



A Study to Correlate the Clinical Signs and Magnetic Resonance Imaging in Lumbar Interveterebral Disc Prolapse

KEYWORDS

Intervertebral disc prolapse, straight leg raising test, medical resonance imaging, lumbar spine, disc bulge

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ABSTRACT *BACKGROUND: A Spinal disc herniation (prolapsed disc) is a condition affecting the spine in which a tear in the outer, fibrous ring (annulus fibrosus) of an intervertebral disc allows the soft, central portion (nucleus pulposus) to bulge out beyond the damaged outer rings.*

The patient presents usually with severe low backache with one or both sided lower limb radiation.

MRI has assumed a prominent role in the imaging evaluation of the spine.

The aim of this study is to evaluate 50 patients who presented to us with low backache and to study the correlation between MRI findings in them with the clinical findings.

MATERIALS AND METHODS: Fifty patients with age groups between 20-70 yrs who presented to JUSTICE K.S.HEGDE CHARITABLE HOSPITAL with low backache were taken under the study. MRI done in all of them and findings were compared with the clinical findings. Using the SPSS software statistical analysis were performed. The following results were drawn.

RESULTS: Out of all our patients majority of them showed negative nerve tension signs with positive disc lesions on MRI. The neurological signs like motor, sensory deficits and abnormal reflexes significantly correlated with MRI.

CONCLUSION: From our study we conclude that the key to diagnose and investigate the intervertebral disc prolapsed is the clinical history and more importantly the clinical examination. The clinical signs like motor deficits and sensory deficit significantly with abnormal MRI findings however the nerve tensions signs are not significant in disc lesions.

INTRODUCTION:

Patients who have low back pain present with a set of symptoms that are not labeled with a specific diagnosis. The task confronting the examining doctor is to integrate these symptoms, physical findings and diagnostic tests resulting in the formulation of a logical diagnosis and then develop a treatment plan. To standardize and organize decision making a systemized approach to patients presenting with low back pain has been developed.

Magnetic Resonance Imaging has assumed a prominent role in the imaging evaluation of spine. Owing to its multi-planar capability and superior soft tissue contrast, MRI is a procedure of a degenerative disc.

AutioRejoA et al¹⁴ in their study found that positive root tension and shorter duration of symptoms correlated with large disc herniation.

The diagnosis of both level and degree of protrusion or prolapsed disc based upon clinical findings can be reported by MRI which has high sensitivity and specificity.

Hence, the study is intended to correlate clinical findings and MRI findings of lumbar intervertebral disc prolapse.

MATERIALS AND METHODS:

SOURCE OF DATA:

Patients for the study were selected from the inpatient department of Orthopaedics examined and treated for intervertebral disc prolapse in Justice K.S. Hegde Charitable Hospital, Deralkatte Mangalore, during the period from dec 2003-dec 2004. Then from august 2012 to September 2013.

METHOD OF COLLECTION OF DATA:

During this period fifty patients who had low back pain, radicular pain and clinical evidence of intervertebral disc prolapse and whose MRI was done were taken into consideration. The MRI of all the patients were taken into analysis and findings were compared with the clinical findings.

INCLUSION CRITERIA:

A) All patients aged between 20-70 with clinical features of intervertebral disc prolapsed who were subjected to MRI.

EXCLUSION CRITERIA:

A) Patients below 20 yrs of age

B) Patients who have already been operated for intervertebral disc prolapsed

C) Patients with evidence of infection and malignancy

TYPE OF STUDY: RETROSPECTIVE**METHODS:**

Records of patients presenting with low backache and MRI films were collected from the records department. Detailed history of the patients comprising of type, onset duration and radiation of pain were noted. History regarding the previous episode of low backaches, aggravating, relieving factors for pain was obtained. A thorough history regarding motor weakness and paraesthesia was also noted. History regarding any injuries to the back was also obtained.

After the clinical history, the patient's were clinical examination were recorded including range of motion of lumbar spine, gait analysis, various nerve tension signs like straight leg raising test and Lesague test.

Sensory and motor deficits were also obtained. Motor deficits were graded from 0-V.

Where grade 0 is no power and Grade V is normal power.

They were later classified depending upon the presence and absence of motor and sensory deficits.

All the MRI findings of the patients were taken into consideration. The severity of the problem was assessed on the level and degree of disc prolapsed like bulge, protrusion, extrusion and sequestration.

Bulge was recorded as normal MRI finding or negative disc lesion. Protrusion, extrusion, sequestration and bulge with indentation were considered as positive or abnormal MRI findings.

The MRI reports were compared and correlated with clinical findings, nerve tension signs, motor deficits, sensory deficits.

The statistics were computed using the SPSS software.

RESULTS:

- Amongst the fifty patients under the study 27(54%) were male and 23(46%) were females. (Table 1)
- 39 patients (78%) of the patients presented with backache.(Table 2)
- Amongst patients with backache 1 had L2-L3, 3 had L3-L4, 6 had L4-L5 and 5 had L5-S1 herniations.(Table 3)
- 24 patients with backaches presented with abnormal MRI.(Table 4)
- 14 male patients and 16 female patients presented with abnormal MRI out of 27.(Table 5)
- It was noted that the incidence of L4-L5 disc prolapsed was more in males and L5-S1 was more in females.(Table 6)
- Out of 18 patients with weakness 13 presented with abnormal MRI.(Table 7)
- Nerve tension signs like SLRT and Lesague test were both absent in 56% and 66% of the patients respectively with an abnormal MRI.(Table 8)
- 16 patients with abnormal MRI had positive nerve tension signs (Table 9).

DISCUSSION:

Patients who had low back pain present with sets of symptoms that are not labelled with a specific diagnosis. The task confronting the examining doctor is to integrate these symptoms; physical findings and diagnostic test result in the formulation of a logical diagnosis and then develop a treatment plan. To standardize and organise decision making, a systemized approach to the patient presenting with low back pain has been developed.

Sex distribution:

This study included 50 patients with various signs and symptoms of lumbar disc prolapse. It was found that male predominance was present in 54% of the cases.

Horai¹ investigation showed that low back pain of significant degree begins in younger age group and was more common in males.

These low back pain were commonly due to disc prolapsed which was averaged nearly a decade of delay in females for the development of symptoms.

The increased incidence in males could be because of arduous labour. The incidence of low back pain is due to increased abdominal pressure with reduction in blood flow to the vertebral body and disc rendering the disc more susceptible to mechanical stress.

Backache and Leg pain:

The most common clinical presentation was backache and leg pain in 78% of the patients. The backache with radicular pain was seen in almost all the patients in either of the legs or in both the legs with left side involvement of 22% and right of 24%. The rest were bilateral involvement.

In a study of 146 cases, Fry Moyer found chronic backache as the most commonest presentation.

William² suggested that back and leg pain were the direct result of compression of the nerve in the area of the intervertebral foramina.

Carriage et al³ in his study of 188 patients with sciatica found out that right sided symptomatic herniations were usually larger than the left sided herniations and men had proportionally greater canal compromise by affected disc than women.

Wadell⁴ in his prospective clinical review of 900 patients found that 87% had low back pain, 70% had leg pain of these 47% of leg pain of referred pattern and 23% had true radicular pain. 3% had extra peritoneal cause. Excluding those patients, most cases in which definite diagnosis was possible, the pain was due to disc prolapse.

Nerve tension signs:

In our study 44% of the patients had positive straight leg raising test positive and 34% had Lesague sign positive.

NEUROLOGIC FINDINGS:

In our study 30% of the patients had motor deficits and 34.7% had positive sensory deficit.

MRI findings:

In this group 20 (40%) had normal MRI and 30 (60%) had abnormal MRI.

SD Bodenet al⁵ studied 67 individuals who never had low

backache, sciatica and neurological claudication. Of these less than 60 years old 20% had herniated nucleus pulposus and 1% had spinal stenosis. In 60 yrs or older group the findings were abnormal in 57% of the scans. There was degeneration or bulging of the disc atleast at one lumbar level in 35% of the subjects between 20-39 years. They concluded that abnormalities on MRI must strictly correlate with age and clinical symptoms.

Pfirmsmann⁶ studied classification of lumbar disc degeneration on MR imaging of 300 disc in 60 patients. There were 14 grade I, 82 grade II, 72 grade III, 68 grade IV and 64 grade V and concluded that disc degeneration can be graded reliably on T2 weighted MRI.

Level of disc lesion:

In our study one patient presented with L2-L3 disc prolapse. 4 patients with L3-L4, 20 patients with L4-L5 and 15 with L5-S1 disc prolapse. Out of these 10 patients had double level disc prolapse (table 3).

In Crock et al⁷ study, maximum disc prolapsed were seen at L4-L5 and L5-S1 levels and in two levels in 3%.

SD Borden et al⁵ performed MRI on normal individuals and found out that 20% of the normal individuals of less than 60 years of age had a herniated disc.

Modic and Gibson⁸ found out 30% of abnormal signal intensity in disc asymptomatic volunteers.

Correlation between straight leg raising test and abnormal MRI findings:

44% of the patients presented with positive straight leg raising test. Out of the 44%, 72.73% of patients presented with abnormal MRI findings (table 9).

Spangfrost⁹ in his study found out that in surgically proved disc herniations SLR sign was positive in 90%. He stated that in young individuals the absence of SLR excludes the presence of herniated disc in greater possibility.

Hirsch and Nachemeion¹⁰ reported high degree of correlation between neurologic sign and presence of disc herniation. If the straight leg raising test was positive with neurologic findings, diagnostic accuracy was 86%.

Schaum et al¹¹ in their study stated that crossed straight leg raising sign is more specific and less sensitive than ipsilateral leg raising test.

ABNORMAL MRI FINDINGS AND MOTOR DEFICIT:

13 patients presenting with motor deficits had abnormal MRI.

Hirsch and Nachemeion¹⁰ in their study reported 86% correlation between objective neurologic sign and presence of disc herniation.

ABNORMAL MRI FINDINGS AND LEVEL OF THE DISC (CLINICAL AND MRI):

In this all the patients with two level disc involvement had abnormal MRI findings.

In this study patients having clinical feature of double level disc level correlated significantly with abnormal MRI findings mainly at L3-L4, L4-L5 and L4-L5, L5-S1 levels. This correlation was 100%.

Webber¹² in his study found excellent correlation between MRI and clinical findings for level and size but there was no correlation of pain and disability with disc size and type. He concluded that 72% of the patients had protruded disc at one or more levels of presentation.

Masaryk¹³ reported MRI has 89% sensitivity and 82% specificity and over all 85% accuracy in the diagnosis of the sequestered disc.

CONCLUSION:

From our study we conclude that the key to diagnose and investigate the intervertebral disc prolapsed is the clinical history and more importantly the clinical examination. The clinical signs like motor deficits and sensory deficit significantly with abnormal MRI findings however the nerve tensions signs are not significant in disc lesions.

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