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Outcome of Single Level Microdiscectomy in Different Herniation Type and Level: A Prospective Study.

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Abstract: *Aim:To report on a young, active population with symptomatic lumbar disc herniations who had failed a reasonable trial of non-operative care and then underwent micro-discectomy. Validated outcome measures, patient satisfaction, and return to duty were correlated with type and level of herniation to determine clinical success.Materials and methods: 36 patients with clinically diagnosed disc herniationswho were subjected to micro-discectomy were analyzed for the outcome using VAS (Visual analogue score) and OPDS (Oswestry Disability Index scoring) pre and postoperatively. Results: There was a significant difference in type of disc herniation (p=0.008). However there was no significant difference with respect to level of herniation (p=0.167). There was a significant improvement in both VAS and OPDS of patients at post-operative stage (p<0.001). Conclusion:We found that surgical outcomes were significantly influenced by disc herniation type. Sequestered discs were associated with the best outcome scores, significantly better than those associated with extruded and contained disc herniations. Patients with disc herniations at the L5–S1 level had significantly better outcomes by VAS and OPDS score than did those with herniations at the L4–L5 level.*

Keywords: *Lumbar Discectomy,Herniation type, Herniation level, Visual analogue score (VAS), Oswestry Disability Index score (OPDS).*

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I. Introduction

Lumbar discectomy remains one of the most commonly performed procedures for Sciatica and back pain which are two of the most common reasons for referral to spine specialists.[1,2] Appropriate patient selection, preoperative work-up, and attention to operative detail can help maximize good outcomes in this procedure. Previous studies have reported on the natural history of lumbar disc herniations, showing improved results in surgically treated patients in the short-term, but no difference in clinical outcomes between surgical and non-operative treatments at the 10-year mark.[1,3,4] More recent studies challenge that claim, reporting improved outcomes in satisfaction and relief of radicular pain for surgically treated patients versus those treated non-operatively at 10 years.[5] A randomized trial intent-to-treat analysis showed small but in significant differences in favour of discectomy compared with usual care.[6]

Very few studies have attempted to correlate outcomes of microdiscectomy for lumbar disc herniations with the specific type or level of disc herniation.[7] Less satisfactory outcomes with smaller lumbar disc herniations have been identified in previous studies, further demonstrating that surgical outcomes are better predicted by herniation size and type than by patient age, gender, or workmen's compensation status.[8] However, little is reported on the relationship between disc herniation level and surgical outcomes of lumbar micro-discectomy in the young, active population.

The purpose of this study was to report on a young, active population with symptomatic lumbar disc herniations who had failed a reasonable trial of non-operative care and then underwent micro-discectomy. Validated outcome measures, patient satisfaction, and return to duty were correlated with type and level of herniation to determine clinical success.

II. Material and Methods

This was a prospective study done at Department of Neurosurgery, Medical Trust Hospital, Kochi over a period of 2 years after getting institutional ethics clearance. 36 patients aged between 20-60 years both male as well as females who had Low back pain with lower limb radiculopathy, Positive root tension signs (SLRT between 30-70 degrees or positive femoral root tension sign), Corresponding neurologic deficit (asymmetric depressed reflex, decreased sensations in a dermatomal distribution or weakness in myotomal distribution) and patients with multiple herniations were included if only one of the herniations was symptomatic. Patients with scoliosis greater than 15 degrees, segmental instability, spondylolisthesis, spine infection or tumors, psychiatric illness, patients refusal and age <20 and >60 years were excluded from the study.

All the patients diagnosed with LDD in our unit were included in the study. Baseline data like name, age and gender were recorded for all the patients included in the study. The clinical examination of patient consisted of history, through neurological examination and corresponding radiological evaluation. Presence of co morbidconditions like diabetes mellitus, hypothyroidism were noted.

A special note was taken about duration of symptoms, whether symptoms were restricted only to the back or radiating to leg, unilateral or bilateral complaints and profession of patient. A visual analogue scale was used to make subjective assessment of patient's complaints (preoperative and postoperative). A self administeredOswestry Disability Index Questionnaire wasutilised for assessment of severity of symptoms and functional status of patient (preoperative and postoperative).[8]

All the patients were subjected for radiological evaluation including lateral and anteroposterior X-rays and MRI LS Spine. A 1.5-Tesla magnetic resonance (MR) system (Sigma, General Electric Medical Systems, Milwaukee, WI) was used for all studies, and all MR evaluations were obtained at our facility on 1 system. The MR sequences included axial and sagittal T1 fat saturation and T2 images from which the measurements were obtained. The images were 3 mm thick with a 1 mm interslice gap. The matrix was 256 by 192. The field of view was 14 cm for the sagittal images and 18 cm for the axial images. All MR interpretations and measurements were performed on our PACS/AFGA (picturearchivingworkstation (AFGA-GevaertGroup,Mortsel,Belgium).

In all cases, the MRIs were read by a single radiologist who documented the disc type and level of involvement. Disc herniation type was classified as sequestered, extruded, or contained, as described by Fardon and Milette.[9]

Statistical analysis: After data collection, data entry was done in Excel. Data analysis is done with the help of SPSS Software ver. 15 and Sigma plotVer. 11.Quantitative data is presented with the help of Mean, SD, Median and IQR. Comparison among study group is done with student t test and intra group comparison is done with the help of One Way ANOVA. Wilcoxon Signed – rank Test was used to assess the difference in pre and postoperative scores.Qualitative data is presented with the help of Frequency and Percentage table. p value less than 0.05 is taken as significant level.

III. Results

During the study period, 36 patients suffering from lumbar degenerative disc disease underwent lumbar microdiscectomy and were studied. The results of clinical examination and their follow up were recorded, tabulated and analysed.

Majority of our patients (44.44%) were having Sequestrated disc herniation. About one third of study population had extruded disc and approx 22% patients had contained disc herniation. 6 were in the age group of 21-30 years, 10 in the 31-40 years, 13 in the 41-50 years and 7 in the 51-60 years. 21 were males and 15 were females.In our study, majority if the patients were in 4 and 5^{th} decade of their life, maximum 13 patients were in 5^{th} decade with the mean age of 37.75 years and median of 37 years. (Table 1 and 2)

The mean preoperative visual analogue score for pain was 7.71±0.57 and median score was 8. The mean 6 months postoperative follow-up visual analogue score for pain was 0.72±1.47 and the median score was 0. The difference is found to be statistically significant. The type of disc herniation also impacted VAS and Oswestry outcome scores. Patients with sequestered disc fragments had significantly greater improvements in both mean VAS and Oswestry outcome scores than extruded or contained disc types, (P 0.001). However outcome in contained and extruded disc was noted statistically insignificant. Disc herniations at both L4-L5 and L5–S1 level had significantly greater improvements in both mean VAS and Oswestry outcome scores. (Table 3 and 4).

IV. Tables

Table no 1: Distribution of herniation type and level in the subjects.

		Total	Mean patient age in years	No of males (%)	No of Females (%)
Herniation type	Extruded	12(33.33%)	29.82 ± 11.16	9(75%)	3(25%)
	Sequestrated	16(44.44%)	40.19 ± 10.29	8(50%)	8(50%)
	Contained	8 (22.22%)	45.33 ± 11.15	4(50%)	4(50%)
Herniation level	L4/5	19(52.78%)	41.09	9(47.37%)	10(52.63%)
	L5/S1	17(47.22%)	34.97	12(70.6%)	5(29.4%)
Legend to Table no 1: With respect to type of disc herniation, male population was noted to have higher incidence only extruded disc. But sequestrated and contained disc herniation showed no gender preponderance. Most of the patients included in the study group were having disc bulge at L4/5 level. Almost equal number of patients was noted to have herniated disc at L5/S1 level.Male preponderance was noted at L5/S1 level, almost two times as female patients were suffering with disc bulge.					

Table no 2: Difference in age group with respect to type and level of disc herniation.

		Total (n=36)	Mean Patient Age (SD)	p value
Type of disc Herniation	Extruded	12(33.33%)	29.82 ± 11.16	0.008
	Sequestered	16(44.44%)	40.19 ± 10.29	
	Contained	8(22.22%)	45.33 ± 11.15	
Level of disc Herniation	L4/5	19(52.78%)	41.09 ± 12.56	0.167
	$L5/S_1$	17(47.22%)	34.97 ± 11.04	
Legend to Table no 2: There was a significant differencein type of disc herniation. However there was no significant difference with respect to level of herniation. Analysis was done using one way ANOVA for assessing difference in type of herniation and student t test for level of herniation.p<0.05 is significant.				

Table no 3: Difference in VAS and OPDS of patients between preoperative and post-operative stage.

(n=36)		Mean ±SD	Median (IQR)	Wilcoxon Signed – rank Test	p Value
VAS	Preop VAS	7.71±0.57	8.00(3)	-5.307	< 0.001
	Post op VAS	0.72±1.47	0.00(5)		
OPDS	Preop OPDS	27.50±2.97	27.00 (14)	-5.214	<0.001
	Post op OPDS	3.14±3.58	2.00 (158)		
Legend to table No 3: There was a significant improvement in both VAS and OPDS of patients at post operative stage. Wilcoxon Signed – rank Testwas used to assess the difference in scores.p<0.05 is significant					

Table no 4: Difference in VAS and OPDS of patients between preoperative and post-operative stage within similar herniation type and level.

		VAS			OSDP		
		Preop	Post Op	p value	Pre op	Post op	p value
Herniation type	Extruded (n=12)	7.92	0.92	0.002	27.17	3.83	0.002
	Sequestrated (n=16)	7.75	0.81	<0.001	27.63	2.81	<0.001
	Contained n=8	7.38	0.25	0.011	27.75	2.75	0.012
Herniation level	L4/5 (n=19)	7.71	0.65	<0.001	11.47	3.71	<0.001
	L5/S1 (n=17)	7.74	0.79	<0.001	9.79	2.63	<0.001
Legend to table No 4: There was a significant improvement in VAS and OPDS of patients between preoperative and post-operative stage within similar herniation type and level. Wilcoxon Signed – rank Test was used to assess the difference in scores p<0.05 is significant.							

V. Discussion

Our study demonstrates that young, active patients who undergo lumbar microdiscectomy for symptomatic disc herniations can return to physically demanding jobs. The complication rate was negligible, patient satisfaction was high (almost 100%) and most were able to return to unrestricted duties that includes heavy lifting, bending, twisting, carrying heavy weight.

These results are comparable with outcome studies of lumbar microdiscectomy in older patient populations, which report mean patient satisfaction to be in the 70% to 80% range, although return to preoperative work and activities of daily living are frequently lower.[(5)]

Multiple postulations for our more favorable results can be formulated. Our patient populations were randomly selected group who came to hospital with significant pain and deficits, thus our patient can be taken as subset of general population. At the point of initial surgical consultation, patients were educated on proper lifting techniques, posture, core muscle strengthening, and low impact fitness. They were encouraged to return to their preinjury activity level at 6 weeks post surgery. This was re-emphasized at the preoperative visit and subsequent postoperative visits.

Previous studies have suggested that patient age at the time of surgery is not predictive of outcomes.[(10)] Very few large case series have been reported in literature. Most of the studies had a mean age of 37 years, which correlates with this study.[(5–7, 11-12)]

A significant effort was made to emphasize to our patients that they could return to their preinjury activities as soon as they felt comfortable. These young patients were made to feel that this was an injury that could be overcome like most musculoskeletal injuries. Female gender and increased duration of preoperative symptoms have been independently associated with poor outcomes in previous studies, but we found no such correlation.

Preoperative to postoperative VAS back pain scores for specific disc herniation levels or types failed to correlate with the preoperative to postoperative VAS leg pain and Oswestry score improvements, remaining a uniformly poor predictor of outcome. Our findings reinforce the accepted surgical indications for lumbar microdiscectomy as effective and predictable treatment for radicular leg pain recalcitrant to nonoperative management, not for isolated lumbar back pain.[(13)]

We found that surgical outcomes were significantly influenced by disc herniation type. Sequestered discs were associated with the best outcome scores, significantly better than those associated with extruded and

contained disc herniations. Contained disc herniations were associated with significantly poorer outcomes than either sequestered or extruded disc types. Our findings are consistent with previous studies that have examined the correlation between disc herniation type and the outcome of surgical treatment. It has also been suggested that noncontained disc herniations may be successfully treated nonoperatively.(14)

Disc herniation level and clinical outcomes was also assessed. Patients with disc herniations at the L5–S1 level had significantly better outcomes by VAS leg and Oswestry score than did those with herniations at the L4–L5 level. We postulate that because the neuroforamen for the S1 nerve is larger and less affected by progressive disc degeneration and foraminal narrowing. Of course, patients may develop L5 symptoms with progressive foraminal stenosis at L5–S1. We also found that operating at the single level disc in multiple level disc herniation, which was correlating clinically and radiologically yielded better outcome.

VI. Conclusion

Microdiscectomy for symptomatic lumbar disc herniations in patients with a preponderance of leg pain who have failed nonoperative treatment has a high success rate, as demonstrated by validated outcome scores, patient satisfaction, and return to active duty. Patients should be encouraged to return to their preinjury activities as soon as possible with no restrictions at 6 weeks. Overall, patients with sequestered lumbar disc herniations fared better than those with extruded herniations, although both groups consistently had better out- comes than patients with contained herniations. Patients with herniations at the L5–S1 level had significantly better outcomes than did those at the L4–L5 level. Lumbar disc herniation level and type should be considered in preoperative outcomes counseling. And in case of multiple level disc herniations, operating at clinically relevant level can further had better outcomes. In the carefully screened patient, lumbar microdiscectomy for symptomatic disc herniation results in an overall high success rate, patient satisfaction, and return to physically demanding activities.

Reference

[1]. Atlas SJ, Chang Y, Deyo RA, Kammann E, Keller RB, Singer DE, *Long-term disability and return to work among patients who have a herniated lumbar disc: the effect of disability compensation. J Bone Joint Surg Am 2000; 82:4–15.*

[2]. Deyo RA, Weinstein JN, *Low back pain. N Engl J Med 2001; 344:363–70.*

[3]. Herzog RJ, Saal JA,Saal JS,*The natural history of lumbar intervertebral disc extrusions treated nonoperatively. Spine 1990; 15:683–6.*

[4]. Weber H. Lumbar disc herniation. *A controlled, prospective study with ten years of observation. Spine 1983; 8:131–40.*

[5]. Atlas SJ, Deyo RA, Keller RB, Wu YA, Singer DE,*Long-term outcomes of surgical and nonsurgical management of sciatica secondary to a lumbar disc herniation: 10 year results from the lumbar spine study. Spine 2005; 30:927–35.*

[6]. Hanscom B, Lurie JD, Skinner JS, Tosteson AN, Tosteson TD, Weinstein JN, *Surgicalvsnonoperative treatment for lumbar disk herniation: the Spine Patient Outcomes Research Trial (SPORT) observational cohort. JAMA 2006; 296:2451–9.DOI: 10.1001/jama.296.20.2451*

[7]. Carragee EJ, Han MY, Kim D, Suen PW,*Clinical outcomes after lumbar discectomy for sciatica: the effects of fragment type and anular competence. J Bone Joint Surg Am 2003; 85:102–8.*

[8]. Fairbank JC, Pynsent PB,*TheOswestry Disability Index. Spine 2000 Nov 15;25(22):2940-52*

[9]. Drake R, Mitchell A, Mitchell AVM, Vogl W. *Gray's Anatomy for Medical Student (Churchill Livingstone, New York, NY 2009).*

[10]. Gaddum-Rosse P, Rosse C, *Hollinshead's Textbook of Anatomy (Lippincott-Raven , Philadelphia 1997).*

[11]. Fear SC, Findlay GF, Hall BI, Musa BS, Oliveira MD,*A 10-year follow-up of the outcome of lumbar microdiscectomy. Spine 1998; 23:1168–71.*

[12]. Atlas SJ, Chang Y, Deyo RA, Keller RB, Singer DE,*Surgical and nonsurgical management of sciatica secondary to a lumbar disc herniation: five year outcomes from the Maine Lumbar Spine Study. Spine 2001; 26:1179–87.*

[13]. Ng LC, Sell P,*Predictive value of the duration of sciatica for lumbar discectomy. A prospective cohort study. J Bone Joint Surg Br 2004; 86:546–9.*

[14]. Ito T, Takano Y, Yuasa N,*Types of lumbar herniated disc and clinical course. Spine 2001; 26:648–51.*

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