Diagnostic Imaging Pathways - Hip Pain (Non-Traumatic)

Population Covered By The Guidance

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

Date reviewed: August 2013
Date of next review: 2017/2018
Published: October 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.

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>RRL</th>
<th>EFFECTIVE DOSE RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>☢️</td>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td>🟢</td>
<td>Minimal</td>
<td>&lt; 1 millisieverts</td>
</tr>
<tr>
<td>🟠</td>
<td>Low</td>
<td>1-5 mSv</td>
</tr>
<tr>
<td>🟡</td>
<td>Medium</td>
<td>5-10 mSv</td>
</tr>
<tr>
<td>💥</td>
<td>High</td>
<td>&gt;10 mSv</td>
</tr>
</tbody>
</table>

Pathway Diagram
Teaching Points

- Initial clinical assessment is important
- Plain radiography is an appropriate first line investigation for those with severe pain and significant functional impairment
- MRI is generally the best investigation to further evaluate hip pain. MR arthrography can help diagnose labral tears
Bone scan is useful in detecting wide-spread bone metastases. Nuclear medicine studies are also useful in suspected infected hip prostheses. CT is useful in diagnosing osteoid osteoma. Ultrasound is useful in selected indications such as bursitis and tendinopathy but is user dependent and insufficient for articular or osseous structures.

**Plain Radiography**

- Plain radiography is an appropriate initial investigation for those with persistent pain and significant functional impairment.
- Plain radiography may detect gross fractures, tumours, advanced arthrosis and hip dysplasias, but does not detect early changes of joint space narrowing, subtle stress or insufficiency fractures, intra-articular structures or bone marrow changes.
- Osteoarthritis (OA) is diagnosed most effectively by clinical criteria with the aid of radiographic findings. Further imaging modalities are seldom needed for OA diagnosis.
- Certain radiographic features may help to distinguish metastases from other conditions and aid in identification of the primary tumour. Overall plain radiographs have poor sensitivity for detection of bone metastases.
- Normal plain radiographs do not reliably exclude osteomyelitis as nearly 50% loss of bone density is required before a radiograph becomes abnormal.

**Magnetic Resonance Imaging (MRI) and MR Arthrography**

- If initial radiographs are negative or non-diagnostic, if soft tissue injury is suspected or a high suspicion of osseous abnormality remains, further evaluation is best done with MRI.
- High sensitivity and specificity for detection of osteos and chondral lesions, e.g. fracture, avascular necrosis or stress injury.
- Ligamental and muscle injuries, e.g. femoroacetabular impingement.
- Osteomyelitis.
- MRI can help predict clinical outcome in osteoarthritis.
- MR arthrography is superior to conventional 1.5T MRI or CT arthrography in the diagnosis of labral tears, but may not preclude arthroscopy when negative and high clinical suspicion remains.
- Higher field (3T) MRI appears equivalent to MR arthrography and may preclude the need for invasive intraarticular contrast.
- MR arthrography is highly specific but insensitive for detection of intraarticular loose bodies compared to arthroscopy.

**Computed Tomography (CT) and CT Arthrography**

- CT offers excellent delineation of cortical bone. It is considered an alternative to MRI in detection of occult hip fracture where MRI is contraindicated.
- More accurate than MRI in detecting the characteristic nidus of osteoid osteoma, although the use of dynamic gadolinium-enhanced MRI improves nidus conspicuity compared to CT.
- CT arthrography is equivalent to MR arthrography in demonstrating articular cartilage lesions, and appears useful in diagnosing labral tears and other intra-articular hip pathology where MRI and MR arthrography is contraindicated or unavailable.
Ultrasound

- Inexpensive and useful in specific indications. Ultrasound allows dynamic evaluation of tendons and muscles and identification of hip effusions as well as bursal and soft tissue collections.
- However, it is user-dependent, insufficient for deeper articular or osseous structures and overall has a limited role in hip imaging.
- Useful in the evaluation of greater trochanteric bursitis and gluteal tendon tears in the hands of an experienced user.

Bone Scan

- Use has mostly been replaced by MRI in the evaluation of focal hip pathology, but bone scintigraphy may be used as an alternative where MRI is contraindicated.
- Useful for screening the entire skeleton to assess for systemic involvement of osseous and joint pathology, such as metastases, infection.
- Some nuclear medicine scans may be helpful to assess suspected infected hip prostheses, where metallic implants may produce local artefacts and decrease imaging quality on 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

8. Khurana B, Okanobo H, Ossiani M, Ledbetter S, Al Dulaimy K, Sodickson A. Abbreviated MRI


Information for Consumers

<table>
<thead>
<tr>
<th>Information from this website</th>
<th>Information from the Royal Australian and New Zealand College of Radiologists’ website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consent to Procedure or Treatment</td>
<td>Arthrogram</td>
</tr>
<tr>
<td>Radiation Risks of X-rays and Scans</td>
<td>Computed Tomography (CT)</td>
</tr>
<tr>
<td>Arthrogram</td>
<td>Contrast Medium (Gadolinium versus Iodine)</td>
</tr>
<tr>
<td>Bone Scan</td>
<td>Gadolinium Contrast Medium</td>
</tr>
<tr>
<td>Computed Tomography (CT)</td>
<td>Iodine-Containing Contrast Medium</td>
</tr>
<tr>
<td>Magnetic Resonance Imaging (MRI)</td>
<td>Magnetic Resonance Imaging (MRI)</td>
</tr>
<tr>
<td>Ultrasound</td>
<td>Plain Radiography/X-rays</td>
</tr>
<tr>
<td>Plain Radiography (X-ray)</td>
<td>Radiation Risk of Medical Imaging During Pregnancy</td>
</tr>
<tr>
<td></td>
<td>Radiation Risk of Medical Imaging for Adults and Children</td>
</tr>
<tr>
<td></td>
<td>Ultrasound</td>
</tr>
<tr>
<td></td>
<td>Nuclear Medicine</td>
</tr>
<tr>
<td></td>
<td>Nuclear Medicine Bone Scan</td>
</tr>
</tbody>
</table>

Copyright
Legal Notice

Please remember that this leaflet is intended as general information only. It is not definitive and The Department of Health, Western Australia can not accept any legal liability arising from its use. The information is kept as up to date and accurate as possible, but please be warned that it is always subject to change.

File Formats

Some documents for download on this website are in a Portable Document Format (PDF). To read these files you might need to download Adobe Acrobat Reader.