



EVALUATION OF LOW BACKACHE IN YOUNG ADULTS AND ITS CORRELATION WITH MRI

Radio-Diagnosis

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ABSTRACT

Background: The best imaging technique for identifying diseases causing young people's low back discomfort is magnetic resonance imaging (MRI). Degenerative disc degeneration is the most common cause of low back pain; it most frequently affects levels L4-L5, then L5-S1. When compared to other reports in the literature, the young individuals with LBP have a significant MRI prevalence of disc degeneration. Before any more suggestions for a public health intervention are produced, a larger cross-sectional investigation is necessary due to the high frequency within a young population. **Aim:** To determine the MRI findings and their correlation to clinical features in young adult patients between 18 to 40 years of age. **Methods:** The current study, conducted at the Department of Radiodiagnosis at DY Patil Medical College, Kolhapur involved 30 patients between the ages of 18 to 40 who had been referred to the department by many other clinical departments with symptoms of low back pain. The MRI results of individuals with mild back pain are explained. When it comes to identifying and classifying lesions of various origins, such as degenerative changes, infectious lesions, malignancies, congenital and developmental problems, compression fractures, and numerous other unusual spine pathologies, magnetic resonance imaging (MRI) is incredibly sensitive. **Conclusions:** MRI is the best imaging modality for diagnosing conditions causing low back pain in young people. The commonest cause of low back ache is degenerative disc disease, most common level being involved is L4-L5 followed by L5-S1.

KEYWORDS

Low backpain, Magnetic resonance imaging, lumbosacral spine.

INTRODUCTION

Low backache is the most common reason for visiting physician. Low back pain is defined as pain and discomfort localized below the costal margin and above inferior gluteal with or without leg pain. Low back pain is divided into three subtypes: acute, sub acute and chronic low back pain. Acute low back pain is pain occurring for 6 week. Sub acute low back pain is pain occurring between 6-12 week. Chronic low back pain is pain occurring for more than three months. Low backache is commonly experienced by adults at some time during their lives. Though it is caused by degenerative changes, spinal stenosis, neoplasm, infection and trauma, lumbar disc degeneration is the most commonly diagnosed abnormalities associated. As Magnetic Resonance Imaging (MRI) is non invasive imaging technique with excellent spatial and contrast resolution, it has become the investigation of choice in evaluation of patients with low back pain.

An ubiquitous issue that affects two thirds of adults at some point in their lives is low back pain. low backache is among the most prevalent symptoms from patients. found in therapeutic settings, with notable financial ramifications. Lumbago can be caused by a variety of factors, such as anomalies of the lumbosacral spine or problems with the soft tissue that surrounds it. Eighty percent of people will experience back discomfort at some point in their lives, which is a common cause of missed work days. A common musculoskeletal ailment, low back pain can be caused by a variety of spinal components, including blood vessels, ligaments, facet joints, vertebrae, paravertebral musculature, and spinal nerves.

Aim And Objectives Of The Study

To determine the MRI findings and their correlation to clinical features in young adult patients between 18 to 40 years of age.

1. To evaluate low backpain in young patients using MRI
2. To determine the patterns of degenerative disc disease on MRI in young patients with low backache

MATERIALS AND METHODS

Study Population

- The study has been carried out after institutional committee acceptance and ethical clearance and data was collected. Conducted a prospective study on 30 young patients with low back pain from July 2022 to November 2023. The study is primarily based on investigations as radiology itself is a tool of investigation. Informed consent has been obtained before any procedure from competent voluntary patient. Consent has been taken after explaining the procedure and receiving their approval to be included in the study.

Inclusion Criteria For Study Group

1. Young patient between 18 to 40 years of age with chief complaint of nontraumatic low back pain.
2. All sexes
3. Patient referred to the department of radiodiagnosis with MRI requisition on advice of a referring doctor.
4. Written informed consent was taken from every patient.

Exclusion Criteria For Study Group

1. Patient with Low back pain cause by trauma.
2. Patients with cardiac pacemakers, ferromagnetic aneurysm clips, cochlear implants and other ferromagnetic implants.
3. Patient with claustrophobia

Data Collection

Every patient gave their informed consent. The patients' complete clinical history and demographic information were obtained. The following MRI imaging findings were assessed: end plate changes, paraspinal soft tissue changes, neural foraminal constriction, disc herniation features, disc type and location of involvement, canal stenosis, and facet and ligamentum flavum hypertrophy. The following X-ray results were assessed: facet arthrosis, spondylosis, spondylolisthesis, sacralization, and intervertebral disc height reduction. Every patient's MRI and X-ray results were compared.

Equipments and Protocol Used

The imaging was done using PHILIPS 3.0 Tesla MR scanner. AP and Lateral plain radiographs of lumbosacral spine were taken using Siemens 500 mAX-ray machine.

MRI Protocol

MRI was performed on Philips 3 T MRI Scanner using spine array coils. In all cases the examination was performed in supine position. Each examination included an overlapping multislice technique. Scout images were first obtained in coronal and sagittal plane. Sagittal T1w, T2W & STIR images were then acquired with spin Echo (SE)/Turbo Spin Echo (TSE) and inversion recovery sequences. Thereafter axial and/or coronal T1 and T2 weighted images were acquired through the levels revealing abnormality. However, axial T1 and T2 weighted scans were obtained through all lumbar disc levels in all the cases. Gadolinium enhanced MRI was done for cases of spinal tumors and T1 +C Sagittal and axial images were acquired.

The signal properties of the spinal cord, ligaments, pre- and paravertebral tissues, intervertebral discs, and vertebral bodies and appendages were examined. Every case's abnormal results were meticulously documented, and an MRI diagnosis was derived from them. The cases were divided into the following categories based on the results of the MRI: The categories of anomalies include

congenital/developmental, degenerative, infectious, neoplastic, and other.

The range of degenerative alterations was thoroughly examined. Particular attention was paid to the decrease in signal strength from the deteriorated nucleus on T2 weighted images, where disc herniation was sought after.

Protrusion/extrusion/sequestration was noted as the form of herniation. A herniated nucleus pulposus was noted as being in the central, posterolateral (left or right), or foraminal (left or right) regions.

RESULTS

Of the 30 (19 male and 11 females; age range 18 to 40 years) patients with LBP that were subjected to MRI examination. In our study, male patient are more affected with low back pain than female patient. Low back pain affect more male because of mechanical injury and stress. MRI changes in the spine appears to be higher and these changes were more frequent (53%) in the higher (25 to 30 years) age group.

Table 1.1 Distribution Of Sex

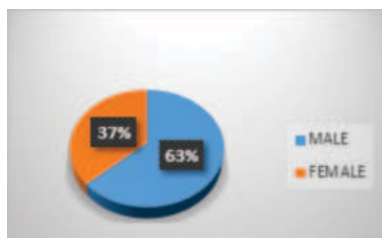
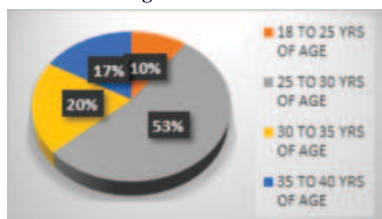


Table 1.2 Distribution Of Age



The majority (90%; 27 out of 30) of the patients had multiple level disease, most commonly involving the lowest 2 spine levels (L4-5 and L5-S1). Single level disease was seen in 3 out of 30 (10%), with close to equal involvement of the L4-5 and the L5-S1 discs. Overall the L4-5 disc, whether by itself or in combination with other discs, was diseased in the majority of the patients (90%).

Table 1.3 Involvement Of Disc Level

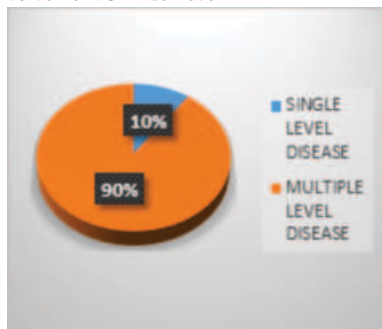
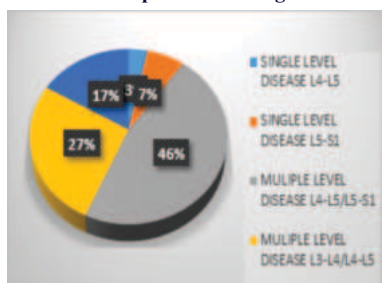


Table 1.4 Involvement Of Spine Levels Single Vs Multiple Levels



The various MRI features of the Disc degeneration (DD) is seen in patients. The most common feature observed was disc bulge 42%, 13 out of 30 followed by reduced signal intensity of the disc 29%, 9 out of 30. The MRI features of the DD were more frequently seen in the higher (25 to 30 years) age group.

Table 1.5 Various MRI Features of Disc Degeneration

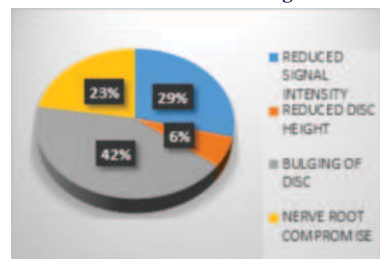


Fig 1.1 T2wi, Sagittal Plane Showing Bulging of Disc

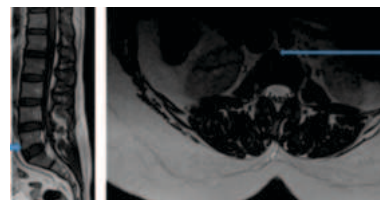


Fig 1.2 T1w In Sagittal Plane; and Axial Plane of T1w Showing New Bone Formation [Osteophytosis] (Blue Arrows) at the Margins of L3, L4 and L5 in A 22 Years Old Female Patient Who Presented With Low Back Pain For 1 Month

DISCUSSION

In the present study, we reported on a young patient, the frequency of MRI changes in the spine appears to be higher and these changes were more frequent (53%) in the higher (25 to 30 years) age group. MRI is the first line investigation performed in the examination for Disc Degeneration of the spine. The imaging features of the DD of the spine are well established and include changes in the intervertebral disc, as well as other parts of the spine. The findings described in the disc on MRI include reduced signal intensity, bulging of disc, reduced disc height and nerve root compromise.

Salminen et al. [14] studied the prevalence of DD disease in adolescence and reported that 31% and 42% of subjects had at least one level of DD at the age of 15 and 18, respectively.

In a Danish study, 21% of 13-year-old school children were reported to have at least one disc with decreased disc signal intensity in the lumbar spine [10]. In a study from Finland on an group aged 20-22 years, Takatalo et al. [12] found a 47% prevalence of DD.

Savage et al. [13] from UK compared MRI features between 2 age groups (20 to 30 years versus 31 to 59 years). In the 20 to 30 years age group, they found that 34% of subjects DD on MRI prevalence of compared to 59% in the older age group. In the 20 to 30 year age group, 47% were asymptomatic. A study on Chinese juveniles (13 to 20 years) reported that 35% of spinal DD, 72% had LBP.

In the current study, the frequency of MRI changes in the spine in the young patients appears to be higher (90%) when compared to other reports in literature and these changes were more frequent (53%) in the higher (25 to 30 years) age group. The prevalence of degenerative changes is shown to increase with age which can explain the age-related higher frequency in our study given that, when compared to other studies of young adults, had patients in a relatively higher (16 to 29 years) age group. Ninety percent of the patients in this study had multiple level disease with the highest prevalence (46%) at the 2 lowest lumbar levels (L4-5 and L5-S1), which is consistent with the

observations made by others.

CONCLUSION

MRI is the best imaging modality for diagnosing conditions causing low back pain in young people. The commonest cause of low back ache is degenerative disc disease, most common level being involved is L4-L5 followed by L5-S1. The MRI prevalence of Disc degeneration among the young patients with LBP is high when compared to other reports in literature.

In view of the high prevalence among a young population, a larger cross sectional study is warranted before any further recommendations can be developed regarding a public health intervention.

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