International Journal of Orthopaedics Sciences

ISSN: 2395-1958
IJOS 2019; 5(3): 326-329

www.orthopaper.com
Received: 11-05-2019
Accepted: 14-06-2019

Dr. Janak Rathod
Professor and Head, Department of Orthopaedics, Smimer, Surat, Gujarat, India

Dr. Prabhav Tijoriwala
Assistant Professor, Department of Orthopaedics, Smimer, Surat, Gujarat, India

Dr. Ankitbhai Khodifad
Third Year Resident Doctor, Department of Orthopaedics, Smimer, Surat, Gujarat, India

Correspondence
Dr. Prabhav Tijoriwala
Assistant Professor, Department of Orthopaedics, Smimer, Surat, Gujarat, India

A study of results of lumbar fenestration discectomy

Dr. Janak Rathod, Dr. Prabhav Tijoriwala and Dr. Ankitbhai Khodifad

DOI: https://doi.org/10.22271/ortho.2019.v5.i3f.1550

Abstract
Low back pain occurs in almost 80% of the adults in some point in time in their life and herniation of the lumbar intervertebral disc is one of the leading causes for it. Discectomy by fenestration method is an accepted procedure for the treatment of herniated lumbar disc. The functional and neurological recovery following this procedure was analysed in this study. Out of the 20 patients who were operated for single level lumbar disc herniation by fenestration discectomy between September 2014 and March 2017, only 19 patients were available for follow up. Patients were followed up for a period of 1 year. The post-operative outcome was analysed using the Prolo economic and functional scoring system. The outcome was analysed with age, sex, employment, duration of unemployment and neurological deficits as variables. The change of Prolo scale between pre-operative and post-operative status was also analysed.
The functional outcome showed good results in 68.44% of cases proving that the surgical results were good following fenestration and discectomy. Good neurological recovery was noted, but neurological status had no influence over the functional recovery of the patients. Better outcome was noted in females and patients below the age of 30 years as well as in patients doing light work. The duration of symptoms had no influence on the outcome of the surgery. This study proves that discectomy by fenestration method is a good surgical procedure for treatment of lumbar disc heniation.

Keywords: Lumbar, fenestration, discectomy, low back pain

Introduction
Low back pain is thought to occur in almost 80% of adults in some points in their life. Among chronic conditions, back problems are the most frequent cause of limitations of activity in persons less than 45 years. Only routine examination post-operative checkups and upper respiratory tract symptoms surpass back problems as a cause of office visits to physicians. It is the responsibility of the Orthopaedic surgeon to diagnose and appropriately treat this ailment of which lumbar intervertebral disc prolapse is a very common cause [1]. Discectomy is a common procedure carried out for treatment of lumbar disc prolapse. In lumbar disc surgery pain is the most important indication, but neurologic symptoms and signs are also considered, although they are usually of far less functional consequence. Perhaps because they appear to be more objective than the pain related signs [2]. In most reports the post-operative changes in neurological signs and functional recovery from pain has shown striking variations. These variations may be caused by several factors, including differences in patient selection and examination technique, but this is difficult to assess because methodologic details are rarely provided. The reproducibility of neurologic signs is moderate and opinions on the value of neurologic signs are divergent [2]. Fenestration discectomy as a surgical procedure is less time consuming with lesser blood loss, lesser post-operative complication and does not compromise the stability of the spine when compared to laminectomy discectomy [3]. The functional and neurological recovery following this procedure of fenestration and discectomy is the topic of this current study.

Aims and Objectives
Primary objective: To study the extent of pain relief (Functional recovery) and neurological recovery following fenestration discectomy in patients with lumbar intervertebral disc prolapse.

Results
A total number of 20 patients were operated between September 2014 and March 2017 for single level disc disease by discectomy using the fenestration method. Out of this 19 patients were available for follow up.

The mean follow up duration was one year and four months with a minimum of eleven months and a maximum duration of one year and eight months.

Pre-operative evaluation of the clinical and neurological symptoms

There were total of 15 males (78.9%) and 4 females (21.1%). The age of the patients varied from 17-54 years with the mean age of 36.68 years. The age of the females varied from 30-52 years (mean 38.4 years) and age of the males varied from 17-54 years (mean 38.2 years).

The patient's occupation was either light or strenuous in nature. Of these patients 8 (39.39%) patients had sudden onset pain while lifting heavy weights or bending forwards or doing household activities. The remaining 11 (40.81%) had insidious onset of pain. The duration of symptoms varied from 4 days to 10 years with the mean duration of 2.4 months

Table 1: Clinical findings

S. No	Signs	Frequency	%
1.	Positive SLR	15	78.94
2.	Paraspinal spasm	14	73.68
3.	Restricted spinal movements	11	57.89
4.	Motor deficits	13	71.05
5.	Sensory deficits	9	50.00
6.	Sluggish or absent ankle jerk	6	31.57
7.	Bladder	1	2.63

The sensory and motor involvement was divided into mild moderate and severe categories. Motor deficits of grade four were considered to be mild, grade-3 were considered to be moderate and those less than 3 were considered to be severe. In case the sensory deficit was after 25% of loss in a particular dermatome it was considered to be mild, 25 to 75% was moderate and more than 75% was severe.

Table 2: Sensory and motor involvement

	Mild	Moderate	Severe
Sensory deficit	5 (55.5%)	3(33.33%)	1 (11.11%)
Motor deficit	11 (81.48%)	2 (14.81%)	1 (3.70%)

The mean duration for not going to work was 1.3months (4 days to 3 months).

The pre-operative prolo economic and functional outcome rating scale to cases is as follows:

Table 3: Pre-operative prolo economic and functional outcome rating scale

Economic scale	Cases	%
E1	2	10.52
E2	11	57.89
E3	6	31.59
E4	0	0
E5	0	0

Table 4: Pre-operative prolo functional outcome rating scale

Functional scale	Cases	%
F1	1	7.89
F2	15	78.96
F3	3	13.15
F4	0	0
F5	0	0

Table 5: The description of different levels of disc prolapse

Sl. No.	Level	Frequency	%
1.	L4-5	13	71.06
2.	L5-S1	6	28.94

MRI scan done for all the patients and it showed central/para-central disc herniation in 12 patients (63.15%) and lateral disc in 7 patients (36.85%).

The following surgery:

Table 6: Complication

Superficial wound infection	2
Repeat surgery	0
Epidural fibrosis	1
Failed back	1
Discitis	1
Post-operative Ileus	1

The average surgical time was 78 minutes (44 to 150 minutes). The average blood loss was approximately 120ml. during surgery. Patient was mobilized on the second day after surgery with a lumbo sacral corset. The three cases of superficial wound infection were treated with Intra-venous antibiotics. The one case of discitis was treated with bedrest and antibiotics. The one case of post-operative Ileus recovered with conservative management.

The outcome of the surgery

A total of 19 patients came back to the OPD for regular follow-up out of which 13 (68.42%) patients could walk without back or radicular pain. 4 (21.05%) patients had back pain and 2 (10.52%) patients were non-ambulant due to sciatica, weakness or infection. All 19 patients had sciatica pre-operatively of which 2 (10.52%) patients showed no improvement.

Post-operative prolo score

Table 7: Economic outcome

Scale	Frequency	Percentage
E1	1	
E2	2	10.52
E3	2	18.42
E4	7	36.84
E5	7	36.84

Functional outcome

Table 8: Post-operative prolo Functional score

Scale	Frequency	Percentage
F1	1	5.26
F2	2	10.52
F3	3	15.78
F4	8	42.1
F5	5	26.31

Table 9: Results

Outcome	Frequency	Percentage
Good	13	68.44
Moderate	3	15.78
Poor	3	15.78

Discussion

Although lumbar discectomy is a common operation, valid indications for operative treatment of patient who has herniation of lumbar disc are still elusive and the results of such treatment have been inconsistent [37].

Lumbar laminectomy is the most common operation for a herniated lumbar disc. But laminectomy has its inherent draw backs of a prolonged surgical time, more blood loss and a delayed convalescence period. The post-operative complication (e.g., Arachnoiditis and adhesions) are found to be more when laminectomy is used as a procedure. To add this it is also found to Jeopardise the mechanical stability of the spine. In such a situation a surgical procedure which is less damaging to the stability of the spine, has a shorter surgical time, less blood loss, lesser incidence of post-operative complications and ultimately has a shorter convalescence period would be more beneficial. Discectomy by fenestration method is exactly that kind of a surgical procedure wherein only the inter laminar space is utilized without removal of any part of the lamina, the cord is exposed, retracted and the discectomy carried out [3].

The present study analyses the results of this surgical technique on the basis of the clinical and functional outcome of the patient. The prolo economic-functional outcome score has been used to analyse the outcome. It is a very simple method and more importantly gives the functional ability of the patient, because eventually it is the functional outcome that has an ultimate impact on the patient. The ability of the patient to get back to his previous level of activity so as to be economically independent is what concerns the patient the most. So the prolo scale is designed to analyse this very outcome following any spine surgery. The results of this study have been compared to those by Pappas *et al.* [30] and Richard. A Davies *et al.* [31] studies whose outcome as also been analysed using the prolo scale. The following are the comparisons between the studies.

Table 10: Comparison of scores between different studies

Prolo	Pappas study	Richard Davies study	Present study
Mean economic Outcome	4.50	4.60	3.86
Mean functional Outcome	4.05	4.50	4.10

Table 11: Comparison of results between different studies

Outcome	Pappas study	Richard Davies study	Present study
Good	77.30%	89.00%	68.44%
Moderate	15.50%	7.7%	15.78%
Poor	6.40%	3.3%	15.78%

The total outcome

Table 12: Comparison of The total outcome between different studies

Score	Pappas Study	Richard Davies study	Present study
8	16.2%	10.00%	21.05%
9	33.2%	19.00%	23.68%
10	26.9%	60.00%	23.68%

Our study showed a poor result of 15.78% which higher than Richard Davies study and the Pappas study. The good result is seen in only 68.44% has compared to 77.3% in Pappas study and 89% in Richard Davies study. This could probably be due to other factors that affect the outcome surgery like psychological factors, aged distribution, sex distribution, symptom duration and other social factors.

But 71.05% of our patient could go back to their previous work with mild or absent pain. The average pre-operative functional score was 2.05 and showed a change of 2.05 post-operative. The average pre-operative economic score was 2.21 and showed a change of 1.65 post-operative. The outcome of the factors that were analysed showed that the best results were seen in the age group of less than 30 next being those above the age of 40 and lastly those being between the age group of 30 to 40 years.

In our study the women showed better results than the men and it correlated well with the Richard Davies study which found house wives to be faring better.

Other studies by Weber had showed women doing badly following surgery.

In our study light workers were found to have better outcome when compared to the heavy workers.

Irrespective of the duration of the symptoms the results were found to be uniform. Thus showing that the outcome of the surgery was not dependent on the duration of the symptoms.

The good outcome following surgery was found to be equal in patients who were unemployed for less than 2 months and those unemployed for 3 to 6 months. The worst outcome were seen in patient who were unemployed more than 6 months.

Patients who had mild motor deficits had better outcome when compare to those with moderate to severe motor deficits. In our study the good outcome was found equal percentage of patients with or without neurological deficits. So the presence or absence of neurological deficits had no effect on the final outcome of the surgery. This is in agreement with results of Bo jonsson [2] and Bjorn Stromqvist who found out in their study that patients without a pre-operative neurological deficit fared as well as those with it in the post-operative course.

Conclusion

Good functional recovery has been noted following the surgical procedure of fenestration discectomy. Good neurological recovery has also been noted following this surgery. Pre-operative neurological deficits had no influence on the outcome of the surgery.

Females were found to have a better outcome following this procedure and best results were noted in the age group less than 30 years. Better results were noted in patients who were employed in light work and the duration of symptoms had no influence on the outcome of the surgery.

References

1. Richard A Dayo. Conservative therapy for low back pain. Journal of American Medical Association. 1983; 250(8):1057-1062.
2. Bo Jonsson. Neurologic signs and lumbar disc herniation. Acta Ortho Scand. 1996; 67(5):466-469.
3. Nagi OM. Early results of discectomy by fenestration technique. Indian Journal of Orthopaedics. 1985; 19(1):15-19.
4. John A, Culloch MC. Mac Nabs-Backache. 3rd edition, Williams and Wilkins, Awaverly Company, 1997, 186.
5. George W Wood. Lower backpain and disorders of the intervertebral disc. Campbells Operative Orthopaedics. 9th edition, Chapter-60, Mosby Publications. 1998; 3:3014-3051.

6. Duthie, Robert B. Affection of the spine. Mercers Orthopaedic Surgery. 9th edition, Chapter-13, Arnold Publications. 1996; 915-1014.
7. Ranschning Wolfgang. Radiology. The lumbar spine 2nd edition, Chapter-6, WB Saunders Company, 1996; 317-1:446.
8. Mercer Rang. Anthology of Orthopaedics. Edinburg and London: E & S Livingstone Ltd. 1968; 59-67.
9. Prolo. Towards uniformly in evaluation of results of lumbar spine surgery. Spine. 1985; 11(6):601-606.
10. Mixter WJ, Barr JS. Rupture of intevertebral disc with involvement of spinal canal. New England Journal of Medicine. 1934; 211:210-215.
11. Armstrong. Causes of unsatisfactory results from operative treatment of lumbar disc disease. Journal of Bone and Joint Surgery. 1951; 33(15):300-307.
12. Kraemer Juergun. "Lumbar spine". 2nd edition, Weisel, Sam. W, W.B. Saunders Company. 1961; 1:421.
13. Lee T Ford. Letter to editor-Chymopapaine. Clinical Orthopaedics and Related Research, 1977, 367-373.
14. Hudgins Robert W. The predictive value of mylography in diagnosis of ruptured lumbar disc. Journal of Neurosurgery. 1977; 32:207-214.
15. Hakelius. Comparative reliability of pre-operative diagnostic method in lumbar disc surgery. Acta, Orthopaedica Scandinavia. 1972; 43:234-238.
16. Ian Mc Nab. Negative disc exploration. Journal of Bone and Joint Surgeries. 1971; 53(5):891-903.
17. Naylor A. Late results of laminectomy for lumbar disc surgery. Journal of Bone and Joint Surgery. 1974; 56(1):69-77.
18. Salenius. Results of surgical treatment of disc herniation. Acta, Orthopaedica Scandinavia. 1977; 48:630-634.
19. Sharma. A clinical profile of prolapsed intervertebral disc and its management. Indian Journal of Orthopaedics. 14(2):204-212.
20. Weber H. Lumbar disc herniation-A controlled prospective study. Spine. 1983; 8:131-140.
21. Jeffrey Lewis. Long term prospective study of lumbo sacral discectomy. Journal of Neurosurgery. 1987; 67:49-53.
22. Astrand. Pain and orthopaedic and neurologic signs after lumbar discectomy. Clinical Orthopaedics & related research. 2000; 379:154-160.
23. Kambin P. Percutaneous lateral discectomy to the lumbar spine. Clinical Orthopaedics. 1983; 174:127-132
24. Ebeling. Results of microsurgical lumbar lumbar discectomy. Acta, Neurochirurgica. 1996; 81:45-52.
25. Silvers Roy. Microsurgical versus standard discectomy. Neurosurgery. 1998; 22:305-312.
26. Casper. The Casper microsurgical discectomy and comparison with a conventional standard lumbar disc procedure. Neurosurgery, 28(1):78-86.
27. Tullberg. Does microscopic removal of lumbar disc herniation lead better results than the standard procedure? Results of 1 year randomized study. Spine. 1993; 18(1):24-27.
28. Mochida. Percutaneous nucleotomy in lumbar disc herniation. Spine. 1993; 18(18):2212-2217.
29. Blaauw. Changes in radicular function following low back surgery. Journal of Neurosurgery. 1998; 81:45-52.
30. Pappas. Outcome analysis in 654 surgically treated lumber disc herniation. Neurosurgery. 1992; 30(6):55-62.
31. Davies. Longterm outcome analysis of 984 surgically treated herniated lumbar disc. Journal of Neurosurgery. 1994; 80:415-421.
32. Errico TJ. Open discectomy has treatment for herniated nucleus Pulposus of the lumbar spine. Spine. 1998; 20(10):1829-1833.
33. Denemeyemez. Outcome analysis of 1072 surgically treated lumber disc herniation. Minimum Invasive Neurosurgery. 1999; 42(2):63-68.
34. Herron. Patients selection for laminectomy and discectomy with the revised objective rating system. Clinical Orthopaedics & related research. 1985; 199:145-152.
35. Hurme. Factors predicating the results of surgery for lumbar disc prolopse. Spine. 1985; 12(9):115-122.
36. Spengler. Elective discectomy for herniation of a lumbar disc. Journal of Bone and Joint Surgery. 1990; 72(2):15-22.
37. Abramovibitz. Lumbar disc surgery: results of the prospective lumbar discectomy study of the joint section on disorders of the spine and peripheral nerves of the American Association of Neurosurgeon and the Congress of Neurological Surgery. Neurosurgery. 1991; 29(2):301-308.
38. Junge. Predictors of bad and good outcome of lumbar disc surgery. Spine. 1985; 20(4):460-468.
39. Mc Culloch. Focus issue on lumbar disc herniation: macro and micro discectomy. Spine. 1986; 21(24):453-568.
40. John C Godersky. Extreme lateral disc herniation: diagnosis by CT scanning in neurosurgery. Neurosurgery. 1984; 14(5):72-79.
41. Modic. MRI of intervertebral disc prolopse. Radiology. 1984; 152:103-111.
42. Morgan-Hough. Primary and revision lumbar discectomy. Journal of Bone and Joint Surgery. 2003; 88(6):92-97.
43. Finneson BE. Lumbar Disc Execison. Operative Neurosurgical Techniques, 3rd edition, 1995, 44.
44. Gupta SK. Surgery in lesions of lumbar intervertebral disc degeneration. Indian Journal Orthopaedics, 1999, 23(1).