

D C Charisopoulou, S R H Rahman Haley, N B Banner *Royal Brompton and Harefield Foundation NHS Trust*

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Introduction Right ventricular (RV) failure in left ventricular assist device (LVAD) recipients, is associated with unfavourable outcomes. Right heart haemodynamic parameters, including RV stroke work index (RVSWI), remain the gold standard in the RV function assessment. Tricuspid annular plane systolic excursion (TAPSE) is an echocardiographic parameter, which is commonly used in the follow-up of these patients. The aim of this study is to investigate the utility of TAPSE in the prediction of RV failure (RVF) in patients undergoing LVAD implantation.

Methods Retrospective study of 68 patients with left heart failure (48 ± 11 years, 58 males, ejection fraction: 22.1 ± 1.2 , ischaemic aetiology: 32%), who underwent LVAD implantation at Harefield Hospital (January 2010 and September 2012). Patients who initially required biventricular mechanical support were not included in the study. TAPSE measurements were obtained preoperatively, in the immediate postoperative period (<72 h) and at 3-, 6- and 12-month follow-ups. RVSWI was measured during the baseline heart catheterisation and at the 3–6 month and 12 to 18 month follow-ups.

Results Eighteen LVAD-recipients (26.4%) developed RVF post-operatively and presented significantly lower survival rates ($p < 0.001$), with 11 (16.1%) requiring RV mechanical support. The survival rate at 3, 6 and 12 months post LVAD implantation was 89.7%, 77.7% and 67.8% respectively. Patients were classified in two groups according to postoperative RVF development. There were no differences between the two groups in the baseline clinical or demographic characteristics and in preoperative TAPSE, left ventricular ejection fraction (LVEF) or haemodynamic parameters ($p = 0 > 0.2$). The correlation between pre-operative TAPSE and RVSWI was weak ($r = 0.31$). RVSWI at 12 months presented improvement compared to baseline measurements (6.89 ± 3.5 vs 6.25 ± 3.6), despite the slight deterioration noted at 6 months (5.16 ± 2.97). However, these postoperative RVSWI changes were not statistically significant ($p > 0.15$). TAPSE was significantly higher pre-LVAD implantation (13.1 ± 4.1) compared to the immediate postoperative values (8.8 ± 2.8 , $p < 0.0001$) and to the 3-, 6- and 12-month follow-up measurements (9.7 ± 4.5 , 10 ± 3.3 , 9.9 ± 3.4 , $p < 0.0001$). There were not significant differences ($p > 0.27$) between the pre- and post-operative LVEF (Simpson's biplane) and

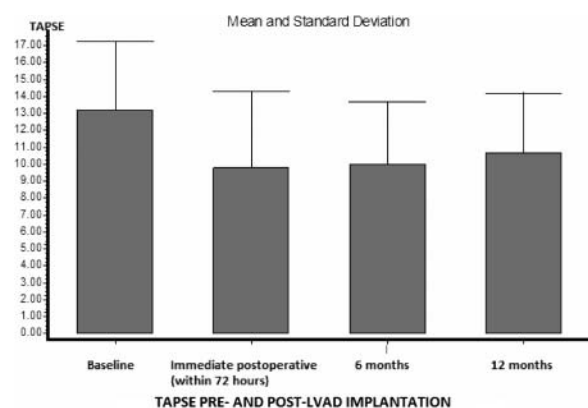


Figure 1

cardiac index (thermodilution). Although at the 3-, 6- and 12-month follow-ups, TAPSE was significantly higher to the immediate postoperatively values ($p < 0.0002$), it remained significantly lower ($p = 0.0002$) than the pre-LVAD measurements (image 1). The degree of TAPSE decline was not predictive of the postoperative RVF development (OR 1.082, 95% CI 0.92 to 1.26, $p = 0.32$) or the survival rate (OR 0.85, 95% CI 0.7 to 1.02, $p = 0.09$).

Conclusions TAPSE presents significant decrease in the immediate post-LVAD implantation period. Despite a gradual improvement within a year and the parallel RVSWI recovery, it remains significantly lower than its baseline values in all LVAD recipients, even in those without clinical RVE. The degree of postoperative TAPSE decline did not appear to correlate with RVF risk, RV recovery or survival rate.