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CLINICAL AND RADIOLOGICAL CORRELATION IN ACUTE AND SUBACUTE LOW BACK PAIN IN ADULT MALES OF 20 TO 30 YEAR AGE GROUP

Manish Kumar	Postgraduate, Department of Orthopaedic, MAMC Agroha Hisar
Anubhav Chhabra*	Senior Resident , Department of Orthopaedic, MAMC Agroha Hisar*Corresponding Author
Pankaj Kamboj	Postgraduate, Department of Orthopaedic, MAMC Agroha Hisar
Saurabh Midha	Postgraduate, Department of Physiology, MAMC Agroha Hisar
Vikas Rao	Postgraduate, Department of Orthopaedic, MAMC Agroha Hisar
Ashok Kumar	Professor, Department of Orthopaedic, MAMC Agroha Hisar
Anurag Chhabra	Senior Professor & Head of department , Department of Orthopaedic, MAMC Agroha Hisar

ABSTRACT Low back pain (LBP) is one of the most common health problems affecting 75% to 85% of the general population. Young adults are suffering from LBP more frequently than in the past, where loss of working days is a great personal and national loss. This study aims to determine the correlation of clinical features with plain radiograph and Magnetic resonance imaging (MRI) findings in adult males of 20 to 30 years age group. 100 male patients with acute or subacute low backache were enrolled in the present study. Personal details and history noted and clinical examination was performed. The Oswestry disability index was used for quantification of pain. Plain radiograph and MRI was done. The plain radiograph and MRI findings were correlated with the clinical findings. The mean age of patients was 25.18±3.28 years. Sensory loss was found in 15% and paraesthesia in 18% cases. The mean Oswestry lower back pain score was 16.66±10.44. The most common abnormality found on plain radiograph was abnormal disc intensity followed by reduced disc height. The most common abnormality found on MRI was disc bulge followed by abnormal disc intensity. The most common site for osteophytes was anterior of L4 vertebral body followed by anterior of L3. There was a poor agreement between clinical findings and radiological findings. Both plain x-ray and MRI imaging found a significantly higher rate of spine changes which did not correlate well with clinical & neurological findings.

KEYWORDS : Low back pain (LBP), plain radiograph, Magnetic resonance imaging (MRI), Oswestry disability index

INTRODUCTION

Low back pain (LBP) is characterised by discomfort or pain in the lumbar region which extends from the costal margin above and the gluteal fold below, that may or may not radiate to the thigh. The diagnosis of LBP, obtained through the clinical history and physical examination, classifies LBP into three categories: 1) LBP potentially associated with a specific cause in the spine, 2) LBP potentially associated with spinal stenosis and 3) LBP with a nonspecific cause[1]. Non-specific LBP is the most common cause of LBP and is generally due to a sprain or strain in the muscle of the back and soft tissues.

LBP can be acute, subacute or chronic. Pain for less than 4 weeks is considered acute LBP. Pain lasting for 4 weeks to 12 weeks is considered as subacute LBP. Chronic LBP is defined as pain that continues for 12 weeks or longer[2].

LBP is one of the most common health problems affecting 75% to 85% of the general population[3,4]. LBP constitutes 37% of all occupational risk factors which occupies first rank among the disease complications caused by work[5]. It is found to be associated with a substantial effect on direct health care, along with the cost that is incurred indirectly due to LBP associated mortality and morbidity[6].

Good clinical history and thorough clinical examination is utmost important in diagnosis of lower back pain. Plain radiograph is the primary investigation in case of low back pain to identify the gross morphological bony changes in the vertebral body and its posterior elements. MRI is a highly sensitive and most commonly used modality to detect the degenerative changes of the spine. Although several studies found degenerative changes to pose no association with the incidence of low back pain[7-9]. MRI and computerised tomography are increasingly used for low back pain. There are no specific protocols or guidelines available to investigate non specific low backache.

Young adults are suffering from LBP more frequently than in the past, which is the most productive and constructive phase of life where loss of working days is a great personal and national loss[10]. LBP in young adult females is additionally multifactorial because of genitourinary reasons, dynamic age group physiologically & endocrinologically, marriage & child bearing age, use of various kinds of intrauterine devices and contraceptives. Plain x-rays and CT scans may also harm fertility. For the above reasons young females were excluded from the study.

MATERIALS AND METHODS

100 male patients of age 20 to 30 years with informed consent with acute or subacute low backache attending outdoor orthopedics department, Maharaja Agrasen Medical College, Agroha (Hisar) from April 2021 to April 2022 were enrolled in the present study.

Patients with systemic disease involving the spine, recent fracture of spine (within 3 months), known primary or secondary malignancy, infective pathology, known metabolic disorder, non-manageable severe claustrophobia and female gender were excluded from the study.

Personal details and historical data such as history of present illness, treatment history, past history of spine problem or family history of all patients were noted. Clinical examination was performed in detail. For quantification of pain, the Oswestry disability index was used. Plain radiograph was done in a standing position. Standard anteroposterior and lateral views were taken. MRI was done on a 1.5 T machine with the patient lying supine comfortably with knees & hips extended. Multi-slice sagittal & transverse sections were taken with MRI sequence.

The plain radiograph and MRI findings were correlated with the clinical finding in patients of acute and subacute low backache. Data analysis was carried out with standard statistical tools.

OBSERVATIONS AND RESULTS

The mean age of patients was 25.18±3.28 years. 47% of patients have acute LBP and 48% of patients had prior treatment history. Radiation of back pain was present in 57% cases (21% bilateral, 25% right and 11% to left side).

The BMI of the cases varied between 19.38-39.95 kg/m^2 (mean

26.22±4.83 kg/m^2). Statistically, there was no difference in patients with neurological deficit and without neurological deficit on the basis of height (p value-0.53), weight (p value- 0.67) and BMI (p value-0.61).

On clinical inspection, abnormal physical attitude was found in 3%, asymmetry in 6%, abnormal heel walk (ankle dorsiflexor power) in 6%, abnormal toe walk (ankle plantar flexor power) in 17%, abnormal flexion in 12%, abnormal extension in 12%, abnormal lateral bending in 11% and abnormal rotation was found in 13% of cases. There was paravertebral spasm in 12% of cases and pelvic obliquity & scoliosis in 6% cases. The gait was abnormal in 17% of cases. On palpation, tenderness was elicited in 44%, rise in local temperature in 4%, paraspinal muscle spasm in 24% of cases.

Sensory loss was found in 15% and paraesthesia in 18% cases. A motor deficit analysis revealed that 17% had motor deficit in ankle muscles, 16% in extensor hallucis longus and 2% in flexor hallucis longus. Neurological examination revealed that 10% patients had projection of pain to a specific dermatome, 1% had brisk knee reflex, 5% had absent ankle reflex while one patient had mute plantar reflex. The straight leg raise test (SLR) was positive in 20%, while Lasegue's test was positive in 5% of cases.

The Oswestry lower back pain score ranged between 4-44 (mean score 16.66±10.44). The mean score of cases with sensory and/or motor deficit (21.17±12.39) was significantly higher (p value-0.005) than those without deficit (14.34±10.44).

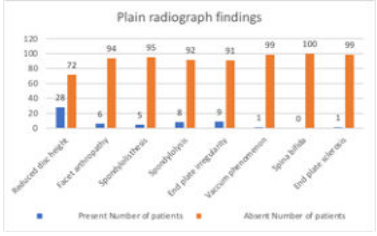

Figure1. Plain radiograph findings

Plain radiography findings are detailed in figure1. On plain radiography, the most common site for osteophytes was anterior of L4 vertebral body followed by anterior of L3. Lumbarization of S1 vertebrae was found in 3% cases and sacralization of L5 in 15% cases. Abnormal disc intensity was most commonly found at L4-L5 level.

MRI visualization allowed a greater analysis of disc and vertebral analysis. Various MRI findings are detailed in figure 2 and table 1.

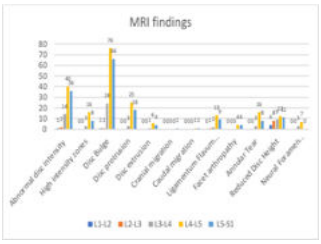

Figure2. MRI findings

Table1. Radiological findings on MRI

Radiological findings	Percentage
Reduced disc height	44%
Spondylolisthesis	10%
Romanus lesions	6%
Spondylolysis	5%
Vaccum phenomenon	4%
Ankylosing spondylitis	0%
Kummel's phenomenon	0%
Baastrup's phenomenon	0%

On MRI, the most common site for osteophytes was the anterior of L4 vertebral body. The most common level of spondylolisthesis observed was anterolisthesis of L5 over S1 found in 9% of cases. The mean anteroposterior canal diameter for L1-L2 was 14.95±2.51 mm, for L2-L3 was 14.09±2.70 mm, for L3-L4 was 13.11±2.73 mm, for L4-L5 was 11.16±2.90 mm, and for L5-S1 was 10.67±2.45 mm. An analysis of variance (ANOVA test) revealed that from L1-L2 to L2-L3 and with every subsequent intervertebral space, there was a highly significant reduction in the anteroposterior canal diameter (p value-0.0001), with L5- S1 having the lowest diameter.

MRI had a comparable rate of detection of anterior osteophytes (p value-0.32), posterior osteophytes (p value-0.27) and spondylolysis (p value-0.74) as plain radiographs. MRI had a higher rate of detection of spondylolisthesis (p value-0.09) and abnormal disc intensities (p value-0.52) but the difference was statistically insignificant.

DISCUSSION

Globally, LBP has been the leading global cause of YLDs (years lived with disability)[11]. The present study was dedicated to young adults, which is the most dynamic and dramatic phase of life.

64% of patients could not pinpoint the initiating cause, rest 36% had some trivial incidence ie. jerk, sudden lifting of weight, sudden exertion, trivial fall etc.

Most common abnormality found on plain radiograph was abnormal disc intensity followed by reduced disc height, anterior and posterior osteophytes, sacralisation of L5 vertebrae, end plate irregularity, spondylolysis, facet arthropathy, spondylolisthesis, vacuum phenomenon, and end plate sclerosis.

Anterior osteophytes were more prevalent than posterior osteophytes. Osteophytes are known to be preceded by intervertebral disc degeneration because it causes the vertebral bodies to become more flexible, which places mechanical stress on the ossification centres of the bones underneath the cartilage of the vertebral body and further causes sclerotic or hyperplastic changes at the vertebral body's edge.

End plate irregularity was observed in 9% of the cases and facet arthropathy was observed in 6% cases. These degenerative changes are lower in comparison to previous studies, probably due to the younger age group of patients.

Spondylolisthesis on plain x-ray was found in 5 cases of which the most common level was L5-S1. At lower levels, vertebrae are more prone to anterior displacement probably due to more sagittal orientation of their facet joints[12].

Abnormal disc intensity was observed in 62% on MRI. In most of the cases found at multiple levels, most common being at L4-L5 and L5-S1 level. Yong et al observed that more than 30% asymptomatic individuals have disc degeneration and concluded that abnormal disc intensity may not be the cause of LBP[13]. Some authors have mentioned high intensity zones as a reliable marker for painful disc in patients of LBP, while some authors have suggested that high intensity zones could be a finding in asymptomatic young individuals.

MRI is a highly sensitive modality to detect the degenerative changes of the spine. Several studies have pointed out that degenerative changes do not pose any association with the incidence of low back pain[7-9].

There are other major muscular and fascial reasons for pain which may be attributable to sedentary life, overworked life (repetitive labour like work), prolonged sitting, bad posture, over exertion, over gymming etc. These muscular or myofascial disorders are not objectively diagnosable or detectable by advance scanning which is usually done to exclude or diagnose primary objective spino-osseous and ligamentous diseases. These primary diseases include local or systemic spinal affections related to trauma, infection, age related degeneration, malignancies & metastasis, endocrine disease, seronegative & seropositive arthropathies and congenital problems. The advanced investigations are focused to diagnose or exclude above major diseases. But the load of patients with nonspecific LBP (occupational) is much more as reported by WHO. Subjecting a patient of non specific LBP to advanced imaging techniques or tools, adds to confusion & dilemma in diagnosis and also burden of surgery. Further, there is an economic burden as well as time loss. There is no substitute of proper history and clinical examination to diagnose these simple but disabling conditions like myofascial band, adhesions, trigger points, tears, fibrofasciatis & fibrofasciatic nodules, myofascial pain

syndrome, satellite trigger point, occupational myalgia, post traumatic hyper irritability syndrome and muscular tightness.

LIMITATIONS

Small sample size in view of our occupationally diverse huge population base of the country, single time clinical examination & correlation with no follow up and lack of a case-control set up are the major limitations of study. The MRI sequence used in our study was spino-osseous lumbosacral spine and did not include muscles & other fascial structures.

STRENGTH

This is a dedicated study to include only males in their most active age of life ie. between 20-30 years of age. Detailed correlation of each radiological feature (plain radiograph and MRI) was done with clinical findings. The sample size is large enough when compared with other studies.

CONCLUSION

The present study is a unique study dedicated to young male patients with acute and subacute lower back pain. The clinical findings have been correlated with radiological findings (plain x-ray and MRI). Overall, the conclusion of our study is that there is a poor agreement between clinical findings and radiological findings. Both plain x-ray and MRI imaging found a significantly higher rate of spine changes which did not correlate well with clinical & neurological findings. This suggests that there is a high prevalence of asymptomatic spine findings on plain x-ray & MRI in young males with acute or subacute LBP.

This study also rehighlightes the value of proper history and clinical examination over advanced radiological investigations. Overuse of these radiological tools not only adds to diagnostic dilemma & surgical confusion, but also adds to economic burden & time loss. Further research is required to find appropriate diagnostic tools to support the clinical diagnosis of nonspecific acute LBP originating from myofascial affections. Till then, definitive protocols with diagnostic algorithms be developed to reduce unnecessary advance investigations in patients with acute LBP.

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