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Research Paper

Outcomes in Patients of Lumbar Prolapsed Intervertebral Disc Operated by Conventional Lumbar Discectomy Versus Microlumbar Discectomy.

Medical Science

KEYWORDS : conventional lumbar discectomy, micro-lumbar discectomy, prolapsed inter-vertebral disc.

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ABSTRACT

Disc prolapse is a common problem encountered in clinical practice with an incidence of 1 in 10,000 general populations. Surgery may be indicated in 10% of cases. The results of operative intervention are encouraging. But the key to operative success is appropriate patient selection. Operative techniques are fast emerging in the orthopaedic world in keeping up with the time. Objective of study is to evaluate outcome of patients operated by conventional lumbar discectomy and by microlumbar discectomy. We studied 25 such patients in each group. The functional outcome was assessed using pain, function, symptom specific well-being, general quality of life, work and disability along with measure of patient's satisfaction. We observed a lesser operative duration and a shorter post-operative hospitalization period in microlumbar group. Microlumbar discectomy demonstrated more favourable results in terms of COMI, back and leg pain intensity reduction scores but with insignificant intergroup difference.

Introduction:

Backache with or without radicular symptoms is a common orthopaedic problem worldwide. The health expenditure incurred in treatment and indirect costs (due to lost time) is a huge burden. Disc prolapse is a common problem encountered in clinical practice with an incidence of 1 in 10,000 general populations. Surgery may be indicated in 10% of cases. Of the varied causes of backache, herniated disc is a significantly common cause. It is a well described treatable condition. The treatment may be conservative or operative. The results of operative intervention are encouraging. But the key to operative success is appropriate patient selection. Operative techniques are fast emerging in the orthopaedic world in keeping up with the times. The need for less invasive, less painful, early rehabilitating procedures with valid optimal outcomes is on the rise in terms of the healthcare provider and the patient both. The traditionally described conventional or standard lumbar discectomy involves removing the lamina to reach the offending disc with a comparatively larger incision. Microlumbar discectomy involves a small (upto 1 inch) incision surgery, the use of a 400mm microscope with the intended advantages of magnification, lesser blood loss, minimized soft tissue trauma, lesser postoperative pain, a shorter duration of hospital stay and an early return to activity/work with comparable neurologic outcomes. Microlumbar discectomy has evolved as the ''gold standard'' surgery for disc prolapse when indicated. (2) The outcomes of surgeries are mostly measured on an objective scale. But in recent times, patient self-rated outcome measures on a multidimensional basis are made essential in outcomes research. Outcome variables include aspects of pain, function, symptom specific well-being, general quality of life, work and disability along with measure of patient's satisfaction.

This is a prospective and retrospective study conducted on patients operated by the two methods on a comparative basis.

Objective:

Objective of the study is to evaluate outcome of patient operated by 'Conventional Lumbar Discectomy' and 'Microlumbar Discectomy' and to compare them.

Materials and methods:

- Includes the patients operated for lumbar disc prolapse by conventional and microlumbar discectomy in Government Hospital in Orthopaedics Department from 2008 to 2012.
- All patients have undergone MRI of the lumbosacral spine with whole spine screening as a diagnostic test apart from neurology focused clinical examination.
- Conventional lumbar discectomy means laminectomy with discectomy.
- Microlumbar discectomy: all lumbar discectomies of one inch incision or less, using the 400mm operating microscope; discectomy with no additional decompressive technique and no additional fusion/stabilization.
- All patients satisfy the surgical inclusion criteria i.e. main pathology: prolapsed intervertebral disc disease, Level: lumbar, lumbosacral.
- Data is based on medical records of patients in the form of case sheets, discharge cards, x-rays, MRI (report, plate or CD) and patient examination findings.

Assessment standards:

- Observations are made on the basis of patients' response to 'Core Outcome Measures Index' or 'COMI' questionnaires at pre-operative phase, and postoperatively at 12th day, 1 month, 3 months and 6 months/ final follow-up assessments.(13,25,26,38)
- The COMI is a short, multidimensional outcome instrument with excellent psychometric properties for spinal surgery and has one question each on back pain intensity, leg/buttock pain intensity, function, symptom specific well being, general quality of life, work disability and social disability, scored as a 0-10 index.
- The global effectiveness of the surgery, and their overall satisfaction with the surgery is measured at final follow-up, on a 5 point Likert scale, with effectiveness ranging from "helped a lot" to "made things worse" and satisfaction from "very satisfied" to "very dissatisfied".
- Pain intensity is measured using the numeric graphic rating - Visual Analogue Scale (0 to10: 0-no pain, 10-worst pain patient can imagine).
- The minimum period of final follow-up is 6 months postoperatively.
- The surgery is considered as a "good" outcome if it has "helped a lot" and "very satisfied" according to the patient.
- The surgical outcome is considered "poor" if the category is "helped only little" and lower – or similar categories that reflect only negligible improvement.

Observation and discussion:

Mean, Median, Standard Deviation, P-values, Student T test and Chi-Square test are obtained at relevant sections using 'epi info' software. A 'p value' of <0.05, if found, is considered statistically significant to compare intra- and inter- group difference. We have compared our findings, for the most part with a similar study conducted within the framework of spine surgical reg-

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istry in an Europian spine centre; a comparative study of 225 standard discectomies with 36 microlumbar discectomies by F. Porchet et al. [9]

1) Age: Maximum number of patients are in the age group of 30-40 i.e. 42.5%. The mean average age is 36 years compared to 49 years in F. Porchet's (9).
2) Sex: More number of patients were males (72.5%) as also seen in study by F. Porchet (9). In addition, 54% were males and 46% females in a study of 237 patients by E. Kotilainen, S. Valtonen and C-A Carlson.(8)
3) Level of involvement: Maximum number of patients had involvement at disc level L5-S1 i.e. 45%. In contrast, L4-L5 i.e. 55.34% was the commonest level in a study of 159 patients by Dr Yash Gulati, Indraprastha Apollo hospitals, New Delhi. (42)
4) Operative duration: 25% of micro-lumbar discectomies were completed in <1 hour as compared to only 5% of standard discectomies. There is a higher percentage(30%) of patients in standard discectomy group with longer operative duration of 2-3 hours compared to 20% in microlumbar group suggesting shorter operative duration in micro-lumbar group, though majority of both groups took 1-2 hours to complete(55-65%). In our study, it is noted that operative duration is lesser in micro-lumbar group overall but not reaching statistically significant levels (p value 0.809). In F. Porchet's study, a significantly higher 70% micro-lumbar discectomies were completed in < 1 hour compared to 11.1% in standard discectomies.
5) Blood loss: There is greater blood loss in standard group and lesser loss in micro-lumbar group with 45% of patients having blood loss of <100 ml compared to no patients in standard group with blood loss of <100 ml. 75% of patients in standard group had blood loss of >500 ml compared to 15% in micro-lumbar group.
6) Duration of hospitalization post operatively: The mean post-operative duration of hospitalization is higher at 6.2 days in standard compared to 4.85 days in micro-lumbar discectomy group.
7) Complications of surgery:

Variable	Standard	Micro-lumbar	P value
General	0	0	0.00
Surgical			0.5392
Wound infection	2 (8%)	1(4%)	
Discitis	0	1(4%)	
Persistent back-ache/recurrence	0	1(4%)	
Others(dural tear, nerve root damage, etc)	0	0	
Total	8%	12%	

In our study, there was no general complication in both groups. We observed that surgical complications are slightly higher in microlumbar group with 1 case each of wound infection, discitis and persistent backache summing upto 12 %. Majority of surgical complication in our study were wound infections, 3 (6%). All resolved within 2 months of operation and required debridement. 1 case (5%) developed discitis in microlumbar group against none in standard group.

8) Reduction in mean COMI score pre-op to follow-up in months: There is a significant reduction in COMI score in both group with equal final follow-up value of 1.4 –1.7 and a comparable reduction in both groups at each level of follow-up. COMI reduction scores were higher in micro-lumbar group i.e. 84.6 %. In our study, improvement at all follow-up level was reflected by decrease in COMI scores in both groups. There was significant reduction in both groups in terms of COMI scores (p=0.00) at final follow-up compared to pre-op.
9) Reduction in mean leg pain intensity (VAS) pre-op to each follow-up level: There is a significant (p=0.00) reduction in mean leg pain intensity levels in both groups with final leg pain values of 1.11 and 0.72 in standard and microlumbar respectively. At final follow-up, as compared to the pre-op status, higher reduction in leg pain intensity of 92% is noted in micro-lumbar compared to 84.2% in standard group, an insignificant difference (p=0.987).
10) Reduction in mean back pain intensity levels pre-op to all follow-up levels: There is back-pain intensity reduction from pre-op to final follow-up in both groups, with micro-lumbar group having 66.3% reduction compared to 63% standard group, an insignificant intergroup difference with p values not reaching significant levels with final reduction follow-up values of 2.6 in standard and 3.35 in micro-lumbar group.
11) Resumption of ADL (Activities of Daily Living) in days: The mean average resumption of ADL is 20 days in Standard group. The micro-lumbar group returned to ADL earlier in 5 days with a significant difference of 15 days (p=0.007).
12) Resumption of work: At the end of the study, 90 % of patients in standard group had returned to work, similarly 90% of patients in micro-lumbar group also returned to work. 50% and 55% patients respectively of standard and micro-lumbar group returned to previous work levels. An equal percentage of 8% (2 each) did not return to work at final follow-up.
13) Time off - work: In our study, the median time of resumption of work is 1.5 months in both groups. 60 % of micro-lumbar discectomies have returned to work in less than 2 months compared to 35% in standard with a significant statistic difference. In contrast, the median time off-work is 3 weeks in micro-lumbar study in Yash Gulati, Apollo Hospital study (41).
14) Duration of belt use with global outcome: There are no patients with poor outcome in short term belt users. 25% of prolonged belt users have poor global outcome at final follow-up. Most of the cases of prolonged belt use were patients with poor follow-up and had unadvised continued use beyond required range with most respondents giving vague answers pointing to patient's own psychological benefit.
15) Global outcome: The global outcome in standard group with 'Good' outcome is 90%, compared to 85% in micro-lumbar discectomy.

CONCLUSION:

At the end of study, both groups showed comparable good 'global outcome' and 'satisfaction' levels ranging from 85-90%. Micro-lumbar discetomy fared better with a significantly (p=0.00) lesser blood loss. We observe a lesser operative duration and a shorter post-operative hospitalization period in micro-lumbar group. There was significant reduction in COMI, leg-pain and back pain intensity reduction in both groups from pre-op through all levels of follow-up. Micro-lumbar discectomy demonstrated more favourable results in terms of COMI, back and leg pain intensity reduction scores but with insignificant intergroup difference. We note an early return to Activities of Daily Living by a difference of 15 days in micro-lumbar group, which reached statistically significant levels (p=0.007). In contrast to other studies showing 3-4 weeks on average, both groups showed a slight overall delay in return to work/occupation with a median of 1.5 months, though the final outcome is good with 85-90% of patients returning to work. Prolonged unadvised use of LSO (Lumbo-Sacral Orthosis) belt beyond 4 months post-operatively appears to have negative impact on the global outcome with all 5(five) of poor outcome patients in this category. In short, both standard and micro-lumbar discectomies demonstrated good and favourable results in terms of 'patient rated outcomes' but distinct superiority of one technique over the other could not be found.

Micro-lumbar discectomy requires specialized instruments and has a steep learning curve. Operative time becomes significantly less as the surgeon gets familiar with the procedure. All the complications of micro-lumbar discectomy are from the initial

part of the study. Since micro-lumbar discectomy offers better cosmesis, lesser surgical time along with lesser amount of blood loss, with early recovery and return to 'Activities of Daily Living' (ADL) and work/occupation with comparable results in terms of 'Core Outcome Measures Index (COMI)' and Global Outcome scores, we should be doing micro-lumbar discectomy for all patients whenever operative intervention is indicated.

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