

## K.1 Severity of valvular regurgitation on cardiac MRI

### K.1.1 Research recommendation

In adults with aortic or primary mitral regurgitation in whom the need for intervention is unclear after echocardiography, what is the prognostic value and cost effectiveness of cardiac MRI to assess the severity of valvular regurgitation?

#### K.1.1.1 Why this is important

Current practice is based on echocardiography, readily available and low-cost imaging modality with a long record of clinical use for assessment and follow-up of patient with heart valve disease and studies of outcomes underpinning timing of valve intervention. Cardiac MRI is a less readily available and more costly imaging modality, established for the assessment of cardiac chambers dimensions and function and tissue characterisation of the heart myocardium and cardiac masses. In these areas, cardiac MRI is demonstrated to have better accuracy than echocardiography. However, there are no studies of outcomes to underpin a role for cardiac MRI in the assessment of valve disease severity for mitral and aortic regurgitation and indeed for other types of heart valve disease. There are no studies of outcomes even for the use of MRI to determine timing of intervention based on parameters related to left ventricular dimensions and function, currently derived from echocardiography for heart valve disease. Maybe cardiac MRI could represent an appropriate or better alternative than echocardiography for the assessment of aortic and mitral regurgitation and consequences on the left ventricle in all cases or in cases where echocardiography is non-diagnostic for example because of poor window.

#### K.1.1.2 Rationale for research recommendation

Importance to 'patients' or the population	To provide an appropriate or better alternative than echocardiography for the assessment of aortic and primary mitral regurgitation and consequences on the left ventricle in all cases or in cases where echocardiography is non-diagnostic for example because of poor window.
Relevance to NICE guidance	Future NICE guidelines may recommend the use for cardiac MRI for follow-up of patients with mitral or aortic regurgitation or at least for a one-off assessment to confirm the need for intervention or the absence of it.
Relevance to the NHS	The introduction of cardiac MRI for those in whom the need for intervention is unclear after echocardiography may lead to significant increase in cost that, however, may be balanced by the benefit of accuracy and avoidance of adverse events due to delayed intervention.
National priorities	"Action on prevention" long term plan
Current evidence base	Limited multivariate evidence was identified. Further studies are needed to inform recommendations on cardiac MRI

Equality considerations	None identified
-------------------------	-----------------

### K.1.1.3 Modified PICO table

Population	<p><u>Inclusion</u>          Adults aged 18 years and over with diagnosed heart valve disease requiring further tests after echocardiography to determine whether intervention is needed.</p> <p>It should be clear that the population represented is those in whom there was uncertainty about whether intervention was indicated</p> <p>Data will be stratified by the type of heart valve disease as follows:</p> <ul style="list-style-type: none"> <li>• aortic [including bicuspid] regurgitation</li> <li>• primary mitral regurgitation</li> </ul> <p><u>Exclusion</u></p> <ul style="list-style-type: none"> <li>• Children (aged &lt;18 years)</li> <li>• Adults with congenital heart disease (excluding bicuspid aortic valves).</li> <li>• Adults with previous intervention for HVD (surgical or transcatheter).</li> </ul>
Prognostic variable	<p><b>Primary mitral regurgitation</b></p> <ul style="list-style-type: none"> <li>• Quantification of MR on cardiac MRI (regurgitant fraction in % or regurgitant volume in ml)</li> </ul> <p>Note that there are currently no accepted thresholds for severe MR based on these parameters on cardiac MRI, but the use of thresholds within the following ranges are suggested for investigation:</p> <ul style="list-style-type: none"> <li>• Regurgitant fraction, 30-50%</li> <li>• Regurgitant volume, 40-60 ml</li> </ul> <p><b>Aortic regurgitation</b></p> <ul style="list-style-type: none"> <li>• Quantification of AR on cardiac MRI (regurgitant fraction in % or regurgitant volume in ml)</li> </ul> <p>Note that there are currently no accepted thresholds for severe AR based on these parameters on cardiac MRI, but the use of thresholds within the following ranges are suggested for investigation:</p> <ul style="list-style-type: none"> <li>• Regurgitant fraction, 30-50%</li> </ul> <p>Regurgitant volume, 40-60 ml</p>

Outcome	<p>Indication for intervention based on prognosis for the following without intervention:</p> <ul style="list-style-type: none"> <li>• Mortality (1 and 5 years)</li> <li>• Hospital admission for heart failure or unplanned intervention (1 and 5 years)</li> <li>• Reduced cardiac function (echo parameters – LVEF) 1 and 5 years</li> <li>• Symptom onset or symptom worsening (e.g. that led to surgery being required) 1 and 5 years</li> </ul> <p>Indication for intervention based on predictors of the following post-operative outcomes:</p> <ul style="list-style-type: none"> <li>• Mortality (6 and 12 months)</li> <li>• Hospital admission for heart failure (6 and 12 months)</li> <li>• Reduced cardiac function (echo or cardiac MRI parameters – for example LVEF &lt;50%) (6 and 12 months)</li> <li>• Return to normal LV volumes post-operatively based on echo or cardiac MRI as defined in the study (6 and 12 months)</li> <li>• &gt;20% reduction in LV volume post-operatively based on echo or cardiac MRI (6 and 12 months)</li> </ul>
Study design	Cohort adjusted for all key confounders
Timeframe	Long term
Additional information	None