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Radiodiagnosis

ROLE OF MRI IN THE DIAGNOSIS OF LUMBAR DISC DEGENERATIVE DISEASE: A HOSPITAL BASED STUDY

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ABSTRACT

Background: Degenerative Lumbar Disc (DLD) is common cause for lower back ache (LBA) Early diagnosis is most important in the treatment of DLD. The present study aimed to find out the role of MRI in the detection of degenerative disc diseases (DDD).

Materials and Methods: This study was conducted in the Department of Radiodiagnosis, Kannur Medical College. A total of 50 patients were included in the study. The study population was subjected to MRI study. Images were collected and used for the analysis.

Results: In 50 patients, 34 showed DDD. Maximum patients showed annular disc bulge.

Conclusion: Our study evaluated and concluded that MRI plays major role in the detection of DDD.

KEYWORDS : MRI, Lower backache, Lumbar disc, disc degeneration, radiation

Introduction

Magnetic Resonance Imaging (MRI) is an important tool in the diagnosis of various DDD. Inflammatory DDD also can also be easily diagnosed with use of MRI. Signal intensity in intervertebral disc spaces and spine is used to diagnose disc degenerative disease [1]. Based on the review of literature DDD is more common in males compared to females. There are three important changes that have been identified. Bone marrow edema which appears hypointense on T1 and hyperintense on T2 (Type-I), Fatty replacement,which appears hyperintense on both T1and T2 (Type-II) and bone sclerosis, which appears hypointense on both T1 and T2 (Type-III)[2]. Studies showed that DDD changes are associated with the various pathologies [3-5]. MRI is able to detect DDD associated changes in the disc [6]. This study was conducted to evaluate the role of MRI in the detection of lumbar disc degeneration.

Materials and Methods

This study was conducted in the Department of Radiodiagnosis, Kannur Medical College for a period of 1 year. The study protocol was approved by Institutional Research Committee and Institutional Human Ethics Committee. R software used to calculate the sample size for this cross sectional study [7].

Inclusion criteria

- Male and female patients
- Age 30 years to 70 years.
- Low back ache.
- Patients giving consent for study.

Exclusion criteria

- Metallic implants.

50 patients were included in the study. Study protocol and procedure was explained in detail and informed consent was taken from each patient. Males and females were included in the study. Demographic changes and other information were recorded. All the patients (who fulfill the inclusion criteria) were subjected to MRI (GE Signa HDXT , 1.5 tesla). Sequences used in our setting are T1 W.I, T2 W.I, STIR, myelogram and T1 FS. For better diagnosis contrast (Omniscan) was used only if necessary. Images were acquired in axial, coronal and sagittal planes. Slice thickness of 3 mm. All the images were subjected for the analysis.

Statistical analysis

The data was expressed in number and percentage. Statistical Package for Social Sciences (SPSS 16.0) version used for analysis. Student t test applied to find the P values. P value less than 0.05 considered statistically significant at 95% confidence interval.

Results

Among 50 cases, 34 showed the DDD, of these 24 were males and 10 were females. Majority of the patients showed annular disc bulge (20) followed by protrusion (8), extrusion (4) and sequestration (2). Thus annular disc bulge was found to be the most common etiology of LBA (Table-2, Image-1&2).

Discussion

MR Imaging has major role in the diagnosis of DDD spine. Decreased signal intensity of the intervertebral disc image indicates disc dessication [8-9]. Spine Injury, physical damage, genetic factors and decreased intake of nutritional food play an important role in the pathology of DDD. Early diagnosis is important in the prevention of progression of DDD [10]. Birney et.al study showed the role of MRI in the detection of DDD. They observed that L4-L5 degeneration was more common as compared to other levels. Our study also showed same results [11]. Grenier et.al study found MRI to be accurate in the diagnosis of minor degenerative changes in lumbar disc [12]. Our study also proved MRI as a specific, sensitive, and accurate imaging modality in detecting the lumbar disc degeneration.

Conclusion

Disc degeneration disease is the major cause for the low back. MRI is the imaging technique of choice for detection of DDD.

Pie chart-1: Distribution of patients based on the gender

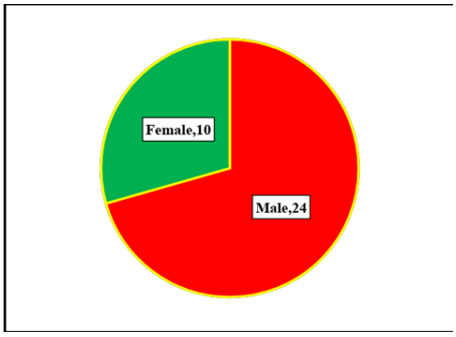

Table-1: Distribution of patients based on disc herniation types

Herniation types	L1- L2	L2-L3	L3-L4	L4-L5	L5-S1	Number
Annular disc bulge	1	3	5	10	1	**20**
Disc protrusion	1	1	1	3	2	**8**
Disc extrusion	0	0	1	2	1	**4**
Disc sequestration	0	0	0	2	0	**2**
Total	**2**	**4**	**7**	**17**	**4**	**34**

Image-1: T2 weighted axial image at the L4-L5 level intervertebral disc showing right paracentral disc bulge indenting the anterior thecal sac

Image-2: T2 weighted sagittal image showing disc dehydration with disc bulge and posterior annular tear at L4-L5 and L5- S1 level intervertebral discs

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