

Global Longitudinal Strain as a Determinant of Left Atrial Reservoir Strain in Primary Mitral Regurgitation

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BACKGROUND

Recently, Global Longitudinal Strain (GLS) evaluation by Speckle Tracking Echocardiography (STE) has emerged as a non-invasive, highly reproducible echocardiographic prognostic index in patients affected by degenerative mitral regurgitation (DMR). Notably, recent studies have identified GLS as one of the strongest determinants of LA reservoir and pump strain. However, how GLS may correlate with Left Atrial (LA) functioning and contractile reserve in this cohort of subjects is currently undefined.

PURPOSE

To investigate the determinants of LA reservoir and contractile function in a cohort of patients affected by DMR undergoing mitral valve surgery.

METHODS

359 consecutive patients affected by DMR who underwent mitral surgery (repair or replacement) were retrospectively enrolled. In the pre-operative phase, all patients underwent a complete transthoracic and transesophageal echocardiography. Patients were then stratified into two groups according to GLS values (group I: GLS > 18%; group II: GLS ≤18%). LA dynamics assessment was based on the evaluation of LA strain, particularly through Global-Peak Atrial Longitudinal Strain (GPALS) while left ventricular longitudinal systolic function was evaluated with GLS. Strain analysis by STE was performed offline. All patients were in sinus rhythm.

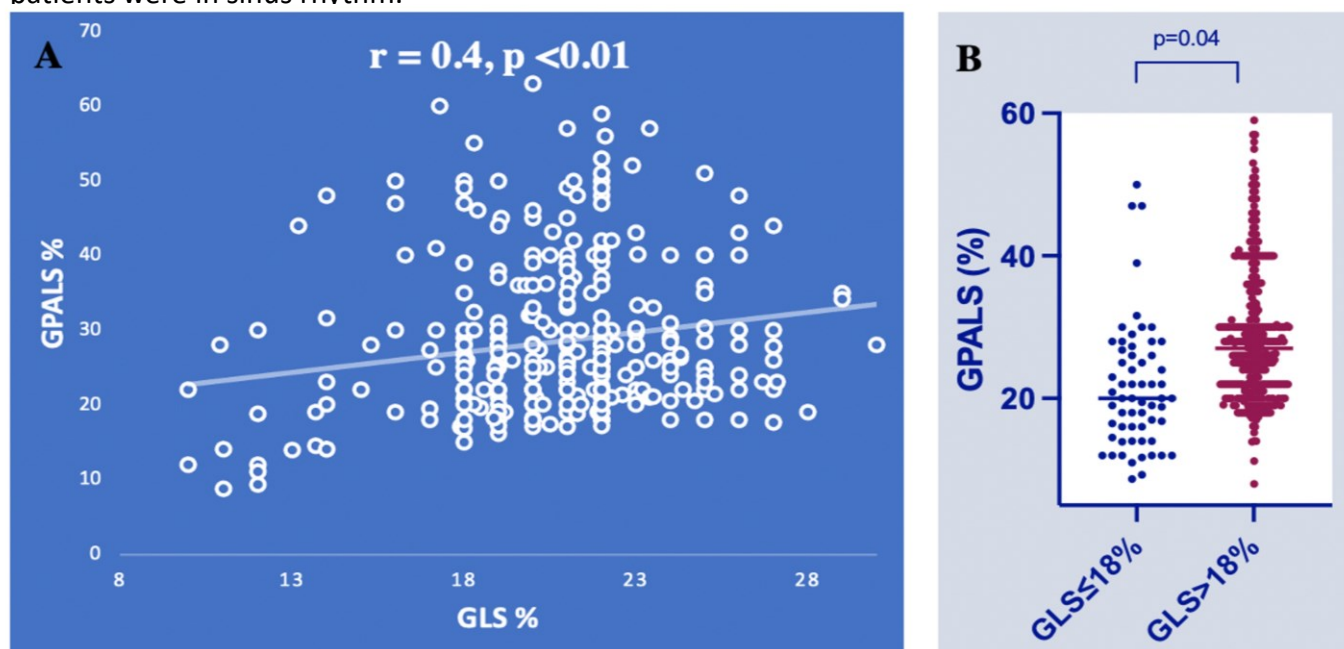


Figure 1. Panel A Correlation between GLS and GPALS in the cohort in study;
Panel B Box and whiskers plot showing the difference in terms of LA strain according to GLS

RESULTS

359 patients (mean age 52 ± 14 y, 65% male) with hemodynamically significant DMR who were admitted for mitral valve surgery at San Raffaele hospital (85% repair, 15% replacement) were retrospectively enrolled from January 2019 to June 2022. Mean hospital stay was 11.5 ± 8 days. At baseline, of the cohort exhibited increased LV and LA dimension. However, a preserved LA reservoir function (mean GPALS 27.6 ± 11) and LV longitudinal systolic function (mean GLS -20.8 ± 3) was found. Interestingly, GLS emerged as a strong determinant of LA reservoir strain with a significant direct correlation observed between GLS and GPALS values ($r = 0.4$ CI 95% 0.3-0.6; $p < 0.01$, **Figure 1, panel A**). Additionally, when stratified according to GLS values, patients with higher GLS values ($>18\%$) exhibited significantly higher values of LA reservoir strain (group I: GPALS $29 \pm 12\%$ vs group II GPALS $22 \pm 10\%$; $p = 0.04$) (**Figure 1, Panel B**).

CONCLUSIONS

In DMR, left atrial reservoir function is mostly determined by LV GLS and there is a strong association between echo-derived measures of LA mechanics and LV longitudinal systolic function, with higher values of LA strain correlating with a better GLS. In this subset of patients, a combined speckle-tracking analysis of LV and LA dynamics appears of relevance to ease risk-stratification, potentially improving the long-term outcome.