Atypical femoral fractures identified on DXA scanner – should we do more?

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The use of bisphosphonates in the treatment of osteoporosis and management of fractures due to low bone mineral density is well established in the world of bone densitometry. Recent studies by a task force on behalf of American Society of Bone Mineral Research (ASBMR) have linked long-term bisphosphonate therapy with an increased risk of atypical femur fractures (AFF). This should not mean that we no longer use this form of treatment to deal with osteoporosis, it has been estimated that for each AFF caused, at least 30 vertebral and five hip fractures will be prevented.

There is a growing need to identify the patients likely to suffer AFF so that intervention can prevent them and lessen the burden of long-term bisphosphonate use without negating the positive aspects.

This AFF burden has been described as significant: relatively well, active patients report poorer health and function after the fracture; are in hospital for longer; and can experience such complications as fat embolism. Two-thirds of subjects in another study had bilateral AFF, 17% needed revision of surgery due to hardware complications and many patients still used a walking aid one year post repair.

Who is at risk?
The European Medicine Agency (April 15, 2011) stated that patients who are taking bisphosphonate-containing medicines need to be aware of the risk of this unusual fracture of the femur. They should contact their doctor if they have any pain, weakness or discomfort in the thigh, hip or groin, as this may be an indication of a possible fracture.

How do we image this using a DXA scanner?
McKiernan et al suggested that extending the length of the DXA femur image presents an opportunity for early detection of AFF. However, this has since been superseded by a dedicated single energy view of the entire femur which can be performed at the same time as the DXA scan with little or no repositioning, a minimal increase in examination time and very low radiation dose to the patient.

Characteristics of AFF were defined in great detail by the task force report of the ASBMR in 2013. They are defined as being found below the lesser trochanter but above the supracondylar flare and having four of the five major features listed:
- Little or no trauma
- Transverse (or mostly transverse)
- Non-comminuted (or minimally comminuted)
- Complete fractures extend through both cortices and may have a medial spike; incomplete fractures involve only the lateral cortex
- Localised periosteal or endosteal reaction of the lateral cortex.

Other features may be considered:
- Generalised increase in cortical thickness
- Delayed healing
- Prodromal symptoms such as dull aching pain in groin or thigh
- Bilateral fractures and symptoms.

Single energy (SE) femur examinations are used to visualise focal reaction or thickening along the lateral cortex of the femoral shaft which may be accompanied by a transverse radiolucent line, a radiolucent horizontal cleft sometimes described as “the dreaded black line”.

Once identified the task force recommendations are:
- STOP anti-resorptive therapy (bisphosphonates and denosumab)
- THEN perform prophylactic nailing or PTH therapy … or both.

Is this type of fracture a rarity?
One study looked at 101 women with no symptoms of fracture who had all been on bisphosphonates for over three years. Two per cent of these showed radiographic evidence of incomplete AFF. These findings were confirmed by MRI and this would seem to be a high incidence.

Are clinicians looking out for this?
Vertec Scientific Limited conducted a survey of a customer database of 400 DXA users to quantify the level of knowledge and the results are summarised here: 75% of responders had patients on therapy 50% of which had more than
five years duration. Only 17% of centres ever ask about
 groin pain, despite 50% of responders having seen AFF in
 their clinics, but hopefully many more will do so in future.

What should happen now?
This is obviously a situation that needs to be addressed.
AFF will increase as more and more patients are on long-
term prescription of bisphosphonates but without judicious
use of this treatment option the incidence of osteoporotic
fractures will continue to rise.

Clinicians have a duty of care to review repeat prescrip-
tions over time and perform a risk benefit equation on a
patient-by-patient basis. Any DXA service should consider
putting in place protocols to include the single energy femur
scan on appropriate individuals using the above mentioned
criteria. It would be prudent, if there is a need to image the
femur, that it is performed bilaterally as the pattern of frac-
ture is not well defined.

References
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