

## Global longitudinal strain in patients with severe aortic stenosis: a comparison between cardiac magnetic resonance imaging feature tracking and speckle tracking echocardiography

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**Background:** Global longitudinal strain (GLS) by echocardiography is a sensitive method for measuring left ventricular (LV) function, and of better prognostic value in valvular heart disease than ejection fraction (EF). Cardiac magnetic resonance imaging (CMR) is the most accurate method for measuring LV volume and EF, but GLS has not been possible to measure by CMR until recently.

**Purpose:** This study compares GLS obtained by CMR and echocardiography in patients with severe aortic valve stenosis. Normal values for GLS by CMR are reported as well.

**Methods:** GLS was measured in 32 patients with severe aortic valve stenosis with speckle tracking echocardiography, using GE Vivid E95 (n = 15) and Philips EPIQ (n = 17) ultrasound machines, as well as with CMR (Avanto 1.5T FIT, Siemens Medical Solutions). For normal values, GLS was measured by CMR in 9 healthy controls. Endo- and epicardial borders of two, three and four chamber cine images were traced for CMR GLS using dedicated software (Qstrain 2.0, Medis, NL). Both CMR and Vivid E95 measured midmyocardial strain, whereas the EPIQ AutoStrain method measures endomyocardial strain. Absolute values of GLS are reported. Pearson correlation coefficient was calculated and paired Student's t-test was used for comparisons.

**Results:** A significant correlation ( $r = 0.45$ ,  $p = 0.01$ ) was found between echocardiographic and CMR GLS (Figure). GLS by Vivid E95 had a very good correlation with CMR GLS ( $r = 0.84$ ,  $p = 0.0001$ ), whereas GLS by Philips EPIQ did not correlate significantly ( $r = 0.14$ ,  $p = 0.01$ ). In patients with aortic stenosis and healthy controls, the average GLS by CMR was  $18.3 \pm 3\%$  and  $20.9 \pm 2\%$  respectively. The average GLS by CMR was comparable to that obtained by GE Vivid E95 ( $17.3 \pm 4\%$  vs.  $17.2 \pm 3\%$ ,  $p = 0.92$ ), and higher than by Philips EPIQ ( $19.2 \pm 2\%$  vs.  $15.4 \pm 2\%$ ,  $p < 0.0001$ ).

**Conclusion:** This study shows that GLS by CMR is feasible and correlates with GLS obtained by echocardiography, especially when quantifying midmyocardial strain. Echocardiographic GLS values based on endomyocardial strain were lower.

### Patient characteristics

Age	75 ± 14 y
NYHA 1	1 (3 %)
NYHA 2	20 (67 %)
NYHA 3	8 (27 %)
NYHA 4	1 (3 %)
CMR EF	66 ± 8 %
AVA	0.7 ± 0.2 cm <sup>2</sup> ;

NYHA = NYHA class of symptoms, EF = ejection fraction by CMR, AVA = aortic valve area by echocardiography  
Abstract Figure. GLS by CMR vs. Echocardiography

