Abstract: 269

Cardiac magnetic resonance for evaluating non-culprit lesions after acute myocardial infarction: a comparison with fractional flow reserve

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Objectives
To determine the diagnostic performance of cardiac magnetic resonance imaging (CMR) for diagnosing hemodynamically obstructive non-culprit lesions after ST-segment elevation myocardial infarction (STEMI). In addition, we investigated whether fully quantitative analysis of myocardial perfusion is superior to semi-quantitative and visual analysis.

Background
The accuracy of CMR for evaluating non-culprit lesions in STEMI patients with angiographic multivessel disease is unknown.

Methods
Seventy-seven STEMI patients with at least one intermediate (diameter stenosis 50-90%) non-culprit lesion underwent CMR and invasive coronary angiography in conjunction with fractional flow reserve (FFR) measurements at 1 month after primary intervention. The imaging protocol included stress and rest perfusion, cine imaging and late gadolinium enhancement. Fully quantitative, semi-quantitative and visual analysis of myocardial perfusion were compared against a reference of FFR. Hemodynamically obstructive was defined as FFR = 0.80.

Results
Hemodynamically obstructive non-culprit lesions were present in 30 (39%) patients. Visual analysis displayed an area under the curve (AUC) of 0.69 (95% confidence interval [CI]: 0.57-0.82), with a sensitivity of 72% and a specificity of 64%. For semi-quantitative analysis, the relative upslope of the stress signal intensity time curve (stress rel upslope) and the relative upslope derived myocardial flow reserve (MFR rel upslope) had respective AUCs of 0.63 (95% CI: 0.50-0.76) and 0.67 (95% CI: 0.55-0.80). Fully quantitative analysis did not augment diagnostic performance (all p>0.05). Stress myocardial blood flow displayed an AUC of 0.71 (95% CI: 0.58-0.83), with a sensitivity of 89% and a specificity of 44%. Similarly, MFR displayed an AUC of 0.70 (95% CI: 0.57-0.82), with a sensitivity of 78% and a specificity of 53%.

Conclusion
CMR has a modest accuracy for diagnosing the hemodynamic severity of non-culprit lesions in STEMI patients.
with angiographic multivessel disease. Fully quantitative, semi-quantitative and visual analysis yield similar diagnostic performance.

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<thead>
<tr>
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<th>Visual</th>
<th>Semi-quantitative</th>
<th>Fully quantitative</th>
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<tbody>
<tr>
<td></td>
<td>SSS</td>
<td>Stress rel upslope</td>
<td>MFR rel upslope</td>
</tr>
<tr>
<td>Sensitivity (%)</td>
<td>72 (53-87)</td>
<td>79 (59-92)</td>
<td>78 (58-91)</td>
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<tr>
<td>Specificity (%)</td>
<td>64 (48-78)</td>
<td>48 (32-63)</td>
<td>54 (38-69)</td>
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<td>PPV (%)</td>
<td>57 (46-67)</td>
<td>49 (40-57)</td>
<td>51 (42-61)</td>
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<td>NPV (%)</td>
<td>78 (65-87)</td>
<td>78 (62-88)</td>
<td>79 (64-89)</td>
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<tr>
<td>Accuracy (%)</td>
<td>67 (55-78)</td>
<td>60 (48-71)</td>
<td>63 (50-74)</td>
</tr>
</tbody>
</table>

Data are % (95% confidence interval). MBF = myocardial blood flow; MFR = myocardial flow reserve; NPV = negative predictive value; PPV = positive predictive value; rel upslope = relative upslope of the signal intensity time curve; SSS = summed stress score.