

Echocardiographic evaluation of mechanical abnormalities to predict significant ventricular arrhythmias in mitral valve prolapse: a systematic review and meta-analysis

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Background: A subset of patients with MVP (mitral valve prolapse) is at high risk of malignant ventricular arrhythmias (VAs). Recently, a role of strain echocardiographic parameters has emerged in the risk prediction of these events.

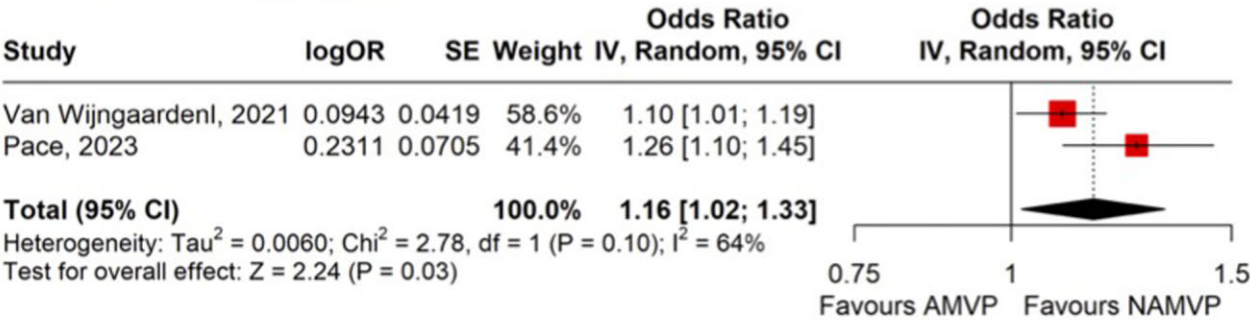
Purpose: This systematic review and meta-analysis aimed to analyze the association between strain parameters and VAs and sudden cardiac death in MVP.

Methods: A systematic review and meta-analysis were performed for studies including patients with MVP, in which strain parameters were analyzed and an history of significant VAs was reported. The aim was to evaluate the association between strain parameters and the occurrence of significant VAs and to compare these parameters between patients with significant VAs ("Arrhythmogenic mitral valve prolapse", AMVP) vs No VAs ("Non-arrhythmogenic mitral valve prolapse", NAMVP).

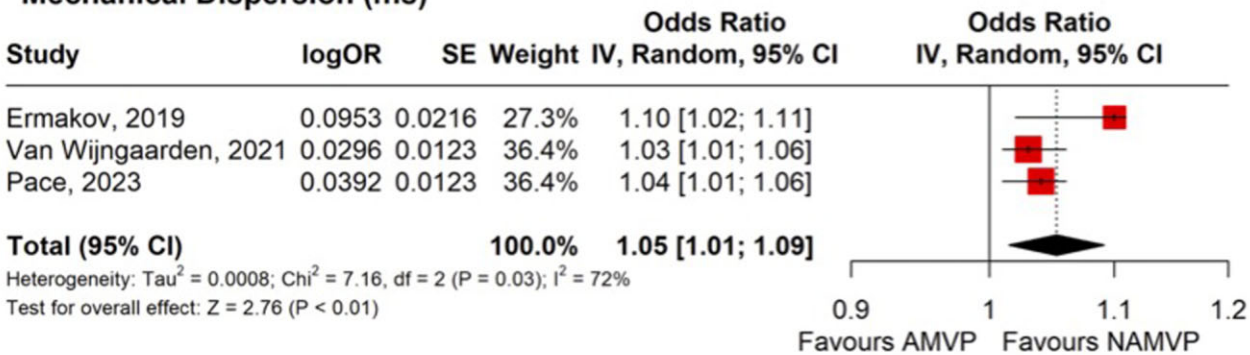
Results: Seven observational studies^{1–7} (six retrospective and one prospective) were included and a total of 1065 patients with MVP were part of the analysis. GLS (global longitudinal strain), mechanical dispersion (MD), and post-systolic index (PSI) demonstrated to be associated with significant VAs in our analysis (GLS: OR = 1.16, 95% CI 1.02 - 1.33, $p = 0.03$, MD: OR = 1.05, 95% CI 1.01 - 1.09, $p < 0.01$, PSI: OR = 1.13, 95% CI 1.03 - 1.23, $p < 0.01$, Fig.1), although some conflicting data exist in literature. A "double-peak pattern" in the LV infero-lateral basal wall was also associated with the occurrence of VAs (HR 4.81, 95% CI 2.22 – 10.4, $p < 0.001$). GLS was significantly lower in patients with AMVP compared with NAMVP (mean difference = 1.24%, 95% CI 0.33 - 2.15, $p < 0.01$, $I^2 = 52\%$, Fig.2); MD and PSI were found significantly higher (MD: mean difference = 7.78 ms, 95% CI 2.81 – 12.75, $p < 0.01$, $I^2 = 61\%$ difference = 1.12%, 95% CI 0.53 – 1.72, $p < 0.01$, $I^2 = 0\%$, Fig.2) in AMVP patients.

Conclusions: Three echocardiographic strain parameters (GLS, MD, PSI) were significantly different between patients with AMVP vs NAMVP and predict the risk of VAs. Further studies are required to confirm the utility of these parameters in patients with MVP.

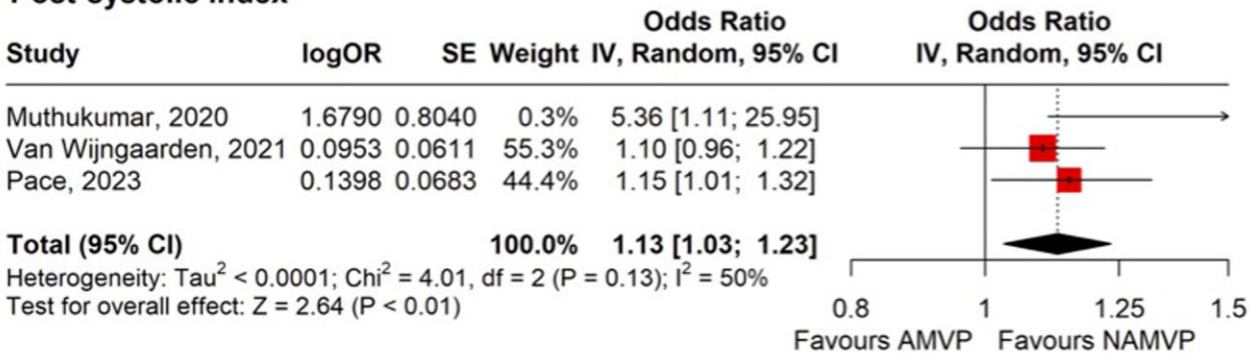
Global Longitudinal Strain

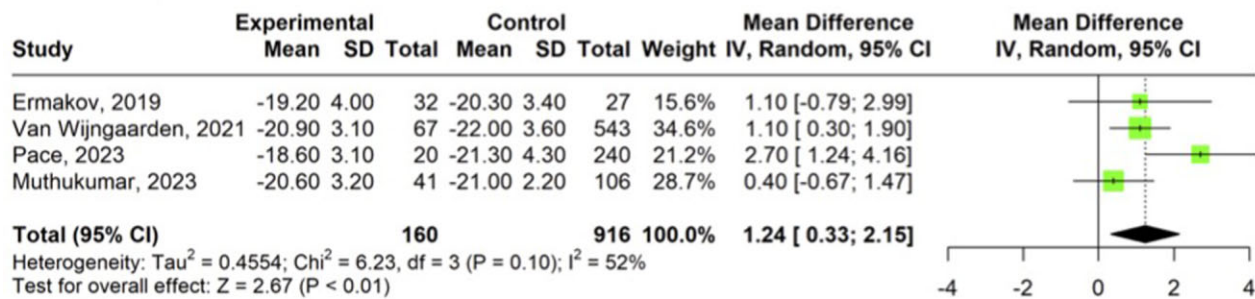
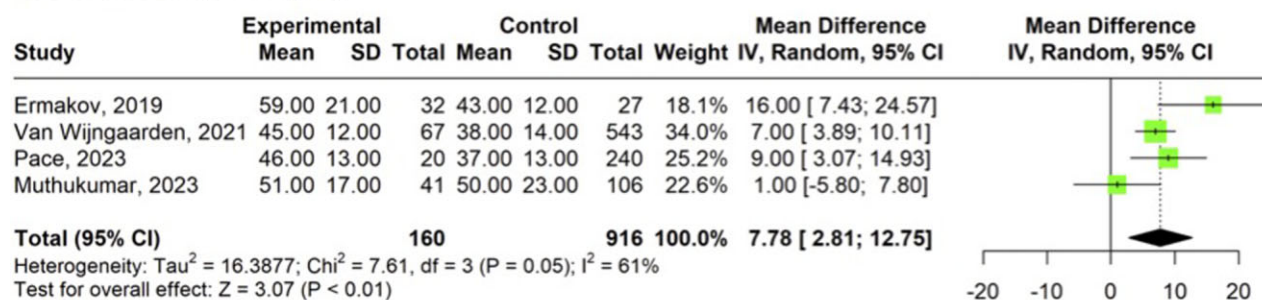


Mechanical Dispersion (ms)



Post-systolic index



Global Longitudinal Strain**Mechanical Dispersion(ms)****Post-systolic index**