Individual patient meta-analysis of global longitudinal strain: is one normal range enough?

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Background – Despite over a decade of evidence, uptake of GLS into guidelines and practice has been slow. Age, BP, and software have been reported to influence GLS, and have led to uncertainty about defining the normal range (NR). As there have been software changes since the last meta-analysis, we sought to define NR in the current era.

Methods – Pubmed, Cochrane, and EMBASE were searched using the keywords ‘Left Ventricle’, ‘Normal global longitudinal strain’, and ‘Speckle tracking Echocardiography’ and relevant synonyms from 2011. Studies were included if they reported GLS based on speckle tracking techniques, included at least 20 healthy individuals, and had up to date contact details available. Healthy was defined as lack of known disease. Platforms used included General Electric, Philips, Canon and Tomtec. The authors of 8 of the 12 studies (67% response) provided individual patient data. Linear regression was used to determine predictors of GLS.

Results – There were 2396 pts, mean age 42 years (range 18-92), weight 66±12kg, height 169±9cm, BSA 1.7±0.2m2, and SBP 120±13 mmHg. Normal range for GLS was 21.0±2.6%. In multivariable analysis age (β=-0.02, p<0.01), weight (β=-0.03, p<0.01), SBP (β=-0.01, p<0.01) and platform were associated with GLS. GLS tends to vary with extremes of age and BP (see Figure 1 and Figure 2).

Conclusion. Extremes of age and BP may lead to low GLS, but generally, GLS is <16% is abnormal.
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