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PATTERN OF MAGNETIC RESONANCE IMAGING FINDINGS IN PATIENTS WITH LOW BACK PAIN IN ROHILKHAND REGION: A STUDY AT RAJSHREE MEDICAL RESEARCH INSTITUTE, BAREILLY.

Radio-Diagnosis

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ABSTRACT

Introduction: Low back pain is interpreted as non-specific pain not ascribed to an appreciable, familiar particular cause. Its frequency is as high as 70-85%. **Aims and objectives:** This study is performed for the determination of patterns and characterization of MRI features in patients with low back pain and to review frequent conditions connected to low back pain in Rohilkhand region. **Material and methods:** This study comprised 100 patients. MRI Lumbar spine was carried out on a 1.5 tesla Siemens machine. The data collection took place during the interval of 01st February 2021 to 31st July 2022 from patients presenting with low back pain, referred to our department of Radiodiagnosis for MRI Lumbar spine. **Results:** Out of 100 patients, 70 patients were of degenerative spinal disease, 09 infectives, 09spondyloarthropathy, 02nontraumatic listhesis, 06 tumors & 08 were normal. The majority of patients were of age above 30 years with male preponderance and the frequent level encountered in degenerative disease was L4/L5 & L5/S1, trailed by a single L4/L5 level.

KEYWORDS

Low back pain, Magnetic Resonance Imaging, Degenerative Spinal Diseases.

INTRODUCTION:

One of the most frequent causes of outpatient visits is low back pain (LBP) [1]. It is explained as "pain and discomfort, located below the costal borders and above the inferior gluteal folds, with or without leg pain" in the European Guidelines for Prevention of LBP. Non-specific LBP, the most prevalent type of LBP, is described as "LBP not assigned to an appreciable, known particular pathology." Disc desiccation, facetal joint arthrosis, and disc herniation were found to be imaging abnormalities that contributed to the development of LBP; nevertheless, these features are present in a large percentage of asymptomatic people and become more common with advancing age. [3]

When a patient has non-specific acute LBP and no "red flags," the American Association of Neurological Surgeons and the Congress of Neurological Surgeons advise against having the spine imaged.

Cancer history, unexplained weight loss, immunosuppressant use, infection, IV medication use, prolonged steroid use, and LBP not improving following conservative care radiculopathy, radiculopathy after discectomy, ankylosing spondylosis, lumbar canal stenosis, cauda equina syndrome, general or increasing motor weakness in the lower extremities and ascending lower limb numbness are all red flag signs of LBP.

This study is performed for the determination of patterns and characterization of MRI features in patients with LBP, reviewing common conditions associated with LBP in the Rohilkhand region.

OBJECTIVES:

1. To evaluate MRI findings and characterize various pathologies in patients with low backache.
2. To identify common conditions associated with low backache.

METHODOLOGY:

This cross-sectional study was performed in the department of Radio-diagnosis on 1.5 Tesla Siemens Sempra MRI machine at Tertiary care Hospital, Rajshree medical research institute, Bareilly Uttar Pradesh. Data collection took place during the interval of 01st February 2021 to 31st July 2022 and comprised of cases presenting with complaints of LBP sent to our department of Radiodiagnosis for MRI lumbosacral spine. 100 patient were included in the study with their consent.

Routine sequences: Fast spin echo sequences.Coronal STIR including SI & Hip Joints, Sagittal T1, T2 & STIR, Axial T2 & T1sequences.

Other sequences whenever required. Post Contrast T1Wt fat sat study. Sagittal diffusion study.

Protocols:

	SAGITTAL	AXIAL(T1)	AXIAL(T2)	CORONAL
Field of View	280	200	200	340
Matrix Size	512	320	320	320
Slice Thickness (mm)	4	4	4	4
Inter-slice gap (mm)	0.4	0.4	0.4	0.4
SNR	1	1	1	1

Standard surface coils were used for the acquisition of images. The MRI images were analyzed based on the following parameters:

Morphology and signal intensity of Vertebrae, marginal osteophytes, IV discs, Spinal canal, Thecal sac, Posterior elements (Facet joints, ligament flavum, Neural foramina, interspinous & supraspinous ligament), Lateral recesses Nerve roots and Pre/Para Vertebral soft tissue and masses

The patients with acute trauma and with absolute contraindications to MRI such as MRI incompatible cardiac pacemakers, ferromagnetic vascular clips, cochlear implants, etc were excluded,

Statistical Analysis:

Statistical package for social sciences 16.0 was used to examine the statistics (SPSS, IBM). Actual numbers, percentages, means, and standard deviations (mean 2 SD) were used to represent values. A 0.05 p-value was deemed statistically significant.

OBSERVATIONS AND RESULTS:

100 patients with low back ache underwent MRI LS Spine examination.

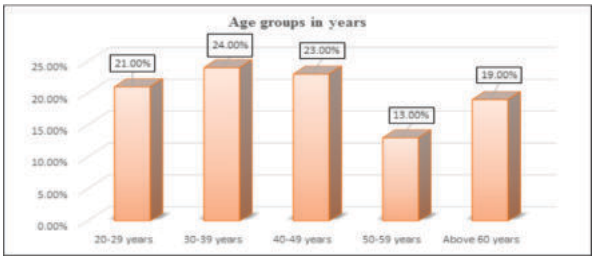

Table 1: Distribution of study population in accordance with Age groups.

The frequent study group belonged to 30-39 years (24.0%) followed by 40-49 years (23.0%), 20-29 years (21.0%), Above 60 years (19.0%), and 50-59 years (13%). There were 55.0% males and 45.0% females.

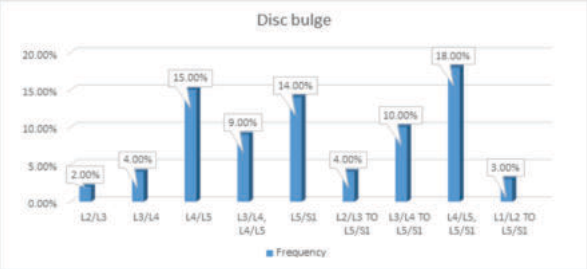

Table 2: Distribution of study population in accordance with diffuse disc bulge at different levels.

Diffuse Disc Bulge was present among 79.0% of patients and L4/L5, L5/S1 levels were most frequently encountered in 18% followed by L4/L5 levels in 15% of patients.

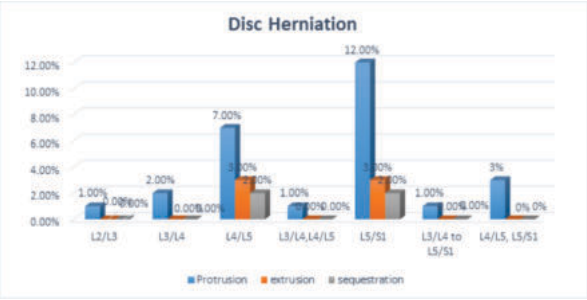

Table 3: Distribution of study population in accordance with disc herniation and different levels.

Disc Herniation was present among 32 (32.0%) subjects. The most common disc herniation was found to be disc protrusion in 27 (27%) patients out of total of 100 patients and the most frequently level involved was L5/S1 in 12% of the study population.

Annular fissure was present among 22.0% patients and L4/L5, L5/S1 levels were most frequently involved levels

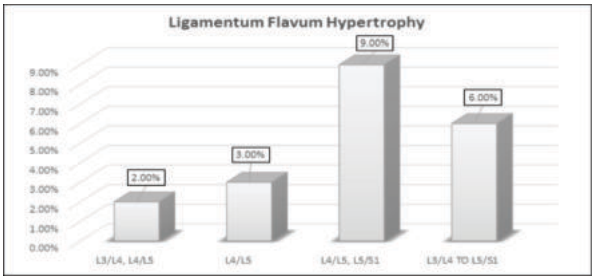

Table 4: Distribution of study population according to Ligamentum Flavum Hypertrophy

Ligamentum Flavum Hypertrophy was found among 20 (20.0%) subjects and L4/L5, L5/S1 levels were most frequently encountered in 09(9.0%) of the study population. Facet Joint Arthropathy was found among 18 (18.0%) subjects and L4/L5, L5/S1 levels were most frequently encountered in 06(6.0%) of the study population. Neural Foraminal Narrowing was found among 20 (20.0%) subjects and L4/L5 level was most frequently involved in 06(6.0%) of the study population.

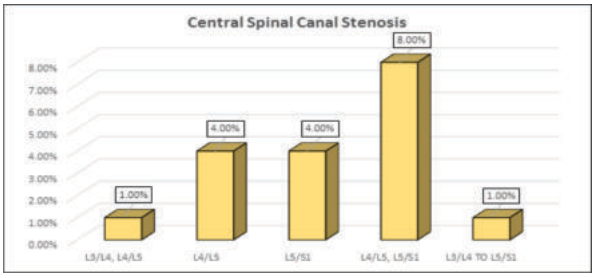

Table 5: Distribution of study population in accordance with Central Spinal Canal Stenosis at different levels.

Central Spinal Canal Stenosis was found among 18 (18.0%) subjects and L4/L5, L5/S1 levels were most frequently encountered in 08(08.0%) of study population.

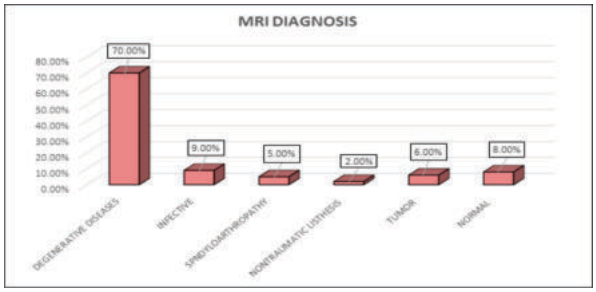

Table 6: Distribution of study population in accordance with MRI diagnosis.

The most common diagnosis based on MRI findings was Degenerative Spinal Diseases in 70(70%) study population.

MRI CASE IMAGES

Degenerative Spinal changes

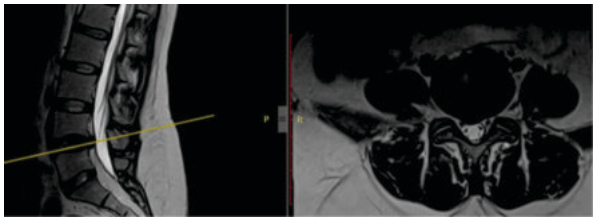

Figure 1: 25yrs male: MRI sagittal and Axial T2W images showing disc protrusion at L4/L5 level.

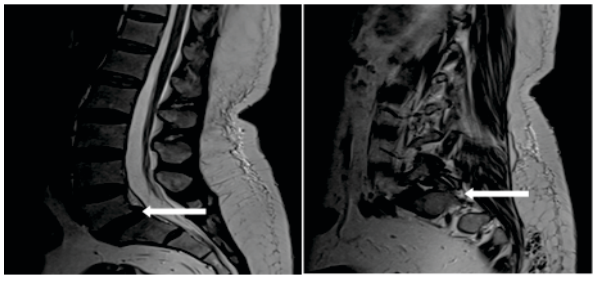

Figure 2: 48yrs female: Sagittal T2Wt images showing Grade-1 anterior listhesis of L5 over S1, Nontraumatic B/L parinterarticularis defect.

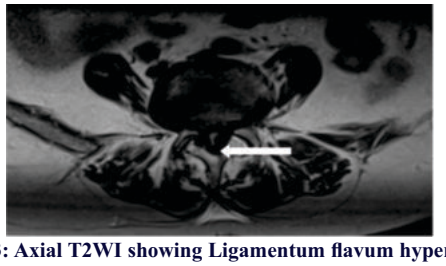

Figure 3: Axial T2WI showing Ligamentum flavum hypertrophy at L4/L5 level causing secondary spinal canal stenosis.

Infective- Pott's spine

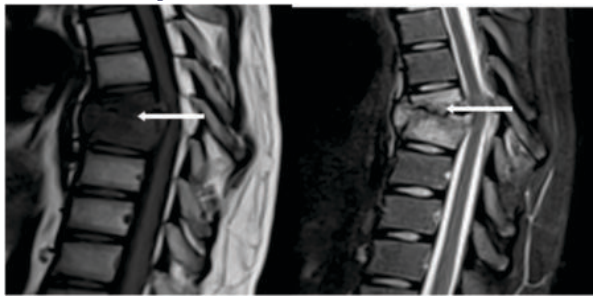

Figure 4(a,b)

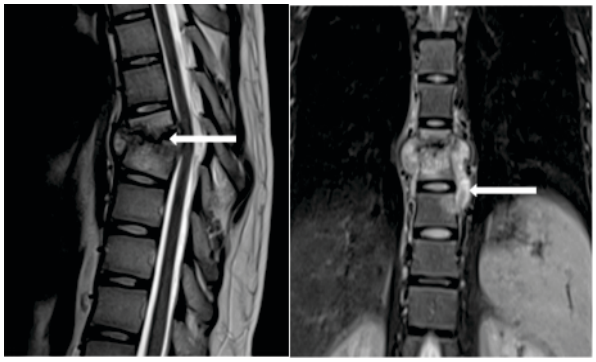

Figure 5(a, b)
Figures 4(a, b) and 5: Sagittal T1WI, T2WI, STIR, and Coronal STIR images showing contiguous vertebral inferior endplate erosions with marrow oedema, intervening disc destruction, and associated pre/para vertebral collection. Potts's spine.

Neoplastic

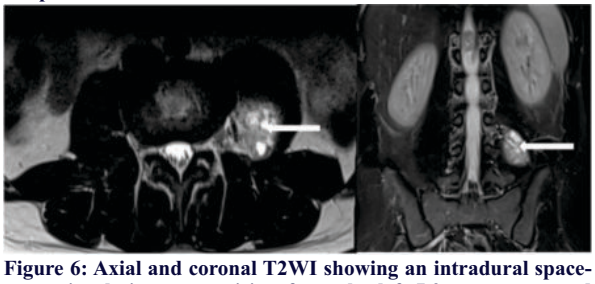

Figure 6: Axial and coronal T2WI showing an intradural space-occupying lesion seen arising from the left L3 nerve root and extending into left psoas muscle...Schwannoma.

Spondyloarthropathy

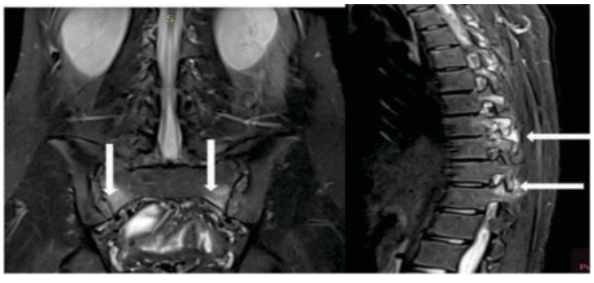

Figure 7: 20 years male: Coronal T2 STIR& Sag Stir showing bilateral sacroiliitis, & facet joint inflammation in dorsal spine.

DISCUSSION:

Now that lumbosacral spine MRI scanning is widely accepted as a very accurate neuro-diagnostic tool, it has significantly changed how patients with LBP are evaluated for diagnosis.

The majority of participants in the current study were aged 20 to 59 (81%) with the bulk of patients falling within the 30-49 age range (47%). Similar findings were found in the study by Prasad et al. (2006) [4] where the majority of patients, or 89.4%, were between the ages of 21 and 60. This is because persons in this age range engage in physically demanding outdoor activities and are frequently subjected to trivial spine damage.

The distribution of study subjects as per gender, there were 55.0% males and 45.0% females similar to the study of **Saleem S et al (2013)** [5] in which out of 163 patients 95 (58.3%) were male and 68 (41.7%) were females.

Disc bulge:
The disc bulge as per, the most typical level involved was L4/L5, L5/S1 in 24% of patients followed by L4/L5 level in 17%. This was comparable to the study by **Saleem S et al (2013)** [5]

Disc herniation: The most common disc herniation was found to be disc protrusion which was in 27 patients out of total of 32 patients of disc herniation and the most frequent level involved was L5/S1 in 12%. **Osman N M et al (2019)** [6] reported that most of the participants, who had a disc herniation (57.1%), frequently appeared at L4/L5, and lesions at L5-S1 were seen in 19.0% of patients with herniation.

Annulus fissure:
In the present study Annular fissure was present among 22.0% of patients and L4/L5, L5/S1 levels were most frequently involved in 8% of patients. **Ernst et al (2011)** [7] found 11 annular tears in 30 asymptomatic volunteers (36.7%)

Facetal arthropathy:
Facetal Joint Arthropathy was identified in the current study in 18 (18.0%) of the participants, and the most often affected levels were L4/L5, L5/S1 in 6 (33%). Facetal arthropathy and ligamentum flavum thickening were observed at 1642 disc levels (90.2% of the disc involvement), and both were prevalent at the L4-L5& L5-S1 disc levels (44.1%), according to Ravikanth R et al (2020) [8].

Ligamentum flavum hypertrophy:
In the present study, the Ligamentum Flavum Hypertrophy was found among 20 (20.0%) subjects and L4/L5, L5/S1 levels were most involved in 09(45.0%) of the study population. Similar findings were found by **Ravikanth R et al (2020)** [8]

Spinal canal stenosis:
In the current study, 18 (18.0%) people had central spinal canal stenosis, and the most frequently affected levels were L4/L5, L5, and S1 in 8 (44.0%) of the participants. Suthar P et al. (2015) [9] discovered that the L4-L5 disc 60 (i.e., 47.24% of involvement) at 127 discs (i.e., 52.70% of disc involvement) evoked the lateral recess narrowing and compression of neural foramen.

Infection:
9% (9/100) of patients had spinal infections occurring more frequently in the fourth decade with similar gender distribution and no occupational predilection. The MR imaging features were comparable to the study by **Duarte RM et al** [10].

Seronegative Spondyloarthropathy: was found in 5% of the study population. This finding was comparable to study conducted by **Malaviya AN et al (2020)** [11].

Tumor:
In our present study, 6% of study subjects had neoplastic etiology. Secondaries, metastatic in nature encountered in 2% of the study population of the sixth -seventh decade in males most frequently due to prostatic cancer confirmed by biopsy. This is in accord with the study done by Wewel JT et al (2020) [12] that the most frequent primary tumor to cause spinal metastases is prostate cancer.

CONCLUSION:

MR imaging is highly sensitive in identifying causes of low back pain. The most frequent diagnosis based on MRI findings was Degenerative Spinal Diseases in 70 (70%) study population. The L4-L5, L5-S1, and L5-S1 levels were most frequently involved. This is followed by infective (09%), Tumor (6%) Spondyloarthropathy (5%), and nontraumatic listhesis (2%). In 8% there were no obvious findings in MRI and were labelled normal.

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REFERENCES:

1. Sathish Babu S, Vinod S, Anu Priya JT. Application of MRI in the Evaluation of Low Backache. International journal of Anatomy radiology Surgery: IJARS 2017 ;6(2)
2. Burton AK. European guidelines for prevention in low back pain. COST B13 Working Group. 2004: 1-53. (Level 1A)
3. Brinjikji W, Luetmer PH, Comstock B, Bresnahan BW, Chen LE, Deyo RA, et al. Systematic literature review of imaging features of spinal degeneration in asymptomatic populations. AJNR Am J Neuroradiol. 2015; 36:811–6.
4. Prasad R, Hoda MF, Dhakal MM, Singh K, Srivastava A, Sharma V. Epidemiological characteristics of lumbar disc prolapse in a tertiary care hospital. Internet J Neurosurg. 2006;3(1).
5. Saleem S, Aslam HM, Rehmani MA, Raees A, Alvi AA, Ashraf J. Lumbar disc degenerative disease: disc degeneration symptoms and magnetic resonance image findings. Asian spine journal. 2013 Dec;7(4):322.
6. Osman NM, Mohamed FI, Hassan AA, Kamel SR, Ahmed SS. Frequency of inflammatory back pain and sacroiliitis in Egyptian patients with rheumatoid arthritis. Egyptian Journal of Radiology and Nuclear Medicine. 2019 Dec;50(1):1-1.

7. Ernst R, Reimer P. MR Imaging of the Body (1st ed.). Thieme. Retrieved from https://www.perlego.com/book/917365/mr-imaging-of-the-body-pdf (Original work published 2011)
8. Ravikanth R. Magnetic resonance evaluation of lumbar disc degenerative disease as an implication of low back pain: a prospective analysis. Neurology India. 2020 Nov 1;68(6):1378.
9. Suthar P, Patel R, Mehta C, Patel N. MRI evaluation of lumbar disc degenerative disease. Journal of clinical and diagnostic research: JCDR. 2015 Apr;9(4):TC04.
10. Duarte RM, Vaccaro AR. Spinal infection: state of the art and management algorithm. European Spine Journal. 2013 Dec;22(12):2787-99.
11. Malaviya AN. Spondyloarthritis in India. Indian Journal of Rheumatology. 2020 Jun 1;15(5):2.
12. Wewel JT, O'Toole JE. Epidemiology of spinal cord and column tumors. Neuro-Oncology Practice. 2020 Nov;7(Supplement_1):i5-9.