

ORIGINAL ARTICLE

Evolution of renal function after partial and full mechanical support for chronic heart failure

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Purpose: Recently a minimal invasive, partial support continuous flow left ventricular assist device (LVAD) became available for treatment of chronic heart failure. The aim of this study was to analyze whether partial support is capable of improving kidney function in end-stage heart failure.

Methods: We performed a single-center retrospective analysis of patients who received a full ($n = 43$) or partial support LVAD ($n = 18$) between 2007 and 2013. Patients on dialysis or in INTERMACS class I were excluded. Renal function was assessed until 3 months after the implantation. A calculated GFR less than 60 ml/min was considered to be renal failure.

Results: Creatinine level after LVAD implant decreased 23% in patients on full support (1.3 ± 0.4 mg/dl vs. 1.0 ± 0.3 mg/dl; $p < 0.001$) and 24% in patients on partial support (1.6 ± 0.6 mg/dl vs. 1.2 ± 0.4 mg/dl; $p = 0.17$) within 3 months. In each group patients with a preoperative GFR less than 60 ml/min were selected. In this subgroup there was a 35% decrease in creatinine levels for patients on full support (1.7 ± 0.4 mg/dl vs. 1.1 ± 0.5 mg/dl; $p < 0.01$) and a 32% decrease in patients on partial support (2 ± 0.4 mg/dl vs. 1.4 ± 0.3 mg/dl; $p < 0.05$) at 3 months.

Conclusions: We observed a significant improvement in renal function in patients supported by full or partial support devices, even if the preoperative renal function was severely impaired. The use of diuretics decreased in both groups. In chronic heart failure patients with impaired renal function, partial support is sufficient to improve renal function significantly.

Keywords: LVAD, Partial support, Renal function

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INTRODUCTION

Heart failure is a major public health problem affecting millions of people worldwide (1). Over the last few decades there has been an increase in the prevalence of heart failure (2-4). Heart failure is associated with an increased mortality, with 5-year survival rates of 41% to 60% (5, 6). Patients with end-stage heart failure have multiple comorbidities including end-organ failure and cardiac cachexia (7-9). Impairment in renal function in particular is shown to be an

independent risk factor for mortality and re-hospitalization in heart failure patients and deterioration of renal function is often the driver to augment medical therapy (10).

Over the last decade left ventricular assist devices (LVADs) have been increasingly used in end-stage heart failure (11). Both pulsatile and non-pulsatile LVADs have been shown to increase survival in patients with end-stage heart failure (12, 13). Despite early concerns regarding non-pulsatile flow, non-pulsatile LVADs have shown to improve end-organ function in patients with advanced