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Meeting abstract

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236 Quantitative T2 Signal intensity in patients undergoing stress perfusion imaging

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Myocardial T2-weighted imaging has been used to detect edema associated with acute ischemia and injury. The images are often evaluated visually for the presence of increased signal. MR stress perfusion imaging is used to detect significant coronary stenosis in patients with suspected CAD. The purpose of this study is to compare quantitative intensity maps of T2-weighted images with the presence and severity of stress perfusion defects.

A retrospective analysis was performed of 30 patients evaluated for suspected CAD by T2-weighted images and subsequent adenosine stress perfusion. A 17-segment model was used (without including the apex) giving 480 segments. T2-weighted images were acquired using a black-blood SENSE technique in a short axis orientation (slice thickness 5 mm, TR 1400, TE 100, flip 90). Quantitative intensity maps of the standard T2 weighted images were created using Qmass MR (Medis) software. The threshold intensity (TIT2) was defined as the intensity 2 SD above the average intensity of a reference segment. The remaining segment scores were expressed as a percentage greater than TIT2. The perfusion defects were scored qualitatively (4 point grade-normal to severe) using the Viewforum workstation (Philips). The evaluation of the perfusion and T2 images was carried out independently by separate evaluators.

There were 90 (18%) abnormal perfusion segments. For a given segment, more severe grades of perfusion defects were associated with a higher % over TIT2 (grade 1–26%, grade 2 – 48%, grade 3–67%, and grade 4–69%) ($p < 0.0001$). When the perfusion results were considered as a binary outcome, elevated T2 was a predictor of a positive perfusion result using a logistic regression analysis ($p < 0.0001$). By visual analysis, 28 segments were identified as having increased T2 intensity, while 106 segments showed an increase of 50% over TIT2.

Quantitative intensity assessments of T2-weighted images correlate with the presence and severity of perfusion defects, suggesting a relationship between significant myocardial flow abnormalities and increased T2 signal. Quantitative assessments yield a greater likelihood that abnormal segments will be identified over visual assessment alone.