Valvular Regurgitation

1 Background

While echocardiography is the first-line test to assess valvular heart disease, studies can be limited by image quality, discrepant findings, or poor correlation with clinical picture. CMR may provide better answers.

2 Why CMR

- High diagnostic accuracy due to excellent image resolution.
- Good image quality independent of body habitus.
- One-stop shop:
    Quantify valvular regurgitation(s).
    Left ventricle – morphology, function, and tissue characterization.
    Ascending aorta – diameter measurement
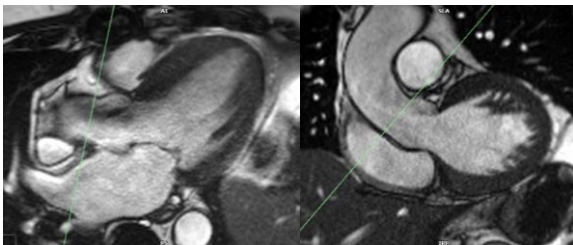- CMR can assess valve at desired position and angle.
- No ionizing radiation.

3 Appropriate Use Criteria

Aortic regurgitation	Class II
Mitral regurgitation	Class II
Pulmonary regurgitation	Class I
Tricuspid regurgitation	Class II

Leiner T, et al. SCMR Position Paper (2020) on clinical indications for CMR. J Cardiovasc Magn Reson. 2020;22:76.

4 Images

Analyzed using phase-contrast velocity encoded imaging

Forward flow = 55 ml
Backward flow (regurgitation) = 20 ml
Regurgitant fraction 37%

Images provided courtesy of: Kana Fujikura
St. Francis Hospital & Heart Center, NY USA

5 References

Prognostic Power of LGE and Mitral Regurgitant Fraction (MR-fraction) in Functional MR

Patients (n=1414) undergoing CMR for cardiomyopathy (LVEF <50%) were assessed for the primary endpoint at 5 years. Ischemic cardiomyopathy (ICM) had significantly higher overall risk than non-ischemic cardiomyopathy (NICM). The hazard steeply increased in patients with LGE ≥5% and MR-fraction ≥35% for ICM. On the other hand, there was a linear increase in risk with increasing MR-fraction in NICM that was steeper than ICM, though notably, the rate of this increased risk was higher in patients with LGE ≥2% than patients with LGE <2%.

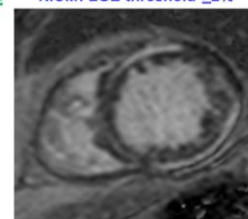Kwon DH, et al. Circ Cardiovasc Imaging. 2023;16:e015134.
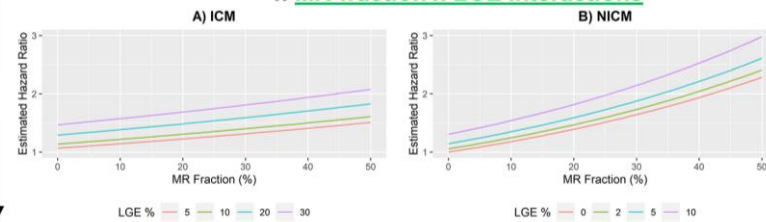
## Prognostic Implication of MR Severity in Asymptomatic Patients.
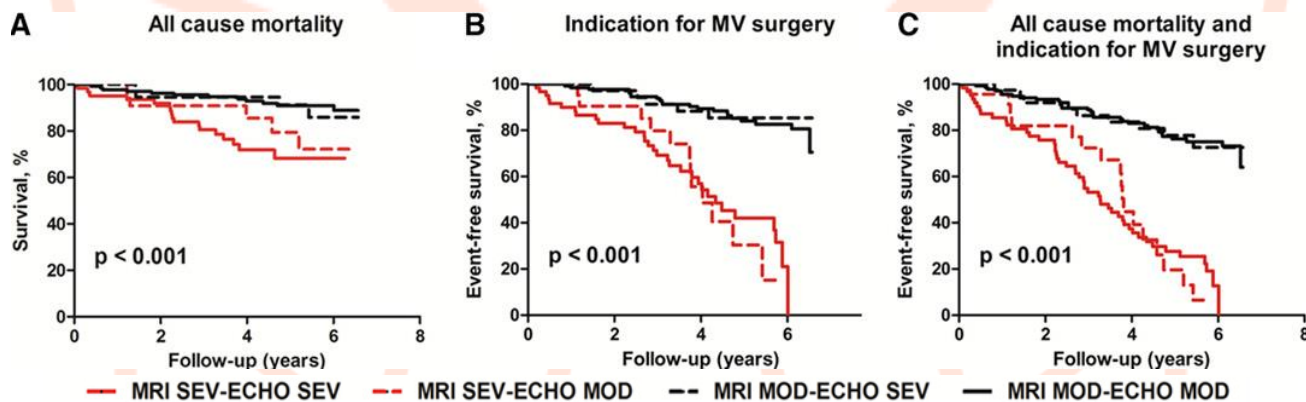
Patients with concordant severe MR showed significantly higher all-cause mortality (27% versus 9%, log-rank p<0.001) and mitral valve surgery events (44% versus 11%, log-rank P<0.001) compared to patients with concordant moderate MR. In contrast, patients with discordant MR severities, Patients with MRI severe and ECHO moderate had significantly higher outcome compared to MRI moderate and ECHO severe (p <0.001).

Penicka M, et al. Circulation. 2018;137:1349-1360.

Quantification of aortic regurgitation associates with clinical outcome.
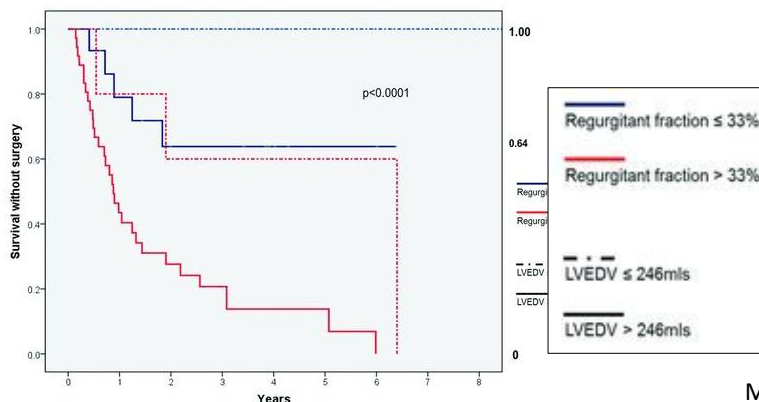
In 113 asymptomatic subjects with at least moderate aortic regurgitation who were initially treated conservatively, surgery-free survival was assessed for up to 9 years. Combination of regurgitant fraction and LVEDV provides a robust discrimination in outcome. LVEF was not able to predict events (AUC 0.55; P=0.43).

Myerson SG, et al. Circulation. 2012;126:1452-1460.