.7-5.6)*	5.1 (4.4-5.3)*	4.50*
	IVS (cm)	0.8 (0.6-0.8)	0.9 (0.8-1.1)	0.8 (0.8-0.8)	0.90

· Patients with adriamycin-induced cardiomyopathy demonstrate higher rates of CR on LVAD support, typically early after device implantation.

Breast cancer survivors and those with small LVEDD are more likely to recover as compared to other etiologies

	All (n=20)	Cardiac Recovery (n=6)	No Recovery (n=14)	p-value				
Demographics								
Age	56.2 (49.9-66.9)	48.3 (34.4-63.8)	61.1 (52.7-67.2)	0.09				
Gender (F)	ender (F) 11 (55.0%)		9 (64.3%)	0.01				
Ethnicity (C)	12 (60.0%)	1 (16.6%)	11 (78.6%)	0.01				
BSA	1.78 (1.56-2.07)	1.64 (1.52-1.84)	1.87 (1.62-2.10)	0.21				
Time with CHF (yr)	3.2 (0.5-7.7)	1.3 (0.4-7.2)	3.4 (0.8-7.6)	0.28				
Time to LVAD (yr)	11.8 (5.5-19.9)	3.5 (1.3-15.5)	14.8 (9.5-20.5)	0.17				
LVAD Strategy								
BTT	8 (40.0%)	2 (33.3%)	6 (42.9%)	0.52				
DT	12 (60.0%)	4 (66.6%)	8 (57.1%)	0.52				
Baseline Echo Parameters								
EF (%)	15.0 (10.0-20.0)	15.0 (13.8-16.3)	16.0 (10.0-20.0)	0.73				
LVEDD (cm)	6.2 (5.3-6.5)	5.2 (4.6-5.7)	6.35 (5.95-6.9)	0.001				
LVES (cm)	5.5 (4.9-6.1)	4.8 (4.6-5.6)	5.9 (5.2-6.8)	0.05				
IVS (cm)	(S (cm) 0.8 (0.6-1.0)		0.8 (0.6-0.8)	0.35				
Comorbidities								
HTN	2 (10.0%)	1 (16.7%)	1 (7.1%)	0.52				
DM	3 (15.0%	1 (16.7%)	2 (14.3%)	0.68				
COPD	5 (25.0%)	1 (16.7%)	4 (28.6%)	0.51				
CVA	3 (15.0%)	1 (16.7%)	2 (14.3%)	0.68				
AF	7 (35.0%)	3 (50.0%)	4 (28.6%)	0.31				
VT	4 (20.0%)	1 (16.7%)	3 (21.4%)	0.68				
Baseline Laboratory Values								
WBC	9.8 (5.5-11.6)	11.7 (4.9-13.1)	9.1 (6.1-10.6)	0.38				
Hemoglobin	11.7 (10.2-12.8)	11.7 (10.2-12.5)	12.0 (10.2-12.9)	0.69				
Sodium	132.5 (128.5-136.0)	135 (126.5-136.3)	131.0 (129.5-137.0)	0.96				
Creatinine	1.48 (0.83-1.94)	0.95 (0.62-1.85)	1.56 (0.96-1.99)	0.29				
Total Bilirubin	1.2 (1.0-2.2)	1.05 (0.75-1.50)	1.3 (0.9-2.2)	0.33				
AST	26.5 (23.8-59.5)	25.5 (22.3-102.0)	27.0 (24.0-63.0)	0.54				

### **Changes in Ejection Fraction**



### Conclusions

Molecular studies will help to establish underlying mechanisms by which LVAD support leads to reverse remodeling in patients with adriamycin-induced cardiomyopathy

