

THE ROLE OF MRI IN THE EVALUATION OF LOW BACK PAIN IN ADULTS

Dr. Pankaj Yadav	Resident, MGM Medical College and Hospital, Kamothe, Navi Mumbai, Room no. 507, PG Hostel, MGM Medical College, Sec-18, Kamothe, Navi Mumbai.
Dr. AbhayGursale	Professor and Head of Department, MGM Medical College and Hospital, Kamothe, Navi Mumbai

ABSTRACT

Introduction: Low back pain is one of the most common presenting complaint encountered by physicians. Reaching to an accurate diagnosis and alleviating patient's pain is prime.

Aim: To evaluate the causes of low back pain by using MRI.

Materials and Methods: 40 adults between the ages of 30 to 80 years who presented to the Department of Radio-diagnosis, MGM Medical College and Hospital, for lumbosacral spine MRI during June 2016 to Dec 2016.

Results: Degenerative disc disease was the most common abnormality. Other findings included- Canal stenosis, Infections, Fractures, Metastases.

Discussion: MRI is the modality of choice in investigating the cause of back pain. Majority patients recover within six weeks and therefore imaging is generally not recommended in the first month of low back pain.

Conclusion: Communication between radiologists and surgeons is particularly important in the setting of back pain

KEYWORDS	Low back pain, Magnetic resonance imaging, Lumbosacral spine
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INTRODUCTION

Low back pain (LBP) is the second most common presenting complaint (after common cold) encountered by health care physicians accounting for the huge socioeconomic burden.^{1,2} About 80% of all individuals will experience LBP at some point in their lives. Unfortunately, a specific clinical diagnosis is not made in most of these patients.^{8,9} In patients with LBP with/without associated radiculopathy, the decision for conservative versus surgical management are difficult to specify, because the ultimate outcome of conservative therapy is nearly same as that of surgery.¹⁰⁻¹⁵ Because of these dilemma, treating patients with low back pain can be particularly difficult for the clinicians, and imaging is commonly performed to diagnose and direct therapy.

Uncomplicated acute LBP is a benign, self-limited condition that does not require any imaging studies.⁷ Most of these patients are back to their usual activities within 30 days.³⁻⁵ Therefore, the main task for the clinician is to distinguish between this small population of uncomplicated LBP from large patient load of complicated LBP that should be evaluated further because of suspicion of a more serious problem.

Indications of a more complicated status, often termed "red flags" include the following:¹⁷⁻²¹

- 1) Recent significant trauma, or milder trauma, age-50
- 2) Unexplained weight loss
- 3) Unexplained fever
- 4) Immunosuppression
- 5) History of cancer
- 6) IV drug use
- 7) Prolonged use of corticosteroids, osteoporosis
- 8) Age- 70
- 9) Focal neurologic deficit progressive or disabling symptoms
- 10) Duration greater than 6 weeks

Imaging modalities available for LBP- Radiograph, Myelography, CT, MRI, Nuclear Medicine and Discography.

Advanced imaging is done frequently to identify rare but high-consequence conditions, such as metastases or infection. However, less than 1% of all LBP patients have these conditions.⁶ The high cost of imaging modality such as CT and MRI is the main disadvantage as compared to radiographs. With its high contrast and spatial resolution and lack of ionizing

radiation, MRI is considered by many to be the best imaging technique for the investigation of LBP.¹⁶

Materials and methods:

Source of data: 40 adult patients aged between 30 to 80 years with presenting complaints of low back ache, who were referred for magnetic resonance imaging of the lumbar spine to MGM Medical College and Hospital, Kamothe, Navi Mumbai, as part of their clinical work up were included in the study. The study was conducted between the months of June 2016 and December 2016. Informed consent had been obtained prior to the imaging study. No sedatives were used in the study, however intravenous contrast was used in selected cases.

Inclusion Criteria:

- All patients with complaints of low back pain who were referred to the department of radiology for Lumbosacral spine MRI.
- Adults aged between 30 to 80.
- Both genders.

Exclusion Criteria:

- Adults aged <30 and >80 years.
- Patients with previous operative history.
- Contraindication to magnetic resonance imaging- cochlear implant, pacemaker, claustrophobia.
- Non-cooperative sick patients.

Patient Preparation:

No specific preparation was required for the examination.

Method:

Clinical data was recorded which included- age, sex, history of trauma, referred pain to lower limb, abnormal posture, tingling/numbness in lower limbs.

Imaging Protocol:

MRI of the lumbo-sacral spine was performed using 0.3T Centurion Imaging System. The sequences used were- Axial T2W; Sagittal T1W, T2W and Coronal STIR.

The imaging findings were categorized into the following groups:

- I. Normal
- II. Degenerative disc disease- Herniation, Bulges, Protrusions, and Extrusions

- III. Canal stenosis
- IV. Infections
- V. Fractures
- VI. Metastases
- VII. Others-Schmorl's node, perineural cyst etc.

Results

Out of 40 adults, 23(57.5%) were male and 17(42.5%) were female. MRI findings were reported as normal in 8 (male-5, female-3) cases (20%) and abnormal findings were seen in 31(male-18, female-13) cases (77.5%). Most (21) of them had features of disc degeneration (Herniation, Bulges, Protrusions, and Extrusions). 15 (male-9, female-6) had some degree of canal stenosis. Others-Schmorl's node: 6(male-4, female-2), Infections: 4(male-3, female-1), Fractures: 4(male-3, female-1), Perineural cyst: 1(male), Metastases: 1(female), etc.

MRI findings with gender distribution is tabulated below:

MR Findings	No. of Males	No. of Females	Total(%)
Normal	5	3	8 (20%)
Degenerative disc disease	11	10	21 (52.5%)
Canal stenosis	9	6	15 (37.5%)
Infections	3	1	4 (10%)
Fractures	3	1	4 (10%)
Metastases	0	1	1 (2.5%)
Others	5	2	7 (17.5%)

TABLE 1: DISTRIBUTION OF MR FINDINGS IN THE SAMPLE.

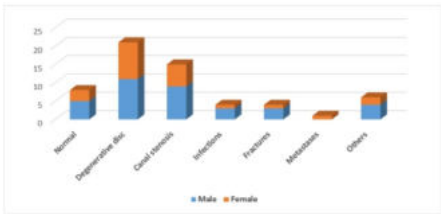


CHART 1: DISTRIBUTION OF MR FINDINGS IN THE SAMPLE.

ILLUSTRATIVE IMAGES:



Fig. 1: Spondylodiscitis with paravertebral collection.

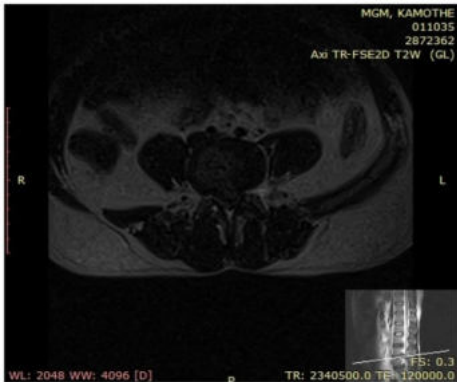


Fig. 2: Disc Extrusion



Fig. 3: Burst fracture of L3 vertebral body



Case 4:Perineural cyst along the S3 nerve segment on left side

Discussion:

MRI is considered the method of choice in spinal infection because it combines high sensitivity with satisfactory specificity²³. Signal changes occur early in the development of the disease, when no other image modality shows early lesions. Short time inversion recovery (STIR) sequence detects initial infective focus as inflammatory edema²². MRI is recommended when a spondylitis is suspected because early diagnosis avoids severe spinal or neurological complications. It enables anatomic localization of the disease in different planes, allows early detection of disk and bone destruction, and depicts extension in bone and soft tissues, and assesses skip lesions in noncontiguous spinal TB^{24,26}. Therefore, it is especially helpful in detecting the subclinical “spinal cord compression syndrome”, in which the neuronal damage can be clearly seen²³. Surgical election, choosing between anterior and posterior decompression, must be established on the basis of MRI²⁵.

MR imaging is highly sensitive in detecting the degenerative changes. Majority of these patients recover within six weeks and therefore imaging studies are generally not recommended in the first month of acute low back pain. Exceptions to this include patients with trauma, suspected cauda equina syndrome, infection, tumor, or progressive neurologic deficit.

An understanding of the benefits and limitations of MRI in evaluating low back pain and improved communication between surgeons and radiologists, should allow for optimal management of the patient's clinical issues.²⁷

Conclusion:

MRI provides valuable information regarding the underlying causes of LBP. The communication between radiologists and their surgical colleagues is particularly important in the setting of back pain. This common disorder often does not have a definable cause, even when the imaging findings are abnormal. An understanding of the various causes of back pain, the universal terminology, and the needs of the surgeon is vital for patient treatment.

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