Musculoskeletal Monthly

An evidence-based newsletter related to the management of musculoskeletal disorders

The role of imaging and its utilization in the management of low back pain

Lumbar spine radiography is the most common investigation undertaken for low back pain (LBP) in primary care.[1] In addition, among some specialties the use of radiography for patients with LBP is influenced little by clinical presentation.[2] The main purpose of lumbar spine imaging is to rule-out "red flag" causes of LBP such as malignancies, infections, inflammatory spondyloarthropathies and fractures.[3] More recently, advances in Magnetic Resonance Imaging (MRI) have made it an attractive substitute to plain radiographs with the hope that it may lead to a swifter definitive diagnosis and screening for systemic disease.[4] As with all interventions and diagnostic tests, the risk-benefit ratio should justify whatever procedures are used. Given the frequency of use and associated costs, one must ask "Is this the case with imaging for LBP?"

Before answering the preceding question, it is first helpful to remind ourselves (yet again) of some relevant common facts about LBP presenting in a primary care setting: a. 80% of LBP is non-specific or mechanical in nature for which a definitive pathoanatomic diagnosis can't be established;[5] b. In selected cases, certain injured structures (degenerated discs and facts (10%), herniated discs (4%), spinal stenosis (3%) and other bony abnormalities) can give rise to mechanical LBP and leg pain but these abnormalities are common in persons without symptoms as well;[6] c. serious spinal conditions are rare and comprise < 2% of presenting cases.[7] Although the large majority of patients with LBP improve substantially within a month, recurrent lingering pain and additional health care seeking at 6 months are common[8] in patients who aren't matched with appropriate intervention[9-11] and 1/3 of primary care patients treated in a primary care setting seek care from multiple providers.[12]

Having the clinical context of LBP outlined makes it easier to answer the pertinent questions regarding imaging, which are: diagnostic accuracy, associated risks, and outcomes.

- **Diagnostic accuracy**: Precise estimates are unavailable due to questions of reference criteria and study biases. However, the following summary by Beattie and Meyers[13]are relevant and remain unaltered by more recent reports:
  1. Disc degeneration is more pronounced with age and is equally common in persons with and with out LBP.[3] In persons without LBP, it is present in 77% of persons aged 35-45yrs and in everyone older than 65.[14]
  2. Disc bulging and herniation are both prevalent in persons with and without LBP(27 – 52%)[3, 6]
  3. Disk extrusion is uncommon in people without LBP (2 – 6%),[14] but is more likely to be diagnostically and clinically relevant in persons with LBP, especially those who have more than 5 previous episodes (30%).[14-16]
  4. Minor nerve root compromise (contact with nerve or thecal sac) is common in persons without LBP. However, major neural compromise (actual compression) is uncommon in individuals with LBP but is common in patients whose symptoms warrant lumbar MRI.[14, 15, 17, 18]

  In addition, spondylolysis and spondylolesthesis, spina bifida, transitional vertebrae, spondylosis, and Scheuermann's disease do not appear to be associated with LBP.[3]
- **Risk**: The first consideration that comes to mind is ionizing radiation, especially with oblique views (double the exposure of standard views) on younger female patients.[19] However, patients who are informed of abnormalities identified on requested radiographs may have an associated increase in pain[20] and in the case of MRI, this may lead to an increased likelihood of surgery[4, 21] with little, if any, additional benefit.

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- **Outcomes**: At least 2 high quality randomized clinical trial have demonstrated that the use of lumbar radiography results in no difference in clinically meaningful health status outcomes for patients with LBP.[1] Similarly, there is no difference in back related disability measures when MRI vs plain radiography is used[4] Patients who receive plain radiography may experience greater patient satisfaction (1 point at a cost of $90.17)[1] but at the risk stated above

In summary, based on the current best-evidence for the role of imaging and LBP: 1. There is a high prevalence of abnormal findings in persons with and without LBP; 2. It is not possible to establish a causal relationship between radiographic findings *alone* and non-specific LBP; 3. Some findings are more common in patients with LBP complaints and these include disc extrusions and major nerve compression;4. MRI abnormalities are not predictive of future LBP episodes;[15, 22]; and 5. Questions remain regarding diagnostic accuracy.

DEPRESSION SCREENING QUESTIONS
1. During the past month, have you often been bothered by feeling down, depressed, or hopeless?
2. During the past month, have you often been bothered by little interest or pleasure in doing things?

Figure 1: Two Depression Screening Questions

MRI has not improved outcomes in patients with non-specific LBP, and in doing so joins the ranks of appealing innovations that have prove illusory. Despite the results of numerous high quality radiologic studies since the 1994 Agency for Health Care Policy and Research Guidelines for LBP have been published, they remain the standard: Imaging should be reserved for those patients considered to be surgical candidates or in whom systemic illness is suspected.[23]

In the majority of patients suffering from LBP, imaging is not indicated nor helpful and a precise cause remains elusive. Identifying depression is a more important task and better predictor of patients at risk for developing poorer outcomes[24] and subsequent episodes of LBP once their condition has resolved (hazards ration= 2.3).[4] The good news is that patients with LBP can achieve a highly successful outcome when managed with a treatment based classification approach.[9-11, 25] and 2 simple questions are useful for identifying depressed patients at risk (-LR ≤.25) (Figure 1).[15, 26, 27] We at

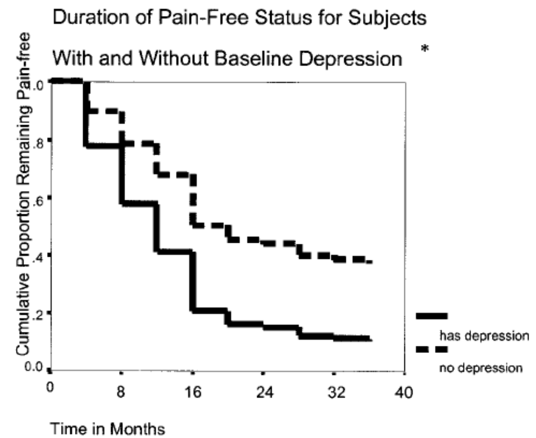

Figure 2: Depression and development of LBP

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