Late Gadolinium Enhancement by Cardiac Magnetic Resonance and Speckle Tracking Echocardiography in the Evaluation of Cardiac Complications in Chagas Cardiomyopathy: A Systematic Review
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Background: Chagas disease (ChD) is a neglected tropical disease that affects between 6 and 8 million individuals around the world, becoming a public health issue. Chagas Cardiomyopathy (CC) is one of the most severe complications of ChD, associated with congestive heart failure (CHF), ventricular arrhythmias (VA), and sudden cardiac death (SCD). Different imaging techniques have been tested to assess disease progression and cardiac risk in individuals with ChD. We evaluated the accuracy of detecting cardiac complications in CC patients using cardiac magnetic resonance (CMR) and speckle tracking echocardiography (STE).

Methods: A systematic review was done using PRISMA guidelines. Electronic databases (PubMed, Cochrane, and Embase) and hand-searching were applied for studies in humans over 18 years of age with ChD. Demographic data, research methodology, imaging parameters, and cardiac outcomes were extracted by two independent reviewers, and study quality was assessed by Joanna Briggs Institute critical appraisal tools, resulting in a narrative synthesis.

Results: Twelve studies with 1124 patients from Brazil, Mexico, and Argentina (946 ChD and 178 non-ChD), were analyzed. They ranged in age from 45 to 62 years old, and most participants were male (590 =52.4%). One study discovered a contractility pattern by STE. Four studies assessed the identification of Early Cardiac Impairment (ECI) and VA risk, respectively, while three studies evaluated the risk of SCD. Global Longitudinal Strain (GLS) identified patients with ECI (-18.5±3.4% non-fibrosis vs -14.0±5.8% fibrosis, p=0.006 and -18 ± 2% non-fibrosis vs -15 ± 2% fibrosis, p=0.004). The amount of fibrosis >11.78% or in two or more contiguous transmural segments were markers for VA risk. GLS and the amount of fibrosis were found to be predictors of SCD.

Conclusion: STE may be considered a screening technique for identifying the subclinical status of CHF. CMR using Late Gadolinium Enhancement (LGE) is considered a relevant parameter for stratifying patients with ChD who are at risk of SCD. Fibrosis and GLS can be used as markers to categorize patients at risk for arrhythmias.

Key terms: Chagas disease, Chagas cardiomyopathy, Magnetic Resonance Imaging, Speckle Tracking Echocardiography.