

Renal Function Improves following Implantation of Continuous Flow Left Ventricular Assist Device

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Renal dysfunction (RD) is frequent in end stage heart failure. It's often unclear whether RD is due to primary renal disease or poor perfusion. Implantation of a left ventricular assist device (LVAD) with restoration of cardiac output may differentiate between the two conditions.

In a retrospective single center analysis of 83 consecutive patients implanted with a HeartMate2 LVAD calculated glomerular filtration rate (GFR, ml/min/1.73m²) was assessed on admission and 1, 3 and 6 months after LVAD. To define predictors for improvement in renal function we examined clinical variables in patients with decreased renal function (GFR<60) before LVAD surviving at one month (n=50).

GFR significantly increased from admission (mean±SD, 53.2±21.4) to one month after LVAD implantation (86.3±34.4 p<0.0001 n=78). Subsequently, at 3 and 6 months GFR remained significantly above pre-LVAD values. Of the 50 patients with GFR<60 before LVAD, 72% improved to GFR>60 at 1 month. Univariate predictors for improvement in renal function at 1 month included an improvement in GFR with optimal medical therapy (OMT) between admission and LVAD implant day (p=0.035), use of an intra-aortic balloon pump (IABP) prior to implant (p=0.005), kidney length by ultrasound above 10cm (p=0.033) and atrial fibrillation (AF) before implant (p=0.019). Treatment with ACEI/ARB before implant was a negative predictor (p=0.032). Multivariate analysis indicated AF as positive and ACEI/ARB treatment as negative independent predictors.

GFR significantly improved following LVAD implantation. In LVAD recipients with baseline RD the ability to improve GFR with OMT or IABP, absence of chronic renal disease manifested by decreased renal size, AF and no treatment with ACEI/ARB prior to surgery were significant predictors of good outcome. These findings suggest that in most patients with end-stage heart failure being considered for LVAD therapy, renal dysfunction is reversible and likely related to poor renal perfusion.