Global longitudinal strain and myocardial mechanics improve after septal myectomy associated with mitral valve repair in patients with obstructive hypertrophic cardiomyopathy

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BACKGROUND
Surgical septal myectomy relieves the left ventricular (LV) outflow gradient and symptoms, and prolongs survival in patients with obstructive HCM and important functional limitation. In recent years, septal myectomy has been associated with mitral valve (MV) repair at several HCM European and North American referral centers. However, the impact of this novel surgical approach on LV function, assessed in terms of global longitudinal strain, has not been investigated. This issue is of particular interest, as systolic function can be impaired in obstructive HCM, despite a supra-normal ejection fraction, and longitudinal strain has proved capable of identifying subclinical systolic dysfunction in this disease.

PURPOSE
To assess global longitudinal strain and myocardial mechanics following septal myectomy and MV repair in obstructive HCM.

METHODS
A total of 51 consecutive patients with obstructive HCM, who had 2D-echocardiograms of sufficient quality to acquire speckle-tracking images and preoperative and postoperative cardiac magnetic resonance (CMR) recordings, were included in the study. Mean age was 54±14 years. Each of the 51 study patients underwent septal myectomy and MV repair at our center over a period of 16 months. Post-operative transthoracic (TTE) echocardiograms and CMR images were obtained 3 to 7 months after surgery, mean 5 months. Pre and post-operative strain indexes were retrospectively measured from the echocardiographic apical 2-chamber, 4-chamber and long-axis views using speckle-tracking software. In addition, indexed LV end-diastolic volumes (LVEDV) and end-systolic volumes (LVESV) were assessed from CMR, and indexed left atrial volume was assessed from TTE.

RESULTS
After surgery, LV ejection fraction remained unchanged, compared to preoperative values (from 67±7% to 66±6%; P=0.06), despite a marked decrease in the LV outflow gradient (from 63±38 to 9±7 mmHg; P<0.001). However, global longitudinal strain increased significantly after surgery (from -17±3.9% to -20±3.2%; P<0.001), indicating improved myocardial mechanics. Furthermore, indexed left atrial volume decreased and CMR LVEDV increased after surgery (from 48±19 to 38±13 ml/m²; P=0.006, and from 45±13 to 62±13 ml/m²; P<0.001, respectively), in the direction of a progressive normalization.

CONCLUSIONS
After septal myectomy with MV repair, global longitudinal strain increased significantly in our consecutive study cohort with obstructive HCM, indicating improved myocardial mechanics. In addition, TTE left atrial volume decreased and CMR LVEDV increased significantly after surgery, further supporting our finding of a marked
postoperative improvement in cardiac performance.