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Role of MRI in Evaluation of Young Adults Present with Back Pain and its Association with their Occupation

Dr Shilpa Chudasama[1], Dr Divyesh Sarvaiya[2]

[1]Associate Professor, Department of Radiodiagnosis, Shri M.P. Shah Government Medical College and Shri Gurugobind Singh Government Hospital, Jamnagar

[2]Resident, Department of Radiodiagnosis, Shri M.P. Shah Government Medical College and Shri Gurugobind Singh Government Hospital, Jamnagar

Abstract: ***Objectives: The objective of this study was to evaluate the non-traumatic and occupational causes of low back pain using Magnetic resonance imaging with in depth evaluation of spinal pathologies and to assess the usefulness and accuracy of MR imaging in spinal pathologies, their characteristics and helping in preventing strategies. Materials and methods: 40 young adults (15 year to 40 year) patients presenting withback painwere assessed with 1.5 Tesla Magnetic Resonance Imaging system. The sequences used in our setting are T1 W.I, T2 W.I, STIR, myelogram and T1 FS. Images were acquired in axial, coronal and sagittal planes. Results: The age distribution in our study was in range of 15 years to 40 years with maximum population within 26-35 year. The majority of cases of back pain included earlylumbar spondylosis followed by sacroilitis. Early lumbar spondylosis is more common in young adults where occupation involves long time abnormal postureand abnormal weight lifting like computer works; mechanics; doctors; students; housewives and factory workers. sacroilitis are most common pathology involved, with L4-L5 and L5 – S1 level most commonly involved. Conclusions: MRI is highly accurate and non-invasive modality for evaluating early developing Lumbo-sacral spinal pathologies like spondylosis and sacroilitis related to certain occupations where prolong working in non-neutral position and weight lift is present. In Particular, abnormal posture was highly associated with low back pain. This study will be of importance in identifying prevention strategies like break from work, reduction in workload, avoid excssive and abnormal bending and not lift heavy weight.***

Keywords: Back pain, occupation, lumbo-sacral spine, MRI

1. Introduction

Low backache (LBA) is a common morbidity in the populatio.Its relation is extremely necessary with certain occupation where working hours and physical stress are more. The physical ergonomic features of work that are most frequently cited as risk factors include rapid work pace and repetitive motion patterns; insufficient recovery time; heavy lifting and other forceful manual exertions; non-neutral body postures (either dynamic or static); vibration (both segmental and whole-body). In the present scenario MRI plays an important role in evaluation of LBA to identify the pathology. MRI has good soft tissue resolution, disc material can be well visualised, any bony pathology can be identified and pathology in the spinal canal can be found and evaluated. Various sequences are used in MRI study. If any lesion is identified it can be further evaluated with contrast material based on the features in plain MRI.

2. Materials and Methods

This prospective study was conducted at the Departmentof Radiodiagnosis, M.P. Shah govt. medicalcollege and Shri Gurugobind Singh Government Hospital, Jamnagar, Gujarat duringJanuary 2019 to December 2019. After taking informed consent, total 40 patients presenting to orthopaedic out-patient department with complaints of lower back pain associated with tingling, numbness and radiating pain to lower limbs without a history of trauma and related to occupations where prolong standing, bending, non-neutral body postures or weight lifting includes, were includedand assessed with 1.5 Tesla Magnetic Resonance Imaging system. All patients were of age ranging from 15 years to 40 years. Their demographic characteristics, lifestyle and employment were noted.

Inclusion criteria

- Male and female patients with LBA, between the age group 18 years to 40 years.

Exclusion criteria:

- Patients with low back pain with trauma
- Patients with age less than 18 year and more than 40 year
- Claustrophobic patient

Protocol:

After enrolment of the case, detailed history with clinical examination was done. Specific tests were done wherever needed and MRI lumbo- sacral spine were done by 1.5 Tesla Magnetic Resonance Imaging system (MagnetomEssenza, Siemens health care, Germany).

Following different criteria was used for the pathologies.

- Normal Lumbo-sacral spine: normal in signal intensity and morphology
- T1- and T2-weighted sagittal and axial MR images evaluates the vertebral endplates and intervertebral discs.
- T2-weighted images show good contrast between the outer part of the annulus, which is more fibrous tissue (low signal), and inner part of the annulus and nucleus pulposus, which have more water content (high signal).

An area of low-intensity signal may be visible in the middle of the nucleus pulposus in a non-degenerated disc . This is considered a normal observation.

- Disc protrusion: distance between the edges of the disc herniation is less than the distance between the edges of the base.
- Disc extrusion: distance between the edges of the disc material is greater than the distance at the base.
- Disc sequestration: tendon defect extending to both surfaces with increased signal intensity on T2-weighted image.
- Sacroilitis define as inflammation of one or both sacroilliac joint. In this pathology, T2W images shows hyper intensity signals.

3. Observations and Results

Table 1: Age-Wise Distribution

Age Group (Yrs)	No. of Patients	Percentage
15-20	2	5%
21-25	9	22.5%
26-30	13	32.5%
31-35	12	30%
35-40	4	10%
TOTAL	40	100%

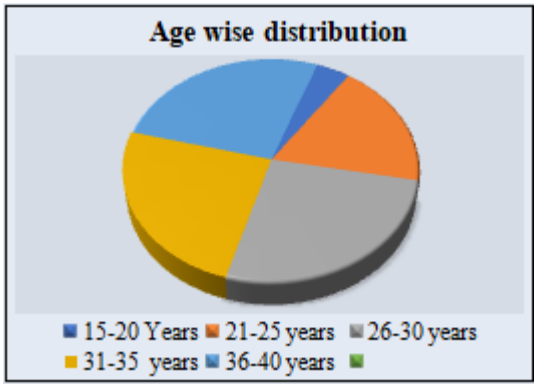


Table 2: Gender Distribution

Gender	No. of Patients	Percentage
Male	18	45%
Female	22	55%
Total	40	100%

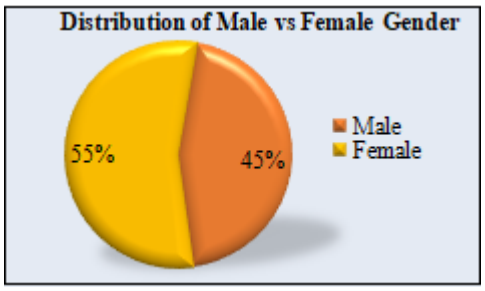


Table 3: Affected Levels

Region	No. of Patients	Percentage
L2-L3 LEVEL	2	5%
L3-L4 LEVEL	2	5%
L4-L5 LEVEL	20	50%
L5-S1 LEVEL	7	17.5%
SACROILITIS	4	10%
NORMAL	5	12.5%
TOTAL	40	100%

Table 4: Distribution of occupations of Back Pain in Young Adults

Occupation Related with back pain	Frequency of Etiologies (More Than One Etiology Can Be Seen in One Patient)	Percentage of Etiology among the Study Group
Factory labourer	9	22.50%
housewife	10	25%
mechanic	2	5%
barber	1	2.50%
farmers	2	5%
Office Worker	16	40%

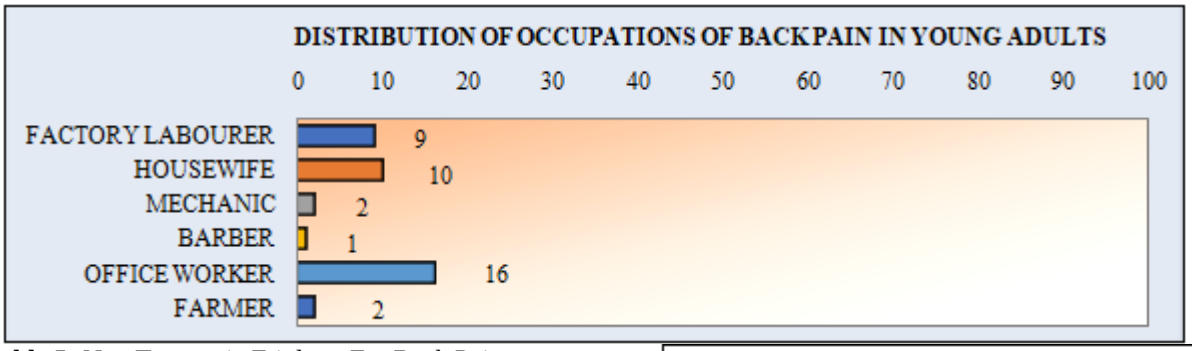
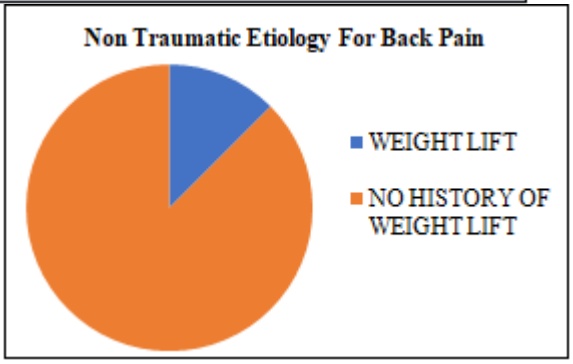


Table 5: Non Traumatic Etiology For Back Pain

Etiology	Number of Cases	Percentage
Weight Lift	5	12.5%
No History Of Weight Lift	35	87.5%
Total	40	100%



Non Traumatic Etiology for Back Pain

4. Figures

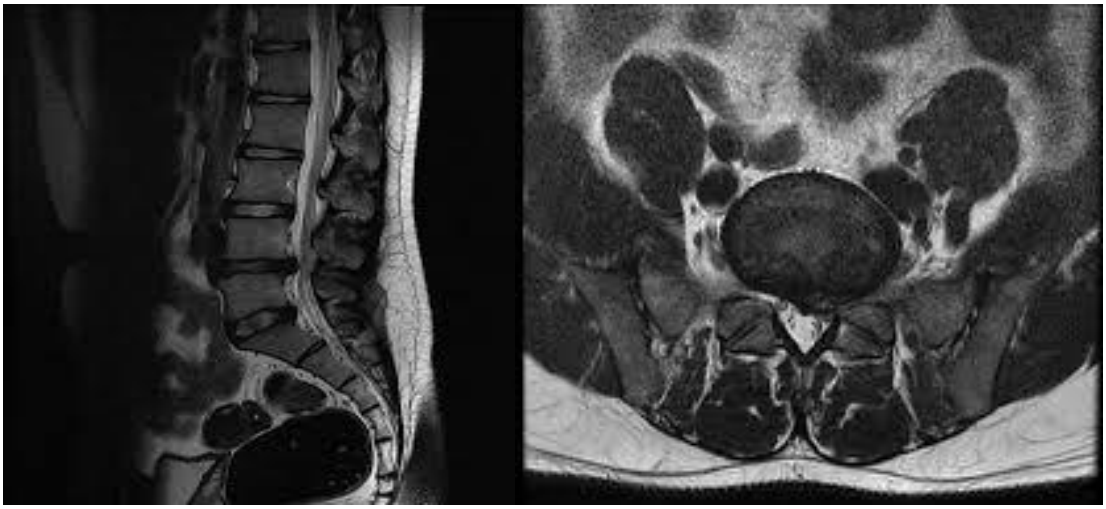


Figure 1: Above T2W MR Images show disc Protrusion

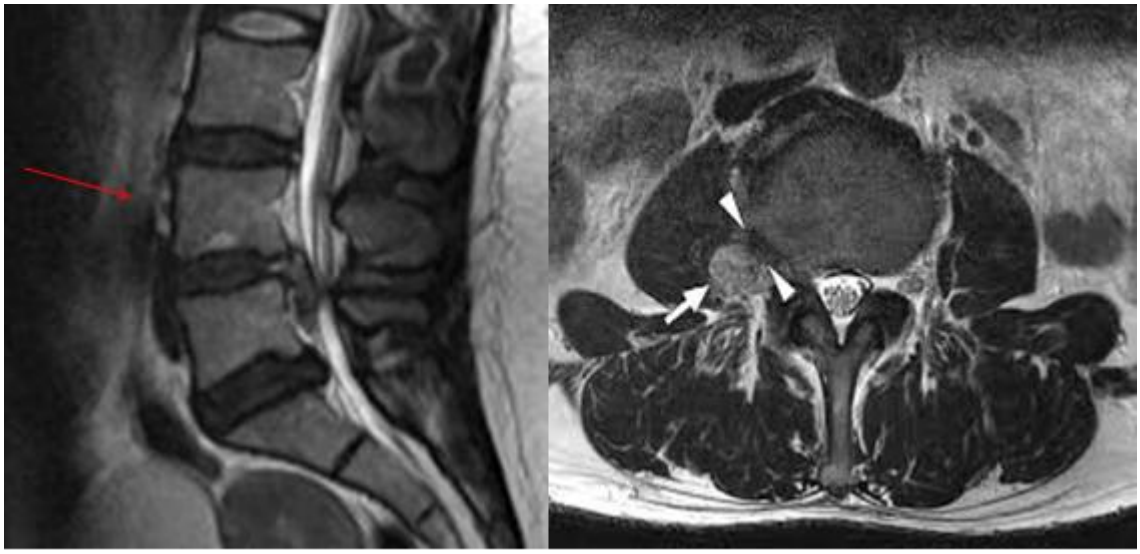


Figure 2: Above T2W MR Images show disc extrusion.

Figure 3: T2W MR Images show disc sequestration

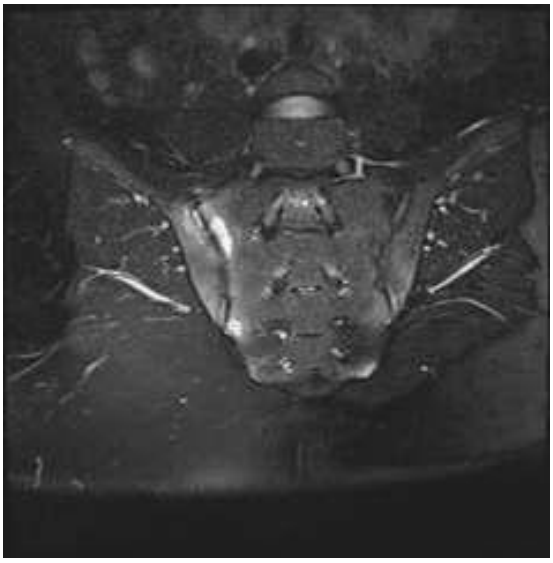


Figure 4: Sacro-ilitis

5. Discussion

1) The age distribution in our study was in range of 15 years to 40 years with maximum population within 26-35 year range.
2) The majority of the cases in our study were female.
3) Most commonly involved side was L4-L5 IVD level.
4) The majority of cases of back pain associated with occupation in Jamnagar district included Office workers followed by housewives, factor labourers, mechanics, barbers and farmers.
5) The findings of low back pain are as followed:
   - The L4-L5 level spondylosisare more common in non-traumatic causes, mostly related to above mentioned occupations.
   - L4-L5 IVD level was the most commonly involved region followed by L5-S1level, L3-L4 level, L2-L3 level and bilateral sacroilitis in decreasing order of frequency.
   - Among these, disc protrusion and extrusion followed by sacroilitis were most common.
   - Early lumbar spondylosis is more common in young adults where occupation involves long time abnormal posture and abnormal weight lifting like computer works; mechanics; doctors; students; housewifes and factory workers.

6. Conclusions

- According to our study MRI is more sensitive to evaluate back pain and its relation with certain occupation in which back pain triggered by certain occupation related postures.
- MRI being non -invasive does not involve morbidity associated with other tests like arthroscopy.
- MRI is unique in its ability to evaluate the lumbo-sacral pathologies.
- Its advantages are: no ionizing radiation, multi-planar imaging and comprehensive display of soft tissue anatomy, demonstration of causes for impingement.
- MR imaging used for soft tissue as well as bony changes involving lumbo-sacral region.

7. Source of Support

None

8. Conflict of Interest

None

Reference

[1] Hart LG, Deyo RA, Cherkin DC. Physician of_ce visits for low back pain: frequency, clinical evaluation, and treatment patterns from a U.S. national survey. Spine (Phila Pa 1976) 1995; 20:11–19
[2] Martin BI, Deyo RA, Mirza SK, et al. Expenditures and health status among adults with back and neck problems. JAMA 2008; 299:656–664
[3] Luo X, Pietrobon R, Sun SX, et al. Estimates and patterns of direct health careexpenditures among individuals with back pain in the United States.Spine2004;29:79–86
[4] Acute low back problems in adults: assessment and treatment. Agency for Health Care Policy and Research. ClinPractGuidel Quick Ref Guide Clin1994;(14)iii-iv,1–25
[5] Deyo RA, Weinstein JN. Low back pain. N EnglJ Med 2001; 344:363–370
[6] Ren XS, Selim AJ, Fincke G, et al. Assessment of functional status, low backdisability, and use of diagnostic imaging in patients with low back pain andradiating leg pain. J ClinEpidemiol1999; 52:1063–71
[7] Beattie P. The relationship between symptomsand abnormal magnetic resonance images oflumbar intervertebral disks. *PhysTher*1996;76:601–608
[8] Beattie PF, Meyers SP, Stratford P, et al. Associationsbetween patient report of symptoms andanatomic impairment visible on lumbar magneticresonance imaging. *Spine (Phila Pa 1976)*2000; 25:819–828
[9] Takatalo J, Karppinen J, Niinimaki J, et al. Prevalenceof degenerative imaging findings in lumbarmagnetic resonance imaging among youngadults. *Spine* 2009; 34:1716–1721.
[10] Jarvik JG, Deyo RA. Diagnostic evaluation of low back pain with emphasis on imaging. *Ann Intern Med* 2002; 137:586–597
[11] Gilbert FJ, Grant AM, Gillan MG, et al. Doesearly imaging influence management and improveoutcome in patients with low back pain? Apragmatic randomised controlled trial. *HealthTechnol Assess* 2004; 8:iii, 1–131
[12] Gilbert FJ, Grant AM, Gillan MG, et al. Lowback pain: influence of early MR imaging or CTon treatment and outcome—multicenter randomizedtrial. *Radiology* 2004; 231:343–351

Author Profile

Dr. Shilpa Chudasama is Associate professor in Radiology, G.G. Hospital, M.P.Shah medical college, Jamnagar-368001

Dr. Divyesh Sarvaiya, 1st year Resident Doctor in Radiology, G.G. Hospital, M.P.Shah medical college, Jamnagar-368001