

Research Article

A prospective study of magnetic resonance imaging findings in patients of chronic low back pain: a clinico-radiological correlation

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ABSTRACT

Background: Low back pain (LBP) is one of most commonly presenting complaint related to musculoskeletal system and affecting mostly middle aged and older person but now a day's younger people are also suffering. Correlation of clinical signs and symptoms with magnetic resonance imaging (MRI) findings is very helpful to find out exact cause of pain and its management. The aim and objective of the study was to correlate the MRI findings with clinical findings of patient and to assess the pattern and spectrum of MRI findings in various degenerative diseases in lumbar spine.

Methods: This institution based prospective observational study had been performed among 100 selected patients in 2yrs period in between April 2013 to April 2015 who presented with chief complaint of chronic LBP. Clinical history of all patients had been taken in detail. Clinical test i.e. SLR and Lasegue's tests have been performed in all patients. MRI of lumbosacral spine (L-S spine) had been performed in 1.5 Tesla Siemens magnetom vision plus MRI scanner.

Results: Total 100 patients of 20 to 80-year age group had been selected with mean age of 50.5yr. Among 100 patients; 68 males and 32 females had participated in the study. The most common degenerative finding was desiccation of disc followed by disc bulge, disc herniation, spinal canal stenosis, ligamentum flavum hypertrophy, facet joint hypertrophy, osteophytes and modic changes. L4-L5 and L5-S1 was the most commonly involved spinal levels in any degenerative pathology.

Conclusions: Significant association has been observed between MRI L-S spine finding and clinical findings in most of the patients of chronic low backache however in few patient clinico-radiological correlations could not be matched completely.

Keywords: Low back pain, Disc degeneration, Lasegue's and SLR test, Clinic-radiological correlation

INTRODUCTION

According to data of national center for health statics impairments of the back and spine are ranked as one of the leading cause of limitation of physical activity in people less than 45 years. Low back pain (LBP) is one of most common complaints throughout the world and our country due to degenerative spine disorder.¹⁻³ In most of the developed countries LBP resulting from the degenerative spine diseases is the most common cause of

physical disability in all ages, predominantly in 4th decade and above age groups and second most common cause to seek consultation from physician.⁴⁻⁶ According to various studies and reports it has been confirmed that 60% to 80% of common people suffers from low backache minimum once in lifetime.⁷ The severity of low back pain may be severe and may cause debilitation.

Mild degenerative changes of spine are physiological and should be considered pathological only if these

abnormalities are causing symptoms and clinical signs. Many structural components of spine are responsible for low backache of degenerative etiology including the intervertebral disc, vertebral periosteum, facet joints and spinal ligaments. The most frequent and common location of these changes is lumbar spine due to heavy mechanical stress and rotatory forces.

In MRI of spine the term degeneration referred to any one or more among the following imaging findings including desiccation of intervertebral disc, reduction in height of disc space, diffuse bulging or prolapse of the disc, extensive fissuring (i.e. numerous annular tears, mucinous degeneration of the annulus, modic changes in end plates, endplates sclerosis and osteophytes at the vertebral apophyses.⁸ In magnetic resonance imaging, these changes are manifested as T2 signal loss in intervertebral disc, narrowing of disc space, presence of fissures in annulus, air locules in disc space, calcification within the intervertebral disc, ligament flavum hypertrophy, altered marrow signals, marginal osteophytosis, disc herniation, vertebral mal-alignment and spinal canal stenosis.

Plain radiography (x-ray) of lumbosacral spine is routinely advised in patients of LBP to identify the gross morphological bony changes in vertebral body and its posterior elements but complete evaluation of the soft tissues elements e.g. intervertebral disc, nerve roots, spinal cord, ligaments and various smaller structures of spine is not possible. With continuous advancement in imaging technology and hardware, MRI has improved the identification and diagnosis of the cause of LBP and MRI has become the preferred modality for evaluation of degenerative spine diseases as it provides multi planar imaging capability, superior delineation of intervertebral disc, nerves, ligament, para spinal muscles, epidural fat, CSF and bone marrow. At present MRI is most sensitive tool for diseases of brain and spine and it provide an excellent window to see the spectrum of disc disease whether it is disc bulge, annular tear, protrusion, extrusion or sequestration and its effects on spinal canal, nerve roots, foramina, spinal cord and other adjacent structures.

During this study it has been observed few times that the few radiological findings of MRI lumbosacral spine (L-S spine) did not match with the clinical presentation or vice versa. In such type of cases role of radiologist becomes challenging and radiologist should always try to find out the relevant radiological finding to explain cause of symptoms. The purpose of this study is to assess the correlation between MRI findings, clinical findings and clinical tests in the patients of LBP due to degenerative diseases.

The aim and objectives of the study was to correlate the MRI L-S findings with clinical findings in patients of low backache due to degenerative diseases and to assess the pattern and spectrum of MRI findings of the various

degenerative diseases of L-S spine in cases of chronic low back pain.

METHODS

Imaging equipment

1.5 Tesla Siemens magnetom vision plus MRI machine.

Study design

It is a prospective observational study approved by the institutional research committee and ethical committee. A Performa was filled after taking clinical history and written informed consent was obtained from all the patients prior to MR imaging. The study includes 100 patients of 20 to 80 year group age those were referred for MRI L-S spine with chief complains of chronic low backache and fit for our inclusion criterion. Detail clinical history has been taken in every case considering the symptomatology of patient by which he/she presented to the Department of Orthopaedics and referred to Department of Radiodiagnosis, People's Medical College Bhopal, where he/she will be evaluated for MRI L-S spine (MRI sequences used- T2, PD Coronal and Sagittal; T1 and T2 Axial; T1 SE Coronal/Sagittal; STIR Coronal).

Inclusion criteria

We selected the patients for study if any one or more complaints are present as mentioned as below:

1. Chronic low back pain is chief complaint.
2. Radicular low backache radiating to one or both lower limbs.
3. LBP Associated with neurological deficits including bowel and bladder disturbances.

Exclusion criteria

If Patient is having ferromagnetic implants especially pacemakers and aneurysm clips.

1. History of trauma or operative intervention for low backache.
2. Non manageable sever claustrophobia.
3. LBP due to infective or neoplastic etiology.

Clinical tests used in the study

Straight leg raising test (SLR)⁹

The active straight leg raising test in supine position with extended knee is normally possible approach up to 90⁰.

If the patient cannot lie supine, this test can be done in lateral position.

In case of sciatic radiculitis, this test elongates the course of sciatic nerve, putting stretch on the sciatic nerve root.

Interpretations

1. Pain in leg raising up to 30° - It is diagnostic of intervertebral disc prolapse.
2. Pain in leg raising between 30° -70° – Suggestive of intervertebral disc prolapse.
3. Pain on raising leg > 70° – equivocal.

Lasegue’s Test⁹

A similar leg test performed by the examiner.

Patient is lying supine; the affected straight leg is elevated by holding it with one hand above the ankle and pressing it by another hand on front of the thigh.

Interpretations

Normal leg can be elevated up to 90 degrees without any pain.

In case of sciatic nerve root irritation, the patient will feel the pain along the course of sciatic nerve, and the lower back much earlier.

Measure the angle (between back of thigh and bed), at which pain just starts.

Statistical analysis

Statistical analysis done by using Statistical Package of Social Science (SPSS Version 19; Chicago Inc., USA). Data comparison performed by applying specific statistical tests i.e. Chi Square test to find out the statistical significance of the comparisons. Qualitative variables were compared using proportions. Significance level was fixed at P < 0.05.

RESULTS

All 100 patients of the study were divided into 4 groups on the basis of age. Data of patients and findings of MRI were analysed and summarised as follows:

Demographics

Mean age of patients in this study was 50.5 years (range 20-80years); 3/4th of study population are in the age groups of 36 - 65 years. 68 % of the study population were males and remaining 32 % were females. One noticeable thing is that 12% patients are adult and majority is females.

Gender distribution

62 % patients of study were male and rest 38% were female.

Age distribution

Age of the pts included in the study range from 20 to 80yr. Age group distribution of patients according to age is given in Table 1.

Table 1: Distribution of all cases according to age groups.

Age group in year	No. of pt.	Percentage
20-35	12	12.0%
36 – 50	35	35.0%
51-65	40	40.0%
66- 80	13	13.0%
Total	100	100

Degenerative changes

In MRI L-S spine overall prevalence of disc degeneration was 93%, followed by disc herniation (38%), disc bulge (30%), modic changes (27%) and spinal canal stenosis (44%). Very few MRI scans (7%) do not show any degenerative change in L-S spine however straightening of curvature is observed in few of them which may be due to muscle spasm.

Spinal canal stenosis

1. Out of total cases (n=100) forty-four patients (44%) had mild to severe degree of spinal canal stenosis. 10mm or more antero-posterior diameter of spinal canal was considered as normal.
2. Spinal canal stenosis was most commonly observed at L4/L5 and L5/S1 level, 17 and 13 cases have been reported respectively for each level. Multilevel involvements were seen in 7 cases and rest 7 cases had other levels involvements.
3. Mild spinal canal stenosis observed in 26 cases mostly involving L4/L5 and L5/S1 level; 9 and 8 cases respectively for each level. Multiple level involvements were seen in 6 cases and 3 cases had involvement of other levels.
4. Moderate spinal canal stenosis observed in 13 cases; mostly involving L4/L5 and L5/S1 level accounting 5 and 4 cases respectively. Multilevel involvement was seen in 2 cases and 2 cases had involvement of other levels.
5. Sever spinal canal stenosis observed in 5 cases; mostly involving L4/L5 and L5/S1 level; accounting 2 cases for each level. L3/L4 level involvement was seen in only 1 case.

Radiculopathy

1. In total 27 patients (27%) of radiculopathy; right unilateral involvement was most common; observed in 16 patients; below knee type in 14 patients followed by above knee type seen in only 2 patients.

2. Left unilateral involvement was less common; observed in 6 cases in which below knee type was present in 5 patients whereas above knee type was seen in 1 patient.
3. Bilateral radiculopathy was uncommon. It was present only in 5 patients; all are below knee type.
4. Bowel and bladder Involvement was seen in 3 patients and postural deformities were seen in 7 patients.
5. Neurological deficits and claudication were present in 17 patients.

Table 2: Association of spinal canal stenosis with SLR test results.

Spinal canal stenosis	Straight leg raising test results			Total no. of cases	Chi square Value	P value
	(<30 ⁰)	(30 ⁰ -70 ⁰)	(>70 ⁰)			
Mild	5 (19.2%)	10 (38.5%)	11 (42.3%)	26	1.70	0.790
Moderate	4 (30.8%)	5 (38.4%)	4 (30.8%)	13		
Severe	2 (40.0%)	2 (40.0%)	1 (20.0%)	5		

Table 3: Distribution of degenerative imaging findings among all age groups.

MRI Findings	20-35yr (Group 1)	36 – 50yr (Group 2)	51-65yr (Group 3)	66- 80yr (Group 4)	Chi Square Value	P value
Mild Disc degeneration	12 (24.0%)	18 (36.0%)	15(30.0%)	5 (10.0%)	24.4	0.001(HS)
Moderate Disc degeneration	0	8 (21.0%)	15 (39.5%)	15 (39.5 %)		
Sever Disc degeneration	0	0	2 (40%)	3 (60%)		
Diffuse bulge	4 (14.3%)	9 (32.1%)	11 (39.3%)	4 (14.3%)	2.80	4.83
Asymmetrical bulge	0	0	2 (100%)	0		
Facet Hypertrophy	0	6 (15.8%)	25 (65.8%)	7 (18.4%)	2.85	4.16
Ligamentum flavum Hypertrophy	1 (1.7%)	16 (27.6%)	30 (51.7%)	11 (19.0%)		

HS-highly significant

Table 4: Association of disc bulge and herniation with spinal canal stenosis.

Disc bulge and herniation	Spinal canal stenosis			Chi square Analysis	P Value
	Mild	Moderate	Severe		
Diffuse disc bulge	10 (66.7%)	3 (20.0%)	2 (13.3%)	0.944	0.624
Asymmetrical disc bulge	2 (100%)	0	0		
Disc Protrusion	4 (26.7%)	8 (53.3%)	3 (20.0%)	5.85	0.211
Disc Extrusion	1 (10.0%)	3 (30.0%)	6 (60.0%)		
Disc Extrusion with migration	1 (50.0%)	1 (50.0%)	0		

Spinal canal stenosis correlation with SLR test

1. 44 patients (44%) of total (n=100) showed spinal canal stenosis in our study. out of them 26 patients (59%) were suffering from mild spinal canal stenosis and it was significantly associated with positive straight leg raising test.
2. Moderate spinal canal stenosis was seen in 13 cases and severe canal stenosis in only 5 cases.
3. Straight leg raising test (<30⁰) was found positive in 11 cases.

4. Straight leg raising test (30° - 70°) was found positive in 17 cases.
5. Straight leg raising test ($>70^{\circ}$) was found positive in 16 cases.

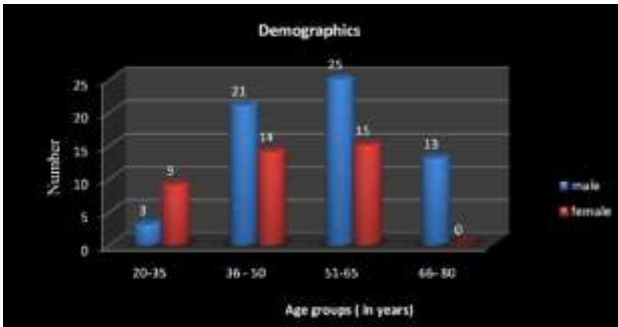


Figure 1: Distribution of cases on the basis of gender in each group.

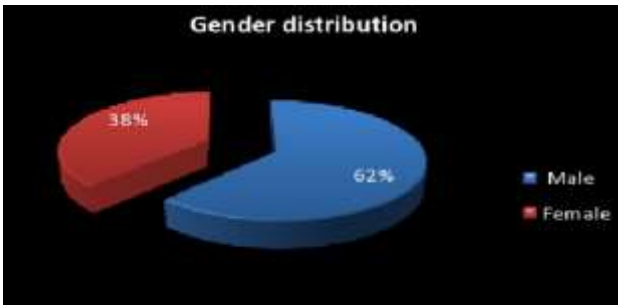


Figure 2: Gender distribution in all cases.

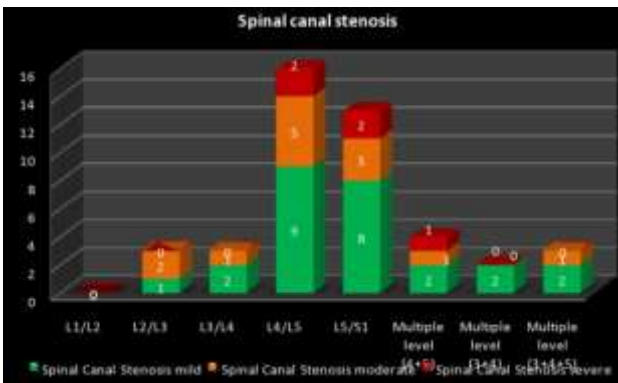


Figure 3: Number of cases of each disease type on imaging findings.

Disc degeneration

1. Out of total positive cases (n=93) of degenerative disc disease; highest prevalence was multiple levels involvement, accounts twenty-six cases (27.9%) followed by eighteen cases (19.3%) involving L5-S1 level, L4-L5 level involvement in seventeen cases (18.3%), L3-L4 level involvement in twelve cases (12.9%), L1-L2 level involvement in eleven cases (11.8%) and L2-L3 level involvement in only nine cases (9.6%).

2. In severity of disc degeneration, the prevalence of mild degeneration was 53.8%, moderate degeneration was 40.9% and severe disc degeneration was 5.3%.
3. Acute/sub-acute posterior peripheral annular tear was observed in 5 cases of the study. Usually focal minor tear does not cause any disc herniation or spinal canal stenosis but in some cases due to release of disc material, inflammation near nerve roots may precipitate severe low backache.
4. Highly significant association of mild to moderate disc degeneration was observed with increased age (p value is 0.001). Most of the patients in 51 to 80 yr. age groups had degenerated discs, whereas mild disc degeneration was common in 36-50 year age group.

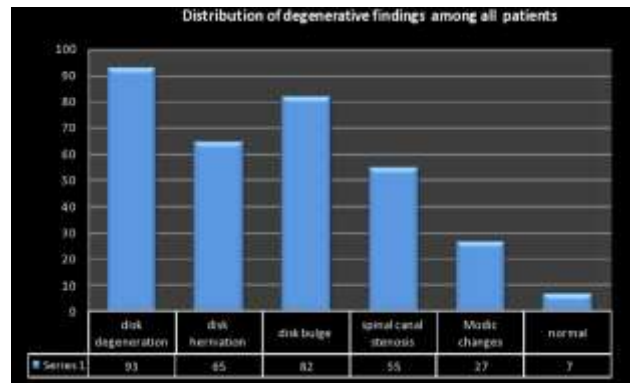


Figure 4: Distribution of degenerative changes at different levels among male and female.

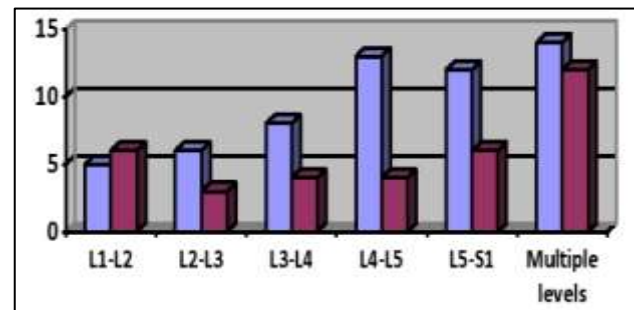


Figure 5: Distribution of cases on the base of severity of spinal canal stenosis at each level.

Disc bulge and herniation

1. 30 cases (30%) in the study showed posterior disc bulge; 28 of them had diffuse poster central bulge and 2 of them had posterolateral bulge. Most of the cases show disc bulge at L4-L5 and L5-S1 level accounting total 21 cases.
2. 38 cases (38%) of the study had posterior disc herniation, out of them 23 cases had protrusion, 12 had extrusion, 3 had extrusion with migration and only one case had sequestration.
3. Most commonly involved level in protrusion cases was L5/S1 (8 cases) then involving L4/L5 (7 cases). Protrusion was significantly associated with

moderate spinal canal stenosis comprising 8 patients (53.3%).

- Among extrusion cases L4/L5 and L5/S1 were among the most involved levels with the frequency of 5 and 4 cases in each. Extrusion was significantly associated with severe spinal canal stenosis comprising 6 patients (60.0%).
- Only 2 cases of Extrusion + Migration were found at L5/S1 spinal level.
- Only 1 case of sequestration was found involving L4/L5 spinal level.

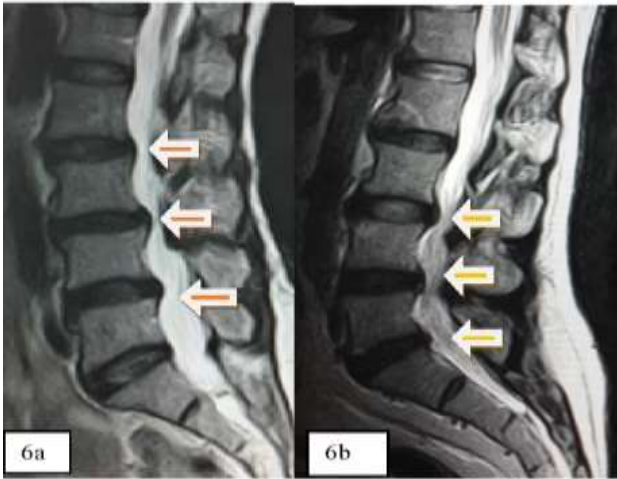


Figure 6: (a) T2 sagittal image of L-S spine is showing desiccation of intervertebral discs at all the levels and posterior disc bulge at L2-L3, L3-L4 and L4-L5 levels (arrow); (b) T2 sagittal image of L-S spine is showing desiccation of intervertebral disc with posterior disc bulge at L3-L4, L4-L5 and L5-S1 level (arrow).

Types of disc herniation

- Protrusion was most common type of disc herniation in this study (23 cases). L5-S1 and L4-L5 levels are involved in most of the cases accounting 8 and 7 cases respectively for each level. 8 cases showed involvement of other levels and multiple levels.
- Posterocentral disc protrusion was most common (83%) followed by posterolateral type (9%) and foraminal type involving only 2 patients (8%). No case of extra foraminal type of protrusion was reported.
- Second most common type of disc herniation was extrusion (12 cases). L4-L5 and L5-S1 levels were involved in most of the cases accounting 5 and 4 cases respectively for each level.
- Disc extrusion with migration of disc fragment is observed in 3 cases.
- Disc sequestration was least common among disc herniation and seen in only 1 case.

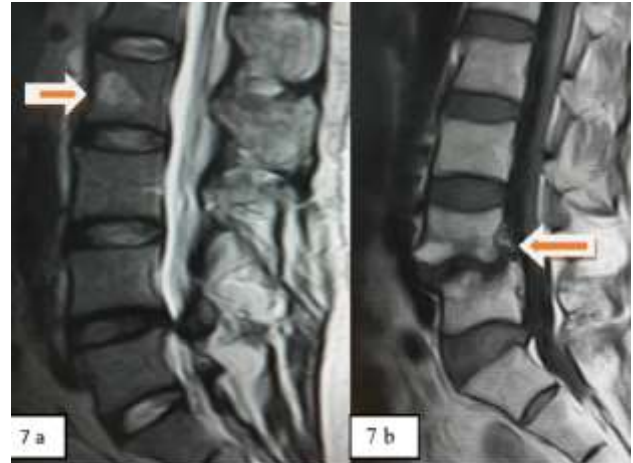


Figure 7: (a) T2 sagittal image of L-S spine is showing a hemangioma in L2 vertebral body (arrow) and spinal canal stenosis at L4-L5 level; (b) T2 sagittal image of L-S spine is showing grade 1 chronic anterolisthesis of L4 vertebra over L5 (arrow) with end plate changes.



Figure 8: (a) T2 sagittal image of L-S spine is showing disc extrusion with superior migration (arrow) at L4-L5 level causing spinal canal stenosis; (b) T2 sagittal image of L-S spine is showing desiccation of intervertebral disc at all the levels with posterior disc protrusion at L4-L5 level associated with ligamentum flavum hypertrophy causing spinal canal stenosis (arrow).

Ligamentum flavum hypertrophy

- In general ligamentum flavum hypertrophy is commonest among all non-discogenic causes of spinal canal stenosis constitutes almost 90% share.
- In fifty-eight cases (58%) of this study ligamentum flavum hypertrophy was observed mostly at L4/L5 and L5/S1 level accounting 14 and 13 cases respectively and rest 31 cases had multilevel or other level involvement.
- Significant association was observed between ligamentum flavum hypertrophy and increased age.

Most of the patients (77%) belongs to 51 to 80 year age groups and had degenerated discs.

Facet joint hypertrophy

1. Thirty-eight patients (38%) of total (n=100) patients showed facet joint hypertrophy.
2. L4/L5 and L5/S1 were amongst the mostly involved levels with the frequency of 10 and 12 cases for each. 16 cases showed other levels and multiple level involvements.
3. Occurrence of Facet joint hypertrophy was significantly associated with increased age. 51-65 and 66- 80 year age group was mostly affected.

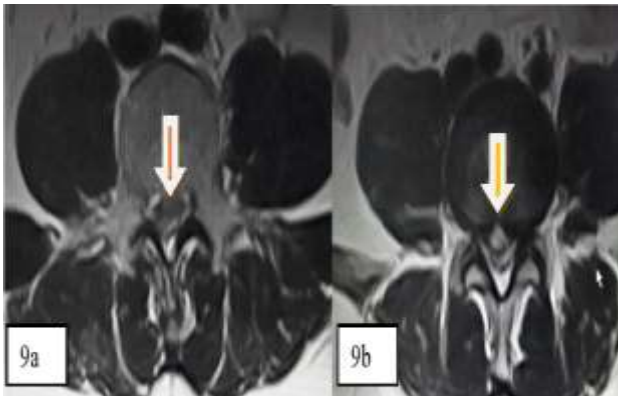


Figure 9: (a) T1 axial image of L-S spine is showing extruded disc in spinal canal (arrow) causing spinal canal stenosis; (b) T2 axial image of L-S spine is showing Posterocentral annular tear with disc protrusion (arrow).

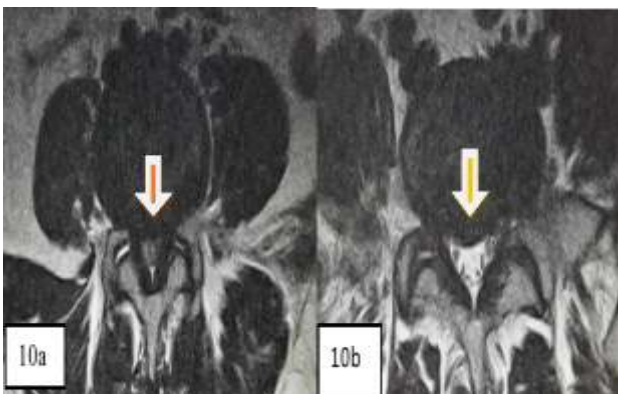


Figure 10: (a) T2 axial image of L-S spine is showing diffuse posterior disc bulge with marked Ligamentum flavum hypertrophy (arrow) causing severe spinal canal stenosis; (b) T2 axial image of L-S spine is showing diffuse posterior disc bulge (arrow) causing compression over lateral recess on both sides.

Modic changes

1. Twenty-seven (27%) patients of this study showed modic changes mostly at L4-L5 and L5-S1 level.

2. In most of the cases Type I and type II modic changes were observed, accounting 21 patients.
3. Type 3 changes were least frequent and observed in only 6 cases.

Osteophytes formation

1. 47 patients (47%) of total (n=100) patients showed osteophytes formation at anterior, anterolateral or posterior aspect of vertebral body.
2. 27 cases were having anterior or anterolateral osteophytes at multiple spinal level and 11 patients only at L4/L5 and 2 patients were showing L5/S1 spinal level involvement.
3. 7 patients showed posterior osteophytes at multiple spinal levels.

DISCUSSION

With increasing longevity of life due to better medical care and socioeconomic condition the percentage of aging populations had increased so the prevalence of degenerative musculoskeletal diseases and associated clinical disability is also on the rise. In our study significant gender predominance is observed (2/3rd patients are male). Disc degeneration was quite higher among males (62%) as compared to females (38%), although the variation observed was not statistically significant. This finding of our study was similar with previous other studies.¹⁰⁻¹² This result confirms the general perception that men are more susceptible to degenerative spine disease than women, most probably due to increased mechanical stress and prone to injuries due to more outdoor activities.¹³ Lumbar disc degeneration may be manifested in form of paresthesia in legs, claudication and weakness of lower limb and relief of pain when bending forward.⁸ It has been suggested by many authors that MR imaging is indicated in the evaluation of a patient with sciatica when (a) Radiculopathy is present, (b) Signs of nerve root irritation was present at physical examination (positive SLR test) and (c) patient has failed to recover after 4-6 weeks of conservative therapy.¹⁴

Degeneration can occur at any level of spine but most commonly seen at L4-L5 and L5-S1 level of L-S spine probably due to highest mechanical stress at these levels.¹⁵⁻¹⁷ This has been observed in many previous studies that degeneration is frequently seen at higher lumbar levels (e.g. L1-L2, L2-L3, L3-L4) in older patients whereas younger persons had disc degeneration at lower lumbar levels (L4-5, L5-S1).^{10,18} Degenerative changes were seen in majority (93%) of patients in this study; most of these changes were observed at L4/L5 and L5/S1 levels and lowest rate of involvement was noted at L1-L2 level. Similar results had been observed in previous studies of weiler et al, boden et al and okada et al.^{1,19,20}

Degenerative changes in intervertebral disc starts early in life which is partly a result of aging but exact etiology is still unknown but many factors like autoimmune, genetic predisposition, re-absorption and biochemical factors seems to be associated in accelerating the process of degeneration.²¹ Disc degeneration in less than 35 year age can probably be explained as a result of genetic predisposition; though, other factors like repeated trauma and more physical load can play an important role in early precipitation of disc degeneration. Lumbar spine is subjected to heavy mechanical stress than any other part of spine so it is prone to be affected by degenerative changes; this fact can explain such observation in our study.

In this study most patients had degeneration on multiple levels and very few patients had degeneration and disability on single level. This observation is similar to study of Boden et al.¹⁹ The prevalence of disc degeneration was observed to rise with increasing age in 51-65 and 66-80 yr. age groups so it can be hypothesizing that increased age is significantly associated with mild and moderate disc degeneration (p value < 0.05). The association of spinal canal stenosis was found with various degenerative conditions like diffuse disc bulge and herniation which had significant association with spinal canal stenosis. Reduced disc space, disc bulge and herniation was observed in most of spinal canal stenosis cases but all of them did not had ligamentum flavum hypertrophy as seen in a past study.²² Disc protrusion and facet joint involvement was present in almost all cases of spinal canal stenosis. Due to disc degeneration and reduction in height of the disc, there is increased stresses on the facet joints with craniocaudal subluxation resulting in loss of T2 hyperintense signals, hypertrophy and osteophytosis, and this condition is termed facet joint arthropathy.⁸

It has been also confirmed again from our study that neurogenic claudication is main complaint after low backache and sciatica in patients with moderate to severe disc degeneration which is a main feature of lumbar spinal stenosis.²³ Low back pain and sciatica aggravated during walking and standing position, as seen in other studies.²⁴⁻²⁷ These findings occur during walking and standing due to decompensation of blood flow to the spinal nerves, resulting in arterial ischemia as well as venous congestion.²⁴ In cases of low backache with radiculopathy there was strong probability of disc protrusion or extrusion causing nerve root compression, but there was no significant correlation between the severity of disease, patient's function, severity of pain and MRI findings.¹⁴ Degenerative spinal canal stenosis is more common in patients of low back pain having significant correlation with SLR test.^{28,29} In cases of spinal canal stenosis due to disc bulge or herniation, thecal sac or nerve roots get impinged against the spine bone hence causing radiculopathy and movement dependent pain.^{15,16}

Modic changes are early signs of spinal degeneration and caused by disc degeneration. They manifested by alteration in MR signals adjacent to the endplates of degenerated intervertebral disc. There are 3 types of modic changes which can be seen commonly in routine MRI scanning. Type II change are commonest and L4/L5 level is the commonest level of involvement. In our study facet joint hypertrophy was seen involving 38% patients; involving mostly L4/L5 and L5/S1 level. The cause of facet hypertrophy is increased mechanical stress due to change in posture and center of gravity. Ligamentum flavum hypertrophy is mostly seen at lower spinal level predominantly at L4/L5 and L5/S1 which was similar to the study conducted by S. Saleem, Hafeez M. Aslam et al.³⁰

Only 2 cases of spondylolisthesis were found in our study both were involving L4/L5 level. Spondylolisthesis had been reported frequently in the patients of lumbar canal stenosis in comparison to patients of disc herniation, reflecting the fact that during stenosis, laxity of capsules and spinal ligaments may result in spondylolisthesis.²⁴ It was mainly present at L4/L5 level same as seen in a previous study.⁸ The presence of degenerative spondylolisthesis at that level was thought to be related to comparatively more sagittal orientation of facet joint that makes them prone to anterior displacement.⁸ Osteophytosis was demonstrable in forty-eight patients of our study. The anterior margin of L4 vertebral body was the commonest site of osteophytosis whereas posterior margin of L1 vertebral body was least involved site. In general, posterior osteophytes were the least common but when present may be symptomatic.

There are many risk factors considered responsible for degenerative disease in lumbar spine which include increasing age, socioeconomic status, torsional stress forces, smoking, obesity, heavy weight lifting, vibration, trauma, immobilization, gender, height, hereditary, genetic factors, occupations like machine drivers, carpenters and office workers.³⁰ Patients of LBP diagnosed with herniated disc in MRI and those were treated surgically have better short-term outcomes in comparison to patients who treated with conservative therapy.³¹ So if surgery is performed earlier after the diagnosis, prognosis will be better.³²

So this study hypothesizes that in MRI is preferred modality of investigation for chronic low backache due to degenerative spine disease than any other modality. MRI findings usually matched with clinical symptoms of patients of low backache but not always this thing facilitates requirement of clinico-radiological correlation and helps in disease management.

CONCLUSION

Following points are concluded from the study:

- Significant correlation has been observed between SLR and Lasegue's test findings with MRI L-S spine findings in most of the patients of LBP which was main aim of this study.
- Few patients' clinical findings did not match completely with MRI findings so it is limitation of our study.
- Wide spectrum of degenerative changes has been observed in L-S spine which shows various patterns of disease and its variability with age.
- Degeneration of intervertebral disc is the commonest degenerative finding in most of the Patients, involving all age groups even younger age group.
- Disc desiccation, bulge, herniation, modic changes, osteophytes, spondylolisthesis and spinal canal stenosis were commonest at lower lumbar levels e.g. L4-L5 and L5-S1 level probably due to highest mechanical stress.
- Posterocentral disc protrusion was commonest type of disc herniation, showed increased prevalence with advancing age and more prevalent in males.
- Spinal canal stenosis had significant correlation with the level of involvement and it showed significant association with the degree of SLR test.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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