

Single-source dual-energy computed tomography for the assessment of bone marrow oedema in vertebral compression fractures: a prospective diagnostic accuracy study

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Products

Dual-energy computed tomography (DECT) for detecting bone marrow oedema (BME).

Hospital / Authors

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Clinical Background

Vertebral compression fractures, prevalent in older adults, require precise diagnostics for treatment planning. MRI remains the gold standard, but DECT offers a rapid alternative with additional benefits.

Aim of Study

To evaluate the diagnostic accuracy of single-source DECT for identifying BME in vertebral fractures compared to MRI.

Cohort Study

192 vertebral fractures in 70 patients aged 50+ were examined using DECT and 1.5T MRI. Virtual non-calcium (VNCa) reconstructions from DECT were compared to T1-weighted and STIR MRI sequences.

Results

- **Sensitivity and specificity** for DECT were 72% and 70%, reader-dependent.
- **Sensitivity increased to 89%** in severe BME cases.
- MRI had higher inter-reader reliability and superior image quality but longer acquisition time.
- **DECT visualized BME adequately** and allowed rapid assessment of fracture morphology with lower radiation compared to other techniques.

Summary

- **DECT identifies BME quickly** and correlates significantly with MRI findings, offering a viable alternative when MRI is unavailable.
- Trained readers improve diagnostic accuracy and reduce variability in VNCa interpretation.
- DECT enhances clinical workflows by combining fracture morphology analysis with BME detection in a single scan.
- Additional MRI is recommended in ambiguous cases or prior surgical interventions to account for potential DECT limitations.