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Dual-Energy CT in Traumatic Bone Lesions: Myth or Reality?

SHORT ABSTRACT

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ABSTRACT

Early and accurate diagnosis of fracture is important to speed patient triage and optimize patient management in Emergency departments. Computed tomography (CT) stands in the front line in the diagnosis of some radiographically occult bone fractures, because tomographic images optimize the detection of cortical and trabecular bone interruption and deformity. Magnetic resonance imaging (MRI), thanks to its ability to detect bone marrow changes, also enables detection of post-traumatic marrow changes that are associated with subtle fractures. In the last decade, many authors have reported that dual-energy CT (DECT) has the potential to detect trauma-associated bone marrow edema (BME) in various bones with a sensitivity of 82% [78–84%] and a specificity of 95% [94–96%] [1–4]. Therefore, DECT would have the capacity to increase the detection of CT-occult fractures and to better differentiate recent from healed fractures.

Il this lecture, we report our experience with DECT in both incidental observations and systematic use in the detection of low-energy radiographically occult pelvic and femoral fractures in elderly patients, in comparison with MRI. Although our results are within the range of published results, our enthusiasm is limited. First, it's questionable what DECT actually detects. What if DECT could only detect hemorrhage-derived iron present in the medullary cavity? Second, the reproducibility of the observations among different manufacturers and models have not been so far assessed. Finally, the real added value of DECT in comparison with images derived from soft tissue kernels in monoenergetic CT remains to be assessed. What if DECT had only been a triggering tool to teach us how to better exploit monoenergetic CT data? The future will tell us how long it will take before CT can replace MRI in the evaluation of the bone marrow.

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COMPETING INTERESTS

The authors have no competing interests to declare.

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REFERENCES

1. **Li M, Qu Y, Song B.** Meta-analysis of dual-energy computed tomography virtual non-calcium imaging to detect bone marrow edema. *Eur J Radiol*. 2017; 95: 124–129. DOI: *https://doi.org/10.1016/j.ejrad.2017.08.005*
2. **Yang P, Wu G, Chang X.** Diagnostic accuracy of dual-energy computed tomography in bone marrow edema with vertebral compression fractures: A meta-analysis. *Eur J Radiol*. 2018; 99: 124–129. DOI: *https://doi.org/10.1016/j.ejrad.2017.12.018*
3. **Suh CH, Yun SJ, Jin W, Lee SH, Park SY, Ryu CW.** Diagnostic performance of dual-energy CT for the detection of bone marrow oedema: A systematic review and meta-analysis. *Eur Radiol*. 2018; 28: 4182–4194. DOI: *https://doi.org/10.1007/s00330-018-5411-5*
4. **Wong AJN, Wong M, Kutschera P, Lau KK.** Dual-energy CT in musculoskeletal trauma. *Clin Radiol*. 2021; 76: 38–49. DOI: *https://doi.org/10.1016/j.crad.2020.08.006*

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