

# Bilateral Femoral Neck Fractures After Pelvic Irradiation

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**B**aesneb first described radiation-induced fracture of the femoral neck in 1927.<sup>1</sup> Although this entity has been sporadically described in the radiology literature,<sup>2,3</sup> it has received little attention in the orthopedic literature.

Radiation-induced fracture is caused by bone weakening secondary to osteocyte and osteoblast damage.<sup>3-5</sup> Radiation also damages the microvasculature and causes vessel occlusion.<sup>3-6</sup> As mineral content decreases, bone becomes more susceptible to fracture. Femoral insufficiency fractures attributable to radiation therapy can occur more than 10 years after irradiation.<sup>2</sup>

Insufficiency fractures occur when weakened bone fails under normal stresses. For patients who have undergone pelvic irradiation for malignancy, insufficiency fractures occur most commonly in the bony pelvic girdle.

We present an unusual case of a woman who developed bilateral femoral neck insufficiency fractures 13 years after pelvic irradiation for a carcinoma of the anus.

## Case Report

A 71-year-old woman presented with left groin pain without a history of trauma. Thirteen years earlier, she had had an anal carcinoma treated with pelvic irradiation of 3000 rad in 15 equal fractions over 4 weeks. She also had a course of chemotherapy with 5-fluorouracil and mitomycin C.

The patient reported that her groin pain had appeared suddenly, when she was getting out of a car 5 weeks before her initial office visit with us. She denied falling or experiencing any other trauma. She had received chiropractic and therapy treatments before presenting to our clinic. The pain had

increased gradually during that time. At presentation, weight-bearing exacerbated her symptoms, and sitting or lying down relieved them.

Pain was noted on palpation of the adductor origin, lesser trochanter, gluteals, and proximal quadriceps and on full flexion, abduction, and external rotation of the hip, but hip range of motion was not limited when compared with the opposite, asymptomatic side. The left knee was normal on examination. The patient could not bear her full body weight through the left lower extremity and was using a walker for ambulation.

As plain radiographs had not been diagnostic (Figure 1), the referring physician ordered a technetium-99 bone scan (Figure 2). This scan showed an area of increased uptake in the subcapital region of the femoral neck. The radiographs and bone scan also showed an area of increased uptake in the region of the pubic symphysis.

Neither the original radiographs nor the bone scan was available to us at the patient's initial office visit. We explained the need to have imaging studies to make a definitive diagnosis, but the patient refused to have a radiograph taken at our clinic. The imaging studies were ordered from the office of the referring physician, and the patient was scheduled for a return visit in 1 week. In the interim, we referred the patient to a physical medicine physician for nerve conduction studies to rule out neurologic pathology. Results of the nerve conduction studies were normal, so the physical medicine physician ordered magnetic resonance imaging (MRI) of the lumbar spine, pelvis, and bilateral hips. MR images clearly showed that the lesion seen on the bone scan was a nondisplaced left femoral neck fracture.

The patient underwent percutaneous fixation with 7.3-mm cannulated screws. Results of the biopsy of the reamings produced when the screws were inserted were negative for metastatic disease, metabolic bone disease, and necrosis. The left femoral neck fracture healed uneventfully, and the patient's symptoms resolved completely. Bony healing was assessed radiographically (Figure 3), and symptoms and function were monitored. The patient returned to full function and ambulation.

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