



Hitting a Moving Target: A Case of Transient Migratory Osteoporosis

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Case

- CC: **R sided hip pain** for a month
- HPI: 32 yo M w/ PMH GERD presents with right sided hip pain for a month. Denies trauma or injury. Pain originated in his hip and radiated down his thigh. Exacerbated by standing and walking and occasionally woke him up at night. Denied any fever or chills
- PMH: GERD



Case

- Meds: Esomeprazole, Acetaminophen and Etodolac for pain
- SH: Denies alcohol or tobacco use. Works on machine maintenance which requires a lot of standing and climbing



Physical Exam

- Height: 6'2 Weight: 205 lbs
- Gen: Patient in no acute distress. Alert and oriented to person place and time
- Cardiovascular: Extremities well perfused
- Respiratory: Unlabored, normal respiratory rate
- Musculoskeletal: No swelling over right hip, **patient with mild tenderness over the trochanteric bursa. Pain experienced with passive hip flexion, internal rotation and external rotation.** No crepitus noted on ROM. Thomas, Ober, Piriformis, Fadir and Scour tests were all negative. **Faber test showed tightness and was positive for pain on ipsilateral side.**



Initial X-ray



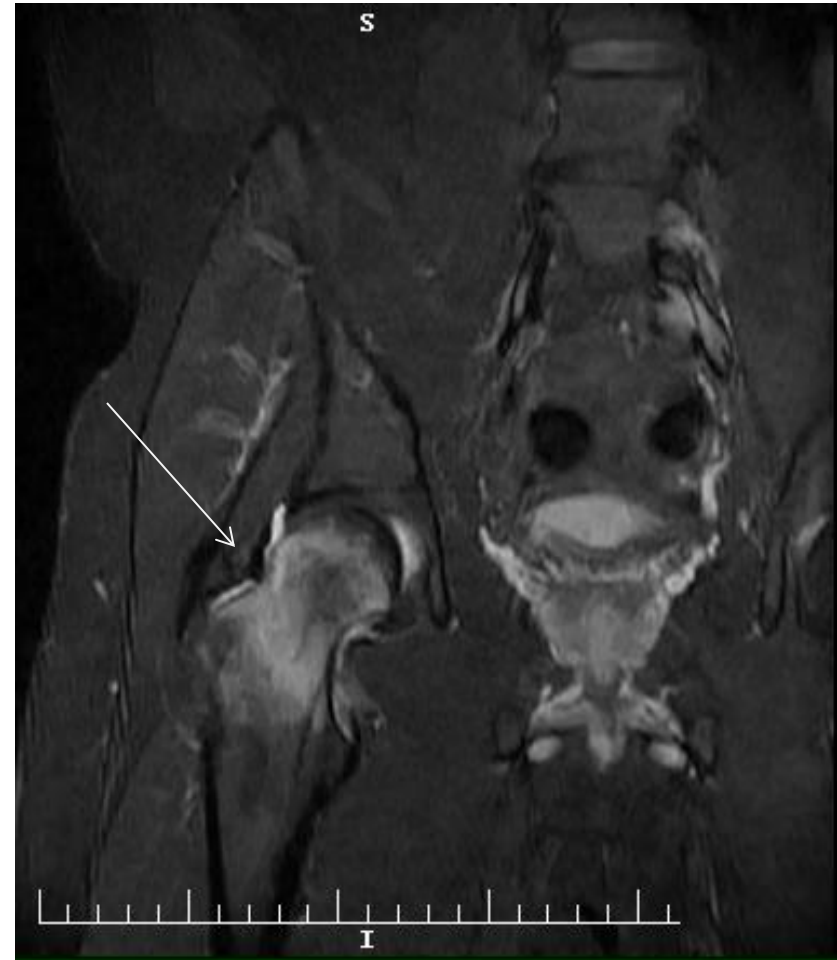


Plan

- Patient sent home with **oral prednisone taper**, given exercises and recommendation for light duty at work as well as rest when possible
- Patient scheduled for 2 week follow up...

2 Week Follow-Up

- Pain had improved minimally and now with severe pain shooting down his R leg
- An MRI was ordered →
- Radiology recommended CT as there was **still concern for fracture**





CT Results

- CT results returned **negative for fracture** but showed some sclerosis in the posterior and superior aspects of the femoral head with some mild adjacent lucency
- Radiologist suggested possible **stress reaction vs progressing osteonecrosis of the hip vs transient osteoporosis of the hip (TOH)**
- Labs ordered: CBC, CMP, TSH, ESR and CRP **all within normal limits**
- Patient kept on weight bearing restriction for 6 weeks and the patient was started on **alendronate and etodolac for pain.**



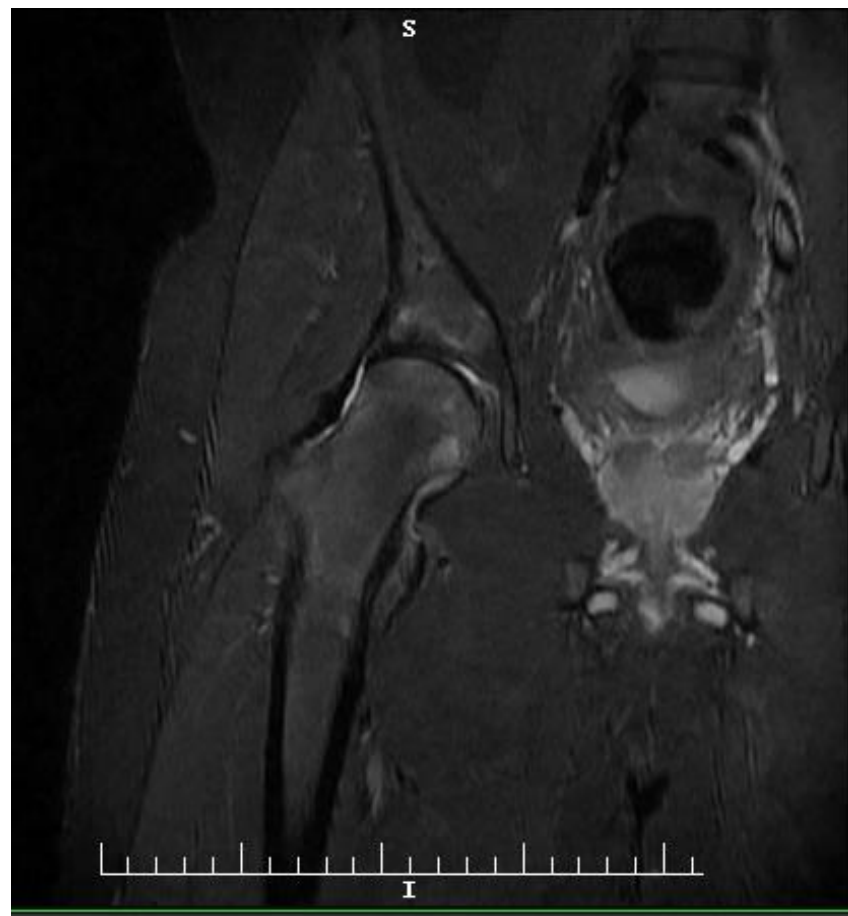
6 week follow up

- Pain is improved and able to tolerate standing ok
- He did not take alendrontate that was prescribed, but continued etodolac for pain. He also started an herbal medication containing Vitamin D and calcium
- Hip x-rays done showed decreased density of femoral head when compared to left
- **DEXA scan was completed, of note: Severe osteoporosis of R femoral neck (T-score -3.0) and osteopenia of the left femoral neck (-1.2), left hip (-1.2) and right hip (-2.0).**
- Patient was transitioned to partial weight bearing and follow up in 6 weeks for repeat MRI



6 week follow up

- Doing well with partial weight bearing on one crutch
- MRI was done →
- Patient was transitioned to full weight bearing over 2 weeks with plan to repeat MRI in 6 weeks
- At this point, considering TOH





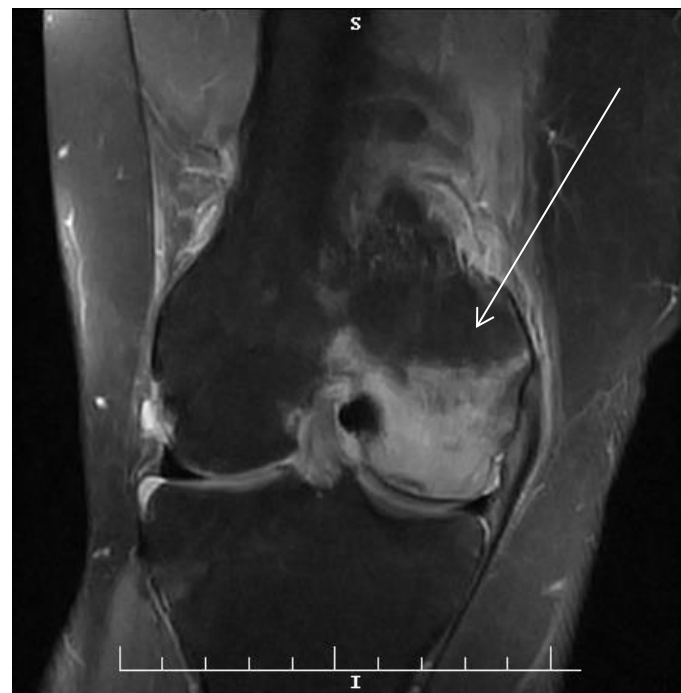
4 weeks later

- Patient came in with new complaint of R knee pain. Pain was located in medial aspect of knee and associated with some swelling and pain exacerbated by flexion and full extension of knee. Denied injury.
- Physical exam significant for pain over medial femoral condyle and medial joint line
- X-ray films of R knee showed no evidence of fracture or bony abnormality
- Given recent history of R hip, **MRI was ordered of R knee. R hip was also obtained to assess healing.**



MRI Knee

- R Knee MRI showed **severe amount of bone marrow edema throughout medial femoral condyle**
- R Hip MRI showed essentially showed complete resolution





Case

- Radiologist had suspicion for progressing spontaneous osteonecrosis of the knee
- Patient was placed back on weight bearing restriction, NSAID for pain and alendronate.
- Several months later, bone marrow findings of R knee almost completely resolved on follow up MRI.
- Patient was noted to be doing well with weight bearing and back to work



Discussion

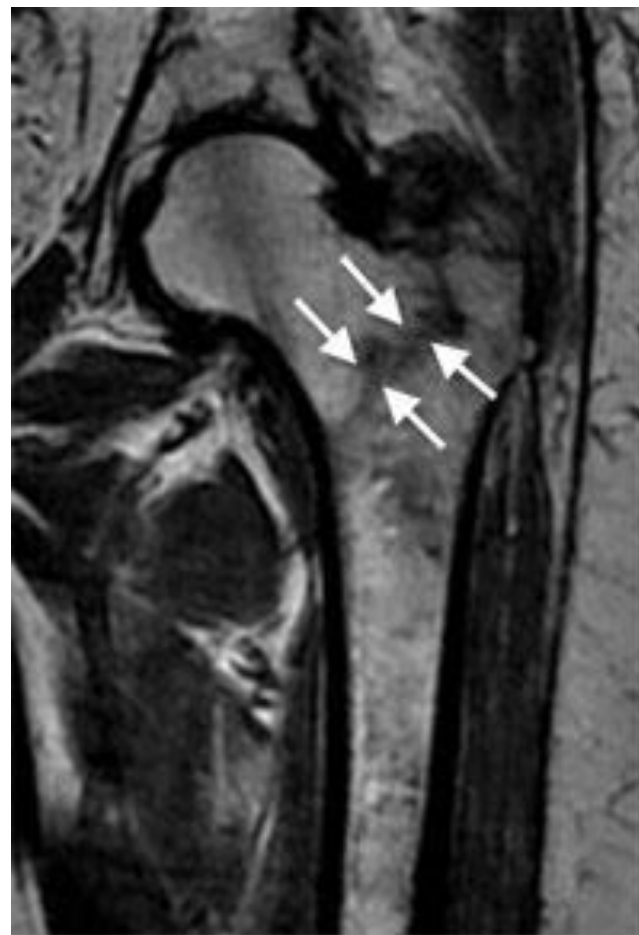
- Hip pain is a common complaint
- In a survey of 6596 adult ages 60 years and older, 14.3 percent reported hip pain on most days over the past 6 weeks [1].





Discussion

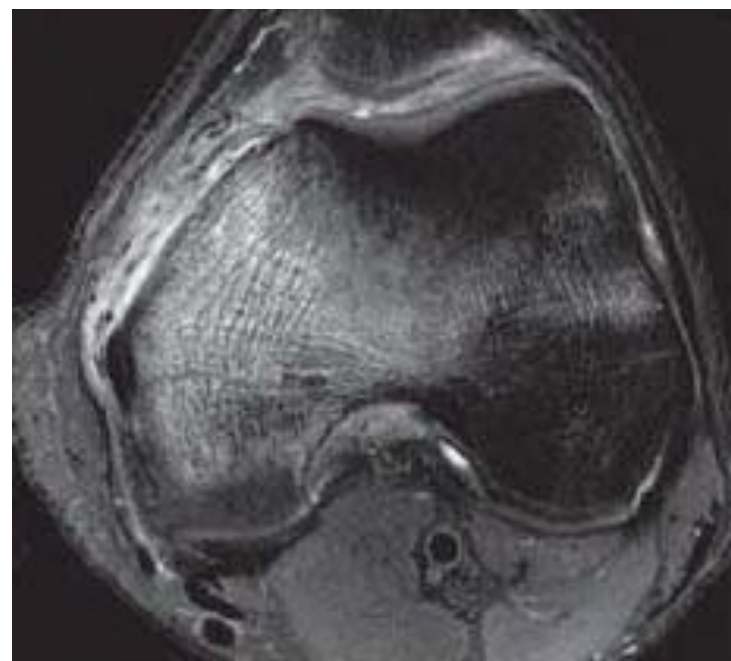
- Radiographic evaluation of the hip
 - Multiple modalities
- MRI is being increasingly used to assess symptomatic hips that are inconclusive on x-ray





Introduction

- A new unique term is being used by radiologists to describe MRI findings in patients with hip and knee pain: **bone marrow edema**





Bone Marrow Edema

- This finding on MRI poses a difficult challenge to clinicians
- Nonspecific and nondiagnostic
- Association with several diseases:
 - Trauma
 - Avascular necrosis
 - Stress reactions
 - Neoplasm
 - Infection
 - And...



Bone Marrow Edema Syndromes

- Benign clinical entities characterized by the imaging finding of bone marrow edema:
 - Transient osteoporosis of the hip (TOH)
 - Reflex sympathetic dystrophy
 - **Transient migratory osteoporosis (TMO)**



Transient Migratory Osteoporosis

- Rare disease first described in 1967 as migrating arthralgia of the lower limb
- Occurs **more often in middle-aged men**
- **Pathogenesis remains unclear**
- Early plain radiographic assessment is unhelpful
- No diagnostic serologic or biochemical markers available



Transient Migratory Osteoporosis

- When a patient presents with single joint involvement, usually the hip, they are usually labeled as having TOH
- TMO cannot be diagnosed until migratory symptoms have appeared
- Pattern of joint involvement is usually proximal to distal
- MRI findings – Bone marrow edema in epiphysis where it extends to subchondral bone often sparing a thin rim of subchondral marrow



Transient Migratory Osteoporosis

- Etiology
 - Possibility that there is 2 separate disease processes
 - Most consider TOH and TMO to be part of a spectrum included in the bone marrow edema syndromes
 - **TOH** thought to be microvascular trauma leading to ischemia followed by reactive hyperemia and vasodilation, causing increased bone marrow pressure
 - Thought to be a **milder form of atraumatic avascular necrosis**, but ischemic insult is mild and allows spontaneous repair and revascularization
 - **TMO** occurs when **feedback mechanism that control the vascular and osteoblastic response to this insult fail** and the response **becomes systemic (our patient's DEXA)**

Transient Migratory Osteoporosis

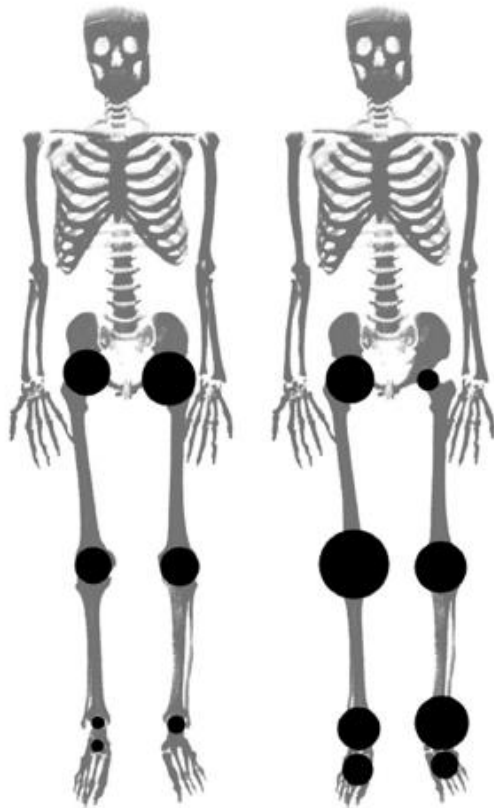


Fig. 2. Diagrammatic representation of the frequency of joint affected by migratory bone marrow oedema or transient osteoporosis in the world literature. The joints involved at first presentation are defined as primary (left) and all joints presenting thereafter are secondary (right). The frequency of joint involvement is directly proportional to the surface area of the overlying black disc.

- Bone may be susceptible to micro-damage in the presence of severe osteoporosis
 - Consistent with TMO occurring in the weight bearing joints and load bearing areas



- Treatment
 - Conservative treatment with weight bearing restrictions and pain control
 - Some have used bisphosphonates and calcitonin with good results
 - Prostacyclin analogues have also been used which are thought to dilate vessels and reduce permeability of capillaries.



Conclusion

- Take home points:
 - Bone marrow edema is a radiologic finding seen in a variety of diseases
 - Keep transient osteoporosis of the hip and transient migratory osteoporosis in the differential
 - Monitor progression as patients could possibly proceed to avascular necrosis requiring surgical intervention
 - Knowledge of these diseases can help practitioners diagnose and manage these rare causes of hip pain
 - Pathophysiology could lead to understanding osteoporosis better



References

1. Anderson BC. Office Orthopedics for Primary Care: Diagnosis and Treatment, 2nd, WB Saunders, Philadelphia 1999.
2. Toms AP, Marshall TJ, Becker E et al (2005). Regional Migratory Osteoporosis: a review illustrated by five cases. Clin Radiol. 60 (4): 425-438.
3. Cahir, J., & Toms, A. (2008). Regional migratory osteoporosis. European Journal of Radiology, 67, 2-10.
4. Koromplias, Anastasios, Apostolos Karantanas, Marios Lykissas, and Alexandros Beris. "Bone Marrow Edema Syndrome." *Skeletal Radiology* 38 (2008): 425-36.



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Questions?