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Global Longitudinal Strain Compared to Left Ventricular Ejection Fraction for Early Identification of Subclinical Cardiotoxicity in Cancer Patients: A Systematic Review

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INTRODUCTION & AIM

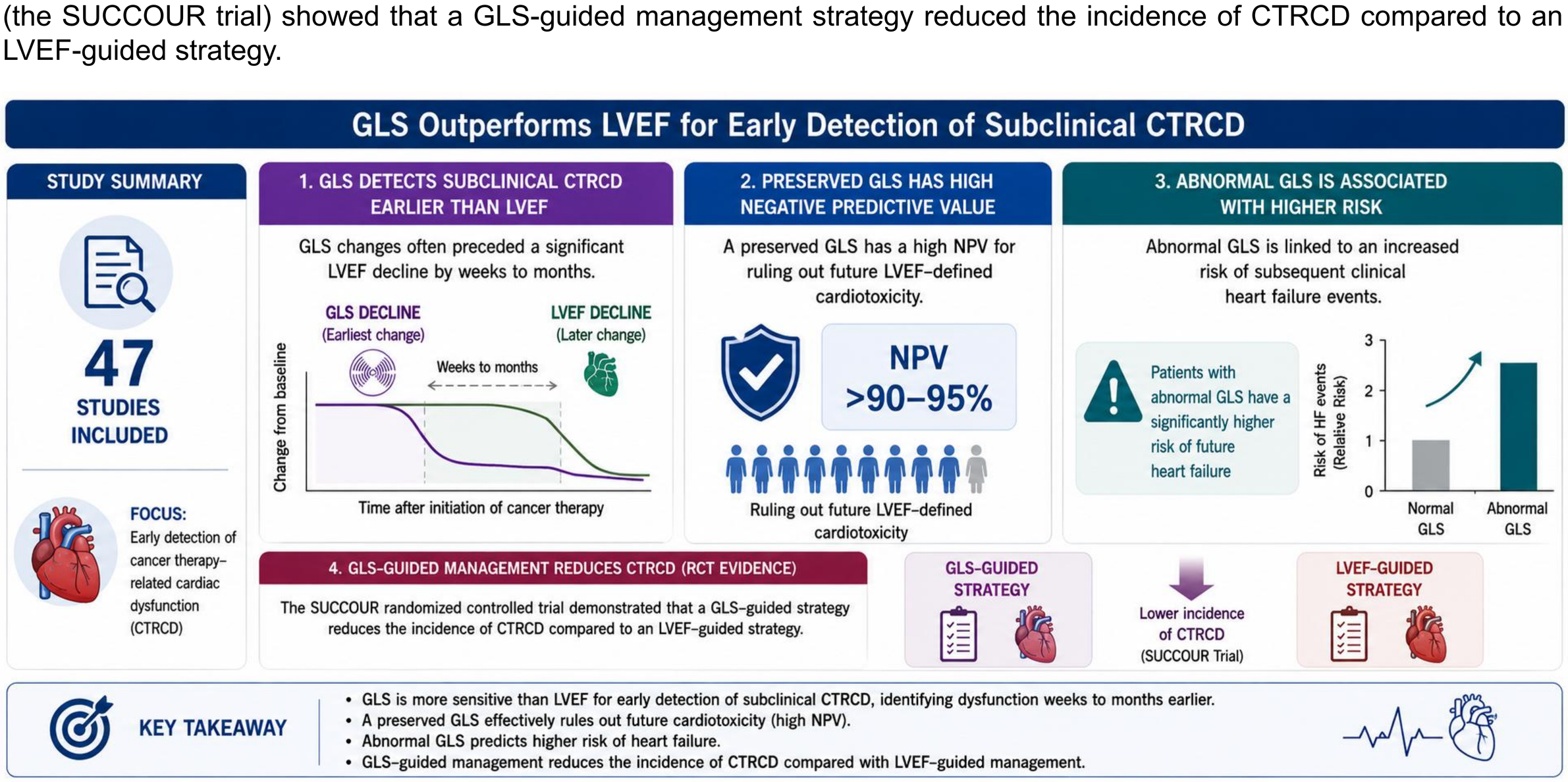
Cancer therapies, while life-saving, can cause cancer therapy-related cardiac dysfunction (CTRCD). Left ventricular ejection fraction (LVEF) has limitations in detecting subclinical myocardial injury. This systematic review synthesizes the current evidence on the diagnostic and prognostic utility of global longitudinal strain (GLS), derived from speckle-tracking echocardiography, compared to LVEF for the early identification of subclinical cardiotoxicity.

METHOD

We systematically searched PubMed and Science Direct from inception to January, 2026 for studies comparing GLS to LVEF for detecting CTRCD in cancer patients. Data on study characteristics, patient demographics, cancer and therapy types, diagnostic accuracy, and prognostic value were extracted. The risk of bias was assessed using the Cochrane Risk of Bias 2 (RoB 2) tool.

RESULTS & DISCUSSION

47 studies were included. The evidence consistently demonstrates the superior sensitivity of GLS over LVEF for the early detection of subclinical CTRCD. GLS changes often preceded a significant LVEF decline by weeks to months. A preserved GLS had a high negative predictive value (often >90-95%) for ruling out future LVEF-defined cardiotoxicity. Furthermore, abnormal GLS was associated with a higher risk of subsequent clinical heart failure events. One randomized controlled trial (the SUCCOUR trial) showed that a GLS-guided management strategy reduced the incidence of CTRCD compared to an LVEF-guided strategy.



CONCLUSIONS

GLS is a more sensitive and prognostically valuable tool than LVEF for the early identification of subclinical cardiotoxicity. Its integration into routine surveillance protocols for patients receiving cardiotoxic cancer therapy is strongly supported by the evidence. A GLS-guided approach for initiating cardioprotective therapy should be considered to improve cardiac outcomes in oncology patients.

FUTURE WORK

Future research should focus on standardizing GLS-based diagnostic thresholds, validating its prognostic utility in large prospective cohorts, and conducting randomized trials to determine whether GLS-guided surveillance and early intervention improve long-term cardiovascular outcomes in patients receiving cancer therapy.