

Electrocardiographic features of mitral annulus disjunction in the context of myxomatous mitral valve prolapse, and impact on clinical outcomes: A multimodality imaging study

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Background

The clinical significance of repolarization abnormalities such as T-wave inversion (TWI) and depolarization abnormalities, including fragmented QRS (fQRS) on resting ECG (Fig. A-B), along with their association with echocardiographic and cardiac magnetic resonance (CMR) features, as well as clinical outcomes in patients with mitral annulus disjunction (MAD), are less explored.

Methods

In this observational study, we included 101 patients with MAD at Haukeland University Hospital, Bergen, Norway between 2013 and 2024.

Standard 12-lead resting ECGs, echocardiograms and CMR images were analyzed. MAD was defined as a separation of the left ventricular (LV) myocardium between the left atrial wall and LV free wall at the posterior mitral valve insertion point at end-systole (Fig. C).

Results

The mean age was 52.8±16.5 years (range 16-85) with 59.4% being males. Echocardiographic features of Barlow disease were present in 72% of the patients. 19.8% of patients presented with mild, 37.6% with moderate and 42.6% with severe mitral regurgitation.

Bileaflet prolapse was present in 47.5% patients. These patients were more likely to be female (52.1% vs 30.2%, p=0.025) and have larger MAD size (9.0±3mm vs 7.6±2.7mm, p=0.014).

Nine (8.9%) patients had a history of ventricular arrhythmia, including aborted cardiac arrest in 5 patients.

CMR was performed in 43 patients, and more than half (24/43) had LGE in relation to MAD.

MAD distance was borderline significantly larger in patients with LGE compared with those without LGE (9.4mm vs 7.8mm, p=0.065).

Results

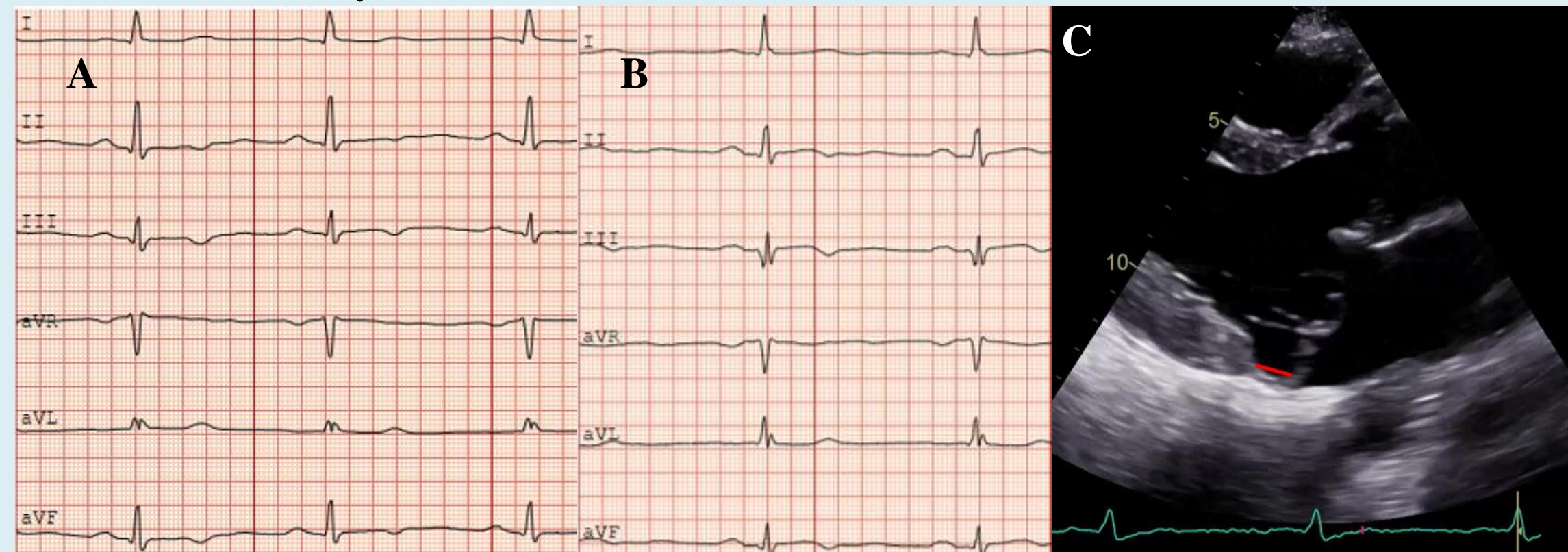
Overall TWI was observed in 35% patients (26% in inferior leads) and fQRS in 52% patients (33% in inferior leads).

The presence of LGE on CMR did not differ significantly in patients with versus without TWI (78% vs 50%, p=0.136) or fQRS (50% vs 58%, p=0.633).

MAD size was comparable both in patients with versus without fQRS (8.1±3.0mm vs 8.4±2.9mm, p=0.640) and TWI (9.1±3.4mm vs 8.0±2.7mm, p=0.112).

During a median follow-up of 37.6 months, two deaths occurred. Mitral valve interventions were undertaken in 54.5% of patients, with no significant difference between those with versus without fQRS (49% vs 57%, p=0.401) and TWI (61% vs 52%, p=0.400).

The presence of LGE on CMR (OR 1.63; 95% CI 0.48-5.47, p=0.433), fQRS in inferior leads (OR 0.74; 95% CI 0.32-1.73, p=0.488) and TWI in inferior leads on resting ECG (OR 1.50; 95% CI 0.58-3.89, p=0.404) did not predict the composite endpoint of mitral valve intervention, aborted cardiac arrest, ventricular arrhythmias or death.



Conclusions: In patients with MAD and MVP, approximately one-third may exhibit ECG changes consistent with repolarization or depolarization abnormalities. MAD size was associated with LGE, but not with depolarization or repolarization abnormalities on ECG.

The presence of LGE on CMR along with depolarization or repolarization abnormalities did not predict cardiovascular events.