MRI EVALUATION OF LIGAMENTUM FLAVUM HYPERTROPHY AND FACETAL ARTHROPATHY IN PATIENTS WITH LOW BACK PAIN

ABSTRACT

BACKGROUND: The prevalence of LBP in Indian population has been found to vary between 6.2% (in general population) to 92% (in construction workers). Many structural components of spine are responsible for low back pain of degenerative etiology including the intervertebral disc, vertebral periosteum, facet joints and spinal ligaments. Aims: The aim of this study was to assess the role of MRI in the evaluation of Ligamentum Flavum Hypertrophy and Facetal Arthropathy in patients with low back pain.

MATERIAL AND METHODS: This cross-sectional study was conducted on forty patients with chief complaint of low back pain. Results: Of the 40 patients evaluated with MRI lumbosacral spine for low back pain, facetal arthropathy was seen in 17 patients (42.5%) and Ligamentum Flavum Hypertrophy was seen in 13 patients (32.5%).

CONCLUSION: It was concluded that MRI is a useful and safe modality for the evaluation of lumbar spine pathologies like facetal arthropathy and ligamentum flavum hypertrophy in patients with LBP.

KEYWORDS
Low Back Pain, MRI, Facetal Arthropathy, Ligamentum Flavum Hypertrophy

INTRODUCTION

The prevalence of LBP in Indian population has been found to vary between 6.2% (in general population) to 92% (in construction workers).

Many structural components of spine are responsible for low back pain of degenerative etiology including the intervertebral disc, vertebral periosteum, facet joints and spinal ligaments.

LIGAMENTUM FLAVUM THICKENING:
Ligamentum flavum thickening is measured on the axial image, perpendicular to the spinal canal axis and parallel to the lamina, where ligamentum flavum is seen along their entire length & measurement is taken at the half length of ligament flavum. According to Park et al., a mean thickness of the ligamentum flavum of 4.44 mm in the patients with the spinal canal stenosis labeled as thickened. So a >4 mm ligamentum flavum thickening should be labelled as thickened

FACETAL ARTHROPATHY:
Facetal arthropathy is defined as reduction in synovial facetal joint space with loss of high signal intensity on T2WI.

MATERIALS AND METHODS

This cross-sectional study was carried out on 40 patients with chief complaint of low back pain in Department of Radio diagnosis, Government Medical College, Rajindra Hospital, Patiala which were referred to our department for MRI from the outpatient department and emergency from the Department of orthopedics. A detailed history along with complete clinical examination was done before the MRI examination.

PATIENT PREPARATION

Before evaluating a patient by MRI imaging informed consent was obtained from the patient or guardian and the procedure was briefly explained to the patient or guardian.

INCLUSION CRITERIA:
1. Patients of age (20-65) years with chief complaint of low back pain who were referred for MRI to Department of Radiology, Government medical college and Rajindra hospital Patiala.
2. Radicular low back pain radiating to one or both lower limbs.
3. LBP Associated with neurological deficits including bowel and bladder disturbances.
4. LBP with some infective, neoplastic or traumatic history.
5. Patients having cardiac pacemakers and electromagnetic implants.
7. Age (less than 20 years and more than 65 years).
8. Patient who refused to give consent.

EXCLUSION CRITERIA:
1. Patients having cardiac pacemakers and electromagnetic implants.
2. Non manageable severe claustrophobia.
3. Age (less than 20 years and more than 65 years).
4. Patient who refused to give consent.

STUDY EQUIPMENT:

- SIEMENS 1.5 TESLA MRI superconducting magnet. Standard surface coils and body coils for lumbar spine for acquisition of images.

SEQUENCES:

- Conventional spin echo sequences T1WI, T2WI, STIR sag, T1WI axial, T2WI axial and post contrast T1 axial, sag and coronal.

- TECHNIQUE:

  - MRI LUMBOSACRAL SPINE was done in all cases on SIEMENS 1.5 TESLA MRI superconducting magnet. Initially non contrast T1 weighted (T1W), T2 weighted (T2W) and short tau inversion recovery (STIR) sequences in axial, sagittal and coronal planes of the involved spine will be taken. Then post-contrast T1 sequence will be obtained by using intravenous administration of gadodiamide (GdDTPA-BMA) of 0.2 mmol/kg doses, in axial, coronal and sagittal planes in selected cases. Several parameters that were noted on MRI are described in peroma.

STUDY ANALYSIS

A total of 40 patients were included in this study. Informed consent was taken from all the subjects before starting the study. After fulfillment of all the inclusion and exclusion criteria, MR imaging of LUMBOSACRAL SPINE was done by various MR techniques by 1.5-T superconductive scanner (Siemens 1.5T Magnetom aera MRI machine).

RESULTS

Table 1: Facetal arthropathy

<table>
<thead>
<tr>
<th></th>
<th>Number of patients</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>No</td>
<td>23</td>
<td>57.5</td>
</tr>
<tr>
<td>Yes</td>
<td>17</td>
<td>42.5</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.0</td>
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Of the 40 patients evaluated with MRI lumbosacral spine for low back pain...
backpain, facetal arthropathy was seen in 17 patients (42.5%).

**FACETAL ARTHROPATHY**

Of the 40 patients evaluated with MRI lumbosacral spine for low backpain, Ligamentum Flavum Hypertrophy was seen in 13 patients (32.5%).

**Table 2: Ligamentum Flavum Hypertrophy**

<table>
<thead>
<tr>
<th>Number of patients</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>No</td>
<td>27</td>
</tr>
<tr>
<td>Yes</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
</tr>
</tbody>
</table>

Thus MRI is a useful and safe modality for the evaluation of lumbar spine pathologies like facetal arthropathy and ligamentum flavum hypertrophy in patients with LBP.

**REFERENCES**


**DISCUSSION**

In the present study, out of 40 patients evaluated with MRI lumbosacral spine for low backpain, facetal arthropathy was found in 54 patients out of 72 patients (75.0%) with low back pain. These results are in concordance with study done by Rai GS et al (2016) in which thirty-eight patients (38%) of total (n=100) patients showed facet joint hypertrophy.

In the present study, out of 40 patients evaluated with MRI lumbosacral spine for low backpain, Ligamentum Flavum Hypertrophy was seen in 13 patients (32.5%). The results are similar to the study conducted by Iyidobi et al (2018) where ligamentum flavum thickening was seen in 24 out of 60 patients (40.0%). In a study conducted by Rai GS et al (2016) in which 58 out of 100 patients showed ligamentum flavum hypertrophy.

![Figure (A) T2 AXIAL Image showing Ligamentum flavum hypertrophy and facetal arthropathy. Diffuse disc bulge with broad-based posteroentral herniation causing indentation of thecal sac and impingement of bilateral traversing nerve roots at L5-S1 disc level is also seen.](image)

**CONCLUSION**

**BASED ON THE RESULTS OF OUR STUDY THE FOLLOWING CONCLUSIONS CAN BE MADE:**

Of the 40 patients evaluated with MRI lumbosacral spine for low backpain, facetal arthropathy was seen in 17 patients (42.5%).

Of the 40 patients evaluated with MRI lumbosacral spine for low backpain, Ligamentum Flavum Hypertrophy was seen in 13 patients (32.5%).