Diagnostic Imaging Pathways - Knee Pain (Non-Traumatic)

Population Covered By The Guidance

This pathway provides guidance on the imaging of adult patients with new onset, non-traumatic knee pain.

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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	EFFECTIVE DOSE RANGE
	None	0
	Minimal	< 1 millisieverts
	Low	1-5 mSv
	Medium	5-10 mSv
	High	>10 mSv

Pathway Diagram

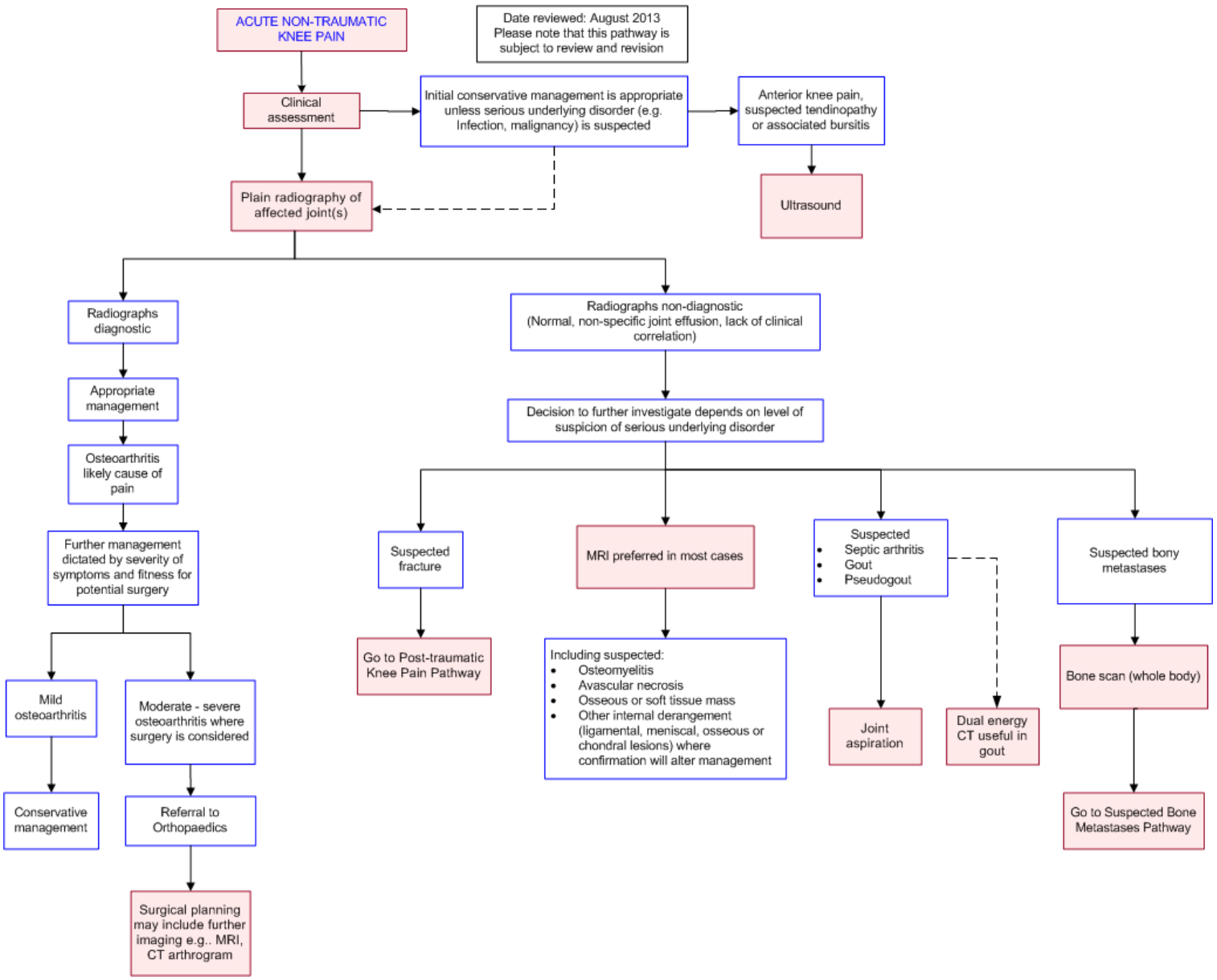

Image Gallery

Note: These images open in a new page

1a

Osteoarthritis

Image 1a, 1b, 1c and 1d (Plain Radiograph): Advanced degenerative changes of the knee joints are demonstrated bilaterally affecting predominantly the medial compartments. There is lateral translation of both tibiae with varus deformity present bilaterally. Osteoarthritic changes are seen in bilateral patello-femoral joints as well. Marked generalised osteoporosis is noted.

1b

1c

1d

Teaching Points

- Initial clinical assessment is important
- Plain radiography is an appropriate first line investigation for those with severe pain and significant functional impairment
- Further imaging is dictated by a provisional diagnosis

Plain Radiography

- Appropriate first line investigation for those with severe pain, and significant functional impairment. 3,4 Consider additional hip radiographs in the case of referred pain if hip pathology is suspected
- Osteoarthritis (OA) is diagnosed most effectively by clinical criteria with the aid of radiographic findings (joint space narrowing, osteophytes, subchondral bone sclerosis and subchondral cysts) which correlate well in acute exacerbations. 5,6 Further imaging modalities are seldom indicated for diagnosis of OA 1
- Radiography does not alter management in patients with less severe degenerative change 7
- Less helpful in crystalline and septic arthritis. A patient with acute knee pain and joint effusion, particularly if infection is suspected, should have arthrocentesis and synovial fluid examination 6
- Normal plain radiographs do not reliably exclude osteomyelitis as nearly 50% loss of bone density is required before a radiograph becomes abnormal. 8 An abnormal radiograph doubles the odds of osteomyelitis 9

Magnetic Resonance Imaging (MRI)

- MRI is effective in ruling out internal derangement of the knee. 10-12 MRI significantly affects the clinical decision-making process and can often prevent unnecessary knee arthroscopy 12-19
- High accuracy in the detection of meniscal and ligamentous pathology, and osseous and chondral lesions such as bone marrow oedema, spontaneous osteonecrosis, insufficiency fractures and chondromalacia patella 20,21
- Useful in patients with persistent undiagnosed pain, including suspected avascular necrosis and sepsis

Ultrasound

- While MRI is diagnostically superior, ultrasound is useful to quickly and inexpensively visualise superficial soft tissue structures and has the advantage of a dynamic evaluation of the knee in active and passive motion
- Useful in the rapid evaluation of the extensor mechanism, suspected tendinopathy or associated bursitis, or popliteal cyst 22,23
- Improves diagnostic accuracy and guidance of local steroid injection in Achilles and patella tendinopathy 24

Computed Tomography (CT) and Arthrography

- CT arthrography has higher spatial resolution that MRI for articular and meniscal pathology and is an excellent alternative test if MRI is contra-indicated or not available 25
- In post-operative knees MDCT arthrography is more accurate than MRI in the diagnosis or meniscal re-tear 26
- Dual energy CT may be used to noninvasively diagnose and monitor gouty arthropathy of the knee by analysis of the chemical composition of the scanned materials 2,27,28
- CT may be used for assessment of patellar maltracking in patients 29,30

Bone Scintigraphy

- Initial imaging modality of choice in detecting widespread bone metastases
- Advantages
    - Allows total body survey for systemic involvement of osseous and joint pathology 31,32
- Limitations 31,32
    - Non-specific – a positive bone scan may require correlation with other imaging modalities
    - Some metastases may not show increased uptake on bone scan, particularly those that are lytic, for example kidney, thyroid and melanoma. Lytic tumours are better detected by metabolic scans such as FDG-PET because they have a high glucose metabolism 33, or anatomical assessment with CT or MRI

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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