

Osteonecrosis and transient osteoporosis of the hip: diagnostic and treatment dilemmas

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In their article in this issue of the *Journal*, Balakrishnan and associates¹ have done an excellent job of outlining the differences between the entities of transient osteoporosis of the hip (TOOTH) and osteonecrosis of the hip (ON). Particularly, the points about imaging are important to the physician. The findings on magnetic resonance imaging (MRI) have proven clinically to be the most useful test for differentiating between these 2 processes. The place for other modalities is severely restricted, and the use of other imaging techniques to diagnose or define the problem would leave the surgeon with more questions than answers. TOOTH is a diagnosis of exclusion, and the patient generally needs MRI to exclude all other diagnoses.

Interestingly, the authors have illustrated with their case mix that TOOTH may be more prevalent in middle-aged men than previously thought. Several papers on the incidence and etiology of TOOTH have been published.²⁻⁴ In the past, TOOTH has been seen as a related entity to ON, with perhaps TOOTH being a precursor stage. The authors maintain, as do others, that these 2 processes are mutually exclusive diseases. This is possible and will be more definitely answered as further

more-sensitive testing and genetic screening better define the ON patient and risk factors for ON.⁵

A pathological study has shown that biopsy specimens of TOOTH femurs evaluated histopathologically by light and electron microscopy revealed focal areas of thin and disconnected bone trabeculae covered by osteoid seams and active osteoblasts.⁶ The surrounding bone marrow tissue showed edematous changes and mild fibrosis, frequently associated with vascular congestion or interstitial hemorrhage, or both. No osteonecrotic region has been observed in either the bone trabeculae or the bone marrow tissue.⁶ People have postulated, on the basis of these pathological changes, that TOOTH is a response to or result of vasomotor processes in the bone and is a separate entity from ON.^{6,7} However, ON patients often present with an unusual amount of edema in the femur similar to that seen in TOOTH. A femoral head lesion with a serpiginous double line on MRI results in a diagnosis of ON, and the edema is qualified as an incidental finding. However, there is no proof that a continual vasomotor response (the postulated etiology of TOOTH) in the enclosed vascular watershed space of the femoral head could not

eventually result in ongoing subacute and then, finally, clinically relevant bone necrosis. Subchondral fractures have been reported with some cases of TOOTH.⁸ We may, indeed, still find that TOOTH and ON are a continuum of presentation in a multifactorial disease.⁵ I would caution against cavalier disregard for possible complications that may be associated with TOOTH, as may be the tendency if TOOTH is seen as a totally benign process. Either progression to ON or other problems may still occur. Anecdotally, I have seen the condition of a young patient with a diagnosis of TOOTH treated with weight-bearing as tolerated progress to a femoral neck fracture with minimal trauma, presumably from local osteopenia. My treatment regimen for the patient with extensive involvement of the femur includes non-weight-bearing with crutches for 3 months or until the problem resolves.

I would encourage surgeons not to treat TOOTH as a benign, interesting case but to take some precautions against full activity and follow the process closely. Any change in symptoms, especially new complaints of groin pain, should be investigated promptly. I would like to thank the authors for an interesting presenta-

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tion on a topic that warrants further investigation.

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**SESAP Question
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Category 10, Item 23

A 23-year-old man with the x-ray shown has left arm swelling and pain two hours after a strenuous work-out involving weight lifting. Venography demonstrates left axillary-subclavian vein occlusion.



The optimal treatment for this patient would be

- (A) immediate anticoagulation with heparin; long-term anticoagulation with warfarin
- (B) axillary vein thrombectomy and first rib resection
- (C) catheter-directed fibrinolysis and anticoagulation; first rib resection if patency is restored and venous narrowing is demonstrated
- (D) catheter-directed fibrinolysis and anticoagulation; balloon angioplasty of the left subclavian vein if venous narrowing is demonstrated
- (E) left clavicular resection

For the incomplete statement above, select the lettered completion that is best of the 5 given.

For the answer and a critique of item 23 see page 215.

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