#0947: Bone marrow edema detection using dual-energy CT: application in sacroiliitis

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Purpose
To evaluate the diagnostic performance of dual-energy computed tomography (DECT) for sacroiliac bone marrow edema (BME) detection in patients suspected for spondyloarthritis.

Methods and materials
Patients aged 18-55 years with suspicion for spondyloarthritis underwent DECT and 3.0 Tesla MRI of the sacroiliac joints on the same day. Virtual non-calcium (VNCa) images were calculated from DECT images for BME detection, using a three-material decomposition algorithm for bone mineral, red bone marrow and yellow bone marrow. Each sacroiliac joint was divided into four quadrants for analysis. VNCa images were scored by two readers independently: 0 = normal bone marrow, 1 = BME. A quadrant was recorded as BME present if either of the readers scored ‘1’ for the quadrant. Diagnostic performance was assessed with reference to MRI. CT numbers were measured on VNCa images. ROC analyses were performed to determine the cut-off values for BME detection.

Results
Forty patients (16 men, 24 women) were included. The sensitivity and specificity of BME detection by DECT were 65.4% and 94.2%. AUCs for CT numbers in the ilium and sacrum are 0.90 and 0.87, respectively. Cut-off values of -44.4 HU (iliac quadrants) and -40.8 HU (sacral quadrants) yielded sensitivities of 76.9%, 76.7%, and specificities of 91.5%, 87.5%, respectively.

Bone marrow edema is displayed as bright green areas on DECT images (arrows in a,c), corresponding to the high signal on STIR images (arrows in b,d)).
Conclusion

VNc images are useful for BME detection in patient suspected for sacroiliitis.

Limitations

The sample size of the present study is small and the prevalence of BME is relatively low. The final clinical diagnosis was not taken into consideration for analysis.

Ethics committee approval

Institutional Review Board approved this study. Written informed consent was obtained.

Funding

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