

Chronic Kidney Disease and Left Ventricular Assist Device Patients: A Retrospective Review

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Background

- Left ventricular assist device (LVAD) implantation remains a valuable long-term option for patients with end-stage heart failure, often these patients present with concomitant renal dysfunction.
- Patients with renal dysfunction prior to VAD implantation are considered to be at increased risk for bleeding, right ventricular dysfunction, and mortality, after implantation.
- Due to the increased risk, it is suggested that patients with end-stage renal disease (ESRD) should be excluded from LVAD implantation, unless they are being considered for heart and kidney transplantation.
- No current guidelines are provided for chronic kidney disease (CKD) 3-5 patients who are implanted with an LVAD.

Objective

- Our study sought to evaluate the outcomes in patients with advanced CKD undergoing LVAD implantation.

Methods

- We retrospectively investigated all patients with CKD 3-5 who received a durable LVAD at our institution from January 2015 until December 2017.
- Patients who underwent investigational device implantation, were lost to follow up, or underwent a second VAD implantation, were excluded.
- CKD was defined by eGFR <15 – 60, utilizing the eGFR noted on the day of LVAD implantation.

CKD Stage	Pre-implant GFR	Post-implant GFR at 1 year
Median	44	51
3	45.4	52.7
4	25.6	36.1

Table 1: Changes in GFR over time

Renal Replacement	Pre-implant	Post-implant
HD	4.4%	11.9%
CRRT	5.9%	16.3%

Table 2: Rates in therapies Pre and Post Implantation

Demographics	Variables
Age (years)	63
Gender	Male- 93 Female- 42
Etiology of Heart Failure	Non-Ischemic- 69 Ischemic- 65 Mixed- 1
Type of LVAD	HMII- 74 HVAD- 38 HMIII- 17 BiVAD- 5 Jarvik- 1
Comorbidities	Hypertension- 76.3% Diabetes- 62.3% IABP- 38.5% ECMO- 11.1%
CKD Stage	3- 120 4- 15 5- 0
Adverse Events Post Implantation	Bleeding- 62.2% Bacteremia- 29.9% Hemolysis- 22.2% Stroke- 20% RV failure/Inotrope- 11.9%

Table 3: Baseline demographics of the subjects

Results

- 135 patients were identified to have CKD stage 3-5.
- 10.3% of patients required renal replacement therapy (RRT) due to worsening renal dysfunction.
- 74% of this population was implanted as DT, and 11.9% underwent heart transplantation.
- The 1 year survival rate was 80.7%, with an overall survival rate, to date, of 63.7%.
- After implantation, 7% were discharged home on hemodialysis.

Conclusion

- Findings suggest that those patients with eGFR <15-60 can successfully undergo LVAD implantation, especially those listed for heart and/or heart and kidney transplantation.
- Both one year and overall survival rates suggest that these patients should still be considered for LVAD implantation.
- More studies are needed to understand ways to decrease adverse event rates in this complex patient population.