ORIGINAL ARTICLE

Frequency of lumbar spondylosis in patients with lumbar herniated discs on magnetic resonance imaging

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ABSTRACT

Background: Lumbar Spondylosis is a degenerative condition characterized by disc wear, disc dehydration, osteophyte formation, disc herniation, spinal stenosis, spondylolisthesis and ligament hypertrophy. This study was designed to determine the frequency of lumbar spondylosis in patients with lumbar herniated discs on Magnetic Resonance Imaging.

Methodology: It was a retrospective study conducted from August 2024 to December 2024 at Chughtai Lab department of Radiology in Lahore, Pakistan. A total of 45 patients with backache were evaluated on Siemens Avanto 1.5T MRI machine. All patients underwent MRI Lumbosacral Spine examination. Non-probability convenient sampling technique was used and data was analyzed using SPSS version 26. Bar charts and Histogram were used to display the data. A p-value less than 5% was taken for statistical significance

Results: Out of 45 patients, 17 (37.7%) were males and 28 (62.2%) were females. Mean age was 53.62±14.615 years. Different types of discs herniation were identified including disc bulges in 30 (66.6%), disc protrusion in 11 (24.4%), disc extrusion in 3 (6.6%) and disc sequestration in 2 (4.4%) patients. Only 15 (33.3%) patients out of 45 were diagnosed with lumbar spondylosis, while it was absent in 30 (66.6%) patients

Conclusion: Lumbar spondylosis is a rare diagnosis, presenting with several patterns of disk degeneration especially discs herniation and MRI is the gold standard modality for its accurate analysis.

Keywords: Spondylosis, Magnetic Resonance Imaging, Disc Herniation, Spinal Stenosis, Lower Back Pain.

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INTRODUCTION

Lumbar Spondylosis is a degenerative condition characterized by disc wear, disc dehydration, osteophyte formation, disc herniation, spinal stenosis, spondylolisthesis and ligament hypertrophy. It is associated with lower back pain, sciatica, and functional disability (1). “Spondylosis” is the term used to highlight the degenerative changes that occur throughout the spine. It is more prevalent in the age group of 45-64 years. 10% of women between 20-29 years of age display disk degeneration. Despite being common in those over 40, lumbar spondylosis appears in 3% of 20-29 years old. The lumbar region is the most affected due to exposure to mechanical stress (2).

The lumbar spine is a weight-bearing structure composed of five vertebrae (L1-L5), supporting about 70% of the body’s load, while the facet joints regulate the rest 30%. These components provide mobility, stability, and protect the spinal cord (3). It also comprises of lumbosacral plexus, which gives off branches to various nerves among which sciatic nerve hold the most importance, extending from the leg's top to the foot's back, it originates from spinal nerves L4 to S3(4). A slipped disc or disc herniation can occur due to the unstable mechanical pressure on spine resulting in deformation of annulus fibrosis, allowing part of the nucleus pulposus to obtrude (5). Degenerative lumbar spinal stenosis is a progressive disease that involves all the moving segments of the spine. The comparative wavering instigated by degeneration of the intervertebral disc causes hypermobility of the vertebral bodies (6).

Risk factors for spinal conditions include age, gender, weight, joint inflammation, and lifestyle factors such as sedentary behavior, weightlifting, and manual work (1). Osteoarthritis, particularly in women, contributes to spondylosis. Age, BMI, spine posture, and activities involving loading,

lifting, increases the risk of radiculopathy (7). Additionally, whole body vibration from vehicle driving and resistive training can harm spinal structures (8). Symptoms of lumbar spondylosis can range from asymptomatic to severe.3 Common symptoms include lower back pain, muscular weakness, sensory changes, and radicular pain (9). Pain may radiate to the gluteal area, thighs, or legs. Sciatica and low back pain are the major symptoms of mechanical compression of the spinal cord and nerve roots (10). The straight leg-raising test can evaluate nerve root irritation (11). Symptoms can worsen with spinal deterioration and degenerative changes. Management ranges from conservative options such as physical therapy and NSAIDs to surgical interventions like spinal decompression and fusion surgery for severe cases (8).

Many radiological investigations are carried out to diagnose this disease, but the main one remains to be MRI due to its superior soft tissue contrast (12). According to several studies, MRI is considered to have high sensitivity for diagnosing lumbar disc herniation (LDH), leading to lumbar spondylosis. Some clinical findings might be misinterpreted, concerning with lumbar disc herniation in asymptomatic patients. Hence, the correlation between imaging and clinical evaluation is essential for the accurate diagnosis and management of patients (9).

MATERIAL AND METHODS

The retrospective study was conducted at Chughtai Lab department of Radiology in Lahore, Pakistan. The study period was from August 2024 to December 2024 after the approval of the synopsis from Institutional Review Board. All patients underwent MRI Lumbosacral Spine examination. The reports that fulfilled the inclusion criteria were used for data collection. Forty-five individuals were evaluated on Siemens Avanto 1.5T MRI machine and images were obtained on sagittal T1W, sagittal T2W, axial T1W and axial T2W sequences, providing the demonstrative data. In addition, continuous variable was expressed as mean ± standard deviation, whereas categorical variables in the form of frequency and percentages. Bar chart and Histogram were used to display the data. Non-probability convenient sampling technique was used and data was analyzed using SPSS version 26. A p-value less than 5% was taken for statistical significance. Demographic findings of 45 patients, both males and females, between ages 30 to 80 years with low back pain (localized or radiating) advised for Lumbosacral Spine MRI were encompassed and included in this study. Patients with history of spinal injury, spinal surgery, infection or abscess, tumors or metastatic disease, severe spinal deformities, rheumatological and neurological disorders and those with severe claustrophobia, implanted ferromagnetic objects or metallic foreign bodies like bullets etc. were excluded.

RESULTS

Total number of patients in the study were 45, out of which 17 (37.7%) were males and 28 (62.2%) were females (Figure-1). The age groups were 30 to 80 years. The mean and standard deviation were 53.62±14.615 years. Patients had clinical history of localized pain in 19 (42.2%), whereas 26 (57.7%) had radiating pain towards leg. Lumbar spondylosis was diagnosed in just 15 (33.3%) patients out of 45, while 30 (66.6%) had no lumbar spondylosis and showed only presence of different disc herniation at various levels of lumbosacral spine, causing compression and leading to lower back pain.

Other variables were as following: disc desiccation was present in 42 (93.3%) patients (Figure-2). Different types of discs herniation was identified including disc bulges in 30 (66.6%), disc protrusion in 11 (24.4%), disc extrusion in 3 (6.6%) and disc sequestration in 2 (4.4%) patients was present.

MRI also detected different types of spinal stenosis according to location, 17 (37.7%) patients had central canal stenosis, 32 (71.1%) had lateral recess stenosis and 20 (44.4%) patients had foraminal stenosis, respectively (Figure-3). Thecal sac compression was observed in 39 (86.6%) patients (Figure-4). For other details see Figure-5).

DISCUSSION

This study examines the prevalence of lumbar spondylosis in patients with lumbar herniated discs using MRI. Its main goal was to evaluate the frequency of lumbar spondylosis, particularly in relation to various types of disc herniation. Keeping in view lumbar spondylosis and the other age-related conditions, this study provides clear understanding of early MRI diagnosis that would leads to improve clinical decisions and the ultimate treatment for patients. MRI is a non-radioactive modality and is widely utilized for detecting soft tissue pathologies, especially lumbar spondylosis in case of back pain (13).

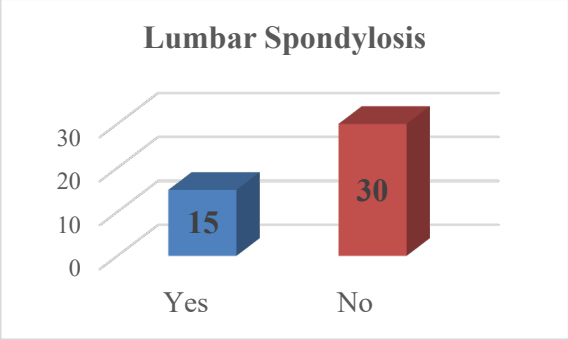

Figure 1: Bar Chart demonstrating frequency of Lumbar Spondylosis in patients.

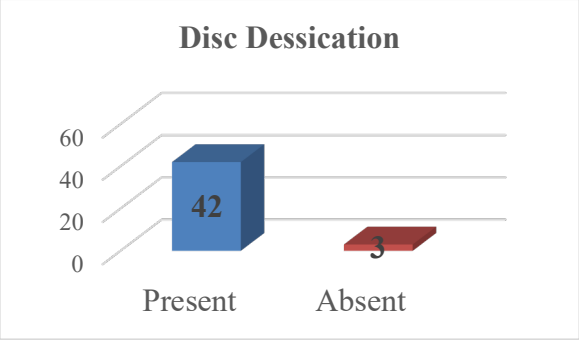

Figure 2: Bar Chart Representation of Disc Desiccation in patients.

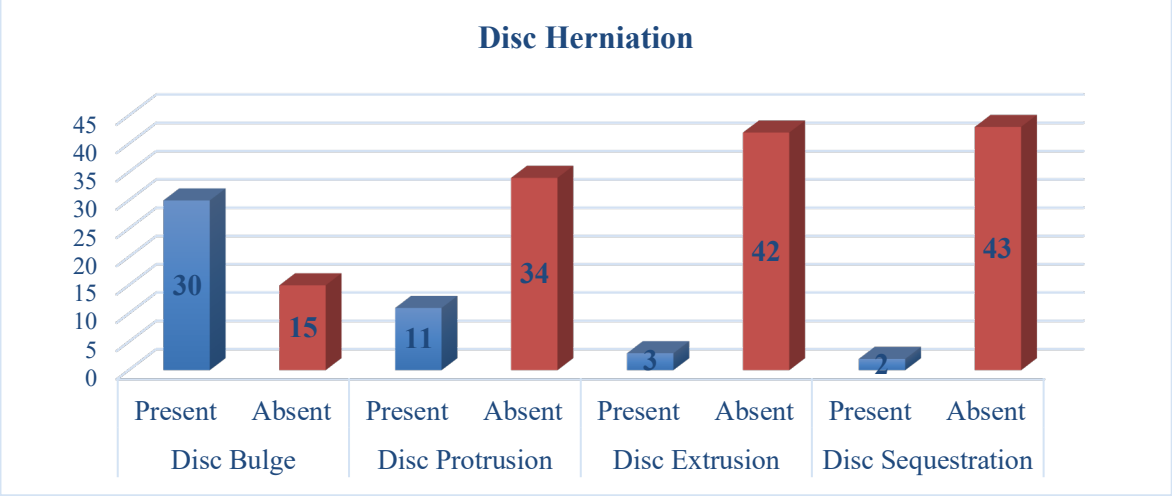

Figure 3: Bar chart Representation for different type of Disc Herniation in patients.

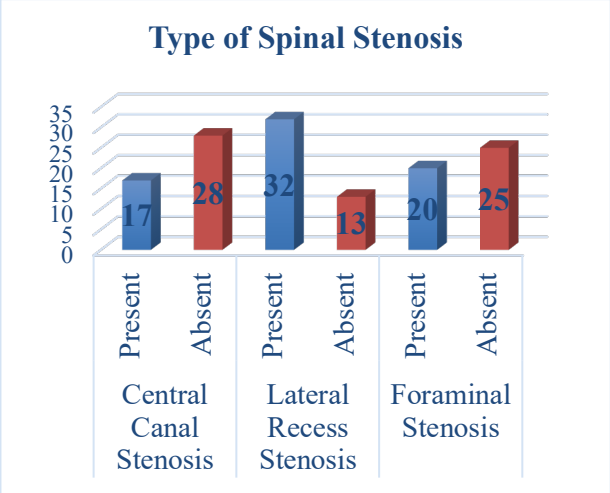

Figure 4: Bar Chart Representation of different type of Spinal Stenosis in patients.

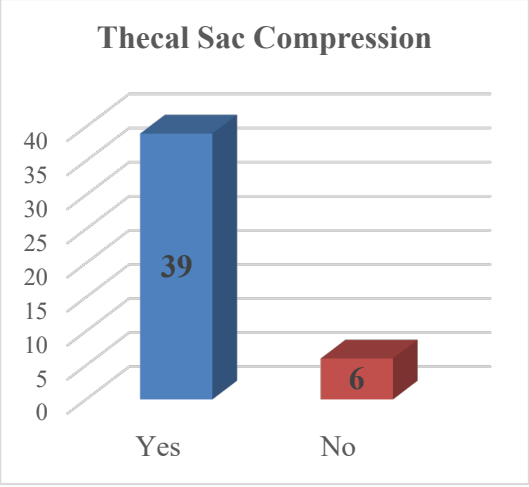

Figure 5: Bar Chart Representation of Thecal Sac Compression in patients.

Lumbar spondylosis usually comprises of lower back pain and numbness of the lower limbs. MRI results often shows thecal sac compressions, disc herniation, spinal stenosis and disc degenerations (14). Chronic lower back pain is determined to be the basic symptom affecting 23% of the population (15).

A study carried out in Pakistan in 2021, included the patients of ages ranging from 30-80 years, prescribed of MRI lumbosacral study. Out of 80 patients surveyed, 61.2% males and 38.8% females resulted in disc dehydration (51.9%) and end plate changes (28.4%). Spondylolisthesis was (17.5%) while lumbar disc herniation and dis bulges were (50.6%). The results suggested that lumbar spondylosis is common in patients with

increasing age of 45 years and above, with continuous complain of lower back pain (87.7%). Thus, concluding the advance results of MRI modality in detecting disc pathologies including lumbar spondylosis and disk degeneration (81.2%) (1). These findings align with another Pakistani study by Naeem et al.

In this study, out of 62 patients surveyed, with the ages ranging between 20-80 years. 33 (53.2%) were males and 29 (46.8%) were females (4). patients with the history of trauma (5.6%), 37 with pain radiating to legs (59.7%), 27 showed disc bulge (43.50%), 40 showed stenosis (64.50%) in nerve root (L4-S1) and 40 with sciatica (64.50%). Hence concluding that the symptoms of lower back pain and pain radiating to one or both legs were leading to sciatica due to sacral plexus stenosis, confirming MRI as the most effective diagnostic tool for spinal stenosis (5).

A Dutch study carried out in 2011, tested different studies on lumbar pathology, but its conclusion on MRI's diagnostic accuracy were consider to be unconvincing due to the limited data and variability (16). A study in 2016 explored the link between LBP and age-related disc diseases due to delayed screening. Prolong back pain can lead to serious spinal cord complications and posture related abnormalities. Hence the need for effective pain management and multidisciplinary care is very significant (17).

A study carried out in Finland in 2024, evaluated that the performance of 3D MRI was better than the conventional 2D MRI in diagnosing central, recess and foraminal stenosis. It concluded that 3D MRI was exceptionally reliable, especially for evaluating recess stenoses (18).

CONCLUSION

It is concluded that 15% of general population had lumbar spondylosis diagnosed on MRI examination. Whereas 30% of population only showed early characterization, such as disc herniation, disc desiccation and thecal sac compression that was resulting in lower back pain. Different types of spinal stenosis were also evaluated, which was not included in prior research. Hence proving that lumbar spondylosis is a rare diagnosis and can be avoided by early detection on MRI.

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