

Perspective study of MRI evaluation of degenerative diseases of Lumbo sacral spine in Maharashtra population

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Abstract

Background: Low back pain is an exceedingly common problem with life time prevalence of 70 to 80% patient. The aetiologies are multi factorial and influenced by degenerative disease of lumbosacral vertebrae especially spines. **Method:** 80 adult patients aged between 23 to 65 year were selected for study A part from Blood examination, MRI protocol was employed. FSE (Fast Spin Echo) technique vastly improved imaging speed was used to study degenerative changes of lumbosacral spines. **Result:** LBP were 80 (100%) radiation of pain to lower limb were 50 (62.5% tingling and numbness 40 (50%) , 19 (23.7%) had weakness of limb, 5 (6.25%) had muscle wasting. In the MRI finding 38 (47.5%) had Osteophytosis 62 (77.5%) had disc bulge, 58 (77.5%) had stenosis of neural foramina 56 (72.5%) had disc herniation 52 (70%) had secondary spinal canal stenosis 54 (67.5%) disc height reduction 36 (45%), 11 (13.7%) hypertrophy of LF, 5 (6.25%) spondylosis. In the study of herniation 3 (5.35%), had L₁₋₂, 5 (8.92%) had L₂₋₃, 6 (10.7%) had L₃₋₄, 17 (30.%) had L₄₋₅, 25 (44.6%) had L_{5-S1}. **Conclusion:** MRI should be choice of investigation to evaluate the degenerative changes in Lumbo – Sacral spines because this degenerative leads to multiple complications which needs alarming attention because of involvement of nerve roots, and neuro – vascular bundles.

Keywords: LBP = Low back pain, LF=ligamentum Flavum, NP=Nucleus pulposus, AF=Annulus Fibrosis, Herniation FSE = Fast spin Echo.

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INTRODUCTION

MRI (magnetic Resonance Image) is considered the best imaging method to investigate back pain. Various condition are responsible for back pain (LBP) such as disc degeneration, central canal stenosis, metastases, spinal compression fractures.¹ Lumbar vertebrae are composed of a vertebral body anteriorly, which gives rise to bilateral

pedicles from superior aspect. These extend posterior and connect to the transverse process, which project laterally and the lamina, which project postero-medially. The lamina come together in the mid-line and connect to the posteriorly projected spinous process. Interposed between each pedicle and lamina are the superior and inferior articular processes, joined by the pars interarticularis.

Vertebra or intervertebral discs transition, though three phases, growth, maturation and degeneration². The degeneration stage is characterised by increased fibrosis with decreasing type-2 Collagen and increasing type-I Collagen which takes after age of 40 or undernourished, malnourished conditions, which leads to loss in the height of disc which involves degeneration of Nucleus pulposus (NP), annulus fibrosis (AF), even disc fissuring termed as inter vertebral osteochondrosis which is a pathologic process.^{3,4} Another most common degenerative disease of lumbosacral spine leads to disc herniation, disc bulging thickening of ligamentum Flavum (LF) due to

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degeneration of lumbar disc spine which leads to stenosis of spinal canal. Hence attempt was made to evaluate the various degenerative factors associated with lumbo-sacral spine degeneration.

MATERIAL AND METHOD

80 patients aged between 23 years to 65 regularly visiting Orthopedic department were referred to Radio-diagnostic department of Dr. Ulhas Patil medical college hospital, Jalgoan -425001.(Maharashtra), having complaints of low back ache with degenerative symptoms of LS , were selected for study.

Inclusive Criteria: The patients having chronic low back ache, radiation of pain to lower limb tingling and to degenerative changes numbness wasting of muscles due to degenerative changes were selected for study.

Exclusion Criteria: Hemipariatic, malignancy of lumbar region immune compromised, polio myelitis, were excluded from the study.

Method: Detailed history of every patient was recorded. Blood examination CBC, ESR, RBS, Mountex, test, HbSA₁C, Sr. Calcium, R.A test C-reactive protein was done to rule out other clinical manifestation MRI protocol employed for the examination of (a) sagittal FSE T₁ weighted images from conus medullaris to S₁ (b) sagittal FSE T₂ weighted images (c) Axial FSE T₁ weighted images from L₁ to S₁ (d) Axial FSE T₂ weighted images. FSE (Fast Spin Echo) Fast or turbo spin echo (FSE/TSE) is an adaptation of conventional spin-echo (SE) acquisition technique designed to reduce imaging time. It is largely

supplanted the origin spin-echo technique due to vastly improved imaging speed.

Sagittal views cover the entire width of the spine from foramen to foramen. Axial views should be obtained parallel to the plane of the disc spaces. Duration of study was April 2016 to May 2018.

Statistical analysis: Clinical manifestations MRI findings were classified with percentage. The statistical analysis data was calculated in 2007 SPSS software. The ratio of male 3:1

OBSERVATION AND RESULTS

Table-1: Study of clinical manifestation of patients with degenerative disease of lumbosacral spine 80 (100%) had LBP, 50 (62.5%) had radiation of the pain to lower limb, 40 (50%) had tingling and numbness, 19 (23.7) had weakness of limb 5 (6.25%) had muscle wasting.

Table-2: Study of MRI finding in degenerative changes of lumbo – sacral spine patients – 38 (47.5%) had osteophytosis, 62 (77.5%) had disc bulge 58 (72.5%) had neural foramen stenosis, 56 (70%) had disc herniation 52 (65%) had secondary spinal canal stenosis, 54 (67.5%) had reduction in disc height, 36 (45%) had disc desiccation 12 (15%) schmorl’s nodes, 7 (8.75%) spondylolisthesis, 9 (11.2%) facet joint hypertrophy, 11 (13.7%) hypertrophy of ligamunatum Flavum, 5 (6.25%) had spondylolysis.

Table-3: study of herniation of disc at various level of lumbo-sacral vertebrae (out of 45 Disc herniation) 3 (5.35%) had L₁₋₂, 5 (8.92%) had L₂₋₃, 6 (10.7%) had L₃₋₄, 17 (30.3%) had L₄₋₅.

Table 1: (No of patients 80) Clinical manifestations of patients with degenerative disease of lumbo- sacral spine

Particulars	No of Patients	Percentage (%)
Low backache	80	100
Radiation of the pain to lower limb	50	62.5
Tingling and numbness	40	50
Weakness of limb	19	23
Muscle wasting	5	6.25

Table 2: (No of patients 80) Study of MRI Findings in Degenerative changes of lumbo – sacral spine

Sr No	Particular	No of patients	Percentage (%)
1	Osteophytosis	38	47.5
2	Disc Bulge	62	77.5
3	Neural Foramen stenosis	58	72.5
4	Disc herniation	56	70
5	Secondary spinal canal stenosis	52	65
6	Disc height reduction	54	67.5
7	Disc desiccation	36	45
8	Schmorl’s Node	12	15
9	Spondylolisthesis	7	8.75
10	Facet joint hypertrophy	9	11.2
11	Hypertrophy of LF	11	13.7
12	Spondylolysis	5	6.25

Table-3: (No of patients 56) Study of level of disc herniation

Sr No	Disc level	No of herniation	Percentage (%)
1	L ₁₋₂	03	5.35
2	L ₂₋₃	05	8.92
3	L ₃₋₄	06	10.7
4	L ₄₋₅	17	30.3
5	L _{5-S₁}	25	44.6

DISCUSSION

In the present study of MRI evaluation of degenerative disease of lumbo-sacral clinical manifestations were 80 (100%) LBP 50 (62.5%) radiation of the pain to lower limb 40 (50%), tingling and numbness, 19 (23.7%) weakness of limb, 5 (6.25%) muscle wasting (Table-1). The MRI findings were 38 (47.5%) osteophytosis, 62 (77.5%) bulging of disc, 58 (72.5%) stenosis of Neural foramen, 56 (70%) disc herniation, 52 (65%) secondary stenosis of spinal canal, 54 (67.5%) disc height reduction, 36 (45%) disc desiccation, 12 (15%) schmorl's node, 7 (8.75%) spondylolisthesis, 9 (11.2%) facet joint hypertrophy, 11 (13.7%) hypertrophy of LF 5 (6.25%) spondylolysis (Table-2). The level of disc herniation out of 56 patents 3 (5.35%) had L₁₋₂, 5 (8.92%) had L₂₋₃, 6 (10.7%) had L₃₋₄ 17 (30.3%) had L₄₋₅, 25 (44.6%) had L_{5-S₁} (Table-3). These findings were more or less in agreement with previous studies^{6,7,8} Patho- physiology of clinical symptoms related spinal stenosis is complex, controversial and not well understood. Most investigators believe that, direct compression of the nerve roots play a major role in production of degeneration moreover there will be involvement arterial and venous obstruction. It is also suggested that intermitted claudication or pseudo claudication may be related to true vascular insufficiency to nerve roots. It is reported that, due to compression of neurovascular bundles there will be release of irritating chemicals be surrounding structures, nerve oedema and chronic impairment of axonal transport and intra neural micro-circulation insufficiency occurs. Due to degeneration of lumbo – sacral spine, there will be herniation of lumbar disc which includes NP, herniation often associated with epidural hematoma. In the degeneration of Lumbosacral spine, in the absence of herniation osteophytosis, schmorl's nodes were reported which cause stenosis of spinal canal¹⁰ spondylolisthesis, spondylolysis, hypertrophy of LF is also associated with degeneration of lumbo-sacral spine though exact cause is not understood.

SUMMARY AND CONCLUSION

The present MRI study degeneration of lumbo-sacral spine, will be quite useful to radiologist, neuro-physician, neurosurgeon, orthopedician to predict the risk factors and prognosis but this demands further genetic, nutritional, hormonal, patho-physiological, bio-mechanical study because exact pathogenesis of degenerative changes in lumbo-sacral spine is still un-clear. This research work was approved by Ethical committee of Dr Ulhas Patil Medical College Jalgoan-425001 (Maharashtra)

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