



Original Article

Disc Prolapses In The Spine on Magnetic Resonance Imaging

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ABSTRACT

A disc herniation occurs when the nucleus, cartilage, or fragmented annular tissue are displaced outside the intervertebral disc area. Because of its high sensitivity and specificity for disc herniations, MRI is the method of choice for assessing disc morphology (both protrusions and extrusion). **Objective:** To use MRI to diagnose disc disorders, to create optimal MRI sequences for diagnosing spine pathologies, to detect which gender was affected, and to correlate the spinal disc with patient age. **Methods:** It was a descriptive cross-sectional study carried out in a DHQ Hospital, Gujranwala, Pakistan and the sample size for this research was 71 calculated via a convenient sampling approach. The data were collected in four months from December 2021 to March 2022 after informed consent. Patients who presented to the MRI department for spinal disc prolapse were included in this study. Patients were to be registered with age, gender, type of examination, and protocol used. An MRI scanner was made by a Japanese manufacturer (Toshiba). Data were analyzed using SPSS version 20. Results: Disc prolapse is widespread in older patients, with an average age of 41-50 years. Males are more likely than females to have disc prolapses 45(63.4 %). In approximately 50(70.4%) of patients, the sagittal and axial technique is the best for confirming disc prolapse. Lower back discomfort is the most prevalent complaint among patients. Conclusion: Disc prolapse is widespread in older male individuals. The sagittal and axial technique is the best for confirming disc prolapse. Lower back discomfort is the most prevalent complaint among patients.

INTRODUCTION

The disc line connects the end borders of the bone components that make up the spine (vertebrae) [1]. They feature a soft middle and a rigid outer ring that allows the spine to move freely while acting as a shock absorber [2]. The spinal canal is connected to the nerves that extend from the central nervous system to the extremities [3]. Nerves exit the spine and travel to the musculature and skin passes very close to the disc's back [4]. When the soft center of a disc is injured, it may prolapse, enabling nerves to pass through [5]. The most prevalent locations for such prolapses are the lower back (lumbar) and the neck (cervical) [6]. A herniated disc is defined as a restricted dislocation of a nucleus, cartilage, fragmented apophyseal bone, or fragmentary annular tissue outside the intervertebral disc area, according to the American Society of Spine Radiology and the American Society of

Neuroradiology [7]. A protruding disc is distinguished from a ruptured disc by the presence of disc tissue diffusely (> 50 percent of the diameter) extending further than ring apophyses' borders [8]. This protrusion could be either symmetrical or asymmetrical. Protrusions and extrusions are two types of herniations [9]. If the gap between the margins of the disc material outside of the disc space in any plane is less than the gap between edges of the base in the same plane, there seems to be a protrusion [10,11]. In any plane, extrusion arises when the maximal gap between the disc's edges surpasses the gap between both the base's margins [12]. The aging process, trauma, and other causes cause intervertebral discs to degenerate as a result of a decrease in oxygen and nutrition availability [13]. The intervertebral discs are supplied with nutrients via vertebral endplates [14]. As a result, endplate alterations

may occur concurrently with or even before disc degradation [15,16]. Because MRI has a greater precision (61-100%) and accuracy (42-96%) for disc herniations, it is the preferred method for assessing disc structure [17]. In this case, the presence of either a protrusion or an extrusion was a positive test, with the reference standard typically consisting of an expert prevailing opinion panel using an amalgamation of different information, based on availability, including medical knowledge, other diagnostics such as myelography, and surgical findings, with the reference standard typically consisting of an expert consensus panel using an amalgamation of various data, including medical knowledge, other diagnostics such as myelography, and surgical outcomes [18]. The use of MRI in the diagnosis and treatment of musculoskeletal disorders has opened up many opportunities [19]. It reveals anomalies in the bones and soft tissue before other imaging modalities can detect them [20]. MRI is notably efficient for detecting and assessing ligament (e.g. sprain), tendon (tendonitis, rupture, dislocation), and other soft tissue structures due to its better soft-tissue contrast resolution, noninvasive nature, and multi planner capabilities (e.g. sinuses tarsal syndrome, synovial disorders). In the diagnosis and staging of a variety of musculoskeletal infections, such as cellulitis and osteomyelitis, MRI has also been shown to be very sensitive [16,21]. In addition, MRI is highly sensitive in the identification and staging of a variety of musculoskeletal infections, such as cellulitis and osteomyelitis [22]. MRI can also be used to detect and assess a variety of osseous abnormalities, including bone contusions, stress and insufficiency fractures, osteochondral fractures, osteonecrosis, and transitory bone marrow edema [4,23]. The vertebral endplates and intervertebral discs are visible on T1- and T2-weighted sagittal and axial MR images [24]. The outer portion of the annulus, which has more fibrous tissue (low signal), contrasts well with the inner part of the annulus and the nucleus pulposus, which has greater water content, in T2-weighted images (high signal) [25]. The goal of the study was to use MRI to diagnose disc disorders, to create optimal MRI sequences for diagnosing spine pathologies, to develop a connection between the patient's age and the spinal disc, and to determine which gender was afflicted. As a greater proportion of persons with disc prolapse in the lumbar spine are being referred to the MRI section for assessment. This study enables the physicians to timely diagnose and manage the disc prolapse and avoid serious complications.

METHODS

It was a descriptive cross-sectional study carried out in a DHQ Hospital, Gujranwala, Pakistan and the sample size for

this research was 71 calculated via a convenient sampling approach [16,15,4]. The data were collected in four months from December 2021 to March 2022 after informed consent. Patients who presented to the MRI department for spinal disc prolapse were included in this study. Patients were to be registered with age, gender, type of examination, and protocol used. An MRI scanner was made by a Japanese manufacturer (Toshiba). Data were analysed using SPSS version 20.

RESULTS

Age, gender, and technique employed were all examined on the MR images of 71 patients. Table 1 shows the frequency distribution of age groups. There were 2 patients (2.8%) whose ages are less than 30, 3 patients (4.2%) had ages between 30-40, 38 patients (53.5%) had ages between 41-50, 15 patients (21.1%) had ages between 51-60 and 13 patients (17.4%) had ages between 61-70. Table 2 shows the frequency and percentage of the gender of patients. According to table 2, 45(63.4 %) patients were males and 26(36.6 %) were females. According to table 3, 21(29.6 %) patients were scanned using the Coronal plane and 50(70.4 %) patients were scanned using the Axial and sagittal plane. Table 4 shows that the majority of patients 43(60.6%) with lumbar spine issues have LBP, 20 patients (28.2%) have LBP with sciatica, and 7 patients (9.9%) were suffering from sciatica and only 1(1.4%) have localized hip pain.

Age (yrs)	Frequency	Percentage
<30 years	2	2.8
30-40 years	3	4.2
41-50 years	38	53.5
51-60 years	15	21.1
61-70 years	13	17.4
Total	71	100

Table 1: The frequency distribution of age groups.

Gender	Frequency	Percentage
Male	45	63.4
Female	26	36.6
Total	71	100

Table 2: Frequency and percentage of Gender of patients

Protocol used	Frequency	Percentage
Coronal	21	29.6
Axial and Sagittal	50	70.4
Total	71	100

Table 3: Frequencies of protocols

Presenting complaints	Frequency	Percentage
LBP	43	60.6
Sciatica	7	9.9
Hip pain	1	1.4
LBP with Sciatica	20	28.2
Total	71	100

Table 4: Indications or presenting complains

DISCUSSION

A herniated disc happens when the nucleus, cartilage, fractured apophyseal bone, or fragmented annular tissue protrudes from the intervertebral site. A cross-sectional study was conducted at a DHQ Hospital, Gujranwala on 71 patients who presented to the MRI department for spinal disc prolapse. Patients were to be registered with age, gender, type of examination, and protocol used. In the current study, there were 2 patients (2.8%) whose ages are less than 30, 3 patients (4.2%) have ages between 30-40, 38 patients (53.5%) have ages between 41-50, 15 patients (21.1%) having ages between 51-60 and 13 patients (17.4%) have ages between 61-70. Disc prolapse is widespread in older patients as stated by Hassan et al study published in 2016. A previously published study by Saad et al in 2018 shows similar results that disc prolapse is more common in older patients. In the current study, 45 (63.4 %) patients were male and 26 (36.6 %) were females [4]. Disc prolapse is widespread in males as declared by Abdalrahim et al in 2018 [16]. In the current study, 21 (29.6 %) patients were scanned using a coronal plane and 50 (70.4 %) patients were scanned using an axial and sagittal plane. The sagittal and axial technique is the best for confirming disc prolapse as declared by previously published studies by Saad et al in 2018 [4] and Hassan et al in 2016 [15]. The present study shows that the majority of patients 43 (60.6%) with lumbar spine issues have LBP, 20 patients (28.2%) have LBP with sciatica, and 7 patients (9.9%) were suffering from sciatica and only 1 (1.4%) have localized hip pain.

CONCLUSION

MRI is a useful tool for detecting disc prolapse in the lumbar vertebrae. As it recognizes structurally how the spinal cord is pinched and represents clinical manifestations inside the spinal cord by revealing a variation in spinal cord signal intensity. MRI has become an intriguing technique for a secure, highly reliable, and cost-effective evaluation of the vertebral column. Disc prolapse is widespread in older male individuals. The sagittal and axial technique is the best for confirming disc prolapse. Lower back discomfort is the most prevalent complaint among patients.

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