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LIVE procedure for ischemic heart failure: the evolution of an unique technique

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Background
Ischemic cardiomyopathy is the leading cause of heart failure. In patients with left ventricular (LV) dilatation, low ejection fraction, and transmural scar in an anteroseptal distribution, surgical ventricular reconstruction (SVR) is a treatment option. However, SVR is an invasive procedure which often cannot be offered to patients with ischemic cardiomyopathy due to other comorbidities. Less Invasive Ventricular Enhancement (LIVE) technique is a unique intervention to exclude scarred myocardium, improving symptoms and quality of life.

Methods
LIVE procedure has evolved from open sternotomy to a hybrid procedure done with right internal jugular vein access and a left minithoracotomy. LV shape and size is restored without extracorporeal circulation by plication of the scarred myocardium. This is achieved by implantation of a series of internal and external microanchors brought together over a poly-ether-ether-ketone (PEEK) tether to make a longitudinal approximation between the LV free wall and the anterior septum. Internal anchors are deployed by a transcatheter technique, through the right internal jugular vein, on the right side of the ventricular septum.

Results
Between July 2018 and January 2020, 47 patients (84.4% men; mean age 61 ± 12.5 years) were submitted to the LIVE procedure in 16 Institutions in Europe, North America and Asia. Procedural success was 100%. There was no intra-hospital mortality. A mean of 2.3 anchor pairs (median 2) were used to reshape the LV. Echocardiographic data showed an increase in LV ejection fraction (EF) from 31.4 ± 9.2% to 40.0 ± 12.4% (change +29.8%, p < 0.001) and LV end-systolic volume index (LVESVI) reduction from 66.6 ± 29.3 ml/m² to 40.7 ± 21.5 ml/m² (change -38%, p < 0.001) and LV end-diastolic volume index (LVEDVI) reduction from 92.8 ± 39.2 ml/m² to 60.6 ± 25.9 ml/m² (change -33.2%, p = 0.001) after the procedure. There was no case of ventricular septal defect, right ventricular perforation or sternotomy conversion. New onset tricuspid valve regurgitation was observed in one patient. In the mean follow-up period of 9.8 months, NYHA class improved a median of 1 grade and there was no late mortality.

Conclusion
Hybrid LV reshaping and volume reduction has proven to be a useful option for patients with symptomatic heart failure after left anterior descending territory myocardial infarction. These results from the latest iteration of the technique show that this approach is safe and has a significant short and mid-term impact on improving EF and reduction in LV.
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