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Incidence and prognosis of late-onset right ventricular failure following continuous-flow left ventricular assist device implantation as bridge to transplantation

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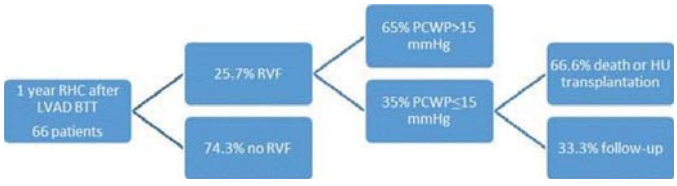
Early right ventricular failure (RVF) remains a frequent complication and is one of the main factors associated to early mortality following left ventricular assist device (LVAD) implantation. However, late-onset RVF (LoRVF) has emerged as an increasing concern, but little is known about its incidenceand underlying mechanisms.

Methods and results: We retrospectively analysed the 1-year hemodynamic and clinical data from all patients that, between 2016 and 2018, underwent a right heart catheterization (RHC) after continuous-flow LVAD implantation as bridge to transplantation. Sixty-six patients (84% males, 53±11 years, 60% implanted in Intermacs 1–2, 52% HeartWare LVAD, 48% HM3 LVAD), out of 187 LVAD implants, were studied. LoRVF was defined as central venous pressure>18 mmHg with cardiac index<2.3 L/min/m^2 during RHC.

LoRVF was present in 17 patients (25.7%) and 12 (71%) of them manifested concomitant clinical signs of RVF. Eleven of the patients who presented LoRVF (65% of the LoRVF) had a pulmonary capillary wedge pressure (PCWP)>15 mmHg. Isolated LoRVF (LoRVF criteria + PCWP≤15 mmhg) was found in 6 patients (35% of the LoRVF) and accounted for 9% of the studied population. Fifty percent of patients who presented isolated LoRVF could be successfully transplanted in high urgent status due to severe chronic RVF and 1 patient died to refractory RVF. We did not find an association between isolated LoRVF and age, renal function, type of LVAD, persistent increased pulmonary vascular resistances or the previous need of temporary right ventricular support due to early acute RVF following LVAD. There was however a significant association between the presence of atrial fibrillation and isolated LoRVF ($p<0.05$).

Conclusion: Late-onset RVF is a frequent complication during LVAD support as bridge to transplantation. Most of the cases are associated to a lesser degree of left ventricular unloading. The presence of isolated late-onset RVF with normal PCWP has an impact on the long-term prognosis and the need of urgent heart transplantation and is not related to early RVF following LVAD implantation or persistent increased pulmonary vascular resistance.



Incidence and prognosis of LoRVF