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Prognostic value of global longitudinal strain in heart failure subjects: A recent prototype



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Heart failure (HF) is one of the most debilitating, highly prevalent medical condition requiring frequent hospitalization impairing the quality of life and impart huge cost burden. The pathophysiology of HF is complex. Various research works are going on to find out the correlation between different factors behind the pathogenesis and prognosis of HF [1]. Global longitudinal strain (GLS) is a newly emerging topic which has a significant role in predicting cardiovascular outcomes, compared to Left ventricular ejection fraction (LVEF). LVEF is the most extensively used and investigated cardiac pumping function for many decades. However, recent reports have prompted that relationship between LVEF and mortality in heart failure patients with inappropriate or unsatisfactory results; where reduced GLS has been an extraordinary predicting measure to provide a good prognosis for many heart failure-related outcomes independent of LVEF [2].

A clinical study involving 4172 heart failure participants conducted by Park et al. exhibited that 84% of the patient having preserved EF had reduced GLS. The study demonstrated that after adjustment of various variables, in fact, independent of LVEF, for each 1% absolute increase in LV GLS there was 5% decrease in risk of mortality (hazard ratio [HR]: 0.95; 95% confidence interval [CI]: 0.93 to 0.96; $p < 0.001$). Moreover, under stratification according to LVEF, mortality increased with the severity of GLS reduction in all patients. In the HF_rEF, HF_{mr}EF

and HF_pEF subgroups the strain has been found to have an important prognostic value that is independent of LVEF. Nonetheless, this study included only patients with acute heart failure, so it is unknown whether their findings would translate to those with chronic heart failure [3]. Another meta-analysis was done by Morris et al. with 2284 patients having HF_pEF, and 2302 controls showed patients with HF_pEF had significantly lower GLS than healthy subjects [4]. Another data pool collected from 16 studies (15 prospective and one retrospective) showed 1 SD change in absolute GLS was associated with decreased all-cause mortality (HR 0.29, 95% CI 0.23 to 0.35). Mortality was detected to be independently associated with each SD change in the absolute value of the baseline GLS (HR 0.50, 95% CI: 0.36 to 0.69; $p < 0.002$). Mortality was less strongly associated with LVEF (HR 0.81, 95% CI: 0.72 to 0.92; $p = 0.572$). The HR per SD change in GLS was found to be associated with a reduction in mortality 1.62 (95% CI 1.13 to 2.33; $p = 0.009$) times greater than the HR per SD change in LVEF [2].

Russo et al. studied 708 participants from the general population with 58 total cardiovascular events with over 4.8 years follow-up and found GLS to be a stronger and independent predictor of this compound outcome [5].

Nevertheless, there is some limitation like GLS values may vary among different software packages. It and can also change due to inter-to-intra observational variations. Secondly, since GLS depends on the imaging quality, therefore, the results of this meta-analysis could not be projected for patients with poor imaging quality of the LV.

GLS adds incremental value to EF in the prediction of adverse outcomes. Comprehensive evaluation of GLS in HF patients provides additive prognostic information and can play a significant role in improving risk stratification in chronic systolic heart failure [3,4].

We can see that GLS has been found to have greater prognostic value than LVEF. Therefore, we can be hopeful that GLS will be considered as the standard measurement in all patients with HF. No doubt this new concept needs extensive validation in further clinical trials before being accepted in clinical practice.

Further research will also detect whether HF classification according to GLS can be used to guide therapy. We are hopeful that this new direction will lead us to a better understanding of the relationship between GLS and HF. Further insight on this topic will aid medical decision making based on myocardial dysfunction assessment.

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Conflict of interest

There is no conflict of interest.

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