

Diagnostic Imaging Pathways – Low Back Pain

Population Covered By The Guidance

This pathway provides guidance for imaging adult patients with acute lower back pain. There are prompts regarding important considerations when planning a referral including ‘red flags’.

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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

None

Minimal

Low

Medium

High

EFFECTIVE DOSE RANGE

0

< 1 millisieverts

1-5 mSv

5-10 mSv

>10 mSv

Pathway Diagram

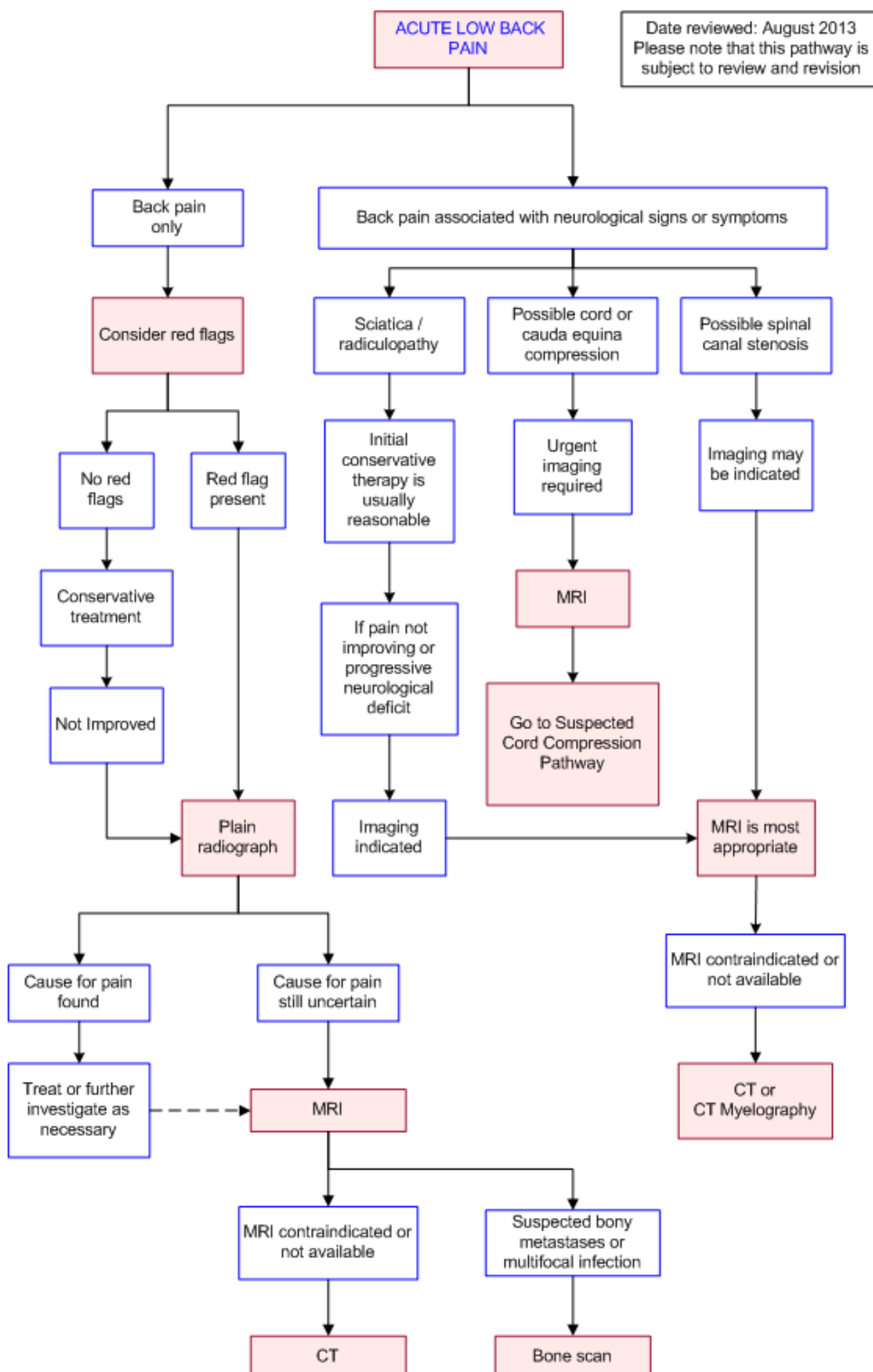


Image Gallery

Note: These images open in a new page

1a



L4/L5 Disc Herniation

Image 1a and 1b (Computed Tomography): Axial and sagittal images demonstrating a large left sided eccentric disc protrusion at L4/L5 that is compressing the traversing left L5 nerve root.

1b



1c

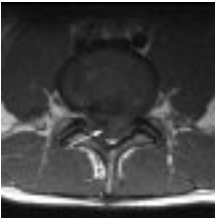


Image 1c and 1d (Magnetic Resonance Imaging): Axial and sagittal images of the same patient.

1d



Teaching Points

- The prevalence of previously undiagnosed serious pathology in patients presenting with acute low back pain in the primary care setting is very rare [1](#)
- Most patients with acute low back pain have substantial improvements in pain and function within



one month [2](#)

- Routine or immediate lumbar spine imaging for low back pain without indications of serious underlying conditions does not affect management or improve clinical outcomes and is associated with radiation exposure and increased expenses [3,4](#)
- 'Red flags' that prompt imaging include recent significant trauma (mild trauma if age = 50), unexplained weight loss, fever, age 55 years, history of malignancy or immune compromise, intravenous drug use, osteoporosis or glucocorticoid use, suspicion of ankylosing spondylitis and compensation or work injury issues
- If there are no 'red flags', imaging is indicated only after a period of conservative therapy is trialled first [3](#)
- Initial investigation is with plain films

Red Flags for the Investigation of Acute Low Back Pain

- These features on history and examination may help to increase the yield of lumbar radiography and have been adapted from criteria proposed by various guidelines [5-8](#)
 - Constitutional symptoms e.g. fever, night sweats
 - Immunosuppression
 - Intravenous drug use
 - History of malignancy or unexplained weight loss of insidious onset
 - Prolonged use of corticosteroids, osteoporosis
 - Age <20 or >55 years
 - Recent history of violent trauma (or mild trauma if age = 50)
 - Presence of associated contusion or abrasion
 - Constant progressive, non mechanical pain (no relief with bed rest)
 - Thoracic pain
 - Structural deformity
 - Widespread neurological signs and symptoms (including cauda equina syndrome)
 - Failure to improve after 4-6 weeks of conservative low back pain therapy
- There is no convincing evidence that the absence of these red flags is sufficient to exclude serious underlying disease and some red flags have high false positive rates, [1,9,10](#) but they may help to reduce unnecessary use of plain radiography

Plain Radiograph

- Frequently but often inappropriately used for the investigation of low back pain
- The majority of patients with low back pain have either normal lumbar radiographs or age related degenerative changes that do not necessarily correlate with the presence or severity of pain [8,11,12](#)
- Disc space narrowing is more strongly associated with back pain than other radiographic features [13](#)
- Routine, immediate plain radiographs are of limited diagnostic value and have no benefit to patient function, pain or disability, other than patient satisfaction, which must be weighed against the significant gonadal radiation dose [3,8,14,15](#)
- Plain radiographs are not indicated in patients with low back pain unless there are significant risk factors or 'red flags' for serious underlying disease or symptoms have persisted for greater than 6 weeks [3,16,17](#)

Magnetic Resonance Imaging (MRI)

- Advanced imaging modality of choice in evaluation of low back pain
- There is a paucity of evidence for the appropriate timing of MRI, but emergent MRI has been suggested for suspected cord compression, cauda equina syndrome, abscess or infection. It may be appropriate to trial a period of conservative care prior to MRI for patients with radiculopathy [18](#)
- Advantages compared to CT include
 - No ionising radiation
 - Better soft tissue contrast – modality of choice for detection of spinal infections, metastases, nerve root disorders and disc abnormalities
- Disadvantages compared to CT include [17](#)
 - Lower spatial resolution – cortical bone lesions are not as well visualised. Where bony anatomy is critical, CT may be preferred
 - Claustrophobia
 - Longer scanning time needed
 - Contraindicated in the presence of a ferromagnetic substance, e.g. Pacemaker, aneurysm clip, cochlear implant, ocular foreign body, spinal cord stimulator and some stent materials
- Most findings on MRI in patients presenting with low back pain represent progressive age-related changes and are not associated with acute events, although primary radiculopathies may have new root compression findings [19](#)
- MRI is recommended for vertebral inflammatory and infectious processes. It can detect osteomyelitis as early as 3-5 days after onset of infection and is reported to have a sensitivity of 96% and specificity of 92% for the detection of spinal infections, more accurate than plain radiography or bone scan [20,21](#)
- MRI is the most accurate modality for detecting suspected malignancy and vertebral metastasis and determining disease extension around the spinal cord. Where there is a high clinical suspicion MRI should be considered even if bone scintigraphy is negative or equivocal [20-25](#)
- A recent metaanalysis concluded MRI can help distinguish benign from malignant vertebral compression fractures [26](#)
- MRI has a high sensitivity (87-96%) and moderate specificity (68-75%) in the detection of spinal stenosis