

MRI AS DIAGNOSTIC METHOD IN SLIPPED DISC DISEASE IN BAGHDAD CITY, ALKHARKH HEALTH DIRECTORATE

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ABSTRACT

The study aims to recognize the effectiveness of the use of magnetic resonance imaging (MRI) in diagnosing the slipped disc diseases after using various statistical methods. The incidence of a herniated disc is about 5 to 20 cases per 1000 adults annually and is most common in people in their third to the fifth decade of life, with a male to female ratio of 2:1, (13), CT scan: It is the preferred study to visualize bony structures in the spine. It can also show calcified herniated discs. It is less accessible in office settings compared to x-rays. But it is more convenient than MRI. In the patients that have non-MRI comparable implanted devices.

KEYWORDS: Magnetic Resonance Imaging, diagnostic Tool, Slipped Discs, cervical lumbar vertebrae.

INTRODUCTION

People with back pain that keeps on radiating down to the leg and foot, may be a sign of a slipped spinal disc, (herniated disc). Which are found between the vertebral bones in the spine (cervical and/or lumbar). the discs have an elastic casing made of cartilage and a gel-like centre called (nucleus pulposus). A slipped disc occurs when the spinal disc tissue pushes out between the vertebrae. This herniated tissue may put pressure on the spinal nerves and irritate them causing very unpleasant feeling. The symptoms usually go away on their own within a period of less than six weeks in most people complaining this abnormality, and not every slipped disc is painful.^[1] The spinal column is composed of the regions, seven bones in the cervical region, twelve in the thoracic region, and five in the lumbar region, followed by the sacrum and the coccyx, the discs have two parts: a soft, gelatinous inner portion and a tough outer ring. Any injury or weakness to the disc can cause the inner portion of the disc to protrude through the outer ring. This is known pathologically as a slipped, (herniated or prolapsed disc). This may compresses one of spinal nerves, leading the patient may feel numbness in addition to the pain along the affected nerve. This condition can occur in any part of the spine, from neck to lower back. The lower back is one of the more common areas for slipped discs. Also slipped disc can place extra pressure on the nerves and muscles around it.^[2] A herniated disc in the spine is a condition during which a nucleus pulposus is displaced from intervertebral space. It is a

common cause of back pain.^[3] Imaging is not indicated in a patient with signs and symptoms of a stable herniated disc until six weeks of persistent symptoms.^[4] Herniated discs are often seen on MRI is of asymptomatic patients. Imaging is not indicated in a patient with signs and symptoms of a stable herniated disc until six weeks of persistent symptoms. MRI is the imaging modality of choice^[5], while refractory cases may require interventional procedures or surgical repair.^[6] Eleven operated herniated disks, 10 of the patients were evaluated preoperatively with plain films, myelography and magnetic resonance imaging. Plain X-ray was a valuable supplement to MRI for studying the bony changes. Myelography showed^[7-11] herniated disks while MRI gave correct diagnosis in all. It is concluded that MRI can replace myelography and computerized tomography in the preoperative evaluation of cervical herniated disk.^[14] none of the MRI findings was significantly associated with the gender, smoking, sports activities, or body mass index (BMI). Those patients with lumbar disc herniation showed a higher prevalence of decrease in signal intensity of intervertebral disc and posterior disc protrusion on MRI of the cervical spine.^[15] MRI has proven to be an extremely valuable tool in the assessment of normal and pathological spinal anatomy.^[16] MRI sensitivity and specificity in diagnosis ranged from 64 to 93% and from 55 to 100%, respectively with wide confidence intervals.^[17]

Types of disc prolapse

1-Cervical disc herniation occurs in the neck, most often between the fifth and sixth (C5–6) and the sixth and seventh (C6–7) cervical vertebral bodies. There is an increased susceptibility among Age 60 especially at C3–4).

2- Lumbar disc herniation occurs in the lower back, most often between the (L4-5) vertebral bodies or between the (L5) and the sacrum. The sciatic nerve is the most commonly affected nerve, The femoral nerve can also be affected and cause the patient to experience a numb, tingling feeling throughout one or both legs and even feet or a burning feeling in the hips and legs. . A herniation in the lumbar region often compresses the nerve root exiting at the level below the disc. Thus, a herniation of the L4–5 disc compresses the L5 nerve root, only if the herniation is poster lateral.^[7]

ETIOLOGY

Usually this may probably be caused by the following pathology

- a- degenerative process, as humans get older in age, the nucleus pulposus becomes less hydrated and weakens. This leads to a progressive disc herniation.
- b- Trauma is most common cause of disc herniation i.
- c- Others like connective tissue disorders and congenital disorders such as short pedicles.

The higher rate of disc herniation is most common in the lumbar spine, followed by the cervical spine, due to the biomechanical forces in the flexible part of the spine. The thoracic spine has a lower rate of disc herniation.^[8]

The pathophysiology of herniated discs is believed to be a combination of the

- 1- Mechanical compression of the nerve by the bulging nucleus pulposus,
- 2- The local increase in inflammatory chemokines.

Mechanism of herniation and causes

- 1- This can happen with age. I.e. we get older, there are more likely to have risk of a slipped disc.
- 2- More common in men than women
- 3- Certain motions may cause a slipped disc.
- 4- Twisting or turning to lift an object.
- 5- Lifting a very large, heavy object can place great strain on the lower back, resulting in a slipped disc.
- 6- A very physically demanding job that requires a lot of lifting, this will increase risk for slipped discs.
- 7- Overweight individuals are also at increased risk for a slipped disc because their discs must support the additional weight.
- 8- Weak muscles and a sedentary lifestyle may also contribute to the development of a slipped disc.^[8]

Diagnosis of slipped disc

Diagnosis depends on clinical physical examination of the patient to follow the underlying source of the pain,

neurological examination of nerve function that supply the affected pain region and examination of the muscle strength, and whether the pain can be felt when moving or touching the affected area. This will be in parallel with taking the medical history and symptoms. Then we may need other investigating process like recommending imaging which will help in viewing the bones and muscles of the area affected. The imaging scan may include any of the followings X-rays, CT scans, MRI scans, discograms, Over 85% of patients with symptoms associated with an acute herniated disc will resolve within 8 to 12 weeks without any specific treatments. However, patients who have an abnormal neurological examination or are refractory to conservative treatments will need further evaluation and treatments, MRI is the preferred and most sensitive study to visualize herniated disc, and the findings will help surgeons and other health providers.^[9] The incidence of a herniated disc is about 5 to 20 cases per 1000 adults annually and is most common in people in their third to the fifth decade of life, with a male to female ratio of 2:1 the estimated prevalence of symptomatic herniated disc of the lumbar spine is about 1-3 percent of patients. The prevalence is most significant among 30-50-year-olds. The patients between 25-55 years old have an approximately 95 percent chance of herniated discs occurring either at L4-L5 or L5-S1.^[10] Disc disease is the underlying aetiology in less than five percent of patients with back pain.^[11]

MATERIAL AND METHODS

Study design: Quantitate study, prospective cross-sectional.

Research subjects/participants: Population who participate in the study are patients attending the Emergency Department of Alkharikh General hospital, Study measurement tool software used to collect data is self-viewed questionnaire, by direct filling the information. Analysis of the data tool is the SPSS software.

Data collection

- a-The information collected directly from the patients attending the emergency department of the hospital.
- b- The data of the study was searched for in PubMed and Google Scholar,
- c- Strict inclusion and exclusion criteria were applied so the selected patients who are diagnosed by the consultant who is in charged for the admission and management of the p.

The information required stated by direct interview with patients attended the out-patient clinic of emergency department.

f- Sampling: A sample of both males & females who are attended the Emergency Department of the Hospital.

RESULTS

Table 1: shows statistical analysis and difference test for the age groups patients having cervical spine disc prolapse, male and females.

| Slipped disk in the Cervical Sacral Spine (CSS) | | | | | |
|-------------------------------------------------|------------|------|----------------|------|--------------------------------------|
| Variable | Male | | Female | | P-value |
| | Freq. | % | Freq. | % | |
| Age | | | | | |
| < 19 years | 0 | 0 | 1 | 7.7 | 0.711 Not Significant |
| 19-31 years | 0 | 0 | 1 | 7.7 | |
| 32-44 years | 2 | 33.3 | 0 | 0 | |
| 45-57 years | 2 | 33.3 | 8 | 61.5 | |
| ≥ 58 years | 2 | 33.3 | 3 | 23.1 | |
| Total | 6 | 100% | 13 | 100% | |
| Mean ± SD | 51 ± 9.143 | | 49.08 ± 12.440 | | |

* The values in the table are found by (means ± SD), The level of significance was found using the independent-samples T Test

In this table the (T) test Independent-Samples is used to test the possible differences may be present, which shows no significant statistically between the means age for both males & females which was (0.711 which is greater than statistical indication level (0.05), which

means there is no difference in incidence because of the age parameter.

The following figure shows the arithmetic mean for the age variable for both groups of males & females.

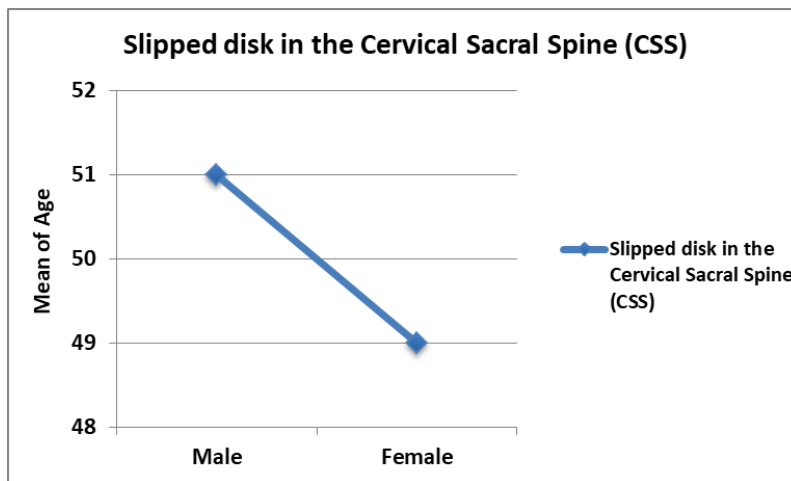


Table number 2: Shows the statistical description for the answers of the patients having cervical & sacral spines disc prolapse of both groups.

| Slipped disk in the Cervical Sacral Spine (CSS) | | | | | | | | | | | | |
|-------------------------------------------------|--------------------------|---|-------|-----|-------|------|-------|------|-------|-----|-------|------|
| Groups | Affected Cervical Spines | | | | | | | | | | | |
| | C1-C2 | | C2-C3 | | C3-C4 | | C4-C5 | | C5-C6 | | C6-C7 | |
| | Freq | % | Freq | % | Freq | % | Freq | % | Freq | % | Freq | % |
| Male | 0 | 0 | 0 | 0 | 4 | 66.7 | 4 | 66.7 | 6 | 100 | 4 | 66.7 |
| Female | 0 | 0 | 1 | 7.7 | 7 | 53.8 | 9 | 69.2 | 13 | 100 | 10 | 76.9 |

By the statistical description of the frequencies, four male patients of the total 6 they are diseased with disc prolapse affecting (C3&C4) with (%66.7) percent, also four of the six male group only have disc prolapse in the region (C4&C5) WITH (%66.7percent while it was found That six of six patients had prolapse discs in the region (C5-C6). which means with (%100) also with (%66.7). Regarding females group of the patients only one patient of the thirteenth is affected by the disease in the (C2-C3) group with (%7.7) percent, seven of the

patients had prolapse in the (C3-C4) with (%53.8) percent, nine of the thirteenth had prolapse in the (C4-C5) with (%69.20, and all the thirteen female patients had disc prolapse in the (C5-C6) which means (%1000 percent, but we found that only ten female patients had the prolapse in the region 9C6-C7).

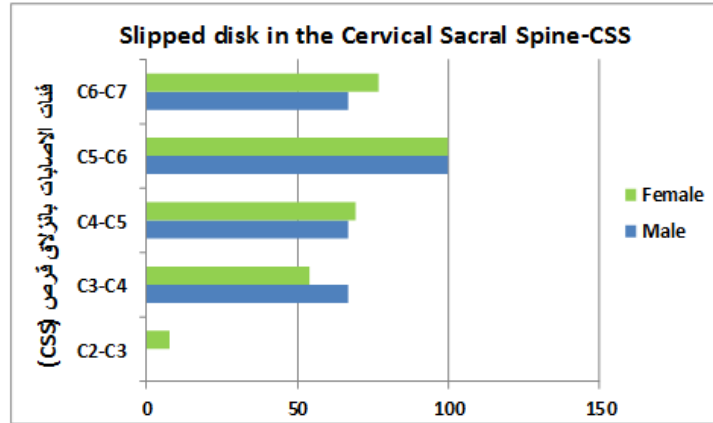


Figure two shows the frequencies of the answers of the patients groups affected with the disc prolapse of males & females.

male is (32) and the females are (32), by using the statistical analysis for the differences and the test for the age and ((L1-L2-L6-L7).

Statistical analysis for the second sample for the patients with disc prolapse who are diagnosed with the apparatus MRI as they were diseased with lumbosacral spine region (LSS) of the vertebral columns who are divided into two groups according to gender (males females), the

The following table number 3 shows the analytic analysis of the difference according to age parameters for the both groups under study whether males or females are.

| Slipped disk in the Lumbo Sacral Spine (LSS) | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------|---------------|------|---------------|------|-----------------------------|
| Variable | Male | | Female | | P-value |
| | Freq. | % | Freq. | % | |
| Age | | | | | |
| < 19 years | 1 | 3.1 | 1 | 3.1 | 0.155 Not Significant |
| 19-31 years | 10 | 31.3 | 3 | 9.4 | |
| 32-44 years | 8 | 25 | 14 | 43.8 | |
| 45-57 years | 9 | 28.1 | 8 | 25 | |
| ≥ 58 years | 4 | 12.5 | 6 | 18.8 | |
| Total | 32 | 100 | 32 | 100 | |
| Mean ± SD | 39.50 ± 15.02 | | 44.44 ± 12.25 | | |
| * The values in the table are found by (means ± SD), The level of significance was found using the independent-samples T Test | | | | | |

As one can see from the table above by using Independent –Sample T Test, there are no statistical differences among the means of the ages for the two

groups with statistical level (0.155), which is greater than the accepted indicator level, which is probably because the ages are two closes.

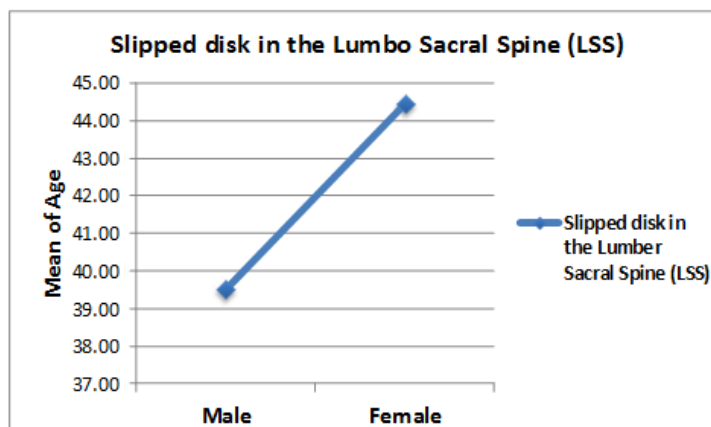


Figure 3: Explain the arithmetic mean for the age for the two groups.

The table (4) shows the frequencies analytic description for the patients answers who are diagnosed with the disc prolapse in the (LSS) regions of the spine, five males of the 32 patients are affected with (%15.5) percent in the region (L1-L2), seven of the 23 patients are affected (%21.9) percent in the region (L2-L3), 17 males of the 32 were affected in the region (L4-L5) (%68.8), 22 OF 23 of the males (%68.8) are affected in the region (L5-L6).

For the females group 5 of the 32 patients had disc prolapse in the region (L1-L2) (%15.6), 8 of the females had prolapse in the region (L2-L3), (%25),9 of the 32 had disc prolapse (L3-L4) (%15.6),18 of the 32 had (56.3) had (L4-L5), 18 of the 32 had (56.3)(L5-L6) with (56.30).

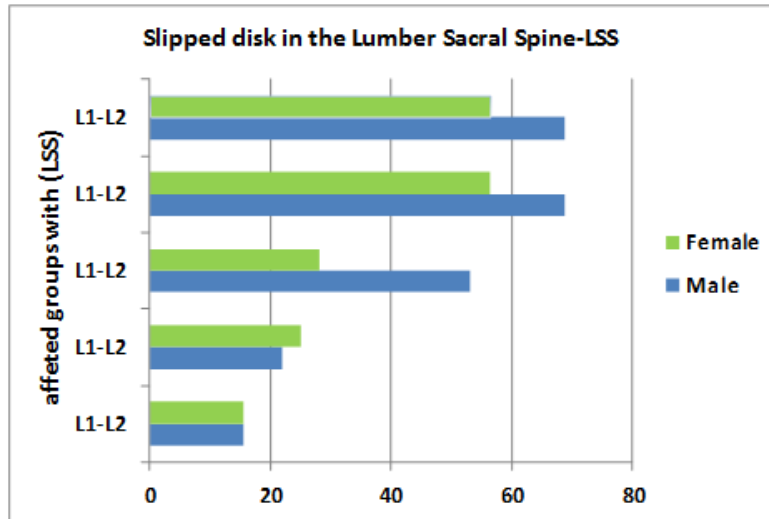


Figure 4: shows the frequencies of the patients answers who had complained of disc prolapse in the sacral region of the columns.

DISCUSSION

The use an MRI shows an important step in correctly assessing a herniated disc in the spine. Which is not possible in an X-ray, MRI uses a magnetic field and a computer to create and record detailed pictures of entire body which help much in diagnosis rapidly, In addition an MRI Can focus on a particular part of the body, a herniated disc in the neck or back, the very first step would a physician may take for the diagnosis. in this study, the findings where more or less, similar to most of the studies, it goes with the objective To evaluate the application and significance of MRI in the diagnosis of prolapse of cervical & lumbar intervertebral disc. The statistical analysis was made on 60 cases who complained of prolapse of lumbar intervertebral disc that received routine CT or MRI examination.

CONCLUSION

The result of this study approved the objectives as the MRI method shows high degree of diagnosing specially in that the mostly affected patients regarding, age groups, gender differences so in conclusion the MRI is likely has the importance of effectively diagnosis of the slipped discs in the cervical and lumbar regions of the body.

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