

Reliability (Revalidation) of MSU MRI Classification of Lumbar Disc Herniation in 100 Patients Series: Severity and Objective Surgical Criteria

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Abstract

Background Data: Success rate of discectomy is greatly variable between surgeons due to lack of clear categorization of lumbar disc patients. Valid radiological objective criteria are required especially for patients with uncertain surgical indication to help in pre-operative patient assessment, surgical selection and research of post-operative outcomes of comparable level of pathology. MSU Classification reports size and location in three precise increments, described simply 1-2-3 and A-B-C providing clear objective classification of disc herniation resulting in excellent interexaminer reliability.

Purpose To test reliability of MSU MRI classification of lumbar disc herniation in helping surgical selection and correlation with preoperative clinical presentation and postoperative clinical and functional outcome.

Study Design Observational analytic retrospective study.

Patients and Methods Retrospective investigations of one hundred patients who underwent lumbar discectomy at Ain Shams University between January 2014 and June 2015 in term of MSU classification.

Results Only 2 patients (2%) in our series had grade 1-A. All other 98 patients had MSU grades with size 2 or 3 **and/or** B or C location or 2 or 3 combination of horizontal disc locations (A, B or C). **Two** cases of unintended durotomy occurred in MSU grade 3-AB (40%) and the other 3 cases occurred in grade 2-AB (60%). One case of CSF leak occurred in 3-AB herniated disc lesion (50%)

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and another one in 2-AB lesion (50%). Twelve patients (12%) developed recurrent sciatica with mean interval of 47.92 weeks after first disc surgery. Only 5 patients (5%) underwent second disc surgery with mean interval of 6.2 months. 95 patients (95%) had good to excellent result.

Conclusion: MSU classification provides solid, universal and objective radiological description of lumbar disc herniation helping patient selection for surgery. (2016ESJ097)

Keywords: MSU Classification, lumbar disc disease

Introduction

Large number of patients presented with low back pain and sciatica undergoes lumbar discectomy.² Success rate of discectomy is greatly variable between surgeons due to lack of clear categorization of lumbar disc patients to be correlated to presentation and outcome and definite objectives for surgical selection.^{12,13} Valid radiological objective criteria are required especially for patients with uncertain surgical indication to help in pre-operative patients assessment, surgical selection and research of post-operative outcomes of comparable level of pathology.¹¹ Abnormal MRI scans can occur in asymptomatic patients that's why clinical correlation is a must before surgical decision.³ Volumetric analysis of herniated lumbar disc is regarded by many surgeons valuable for surgical selection.^{5,6,9,10}

Large disc fragments with obvious annular defect have better clinical postoperative outcome with less risk of recurrence (as low as 3.5%) than small disc lesions which have poor clinical postoperative results with greater probability of recurrence (as high as 40%). This suggests that small lumbar disc herniation could improve by its own with conservative treatment.⁴ This comes in favor with the suggestion that symptoms related to sciatica may be caused by chemical neuritis due to proteoglycans and nerve root adhesions caused by local inflammation.⁷

MSU Classification reports size and location in three precise increments, described simply 1-2-3 and A-B-C, all taken from a single measurement of the intra-facet line, thus validating an objective classification scheme

to eliminate confusion and developing clear objective description of disc herniation resulting in excellent interexaminer reliability.⁸

In this study, we try to revalidate MSU classification by applying it on one hindered patients who underwent lumbar discectomy trying to correlate it with preoperative clinical presentation and postoperative course of our patients.

Patients and Methods

Retrospective investigations of a series of one hundred patients who underwent lumbar discectomy in our neurosurgical department at Ain Shams university between January 2014 and June 2015 and applying MSU classification to the patients to test its reliability in helping surgical selection and correlation with preoperative clinical presentation and postoperative clinical and functional outcome.

Data of one hundred patients who underwent lumbar discectomy are retrieved including: -preoperative clinical manifestations as regard low back pain and sciatica and their intensity by visual analogue score. -Classification of patients by MSU classification scheme based on MRI scans as regard location and size of herniated disc. -Details of surgery either laminectomy or fenestration and discectomy. -Postoperative assessment of clinical data as regard low back pain and sciatica. -Postoperative complications as CSF leak, unintended durotomy, wound infection and recurrent sciatica.

MSU classification:⁸

The MSU Classification reports the size of disc herniation and its location. It uses a single intra-facet line as a reference point to measure the disc herniation at the level of maximum

protrusion or extrusion, where it compresses on neurologic structures. This is measured from the T2 axial MRI cut that shows the level of maximal herniation, taking into account cranial or caudal disc displacement. The size and location of disc herniation are measured at the level of maximal extrusion in reference to a single intra-facet line drawn transversely across the lumbar canal, to and from the medial edges of the right and left facet joint articulations (Figure 1).

To describe the size of disc herniation, the disc herniation is reported as 1, 2, or 3. In reference to the intrafacet line, size-1 means that the disc herniation extends up to or less than 50% of the distance from the non-herniated posterior aspect of the disc to the intra-facet line, size-2 indicates that disc herniation extends more than 50% of that distance and if the herniation extends altogether beyond the intra-facet line, it is termed size-3 disc. In cases of more caudal or more cranial maximal extrusions, this measurement is taken from the posterior edge of the vertebral cortex/endplate instead of the disc.

To report location of the disc herniation, the disc herniation is described as A, B, or C. Three points are placed along the intra-facet line, dividing it into four equal quarters (Figure 2). Then, perpendicular lines are drawn through each of these points to create the right and left central quadrants representing zone-A (central) and the right and left lateral quadrants representing zone-B (lateral).

A third zone-C is represented at the level of the foramen by the area that extends beyond the medial margin of either facet joint, past the borderline of the lateral quadrants. It is traditionally referred to as far lateral where the herniation extends out into the intra-foraminal space and beyond on the right and left sides. The lateral zones-B and -C are obviously anatomically more constrained spaces than the more roomy zone-A, which is centered in the middle of the spinal canal. So it is not surprising that when a size-2 disc herniation occurs within

either of the two more constrained zones-B and -C, it typically exerts a greater impact on the spinal nerves. The disc herniation is described as A, AB, B, or C according to the zone where the herniated nucleus intrudes furthest.

Whether the greatest dimension of disc herniation is located more caudal or more cranial has had no critical impact on whether or not the disc herniation was suited for surgery. Level is only important to take the measurements of grade and zone, and as part of the surgeon's pre-operative planning for precise removal of the lesion. Therefore, level has not been included in this classification.

So we have 3 vertical locations based on size of herniated disc lesion (1, 2 or 3) and 3 horizontal locations based on laterality of it (A=central, B=lateral, C=far lateral) resulting in 9 squares where the herniated disc lesion can occupy one or more of them.

Result

A hundred patients underwent single level lumbar discectomy. Table 1 shows patients characteristics as regard age, sex and level of lumbar disc herniation. Table 2 shows the number and percentage of different categorization of patients based on radiological morphology of lumbar disc herniation according to size (1, 2 and 3) and location (A, B and C) using validated MSU classification as shown in figure 3. Ten grades were described in MSU classification.⁸ We also found other combination of lumbar disc herniation as IAB, IABC, IIABC, IIIABC, IBC and IIBC. Lumbar disc herniation was on right side in 34 patients (34%), on left side in 52 patients (52%), on both sides in 4 patients (4%) and central in 10 patients (10%). High intensity zone (HIZ) is defined as bright white signal on T2W images in the posterior annulus of the disc representing a fissure or tear in the posterior annulus and was found in 7 patients (7%). The mean of duration of preoperative symptoms (low back pain and sciatica) was 9.76 ± 10.62

with range from 1-60 days. 92 patients (92%) presented by severe excruciating symptoms. Root pain (leg pain) was found on right side in 37 patients, on left in 52 patients and bilateral in 1 patient. Neurological deficit was found in 13 patients (13%). Straight leg raising sign (SLR) ≤ 60 was found in 90 patients (90%). (Table3) Severity of pre-operative sciatica was correlated to MSU grade in all 100 herniated disc patients as shown in table 5. 13 patients (13%) presented with pre-operative motor deficit and 12 of them (92%) had MSU grade of the herniated disc lesion, either size 2 or 3 and/or 2 locations or more or one far lateral location (C location) as shown in table 6.

The mean operative time was 87.6 ± 22.58 minutes. Unilateral muscle separation was done 74 patients (74%) and bilateral muscle separation was done in 26 patients (26%). Fenestration was done in 82 patients (82%) while laminectomy was done in 18 patients (18%). The mean hospital stay was 1.54 ± 1.31 days. Early postoperative sciatica (first week) occurred in 17 patients (17%) and mean VAS of it was 2.53 ± 1.51 . Unintended durotomy

occurred in 5 patients (5%). Postoperative CSF leak was observed in 2 patients (2%). Postoperative superficial infection of discectomy wound was seen in 3 patients (3%) with no deep infection experienced. The mean VAS of recurrent sciatica was 5.5 ± 2.11 and mean of its postoperative duration interval to occur was 47.92 ± 48.06 weeks. This occurred in 12 patients (12%). Reoperation was needed in 5 patients (5%). The mean interval between the first and second surgeries was 6.2 ± 9.9 months. (Table 8) Two cases of unintended durotomy occurred in MSU grade 3-AB (40%) and the other 3 cases occurred in grade 2-AB (60%) as shown in table 10. So all cases of unintended durotomy occurred in herniated disc lesions occupying 2 zones or more as regard location (A,B,C) and size (1,2,3). The same was observed in term of CSF leak as one case occurred in 3-AB herniated disc lesion (50%) and another one in 2-AB lesion (50%) as shown in table 11. Second disc surgery (reoperation) was needed in 5 patients. Herniated disc lesions were size 2 or 3 and/or occupied 2 or 3 horizontal locations or B location (lateral disc) as shown in table 13.

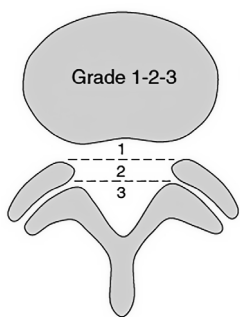


Figure 1. Grading the disc herniation for size. Grade 1 lesions have little impact and grade 3 have the most impact on nerve compressio

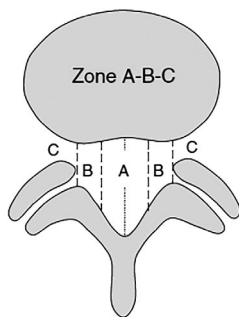


Figure 2. Zoning the disc for location. Lesions have more impact in tighter zone-B and -C

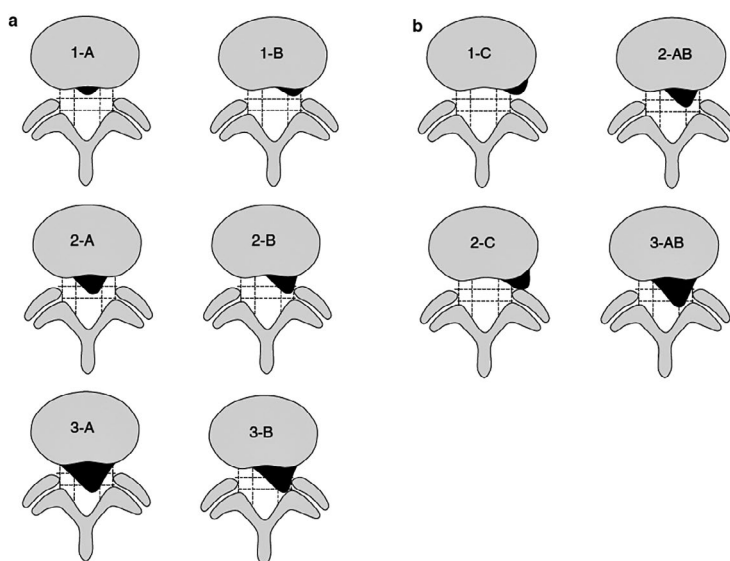


Figure 3. Combining size and location. a Lesions 2-B are commonly symptomatic. 3A lesions are often seen in cauda equina. b Lesions 2-C are the largest foraminal lesions. Lesions 2-AB are quite common, occurring on the line between zones-A and -B

Table 1. Patients characteristics

		No.	%
Sex	Female	29	29.0%
	Male	71	71.0%
Age	Mean±SD	39.22±9.67	
	Range	22–61	
Level	L5-S1	46	46.0%
	L4–5	50	50.0%
	L3–4	3	3.0%
	L2–3	0	0.0%
	L1–2	1	1.0%

Table 2. Radiological grading of lumbar disc herniation patients (based on MSU classification)

MSU grade	No.	%
IIIABC	1	1.0%
IIIAB	19	19.0%
IIIA	1	1.0%
IIBC	1	1.0%
IIABC	2	2.0%
IIAB	33	33.0%
IIC	2	2.0%
IIB	26	26.0%
IIA	3	3.0%
IB	3	3.0%
IA	2	2.0%
IBC	2	2.0%
IAB	3	3.0%
IIIB	1	1.0%
IABC	1	1.0%
Total	100	100.0%

Table 3. Radiological and clinical patients characteristics

		No.	%
Laterality	Right	34	34.0%
	Left	52	52.0%
	Bilateral	4	4.0%
	Central	10	10.0%
HIZ(high intensity zone)	No	93	93.0%
	Yes	7	7.0%
Duration of symptoms (ms)	Mean±SD	9.76±10.62	
	Range	1 - 60	
Presence of severe excruciating symptoms	Yes	92	92.0%
	No	8	8.0%
Duration of severe excruciating symptoms (wks)	Mean±SD	5.52±5.11	
	Range	1 - 30	
Leg Pain	Right	37	37.0%
	Left	52	52.0%
	Bilateral	11	11.0%
Neuro deficit	No	87	87.0%
	Yes	13	13.0%
SLR	SLR > 60	10	10.0%
	SLR <= 60	90	90.0%

Table 4. MSU grades and presence/absence of severe excruciating pre-operative symptoms in our 100 herniated disc patients series in relation to their MSU grades.

MSU grade	Presence of severe excruciating symptoms			
	Yes		No	
	No.	%	No.	%
IIIABC	0	0.00%	1	12.50%
IIIAB	19	20.70%	0	0.00%
IIIA	1	1.10%	0	0.00%
IIBC	1	1.10%	0	0.00%
IIABC	2	2.20%	0	0.00%
IIAB	31	33.70%	2	25.00%
IIC	2	2.20%	0	0.00%
IIB	25	27.20%	1	12.50%
IIA	3	3.30%	0	0.00%
IB	2	2.20%	1	12.50%
IA	1	1.10%	1	12.50%
IBC	2	2.20%	0	0.00%
IAB	2	2.20%	1	12.50%
IIIB	1	1.10%	0	0.00%
IABC	0	0.00%	1	12.50%
X2	36.499			
P-value	0.001			

Table 5. MSU grades and severity of pre-operative sciatica (measured by visual analogue score=VAS)

MSU grade	Mild (1-4)		Moderate (5-7)		Severe (8-10)	
	No.	100%	No.	100%	No.	100%
IIIABC	0	0.0%	1	4.2%	0	0.0%
IIIAB	1	100.0%	3	12.5%	15	20.0%
IIIA	0	0.0%	0	0.0%	1	1.3%
IIBC	0	0.0%	0	0.0%	1	1.3%
IIABC	0	0.0%	0	0.0%	2	2.7%
IIAB	0	0.0%	6	25.0%	27	36.0%
IIC	0	0.0%	0	0.0%	2	2.7%
IIB	0	0.0%	5	20.8%	21	28.0%
IIA	0	0.0%	3	12.5%	0	0.0%
IB	0	0.0%	2	8.3%	1	1.3%
IA	0	0.0%	1	4.2%	1	1.3%
IBC	0	0.0%	1	4.2%	1	1.3%
IAB	0	0.0%	1	4.2%	2	2.7%
IIIB	0	0.0%	0	0.0%	1	1.3%
IABC	0	0.0%	1	4.2%	0	0.0%

Table 6. MSU Grades and Pre-operative Neuro Deficit

MSU grade	Neuro deficit			
	No		Yes	
	No.	%	No.	%
IIIABC	1	1.1%	0	0.0%
IIIAB	18	20.7%	1	7.7%
IIIA	1	1.1%	0	0.0%
IIBC	1	1.1%	0	0.0%
IIABC	1	1.1%	1	7.7%
IIAB	29	33.3%	4	30.8%
IIC	1	1.1%	1	7.7%
IIB	21	24.1%	5	38.5%
IIA	3	3.4%	0	0.0%
IB	3	3.4%	0	0.0%
IA	1	1.1%	1	7.7%
IBC	2	2.3%	0	0.0%
IAB	3	3.4%	0	0.0%
IIIB	1	1.1%	0	0.0%
IABC	1	1.1%	0	0.0%

Table 7. MSU Grades and Straight Leg Raising Sign (SLRS)

MSU grade	SLRS			
	≤60		>60	
	No.	100%	No.	100%
IIIABC	1	1.1%	0	0.0%
IIIAB	16	18.0%	3	27.3%
IIIA	1	1.1%	0	0.0%
IIBC	1	1.1%	0	0.0%
IIABC	2	2.2%	0	0.0%
IIAB	30	33.7%	3	27.3%
IIC	1	1.1%	1	9.1%
IIB	23	25.8%	3	27.3%
IIA	2	2.2%	1	9.1%
IB	3	3.4%	0	0.0%
IA	2	2.2%	0	0.0%
IBC	2	2.2%	0	0.0%
IAB	3	3.4%	0	0.0%
IIIB	1	1.1%	0	0.0%
IABC	1	1.1%	0	0.0%

Table 8. Operative details and postoperative complications

		No.	%
Operative Time (minutes)	Mean±SD	87.6±22.58	
	Range	60 - 180	
Drain	No	78	78.0%
	Yes	22	22.0%
Incision (cm)	Mean±SD	2.84±1.26	
	Range	2 - 8	
Muscle separation	Unilateral	74	74.0%
	Bilateral	26	26.0%
Bonywork	Fenestration	82	82.0%
	Laminectomy	18	18.0%
Hospital stay	Mean±SD	1.54±1.31	
	Range	1 - 10	
Early Postoperative Sciatica (VAS) in 17/100 patients	Mean±SD	2.53±1.51	
	Range	1 - 7	
Unintended durotomy	No	95	95.0%
	Yes	5	5.0%
CSF Leakage	No	98	98.0%
	Yes	2	2.0%
superficial wound infection	No	97	97.0%
	Yes	3	3.0%
Deep infection	No	100	100.0%
	Yes	0	0.0%
Recurrent sciatica (VAS) in 12/100 patients	Mean±SD	5.5±2.11	
	Range	2 - 8	
Duration interval of postoperative recurrent sciatica (weeks)	Mean±SD	47.92±48.06	
	Range	2 - 156	
Reoperation	No	95	95.0%
	Yes	5	5.0%
time between first and second surgery (months)	Mean±SD	6.2±9.9	
	Range	1 - 24	

Table 9. MSU grades & bony work (fenestration or laminectomy) done intra-operatively

MSU grade	Bony work			
	Fenestration		Laminectomy	
	No.	100%	No.	100%
IIIABC	1	1.20%	0	0.00%
IIIAB	13	15.90%	6	33.30%
IIIA	1	1.20%	0	0.00%
IIBC	1	1.20%	0	0.00%
IIABC	2	2.40%	0	0.00%
IIAB	26	31.70%	7	38.90%
IIC	2	2.40%	0	0.00%
IIB	24	29.30%	2	11.10%
IIA	2	2.40%	1	5.60%
IB	2	2.40%	1	5.60%
IA	2	2.40%	0	0.00%
IBC	2	2.40%	0	0.00%
IAB	2	2.40%	1	5.60%
IIIB	1	1.20%	0	0.00%
IABC	1	1.20%	0	0.00%

Table 10. MSU grades of unintended durotomy cases

MSU grade	Unintended durotomy			
	No		Yes	
	No.	100%	No.	100%
IIIABC	1	1.1%	0	0.0%
IIIAB	17	17.9%	2	40.0%
IIIA	1	1.1%	0	0.0%
IIBC	1	1.1%	0	0.0%
IIABC	2	2.1%	0	0.0%
IIAB	30	31.6%	3	60.0%
IIC	2	2.1%	0	0.0%
IIB	26	27.4%	0	0.0%
IIA	3	3.2%	0	0.0%
IB	3	3.2%	0	0.0%
IA	2	2.1%	0	0.0%
IBC	2	2.1%	0	0.0%
IAB	3	3.2%	0	0.0%
IIIB	1	1.1%	0	0.0%
IABC	1	1.1%	0	0.0%

Table 11. MSU grades of CSF leak cases

MSU grade	CSF Leakage			
	No		Yes	
	No.	100%	No.	100%
IIIABC	1	1.0%	0	0.0%
IIIAB	18	18.4%	1	50.0%
IIIA	1	1.0%	0	0.0%
IIBC	1	1.0%	0	0.0%
IIABC	2	2.0%	0	0.0%
IIAB	32	32.7%	1	50.0%
IIC	2	2.0%	0	0.0%
IIB	26	26.5%	0	0.0%
IIA	3	3.1%	0	0.0%
IB	3	3.1%	0	0.0%
IA	2	2.0%	0	0.0%
IBC	2	2.0%	0	0.0%
IAB	3	3.1%	0	0.0%
IIIB	1	1.0%	0	0.0%
IABC	1	1.0%	0	0.0%

Table 13. MSU grades and reoperation

MSU grade	Reoperation			
	No		Yes	
	No.	100%	No.	100%
IIIABC	1	1.1%	0	0.0%
IIIAB	17	17.9%	2	40.0%
IIIA	1	1.1%	0	0.0%
IIBC	1	1.1%	0	0.0%
IIABC	1	1.1%	1	20.0%
IIAB	32	33.7%	1	20.0%
IIC	2	2.1%	0	0.0%
IIB	25	26.3%	1	20.0%
IIA	3	3.2%	0	0.0%
IB	3	3.2%	0	0.0%
IA	2	2.1%	0	0.0%
IBC	2	2.1%	0	0.0%
IAB	3	3.2%	0	0.0%
IIIB	1	1.1%	0	0.0%
IABC	1	1.1%	0	0.0%

Table 12. MSU grades and recurrent sciatica

MSU grade	recurrent sciatica VAS							
	No pain		Mild (1-4)		Moderate (5-7)		Severe (8-10)	
	No.	100%	No.	100%	No.	100%	No.	100%
IIIABC	1	1.1%	0	0.0%	0	0.0%	0	0.0%
IIIAB	17	19.3%	0	0.0%	1	25.0%	1	33.3%
IIIA	1	1.1%	0	0.0%	0	0.0%	0	0.0%
IIBC	1	1.1%	0	0.0%	0	0.0%	0	0.0%
IIABC	1	1.1%	0	0.0%	1	25.0%	0	0.0%
IIAB	29	33.0%	2	40.0%	1	25.0%	1	33.3%
IIC	2	2.3%	0	0.0%	0	0.0%	0	0.0%
IIB	22	25.0%	2	40.0%	1	25.0%	1	33.3%
IIA	3	3.4%	0	0.0%	0	0.0%	0	0.0%
IB	2	2.3%	1	20.0%	0	0.0%	0	0.0%
IA	2	2.3%	0	0.0%	0	0.0%	0	0.0%
IBC	2	2.3%	0	0.0%	0	0.0%	0	0.0%
IAB	3	3.4%	0	0.0%	0	0.0%	0	0.0%
IIIB	1	1.1%	0	0.0%	0	0.0%	0	0.0%
IABC	1	1.1%	0	0.0%	0	0.0%	0	0.0%

Discussion

We tried to re-validate and retrospectively apply MSU radiological classification of herniated lumbar disc lesions to our series of 100 patients who underwent herniated lumbar disc surgery. Simply MSU classification sort different herniated lumbar disc lesions radiologically based on 2 factors: size (3 vertical grades or squares) 1, 2 or 3 and herniated disc location A, B or C (3 horizontal grades or squares) and this results in 9 squares and different combination of herniated lumbar disc lesions. 12 patients (12%) developed recurrent sciatica with mean interval of 47.92 weeks after first disc surgery. Five patients of these twelve had mild recurrent sciatica (VAS=1-4), 4 patients had moderate recurrent sciatica (VAS= 5-7) and only 3 patients had severe recurrent sciatica (VAS= 8-10). Only 5 patients (5%) underwent second disc surgery

with mean interval of 6.2 months between the two surgeries and these 5 patients had MSU grades of 3-AB, 2-ABC, 2-AB and 2-B. The other 7 patients with recurrent sciatica responded to short term medical treatment (one month). 95 patients (95%) had good to excellent result with return to work and or daily activities within one month after surgery with no residual sciatica.

The outcome of our series of lumbar disc surgery is comparable to literature.^{1,12,13} Only 2 patients (2%) in our series (had lumbar disc surgery) had grade 1-A. All other 98 patients had MSU grades with size 2 or 3 and/or B or C location or 2 or 3 combination of horizontal disc locations (A, B or C). Size 1 disc herniation would exert minimal compression on nerve roots specially when disc herniation occur in location A (central) and clinical symptoms are mostly due to chemical neuritis which responds greatly to conservative treatment.

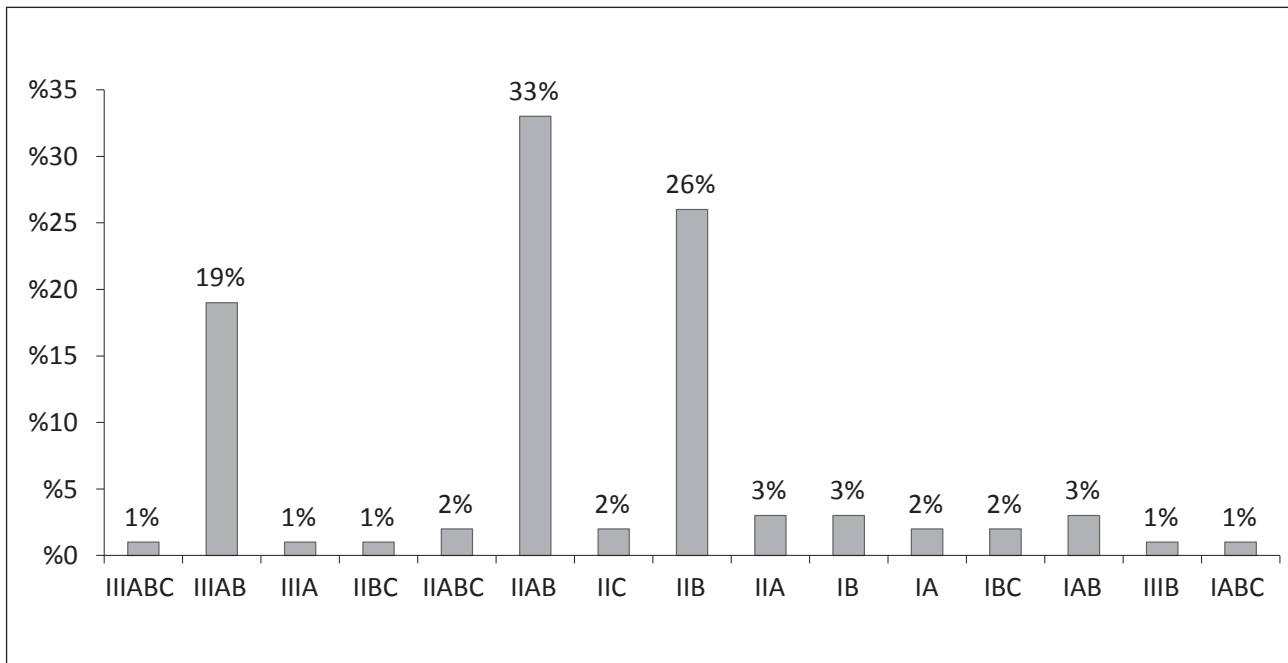


Figure 1 (Discussion). Different MSU grades in our 100 patients series with herniated lumbar disc disease who underwent lumbar disc surgery

Location B or C disc herniation even in size 1 only could exert considerable impaction on spinal nerves and thus noticeable sciatica due to adjacency to and impaction on dorsal root ganglion, therefore they could require surgical treatment.⁸ We had only 5 patients (5%) in our series, who had location A disc herniation in size 1 (2 patients) and in size 2 (3 patients) and underwent herniated lumbar disc surgery. Location A disc herniation in size 1 or 2 appears centered in the middle of the spinal canal and could be less symptomatic than other types of disc herniation and thus responds well to non-surgical conservative treatment.⁸

Concerning pre-operative severe excruciating presenting symptoms, among our 100 patients series, we found only one patient in MSU grade 1-A (1%) and three patients in MSU grade 2-A (3%) and rest of the patients had MSU grade with size 2 or 3 and/or B or C location or 2 or 3 combination of horizontal disc locations (A, B or C) as shown in table 4. This applies to severity of sciatica as shown in table 5. We found the same concept, when we investigated SLRS (Table 7) and pre-operative neurological deficit (Table 6). These findings of pre-operative data of our series were comparable to results of the original MSU radiological classification of herniated lumbar disc patients which aimed at finding objective surgical criteria.⁸

Laminectomy was done in 18 patients. All of them were MSU size 2 or 3 **and/or** horizontal location B and/or two or three combined horizontal locations (A, B, C). 6 Patients were 3-AB, 7 patients were 2-AB, 2 patients were 2-B, one patient was 2-A, one patient was 1B and one was 1-AB (Table 9)

Unintended durotomy (3 patients with 3-AB and 2 patients with 2-AB) and CSF leak (one patient with 3-AB and another one with 2-AB) were likely to occur with large disc herniation with size 2 or 3 and/or 2 or more combined horizontal location (AB in our series). This finding is found to be logic with the objective radiological MSU classification of herniated

lumbar disc patients as it correlates severity of lumbar disc herniation to size (vertical location=1, 2 ,3) and horizontal location (A, B, C) of the disc herniation and the more squares (the resultant 9 squares representing the spinal canal as a result of the 3 vertical and 3 horizontal locations) the disc herniation occupies, the more severe it is considered and the more tight the spinal canal is.⁸

Conclusion

MSU classification provides solid, universal and objective radiological description of lumbar disc herniation and thus aids in patients selection for surgical treatment and this would help excellent outcome of herniated lumbar disc surgery. It could measure severity of lumbar disc herniation in term of size and location and thus predicting severity of clinical symptoms.

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الملخص العربي

موثوقية (إعادة تصديق) تصنيف جامعة ولاية ميشيغان للانزلاق الغضروفي القطني بالرنين المغناطيسي في سلسلة من ١٠٠ مريض: شدة الانزلاق الغضروفي القطني والمعايير الجراحية الموضوعية

البيانات الخلفية: نسبة النجاح في استئصال الانزلاق الغضروفي القطني متغيرة بدرجة كبيرة بين الجراحين بسبب عدم وجود تصنيف واضح لمرضى الانزلاق الغضروف القطني. مطلوب معايير موضوعية إشعاعية صالحة وخاصة بالنسبة للمرضى ذوي مؤشرات جراحية غير مؤكدة، للمساعدة في تقييم المرضى قبل الجراحة، ولتحديد المرضى المحتاجين للجراحة ولبحث نتائج ما بعد الجراحة لدرجات مماثلة من الانزلاق الغضروفي القطني. تصنيف جامعة ولاية ميشيغان يبين حجم وموقع الانزلاق الغضروفي القطني في ثلاث زيادات دقيقة، وصفها ببساطة ١-٢-٣ و A-B-C لإعطاء تصنيف موضوعي واضح للانزلاق الغضروفي القطني مما يؤدي إلى توحيد تقييم الانزلاق الغضروفي القطني بين جراحي المخ والأعصاب والعمود الفقري بدرجة ممتازة.

الغرض: لاختبار موثوقية تصنيف جامعة ولاية ميشيغان للانزلاق الغضروفي القطني بالرنين المغناطيسي في اختيار المعايير الجراحية للانزلاق الغضروفي القطني وربط هذا التصنيف مع الأعراض الأكلينيكية قبل الجراحة والنتائج الأكلينيكية والوظيفية لما بعد الجراحة.

تصميم الدراسة: ملاحظة تحليلية استيعادية.

نوعية المرضى وطرق الدراسة: تقييم استيعادي لمائة مريض انزلاق غضروفي قطني خضعوا لجراحة استئصال انزلاق غضروفي قطني في مستشفيات جامعة عين شمس في الفترة بين يونيو ٢٠١٤ وديسمبر ٢٠١٥ في ضوء تصنيف جامعة ولاية ميشيغان للانزلاق الغضروفي القطني بالرنين المغناطيسي.

النتائج: مريضان فقط (٢٪) في بحثنا كانوا بدرجة A-1. باقي الـ ٩٨ مريض الآخرين كانوا حسب تصنيف جامعة ولاية ميشيغان بحجم ٢ أو ٣

(مع / أو) درجة (موقع) B أو C أو درجتين أو ثلاثة من الدرجات الأفقية (B ، A أو C) لهذا التصنيف. كان هناك حالتين من قطع الأم الجافية الغير مقصودة بدرجة AB-3 حسب تصنيف جامعة ولاية ميشيغان (٤٠٪) وثلاث حالات أخرى (٦٠٪) بدرجة AB-2. حالة واحدة من تسرب السائل النخاعي حدثت في مريض انزلاق غضروفي قطني بدرجة AB-3 (٥٠٪) وأخرى بدرجة AB-2 (٥٠٪). ١٢ مريضا (١٢٪) اشتكوا من عرق النسا المرتجع بعد فاصل زمني متوسطه ٤٧،٩٢ أسبوع بعد أول جراحة لاستئصال الانزلاق الغضروفي القطني. فقط خمس مرضى (٥٪) خضعوا لعملية جراحية ثانية لاستئصال الانزلاق الغضروف القطني بعد فاصل زمني متوسطه ٦،٢ شهر. نتائج خمس وتسعون مريضا (٩٥٪) كانت جيدة إلى ممتازة.

الخلاصة: تصنيف جامعة ولاية ميشيغان لدرجات الانزلاق الغضروفي القطني بالرنين المغناطيسي يوفر وصف إشعاعي موضوعي يمكن أن يتفق عليه جراحي المخ والأعصاب والعمود الفقري كما يساعد في تحديد المعايير الجراحية لمرضى الانزلاق الغضروفي القطني.