ACE CLINICAL GUIDANCE

Published: **1 October 2020**
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# When to order MRI for low back pain

## Objective

To enhance appropriate use of magnetic resonance imaging (MRI)

## Scope

MRI of the lumbar spine for diagnostic investigation of low back pain

## Target audience

This clinical guidance is relevant to all healthcare professionals ordering MRI of the lumbar spine

**Globally, low back pain leads to more years lived with disability than any other symptom or condition.**[1] The prevalence of low back pain is higher among middle-aged people, as well as in high-income countries, such as Singapore.[2] As low back pain is largely a self-limiting condition, imaging is not indicated in most cases. When indicated, magnetic resonance imaging (MRI) of the lumbar spine is one of several imaging modalities for low back pain. However, its clinical utility varies with the clinical presentation and working diagnosis.

### Statement of Intent

This ACE Clinical Guidance (ACG) provides concise, evidence-based recommendations and serves as a common starting point nationally for clinical decision-making. It is underpinned by a wide array of considerations contextualised to Singapore, based on best available evidence at the time of development. The ACG is not exhaustive of the subject matter and does not replace clinical judgement. The recommendations in the ACG are not mandatory, and the responsibility for making decisions appropriate to the circumstances of the individual patient remains at all times with the healthcare professional.

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## Overall approach to low back pain assessment

The assessment of low back pain begins with thorough history taking and physical examination to triage according to the likelihood and type of underlying pathology.[3]

For low back pain that is likely to originate from the spine (some non-spinal pathologies may present as low back pain, such as abdominal aortic aneurysm, renal disease, or pancreatitis), patients can generally be grouped into those with:

- Non-specific low back pain, or
- Low back pain linked to a specific spinal pathology

A number of investigations, including imaging, are available for further evaluation of low back pain to confirm the diagnosis. The focus of this clinical guidance is on the role of MRI of the lumbar spine for low back pain that is non-specific or linked to a specific spinal pathology.

## MRI for non-specific low back pain

The largest group of patients with low back pain (more than 80%) have non-specific low back pain.[4] Typically, a diagnosis of non-specific low back pain is reached when a precise source or defined pathoanatomical cause of pain cannot be identified. For example, patient history and examination do not suggest trauma, nor features of a specific spinal pathology. Sometimes, non-specific low back pain occurs with radicular symptoms in one or both lower limbs, suggesting nerve root involvement.

### Recommendation 1

**Patients with non-specific low back pain, with or without radicular symptoms**

**MRI is not indicated**

MRI is not recommended for patients with non-specific low back pain (even in the presence of radicular symptoms), particularly at initial presentation. This is because for non-specific low back pain, imaging findings tend to correlate poorly with symptoms, ultimately not altering the management decision or clinical outcomes.[5-7] For these patients, the initial management approach is usually conservative, and symptoms typically regress soon after onset. Review after 4 to 6 weeks of conservative management (see Recommendation 2 below).

### Recommendation 2

**Patients with non-specific low back pain despite 4 to 6 weeks of conservative management**

**MRI may be indicated**

Consider MRI when conservative management of 4 to 6 weeks has not reduced symptoms, as most patients with non-specific low back pain are expected to improve after this.[8] Lack of improvement may point to an alternative diagnosis or management approach. When present, certain factors (such as psychological distress, prolonged inactivity, or older age) may perpetuate low back pain and lead to significant disability.[9] Therefore, reassess the patient at this point to determine the need for an MRI, including the presence of aforementioned factors and the likelihood of a specific spinal pathology.

### Conservative management

Conservative management of low back pain encompasses various strategies, such as use of nonsteroidal anti-inflammatory drugs (NSAIDs), exercise, or manual therapy. These should be accompanied by patient education, including advice to remain active and avoid prolonged bed rest. Evidence suggests that for most patients with non-specific low back pain, pharmacological treatment can be reserved for those who do not respond to non-pharmacological strategies.[8,10] When used, medications should be prescribed for the shortest possible duration and at the lowest effective dose, after having assessed for possible contraindications and precautions.

## MRI for low back pain linked to a specific spinal pathology

Low back pain can be the symptom of a specific spinal pathology, although this happens less commonly than non-specific low back pain. Examples include vertebral fractures, spinal cancer (primary or metastatic), spinal infections, and inflammatory diseases of the spine. The presence of symptoms, signs, previous diagnoses, or other features associated with a specific spinal pathology increases the likelihood of it being the cause (particularly when two or more features are present that suggest the same spinal pathology).[11]

### Imaging for suspected vertebral fragility fracture

Plain radiography is the initial diagnostic investigation of choice for patients with a suspected vertebral fragility fracture, such as elderly patients with a history of low velocity trauma accompanied by osteoporosis or chronic steroid use. Other imaging modalities, including MRI, could be considered after evaluation with plain radiography.

Decision-making regarding further investigations, including imaging, should take into account whether the suspected spinal pathology would require urgent or specialised management (such as surgery), and potential consequences of missing or delaying the diagnosis. When there is significant suspicion of a specific spinal pathology, further investigations are usually indicated.

The choice of imaging modality mainly depends on the type of suspected spinal pathology. MRI is an appropriate choice for investigating soft-tissue pathologies of the spine. The following recommendations pertain to spinal pathologies or clinical features that require MRI of the lumbar spine as diagnostic investigation of low back pain.

**Recommendation 3** — **Patients with low back pain and progressive neurological symptoms or signs** — **MRI is indicated**

Progressive neurological deficits, such as deteriorating motor power or worsening numbness, may be due to a space-occupying lesion including herniation of a lumbar intervertebral disc, cancer, infection, and epidural haematoma. MRI is indicated to identify the underlying spinal pathology, especially when the progression is rapid.

**Recommendation 4** — **Patients with low back pain and suspected cauda equina syndrome** — **MRI is indicated**

Cauda equina syndrome is rare, but warrants urgent management. It may result from disc herniation or other spinal pathologies including cancer, infection, spinal stenosis, spondylolisthesis, and epidural haematoma. Suspect cauda equina syndrome when low back pain presents with associated features, such as bilateral lower limb symptoms or signs (like pain, motor weakness, or sensory changes), sexual dysfunction, bladder or bowel dysfunction, or saddle anaesthesia.[12]

**Recommendation 5** — **Patients with low back pain and cancer or infection (suspected or known)** — **MRI is indicated**

One should suspect cancer or infection of the spine when a patient with low back pain presents with associated features such as fever or chills, unexplained weight loss, history of cancer, immunosuppression, pain at rest or at night, intravenous drug use, or bacteraemia. MRI can localise the area and extent of disease, and hence it is indicated to investigate lumbar spinal involvement when cancer or infection is suspected.

**Recommendation 6** — **Patients with new or progressive low back pain following an invasive procedure on the lumbar spine** — **MRI is indicated**

Free disc fragments or scarring may result from invasive spinal procedures. For patients with new or progressive low back pain following an invasive procedure on the lumbar spine, MRI is indicated to examine potential abnormalities, for example to distinguish between scar tissue and recurrent disc herniation.

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## About the Agency

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Suggested citation:
Agency for Care Effectiveness (ACE). When to order MRI for low back pain. ACE Clinical Guidance (ACG), Ministry of Health, Singapore. 2020. Available from: go.gov.sg/acg-when-to-order-mri-for-low-back-pain





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