

Diagnostic Imaging Pathways - Hip Fracture (Suspected)

Population Covered By The Guidance

This pathway provides guidance on imaging adult patients with suspected hip fracture.

Date reviewed: August 2013

Date of next review: 2017/2018

Published: August 2013

Quick User Guide

Move the mouse cursor over the **PINK** text boxes inside the flow chart to bring up a pop up box with salient points.

Clicking on the **PINK** text box will bring up the full text.

The relative radiation level (RRL) of each imaging investigation is displayed in the pop up box.

SYMBOL



RRL

None

EFFECTIVE DOSE RANGE

0



Minimal

< 1 millisieverts



Low

1-5 mSv



Medium

5-10 mSv



High

>10 mSv

Pathway Diagram

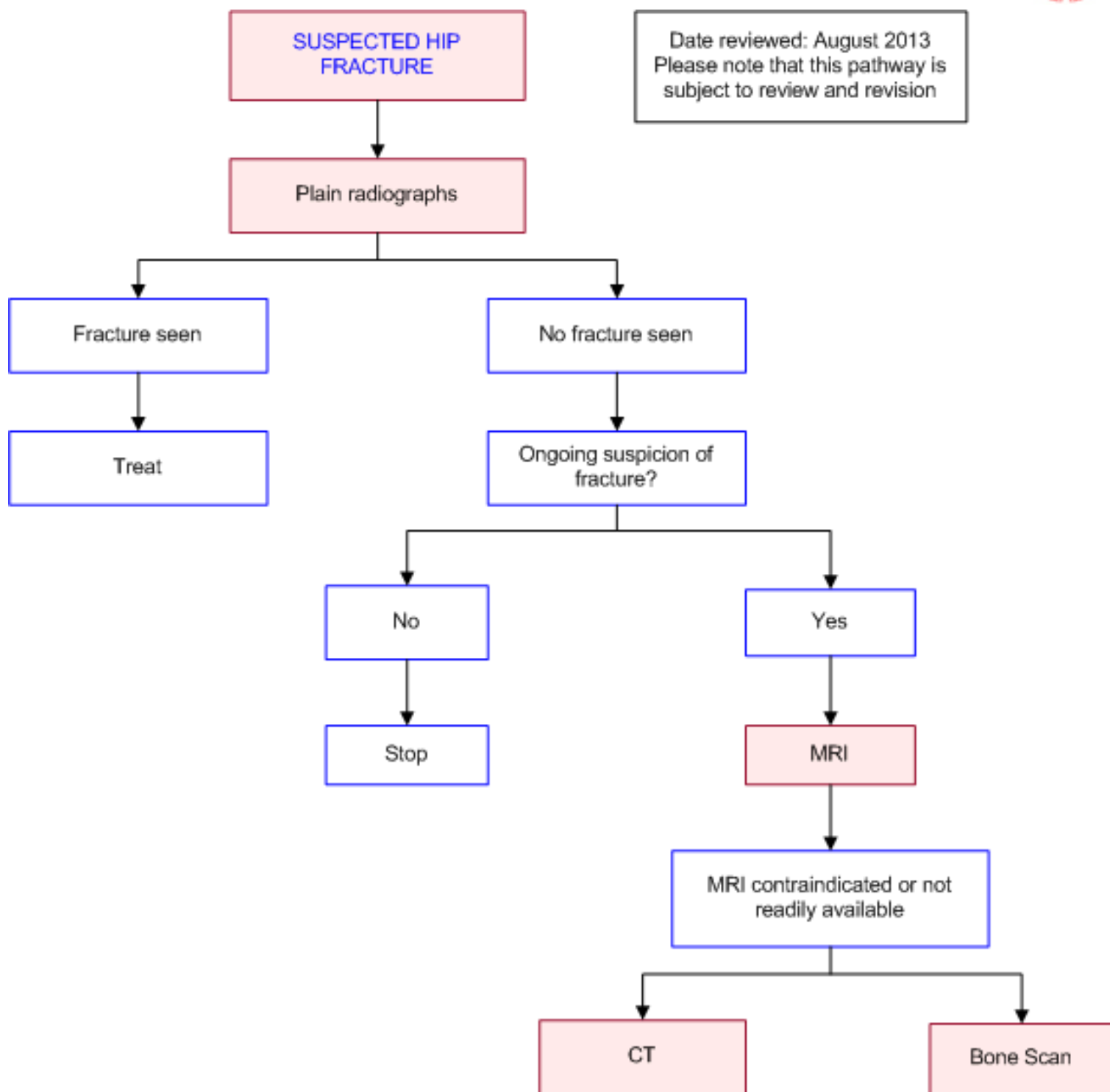


Image Gallery

Note: These images open in a new page

1



Fractured Pubic Ramus

Image 1 (Plain Radiograph): Fractured left superior pubic ramus (arrow).

2 Fractured Acetabulum



Image 2 (Plain Radiograph): Fractured right acetabulum (arrow).

3 Inter-Trochanteric Femoral Fracture



Image 3 (Plain Radiograph): Inter-trochanteric fracture of the right hip (arrow).

4 Undisplaced Inter-Trochanteric Femoral Fracture



Image 4 (Magnetic Resonance Imaging): Undisplaced inter-trochanteric fracture of the right hip (Arrow).

5 Sub-Capital Femoral Fracture



Image 5 (Plain Radiograph): Sub-capital fracture of the right hip (arrow).

Teaching Points

- Plain radiographs will show a suspected fracture in the majority of cases
- If clinical suspicion of occult hip fracture persists MRI is the imaging modality of choice
- CT or nuclear medicine bone scan are alternatives to MRI

Plain Radiography

- Will show a suspected fracture in the majority of cases
- May miss some fractures, particularly those that are non-displaced or in patients with osteoporosis [1](#)
- Reported overall incidence of radiographically occult fractures varies between 2 – 14% [2-9](#)
- Lower level of interobserver agreement than CT or MRI [10](#)
- In patients undergoing MRI for suspected hip fracture, radiographic findings had a false positive rate of 12% [7](#)
- If clinical suspicion remains high despite normal or equivocal radiographs further imaging should be pursued, as delayed diagnosis increases the rate of secondary fracture displacement and morbidity and is associated with lengthened hospitalisation periods and increased costs [4,8,11,12](#)

Magnetic Resonance Imaging (MRI)

- MRI is superior to other imaging modalities in detecting occult hip fractures, [1,5](#) with a reported 100% sensitivity and specificity [6,13-16](#)
- Of those patients with suspected hip fracture who undergo MRI, incidence of radiographically occult hip fracture and occult hip and/or pelvic fracture varies widely, and likely depends on MRI

- requesting criteria [1,17](#)
- MRI can also detect other causes of pain such as soft tissue injuries and occult pelvic fractures [1, 15,17-22](#)

Computed Tomography (CT)

- Widely available and generally considered effective at diagnosing the occult hip fracture [2,5,23](#)
- May miss a small percentage of hip fractures, particularly osteoporotic bone, small impacted fractures or undisplaced fractures that run parallel to the axial plane [5,24](#)
- Given the importance of timely surgical management, an MRI may be warranted where CT is negative but a high clinical suspicion remains [5,9](#)
- CT is an alternative when MRI is contraindicated. The shorter acquisition time of CT makes it a useful alternative in elderly and claustrophobic patients who may have motion artefact due to pain or anxiety

Bone Scan

- Although bone scintigraphy is highly sensitive for detection of occult fracture, its lower specificity compared to MRI limits diagnostic utility, often necessitates further advanced imaging, and has been associated with diagnostic and surgical delay [13,14,25-27](#)
- False positive bone scans have been reported with synovitis, tumours, arthritis and degenerative changes sometimes mimicking fractures [13,25,26](#)
- It may be useful where MRI is contraindicated or not available, or where metallic implants may produce local artefacts and decrease imaging quality on MRI
- Bone scans may be negative in the first 24-48 hours in elderly patients with slow bone turnover or osteoporosis
- There is some debate over the optimal time for doing a bone scan with one study showing it to be accurate within 24 hours of injury but there is a perception that for optimum results it should be delayed for up to 72 hours [13](#)

References

Date of literature search: April 2013

The search methodology is available on request. [Email](#)

References are graded from Level I to V according to the Oxford Centre for Evidence-Based Medicine, Levels of Evidence. [Download the document](#)

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