



Musculoskeletal Case No. 15, December 2004

This is a PASSOR Recognized Fellowship Case

Presenting Symptom(s): 1) Left groin pain; 2) hip pain; 3) limb pain

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Disclosures: R. Reeves, None; M.B. Furman, None.

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Appropriate Audience: Residents and practicing physicians

Learning Objectives: After completing this educational activity, participants will be able to: (1) establish a systematic approach to diagnosis and treatment of hip and leg pain; (2) formulate an appropriate clinical plan for a patient that would benefit from a spinal cord stimulator as well as those that will not; (3) identify possible complications of post surgical patients; (4) carry out appropriate diagnostic testing in a complex patient

Level of Difficulty: Intermediate

This case is no longer available for CME credit.

History

The patient is a 62-year-old female who presents with subacute, chronic left leg pain progressive over the past 9 months. She was referred for an evaluation for a spinal cord stimulator.

Her current symptoms began insidiously in July of 2003. The left limb pain is distributed within the groin and hip referring down the anterior medial thigh, slightly past the knee. She states that she occasionally experiences the pain down the lateral aspect of the thigh to the calf into the ankle. She has a history of multiple orthopedic surgeries including a lumbar discectomy and fusion at L4-5 (11/03), bilateral total hip arthroplasty (THA) (04/02) and a left TKA (10/00).

- Prior to continuing, please develop a differential diagnosis in order of likelihood.
 1. The patients past history of intermittent radiculitis is highly suggestive of radiculopathy. Given her clinical age and history, this would most likely be secondary to epidural fibrosis from her L4-L5 discectomy and fusion causing nerve root irritation.



2. With her previous history of hip replacement heterotopic ossification is a distinct possibility.
 3. With her history of bilateral THA, prosthetic loosening could also result in her hip pain, but is unlikely to explain her radiculitis.
 4. A concomitant or isolated trochanteric bursitis could result in her symptom presentation and should always be considered in any local hip pain.
 5. Given the patients age consideration should also be given to a proximal femoral stress reaction or fracture.
 6. Possible metastatic disease should always be considered within the differential diagnosis of a 62 year old female with left hip pain. Metastatic disease can be both osteolytic and osteoblastic. When osteolytic lesions are present primary origin is most likely lung, kidney, breast, thyroid or colon. When osteoblastic lesions are present, prostate, breast, bladder colon and oat cell carcinoma are the most common primary cancers that can metastasize to bone. Multiple myeloma, the most common primary bone tumor, osteosarcoma and chondrosarcoma are primary long bones tumors that can also occur.
- Is there any additional information regarding the clinical history that might be useful in clarifying your differential list or changing its order of priority?

History of Present Illness:

She has a past neuromusculoskeletal history of a left L5 radiculopathy confirmed by electrodiagnosis performed in 2/04. She previously underwent a L4-5 discectomy and fusion in 11/03 that unfortunately resulted in only 3 months of symptom relief. She states that she fell onto her left hip four months prior to presentation and has had progressive problems since. She has had her hip prosthesis evaluated by two different Orthopaedic surgeons after her fall who reported her hip prosthesis to be intact. She also reports that previous treatment has included 3 lumbar epidural steroid injections performed by another interventionalist. These injections were performed using fluoroscopy but unfortunately offered her no relief.

Her symptoms are constant, yet they are significantly increased with mechanical motions of her left limb.

The pain is also experienced in the anterior and medial aspect of the left thigh. She will occasionally experience pain in the calf to the ankle. The worst aspect of her pain is located within her buttocks, medial and lateral thigh on the left. All of her pain is located within her left hip and leg without any back involvement. Prior to the current episode of hip pain, this region was symptom-free until her fall. She denies any paresthesias. She does state that she primarily has weakness of hip flexion that tends to affect her gait and general mobility.

Review of Symptoms:

She denies systemic symptoms. She denies any fevers, chills or night sweats or any incidental weight loss. She denies any vaginal bleeding. She denies any bladder or bowel incontinence. She denies saddle paresthesias. Her primary care physician has recently



performed a sigmoidoscopy and a mammogram and these tests were reported to be normal.

- If necessary, revise your differential diagnosis based on the additional clinical history.

Commentary I

With the history of her pain distribution and lumbar surgery and likely epidural fibrosis secondary nerve root irritation remains a distinct probability. Trochanteric bursitis is a distinct possibility with her likely biomechanical overload from tight musculature from post operative contractures. Given the patients history of local trauma a femoral stress reaction with prosthetic loosening is also a major concern even though she was sent by an orthopaedic surgeon.

- On which details of the physical examination should you focus at this point?

Commentary II

1. Any objective neurologic findings subtle or obvious would help to explain her radicular symptoms. A full neuromusculoskeletal exam should be pursued with dural tension maneuvers.
2. There are no reliable physical examination maneuvers to assess for femoral stress fractures or prosthetic loosening. Attention should be focused to the amount of mechanical pain that can be produced with passive hip range of motion and femoral-acetabular grinding maneuvers.
3. Local point tenderness over the greater trochanter reproducing the patient's pain will aid in evaluating the local bursa as a potential cause. Lateral hip pain in trochanteric bursitis can be reproduced with flexion of the hip followed by resisted hip abduction. This maneuver is more sensitive in younger patients without probable concomitant hip joint pathology.

Physical Examination

The patient presents as a well-developed, well-nourished, elderly female who appears older than her stated age. She is very pleasant and fully cooperative with the history and physical examination. There are no pain amplification behaviors.

She ambulates with a rolling walker with a prolonged stance phase on the right. She is unable to perform one legged stance on the left.

Lumbar range of motion (ROM) is intact with anterior and lateral flexion, extension and rotation. Left hip pain is reproduced with lumbar extension. Palpation examination does not reveal any significant tenderness over the greater trochanters. There is no tenderness elsewhere throughout the lumbar spine, hip girdle or lower limbs.

Inspection reveals no significant leg length discrepancy. There is no skin or vasomotor changes. Muscle bulk is decreased over the dorsum of the left foot without intrinsic wasting.



There is no left sided sabers sign (anterior tibialis atrophy with prominence of the anterior crest of the tibia protruding under the skin).

Muscle stretch reflexes are 2/4 bilaterally at the patellar and Achilles tendons. The left medial hamstring reflex is diminished while the right side is 2/4. There are no sensory deficits in the lower limbs. There are no dural root tension signs seen in the supine or seated positions, although both supine and seated straight leg raise reproduce left hip pain without distal referral. Posterior tibial and dorsal pedis pulses are 2+ symmetrically.

Muscle tone is normal and symmetric.

Manual muscle testing reveals (grading is bilateral unless otherwise indicated): left hip flexion 2/5; right hip flexion 5/5; right hip abduction 5/5; left hip abduction 3/5; right hip adduction 5/5; left hip adduction 3/5; left knee extensors 3/5; right knee extensors 5/5; ankle dorsiflexors 5/5; left great toe extension 4/5; right great toe extension 5/5; ankle plantar flexors 5/5.

Left hip ROM is limited secondary to pain in both the sitting and supine position. Right hip ROM is painless and full.

Patricks testing is negative bilaterally, however there is significant pain produced with internal and external rotation as well as femoral grind.

- At this point review your differential and revise as appropriate.

Commentary III

Given her localized atrophy, presenting radiculitis with a previous L4-5 discectomy and fusion, a lumbosacral radiculopathy remains a distinct possibility. The reproducible concordant pain with hip ROM suggests a mechanical component to her pain such as prosthetic loosening.

Diagnostic Testing

- What diagnostic testing would you order at this time?

Commentary IV

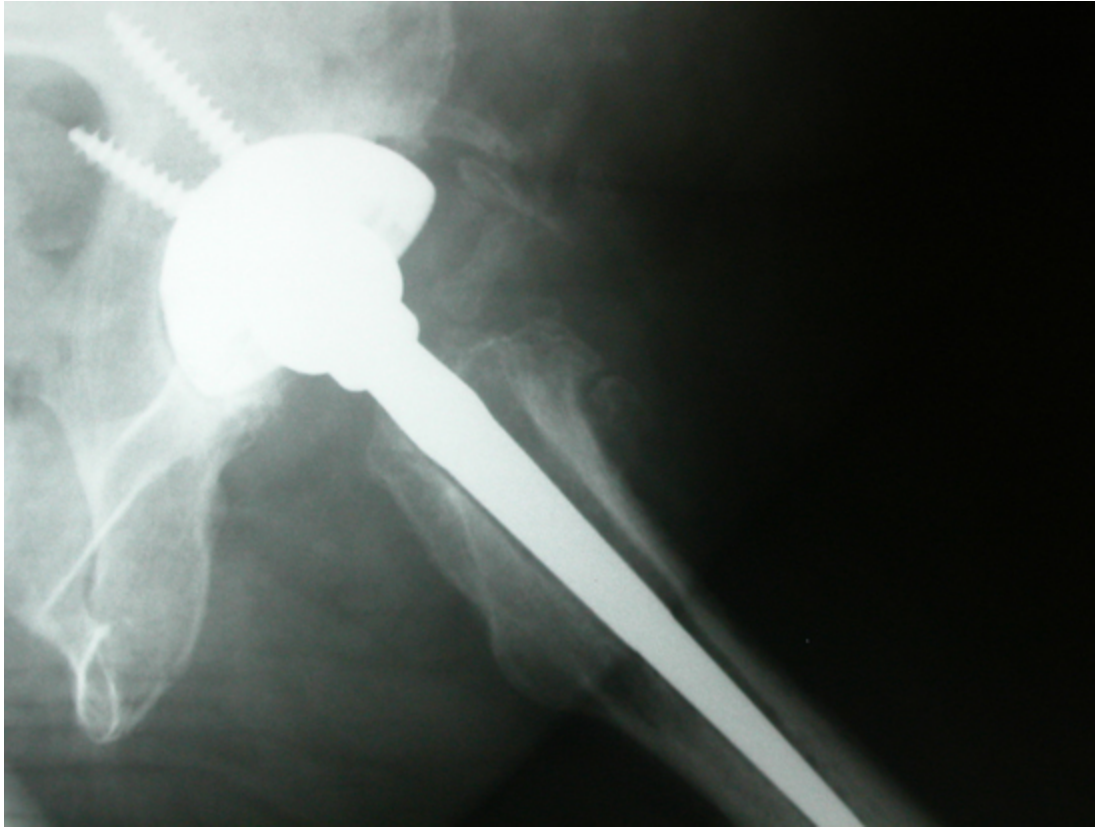
Plain radiographs of the left hip, femur and pelvis are appropriate at the time of the initial evaluation. See Figures 1 and 2.

Radiologic Examination

(Figure 1)



(Figure 2)



Two views of the left hip show a left total hip arthroplasty. The inferior screw displays prominent penetration on the under surface of the ilium. There is a small amount of heterotopic ossification at the posterior lateral acetabular region. Anteroposterior radiograph reveals the femoral stem of total hip arthroplasty with 2.5-3 mm of lucency seen more prominent posteriorly. There are no osteolytic or blastic lesions consistent with malignancy.

Based on the patient's history, even with the above abnormal x-ray results, ruling out a concomitant radiculopathy is necessary.

Electrodiagnostic Examination

Repeat electrodiagnostic evaluation shows a remote left L5 with increased motor unit potential recruitment frequency (14-16 hertz), amplitudes of 4-6 mV, units with prolonged duration and polyphasicity within L5 innervated myotomes. There is no evidence of any membrane irritability. Left tibial motor, sural sensory and tibial H reflexes were all within normal limits. The left peroneal motor distal latency and conduction velocity to the extensor digitorum brevis was normal while the distal amplitude was decreased (1.2mV).



Commentary V

We were originally considering the six conditions listed in the original differential diagnosis list (Commentary I). The physical exam helped exclude trochanteric bursitis. Although the electrodiagnostic findings are suggestive of a remote L5 radiculopathy, there was no suggestion of any active nerve root irritation. An updated lumbar MRI could be considered but given her lack of active radicular findings other treatable causes for her complaints should be investigated. Her remote L5 radiculopathy alone does not explain her pain elicited with mechanical movements such as hip internal rotation. The radiographs excluded any localized metastatic bony lesions while the extent of heterotopic ossification without ankylosis is not likely to result in her severe pain. Plain radiographs have a low sensitivity for any stress fracture and stress reactions; however any co-existing fractures around the prosthesis would result in dislocation with prosthetic migration seen as trochanteric advancement. The presence of loosening of 2mm or more around the femoral component suggests loosening. Obvious loosening of a femoral prosthesis is suggested when there is evidence for progressive migration or tilt. This can be both septic and aseptic in etiology.

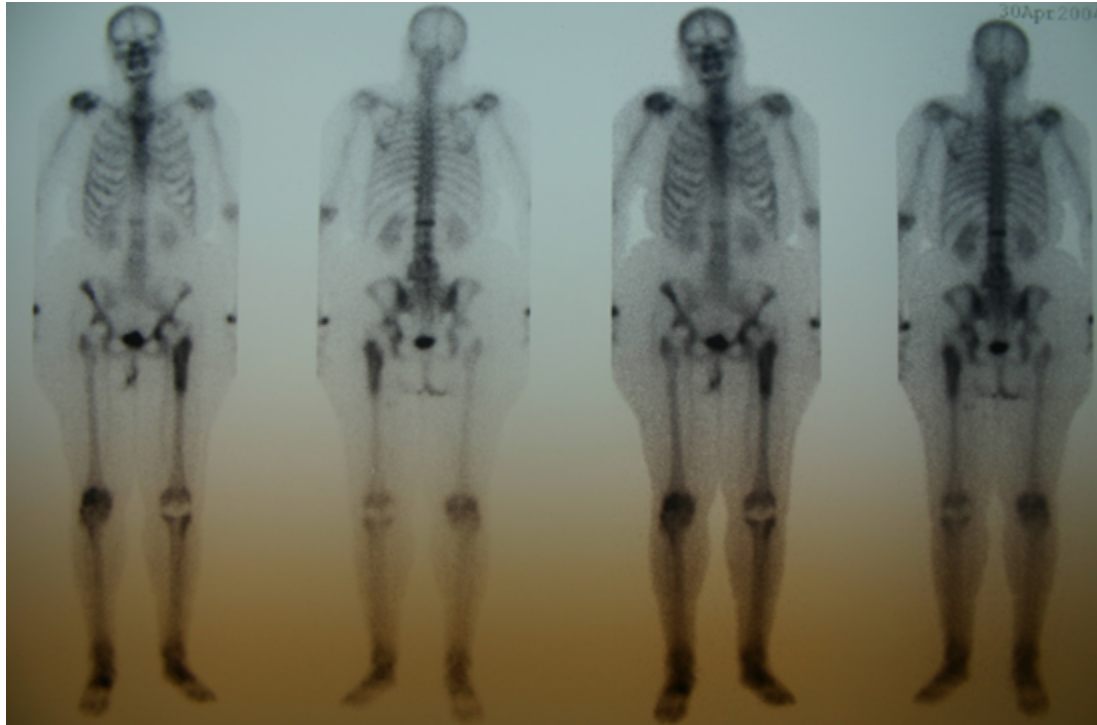
- What additional test would you order?

Commentary VI

The diagnostic options include radionuclide bone scan for further delineation of loosening. It could also give insight to possible bony uptake if metastatic concerns were still high on the differential. Fluoroscopic percutaneous arthrocentesis with arthrography to exclude infection as a cause of loosening could be pursued. In addition, extraarticular fluid collections can be identified with sonography.

Computed tomography (CT) and magnetic resonance imaging (MRI) have been used for further evaluation, however the extent of scatter artifact usually obscures findings.

**Bone Scan Results:
Figure 3**



The bone scan is as follows: from left to right there are 4 pictures. The first two represent the blood flow or vascular phase while the last two represent the late phase.

- The first is an anterior view of the skeletal structures with the right side defined as right and the left, left
- The second is a posterior view of the skeleton with the right side defined as left and the left side defined as right
- The third is also an anterior view of the skeletal structures with the right side defined as right and the left, left
- Finally, the fourth side is the posterior view of the skeleton with the right side defined as left and the left side defined as right.

Initial flow reveals slight diffuse increased activity about the left hip region. Delayed images reveal intense uptake involving almost the entire portion of the left femoral component to the hip prosthesis. This is in marked contrast to the normal appearing right hip prosthesis. No evidence of fracture is seen.

Diffuse arthritic change about the right knee is noted. Arthritic changes at both ankles are also seen. Linear increased activity about the L1 vertebral body is identified suggestive of a subacute compression fracture.

- If necessary, revise your differential diagnosis based on the test results.



Commentary VII

Bone scans are highly sensitive for bone pathology but they lack specificity. Weissman investigated the usefulness of three phase bone scan and showed that increased uptake after one year can indicate infection or loosening. The nuclear medicine report also provides us with incidental findings of a subacute L1 vertebral body compression fracture and expected osteoarthritic findings.

- Make the final revisions of your diagnostic impression(s).

Diagnostic Impression

1. Left femoral prosthetic loosening.
2. Remote left L5 radiculopathy.

Commentary VIII

The patient denied any significant thoracolumbar symptoms at follow up. Plain radiographs were obtained for measurement of the amount of anterior vertebral body collapse and base line measurements.

Treatment

1. An informal discussion with the referring orthopedic surgeon resulted in an immediate orthopaedic surgical re-evaluation for left total hip arthroplasty revision.
2. Re-evaluation in 2-4 months after hip revision for extent of limb pain and possible stimulator.
3. A referral to an Internist or initiation of osteoporosis treatment as well as further laboratory testing such as TSH and PTH tests (evaluating for potential secondary causes of hyperthyroidism and hyperparathyroidism), alkaline phosphatase, calcium and phosphate (rule out osteomalacia). A DEXA scan should be performed to evaluate for low bone mineral density. If indicated, bisphosphonate and supplementation with calcium citrate 1500 mg/d and vitamin D 800 IU/d could be pursued. Selective estrogen receptor modulators or hormone replacement may be appropriate in selected clinical settings.

Follow Up

The referring surgeon opted to culture and perform a wash out with a later revision. The patient returned to follow up after a postoperative course of rehabilitation. Overall, she states that she is approximately 70% improved and is no longer considering further invasive treatments for her pain. The character of her pain has changed and now is described as a generalized "hip" soreness without radiculitis.

Commentary IX

As physiatrists, we are often asked to treat patients who have pre-determined conditions resulting from multiple physician visits. Paramount to all new patient evaluations is a complete clinical assessment with appropriate work up for presenting symptoms, regardless



of pre-determined diagnosis. When considering an aggressive pain relieving procedure such as spinal cord stimulation, treatable causes for the pain must be completely ruled out. We always need to have "our antennas up" and evaluate each patient on an individual basis. Vigilant attention to available clinical information may help guide warranted treatment, even if it differs from the requested intervention. Although, cost effective medicine pressures us to avoid excessive diagnostic work ups, judicious clinical evaluations and testing may help guide warranted treatment – especially if the considered treatment is aggressive (i.e. spinal cord stimulation)

First and foremost, we must do what is best for our patients. We must balance the desire to take the easy path of "doing what's asked for" with the political and business ramifications of considering a different treatment course. These do not necessarily need to be diametrically opposed.

In this particular case, a complicated case was sent by an Orthopedic Surgeon for a spinal cord stimulator trial. Our evaluation suggested that the patient's complaints were from hip prosthesis loosening and not chronic neuropathic pain. An informal discussion with the referring physician followed by re-evaluation and subsequent revision surgery resulted in a favorable outcome.

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