Summary: DXA and QCT Densitometry

To diagnose osteoporosis it is generally accepted that DXA is the mode of choice to measure bone density. However, in some regions, QCT is used as an alternative to DXA. The ACI Musculoskeletal Network has thus sought advice from a leader in the field to gain perspectives on the use of each mode for the investigation of osteoporosis.

**Issues to consider when scanning the spine**

- T-scores in the spine decrease more quickly in QCT than DXA. For this reason the WHO criteria of osteoporosis at a T score of -2.5 or less does not apply.
- Spine QCT can occasionally be spuriously low in a patient with normal T scores on DXA. It is suspected this is due to increased marrow fat with advancing age which can be problematic in assessing the bone density in QCT, but not so in DXA.
- Spine QCT may be used to assess BMD in a patient who is suspected of having a falsely elevated BMD on DXA due to osteoarthritis.

**Radiation doses**

- In the QCT of the spine the dose is about 200-300 microsieverts (uSv). This compares to about 10 uSv in DXA of the spine.
- In the QCT of the hip the dose is at least 500 uSv and can be as high as 1000 uSv, compared to about 10 microsieverts in DXA of the hip. The results from QCT of the hip are very similar to DXA of the hip. In view of the lack of any evidence of superiority of QCT, the basic principle of the use of diagnostic radiation (i.e. ALARA - As Low As Reasonably Achievable) should be adopted and consequently DXA of the hip is the recommended preferred investigation.

**Overall**

- There are a few longitudinal studies on QCT in predicting fracture and no evidence it is better than DXA.
- The dose of radiation in QCT is significantly higher than DXA and providers should justify exposing patients to a higher dose for no demonstrated benefit.

**Recommendation**

DXA is the recommended technique to diagnose and monitor bone density in the management of osteoporosis.

**References**


