

Correlation between magnetic resonance imaging and intra-operative findings in disc herniation at lumbo-sacral region

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ABSTRACT

Background: Prolapsed intervertebral disc is an important and common cause of low backache. MRI has now become universally accepted investigation for prolapsed intervertebral disc. We, however, regularly come across situations, when MRI shows diffuse disc bulges, even at multiple levels, which cannot be correlated clinically and when such cases are operated, no significant disc prolapse is found resulting in negative exploration.

Objective: To evaluate the role of M.R.I. finding not only for diagnosis of disc herniation at lumbar region but also for localization the level of herniation

Methods: A prospective study on seventy five symptomatic low backache and MRI confirmed prolapsed intervertebral disc patients at lumbo-sacral region were operated on, all of the cases required excision of disc through posterior approach in knee elbow position. The time between MRI taken and surgery was two weeks, from which the data were taken in a questioner forma which include name, age, gender, occupation, chief complaint, duration, MRI findings and intra operative finding, from June 2011 to October 2013 at Al-Kindy teaching hospital.

Results: In our study 75 patients were diagnosed by clinical examination and MRI finding to have disc herniation at lumbar region. The female more than male

(36 females, 12 males) and the ratio was 5-1, the accuracy of MRI against intra operative finding in deciding the provisional diagnosis as disc herniation was 68%. The commonest site was L4-5 disc herniation 43 patients (57.3%), and L5-S1 prolapse is the next common disc herniation level 27 patient (36%), L3-L4 disc herniation was two cases (2.7%) and L4-L5, L5-S1 disc herniation was 3 cases (4%).

Conclusion: The most common level was L4-5 followed by L5S1. The MRI is more accurate in diagnosis of the lumbo-sacral disc herniation and its level in single one is more than multiple levels.

Keywords: Disc herniation, MRI, Surgery, posterior approach

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Prolapsed intervertebral disc is a common cause of backache and affects young age group, 25 to 45 years, particularly those lifting weight on unprepared back. Clinical examination is mainstay of diagnosis, to be confirmed by plain X-ray, invasive radiography like myelography, discography etc. In last decade or so, non-invasive radiography as CT scan, MRI has taken over the onus of diagnosis of prolapsed intervertebral disc¹.

MRI is considered highly sensitive and specific test for diagnosing prolapsed intervertebral disc, however, the problem is over diagnosing the condition. Even asymptomatic patients may show disc bulge. Studies have conclusively proved that MRI findings of disc degeneration and prolapse can be found normally, especially in aged¹. MRI shows multiple level disc prolapses, which is theoretically uncommon, surgically unfeasible and totally unrequired to treat all of them. So the dilemma lies, whether to operate these patients with MRI findings and if so, how extensive the surgery should be? It is here, that importance of clinical correlation with MRI findings has to be made so that "negative explorations" can be avoided. The aim of our study is to emphasize the fact that MRI findings should always be correlated with clinical findings to decide about

surgical intervention.

Method. Seventy five cases of symptomatic prolapsed intervertebral disc confirmed by MRI selected for surgical intervention were studied from June 2011 to October 2013 at Al-Kindy teaching hospital. The average time interval between MRI taken and surgery were two weeks.

The indications for surgery were: 1. Persistent pain unrelieved by adequate trial of conservative treatment. 2. Neurological deficit like weakness, foot drop or sphincteric disturbance. 3. Recurrent episodes of incapacitating symptoms. 4. Cauda equina syndrome.

Disc prolapse on MRI (1.5 tesla) performed in both T1 and T2, sagittal and axial views were designated as significant when compression of thecal sac and adjoining nerve root was present. Preoperatively, the type of surgical procedure was decided on the basis of clinical correlation with MRI findings.

Surgical procedure; Intra-operatively disc was excised when bulge was significant and gave doughy feeling on palpation. Surgery was done using posterior approach in knee elbow position using hypotensive technique. All cases required excision of the disc, the data was taken in a questioner forma which include name, age, gender, occupation, chief complaint, duration. Intra-operative

findings were noted in terms of, disc bulge, its level, feeling and were compared with MRI findings.

Result. The age of the patients ranged between 28 to 66 years, (mean 45 years). The male to female ratio was (1:5) the male 12 cases (16%) and the female 63 cases (84%), table 1. All of our patients were not involved in manual heavy work, table 2.

Table 1: Age and Gender.

Age	Female	Male	Total	%
20-29	3	0	3	4 %
30 - 39	24	6	30	40 %
40 - 49	18	3	21	28 %
50 - 59	12	0	12	16 %
60 - 69	6	3	9	12 %
Total	63	12	75	100 %

Table 2: Type of Occupation.

Occupation	No. of patients	%
Light worker	36	48 %
House wife	39	52 %

MRI finding; Disc prolapse in single level forty eight cases (64 %), L4- L5 had twenty five cases 33.2 % and L5-S1 twenty one cases 28 %. Twenty seven cases(36%) were more than one level disc prolapse as follow(L4-L5 ,L5-S1) fourteen cases 18.6 % ,(L3-L4 , L4 - L5) .Fourteen cases 18.6 % ,(L3-L4) one case 1.4 % , table 3 .

Table 3: MRI Finding.

Level	Number	%
L3 - L4	1	1.4 %
L4 - L5	25	33.2 %
L5 - S1	21	28 %
L3 - L4, L4 - L5	14	18.7 %
L4 - L5, L5 - S1	14	18.7 %
Total	75	100 %

Intra operative finding; In our study ,L4-5 was the commonest level for disc prolapse forty four cases (58.7 %), while the next common level was L5 -S1 twenty seven cases (36 percent).L3 - L4 one case (1.3 %), L4 - L5 , L5 - S1 three cases (4%), table 4

MRI was accurate in determining disc prolapse level in fifty one cases (68 %), for the rest of the twenty four cases (32%), only one level disc prolapse. For single level disc prolapse: The cases were 48 cases, all the cases were accurate level (100%). For the multiple levels; the cases

were 27, 3 cases were accurate (11.1 %) while the remaining 24 cases needed only single level laminectomy (88.9 %).

Table 4: Intra operative finding.

Level	Number	Percent
L3 - L4	1	1.3 %
L4 - L5	44	58.7 %
L5 - S1	27	36 %
L3 - L4, L4 - L5	0	0%
L4 - L5 , L5 - S1	3	4 %
Total	75	100

Discussion. The office of National Statistics performed a survey in 1998. They found that 40%of adults reported back pain lasting more than 1 day in the last 12 months. Fifteen percent of these people had been in pain throughout the entire year. Forty percent of sufferers had seen their general practitioner and 10% had visited a complementary medicine practitioner¹.

During the decade 1983to 1993, there was a fivefold increase in outpatients reporting for back pain. Furthermore, there was a doubling of social security benefits paid during that time for back related disorders. Between 1988 and 1998, a study reported an increase of 12.7% in back pain in the United Kingdom. This was mostly due to less disabling back pain. The researchers concluded that increase was due to changes in attitude and behaviour. The estimated costs to the United Kingdom from back pain are more than 6 billion £ per year².

In our study The age of the patients ranged between 28 to 66 years, mean 45 year, which is near to the study done in 2007 (The mean age in our study was 43 years range from 21 to 65 years)³, and it is higher than other studies, Baldwin NG mean age of 34.96 years (range 21-72 years)⁴, Battie MC et al⁵, Weber H⁶.

In our study male to female ratio about (1:5) with female predominantly 84% female ,16% male , which is higher than other study Which includes 31 male 62% and 19 female 38% and the male/female ratio is 1.63:1³, because the male can tolerate pain more than female and because in our society she engage in heavy duties.

In our study the occupation of all patients were sedentary, either light workers (36 patients) 48% and housewives 39 patients 52 %, which is similar to other study Kelsey JL et al (lack of exercise leads to muscle weakness, and this may explain why some sedentary occupations increase the risk of disc prolapse⁷, which is differ from other studies done by Marras WS et al (physical occupational risk factors have been reported to be responsible for the development of disc)⁸. Although some manual occupations carry no greater risk than sedentary work. "Adaptive remodelling" in response to controlled exercise explains why physically active individuals have extremely strong vertebrae and discs^{9,10}.

In our study the commonest herniated disc level was

L4-L5 (58.7%) and the next common level was L5-S1 (36%) this is goes with other studies disc herniation and end-plate defects show little correlation with age and they most commonly affect only the lower lumbar levels mainly L4-5 intervertebral disc space was the most commonly afflicted level ¹¹, and it is similar to another study 56% (28 patients) had herniation at L4-5 level, 44% (22 patients) of them had herniation at L5-S1 level.) ³.

In our study the accuracy of the MRI in diagnosis of lumbar disc prolapse and its level in single level disc herniation more than multiple levels disc herniation, this goes with other study by SK Lunawat et al ¹². Disc dehydration, annular bulges and focal protrusions are common findings in normal adult population and may not related to the patient's symptoms¹³. This is because the MRI is highly sensitive, some of these herniated disc is the intermittent herniation of Falconer or "the concealed disc" of Dandy ¹⁴, this herniation is not obvious from the position of flexion on the operating table, but bulging can be reproduced by hyperextension of the spine, also the position of the patients in the MRI device in supine position and in the operating room knee elbow position.

In conclusion, disc herniation at lumbo-sacral region might result from a relatively lesser strains in previously damaged or degenerated discs. The most common age affected by the disease was 30-49 years in being more in female with light manual work and housewives. The most common level was L4-5 followed by L5S1. The MRI is an important step in the diagnosis of lumbar disc prolapse. The MRI is more accurate in the diagnosis of the lumbar disc prolapse and it level in single level more than multiple levels. The MRI alone is not a substitute for the clinical examination. Do not examine the MRI films until after the diagnosis has been suggested. You are treating the patient and not the MRI films.

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