



"Is it broken?"



Rose Mengual, MD, ACP

Filomena's case

Filomena, 84, is taken to the ED by her daughter after having suffered a fall 4 days prior. Normally, she ambulates independently without the use of any walking aids. Since the fall, she has required the use of a walker and reports the following:

- Right hip pain
- Inability to bear weight without the use of the walker

Medical history

Filomena's medical history reveals that she has Type 2 diabetes and hypertension.

Examination

Filomena's vital signs are as follows:

- Temperature: 37°C
- BP: 147/78 mmHg
- Heart rate: 76 bpm
- Respiratory rate: 20 breaths per minute
- Oxygen saturation: 97% on room air
- Point-of-care blood glucose: 8.7 mmol/L

On examination, Filomena is alert and oriented to person, place and time. She is lying semi-sitting. There is no leg length discrepancy or rotation of the affected limb. There is pain with internal and external rotation of the right hip. The peripheral neurologic exam is normal and there is no vascular compromise.

Look to page 4 for the conclusion to Filomena's case.

Questions & Answers

1. What is the differential diagnosis?

In a patient of this age, it is important to consider a broad differential diagnosis that extends beyond the immediately obvious problem of hip pain. It is important to explore whether her initial fall was purely accidental (*i.e.*, tripped), or rather a consequence of pre-syncope, chest pain, neurologic event, *etc.* Filomena denies any symptoms suggestive of an occult medical cause for the fall. The differential diagnosis at this point then becomes focused on musculoskeletal injuries. Certainly, a hip fracture is at the top of the list, but other injuries must be considered.

The differential diagnosis includes:

- Hip fracture
- Pelvis fracture
- Femur fracture
- Hematoma
- Muscular strain
- Ligamentous sprain

2. Is Filomena at risk for a hip fracture?

There are approximately 250,000 hip fractures treated annually in the US, a figure that is expected to double over the next 40 years. The combination of Filomena's age, gender and post-menopausal state places her at risk for osteoporosis. The majority of hip fractures in



Figure 1. X-ray showing a cortical irregularity at the neck of the right femur. No definite fracture line is seen.

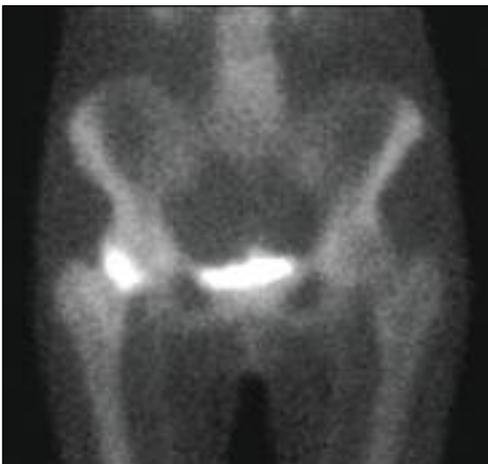


Figure 2. Bone scan showing intense uptake in a linear distribution across the neck of the right femur.

patients > 65-years-of-age occur following minor trauma to bones weakened by osteoporosis. Given Filomena's risk, mechanism of injury, pain and inability to bear weight, the clinical suspicion of a hip fracture is high.

3. *What is the best way to diagnose Filomena?*

The initial diagnostic test of choice is x-ray (Figure 1). Filomena should have plain films, including an anteroposterior pelvis and lateral view of the affected hip.

4. *Do x-rays detect all hip fractures?*

No. The incidence of hip fractures that are not detected on initial x-ray (radiologically occult) is 3% to 9%. If the x-rays are normal or equivocal and there is a high clinical suspicion of hip fracture, additional investigations are necessary.

5. *How can we investigate further?*

The diagnostic test of choice to diagnose the radiologically occult hip fracture is a MRI scan. MRI scans can detect evidence of a hip fracture as early as four hours after an injury, with 100% sensitivity and specificity. Alternatively, a bone scan (Figure 2) can detect a hip fracture with 93% sensitivity and 95% specificity. In general, the fracture will become evident on bone scan 24 to 72 hours after injury. In centers where neither of these modalities is immediately available, consider repeat plain films or orthopedic consultation. Imaging with a MRI scan has the added advantage of being able to illustrate alternative diagnoses, including ligamentous or soft tissue injury.

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Filomena's case cont'd...

Filomena is admitted to the orthopedics service with a diagnosis of query occult right hip fracture. She undergoes a bone scan the following day which confirms the diagnosis of an occult hip fracture.

Filomena has her hip surgically repaired via internal fixation with screws (Figure 3) and is currently completing physical rehabilitation.



Figure 3. Internal fixation of right hip via placement of trabecular screws.

6. What are the consequences of missed hip fractures?

Despite the obvious medico-legal risk of missed hip fractures, there are many important patient-focused problems that may result. The complications associated with missed hip fracture include:

- pain,
- fracture displacement,
- avascular necrosis,
- thromboembolic disease and
- a future need for more complex surgery.

7. What should we learn from Filomena's case?

If there is a high clinical suspicion of hip fracture with negative or equivocal x-rays of the hip and pelvis, you must consider the possibility of a radiologically-occult hip fracture. Follow-up imaging with a MRI scan or bone scan is necessary. **Dx**

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