ORIGINAL ARTICLE

OUTCOME IN PATIENTS UNDERGOING ENDOSCOPIC LUMBAR DISCECTOMY FOR PROLAPSED PARA SPINAL INTERVERTEBRAL DISC

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Background: Backache is second most common problem presenting to the primary healthcare providers. Lumbar discectomy has been revolutionized from open conventional discectomy to endoscopic removal. Endoscopic procedures are proving their superiority regarding good outcome, less wound site pain and shorter hospital stay, in Neurosurgery as well. Micro discectomy and Endoscopic discectomy is used only in few centres in Pakistan. This study aimed to share our experience of early surgical outcome endoscopic lumbar discectomy in terms postoperative pain improvement and duration of hospital stay **Methods:** This prospective study was carried out at Neurosurgery Department, Jinnah Hospital, Lahore from Jan 2014 to Jan 2016. During this period, 35 patients of both sexes, aging between 20 and 60 years, with symptoms and signs of lumbago with sciatica were enrolled. Data was collected on a questionnaire after informed verbal and written consent. **Results:** A total of 35 patients were operated including 10 males and 25 females. Their age ranged from 20 to 60 years with mean age 33.14±8 years. Majority (32, 91%) of the patients had left side prolapsed paracentral disc, and remaining (3, 9%) had right sided prolapsed disc. Regarding the level of disc 19 (54%) patients had L4-5 while 15 (43%) had L5-S1 and remaining one (2.9%) patients had L3-4 level. The post-op wound site visual analogue score was 1.57±1.1. Twenty-five patients had VAS of 1 (71.4%). Minimum hospital stay was 1 day in 16 (45.75%) patients and maximum was 4 days in 3 (8.6%) patients. Mean hospital stay was 1.83±0.95 days. The only complication encountered was iatrogenic dural tear seen in one patient but with no CSF leak from wound site. No surgical site infections were reported at follow-ups. **Conclusion:** Endoscopic Lumbar discectomy is a safe procedure with short hospital stay.

Keywords: sciatica, prolapsed intervertebral disc, microscopic discectomy, endoscopic discectomy
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INTRODUCTION

Backache is second most common problem presenting to the primary healthcare providers.[1] A survey of 2008 showed that almost 26% of US population had low backache and 14% had cervical pain.[2] No statistical data for Pakistan is published so far. Lumbar disc herniation is a cause of low backache. Lumbar disc herniation occurs due to degeneration of annulus fibrosus. Many theories explain the degeneration of annulus fibrosus include mechanical, chemical, age related autoimmune and genetic. Factors associated with lumbar disc herniation are age, improper working posture, bearing heavy loads, trauma and smoking.[3] Common age for lumbar disc herniation is 30–45 years with a male to female ratio of almost 3:1.[4] The lumbar disc is mostly herniated in posterolateral (Para-central) or lateral but sometimes posterior (central) herniation is also seen. Among the vertebral levels L4-L5 and L5-S1 intervertebral disc is herniated in almost 95% of cases between 22–50 Years and Level above L4 is common in older age groups.[5,6] The clinical symptoms depend on the level of disc herniation, the direction, i.e., central, para-central or lateral, and the degree of herniation. The symptoms include lumbago, sciatica and bladder symptoms.[7] Sometimes patients present with motor or sensory deficit along the distribution of nerve root involved. MRI is the gold standard investigation for diagnosis and planning the treatment.[8] Conservative treatment for 6 weeks of analgesic and strict bed rest is effective in almost 85% of cases.[9] Surgical intervention will be indicated in case of failure of medical therapy or progression of symptoms despite of medication.

Mixter and Barr[10] reported the first lumbar discectomy and the management of lumbar disc herniation have been revolutionized since then. The commonly practiced, open discectomy, or Love's technique, was published by Ross and Love in 1939.[11] Yasergil[12] used the operating microscope for first time to perform lumbar discectomy. Microscopic discectomy procedure was further refined by Casper[13] in 1977 and Williams[14] in 1978. The concept that discectomy can be performed by endoscopic method was introduced in 1983 by Kembin.[15] Foley and Smith introduced the tubular endoscopy and named the procedure endoscopic discectomy in 1997.[16] Yeung[17] introduced a multi-channel rigid wide angle operating endoscope for an easier access to the lumbar disc and exiting nerve root.

In Pakistan, the conventional Love's Discectomy is commonly practiced. Micro discectomy and endoscopic discectomy is used only in few centres. In our hospital EASYGO!® Endoscopic Spine Surgery is used along with the conventional open discectomy. In

this study we shared our experience of early surgical outcome endoscopic lumbar discectomy in terms post-operative pain improvement and duration of hospital stay.

MATERIAL AND METHODS

This prospective study was carried out at Neurosurgery Department of Jinnah Hospital Lahore from Jan 2014 to Jan 2016. During this period 35 patients were enrolled. Patients of both genders were included with the ages between 20 and 60 years, having signs and symptoms of sciatica and MRI findings of Prolapsed paracentral intervertebral disc prolapsed between L3-S1. Patients with Cuada Equina Syndrome, Central Lumbar Disc Prolapse, and Recurrent Lumbar Disc Prolapse were excluded.

All patients underwent endoscopic lumbar discectomy with the use of EASYGO system. Data was collected on a preformed questionnaire and variables studied were gender, age distribution, level and side of lumbar disc herniation, pre op straight leg raising test, wound site pain quantified on visual analogue score (VAS) scale of 0–10, duration of hospital stay and complications. Data was studied on SPSS version 17.0.

Position was prone with chest and pelvis supported and desired inter-vertebral Space was marked and confirmed by Fluoroscope. Annulotomy was accomplished with a sheathed micro knife while protecting the nerve root with the suction retractor. The herniated disc was then removed with a pituitary rongeur in a standard fashion. The nerve root was explored to ensure the decompression was complete.

RESULTS

A total of 35 patients were operated including 10 males and 25 females. The age range from 20–50 years with the mean of 33.14±8 years and younger patient was 20 years old. Majority of the patients enrolled in study had left side prolapsed paracentral disc, i.e., 32 (91%) and remaining had right sided prolapsed disc, i.e., 3 (9%). Regarding the level of disc, 19 (54%) pts had L4–5 while 15 (43%) pts had L5–S1 and remaining 1 (2.9%) pt had L3–4 level. The post op wound site visual analogue score was 1.57±1.1. Out of the 35 patients, 25 had VAS of 1 (71.4%). Regarding hospital stay, the minimum hospital stay was 1 day in 16 (45.75%) patients and maximum was 4 days in 3 (8.6%) patients. Mean hospital stay was 1.83±0.95 days. The only complication encountered was iatrogenic dural tear seen in one patient but with no CSF leak from wound site. No surgical site infections were reported at follow ups.

Table-1: Side involved

Side	Frequency	Percent
Left	32	91.4
Right	3	8.6
Total	35	100.0

Table-2: Level of disc involved

Disc level	Frequency	Percent
L3-L4	1	2.9
L4-L5	19	54.3
L5-S1	15	42.9
Total	35	100.0

Table-3: Postoperative wound site VAS

VAS	Frequency	Percent (%)
1	25	71.4
2	5	14.3
3	2	5.7
4	1	2.9
5	2	5.7

Table-4: Hospital stay

No of days	Frequency	Percent (%)
1	16	45.7
2	12	34.3
3	4	11.4
4	3	8.6

DISCUSSION

Microdiscectomy, introduced by Yasargil and Caspar (1977)[12], is considered as a gold standard in prolapsed paracentral intervertabral disc. Katayama *et al.*[18] compared the results of macrodiscectomy versus microdiscectomy and concluded that there was no difference between the surgical outcomes of both techniques but microdiscectomy gave better magnification and decreased the length of incision and tissue invasion. They found that microdiscectomy allowed the patients to return early to functional level and required lesser use of postoperative narcotic analgesics.

Microendoscopic discectomy (MED) introduced by Foley *et al.*[16] combines standard lumbar microsurgical techniques with an endoscope, enabling surgeons to successfully address free-fragment disc pathologic factors and lateral recess stenosis. The endoscopic approach allows even smaller incisions and less tissue trauma, compared with standard open microdiscectomy. Because the MED procedure causes significantly less iatrogenic injury to the paraspinal musculature, it may potentially provide additional long-term benefits over more aggressive open procedures. The only thing which requires to be established is the long-term result comparable to standard microdiscectomy and the lesser tissue invasiveness than microdiscectomy.

Many reports are presented which prove the efficacy of MED with overall comparable results.[21–25] it had an overall result of 91% which was compared with results of Perez-Cruet *et al.*[19] (n=150) where the average surgical time was 66 min, average blood loss was 22 ml, average hospital stay was 7.7 h, complication rate was 5%, reoperation rate was 4%, and average return to work was 17 days with an overall result of 94%. Foley *et al*[16] had 24–48 hrs of hospital stay compared to 7.7 h

of Perez-Cruet *et al.*[19] Other factors like surgical time (66 vs. 70 min), complication rate (5% both series), re-operation rate (4% vs. 3%), return to work (17 vs. 21 days), and overall results (94% vs. 91%) were comparable in both series. Similar results are reported by Ranjan *et al*.[20] in the series of 107 cases. From these data, it can be concluded that MED is safe and effective. As yet, there is no good prospective randomized study to compare the results of MED, microdiscectomy, and standard discectomy. Though there is one nonrandomized study by Schizas[21] which compared the results of MED with standard microsurgical discectomy and concluded that MED is at least as effective as microsurgical discectomy for the treatment of uncontained or large contained disc herniations.

It seems MED is a technique which gives early rehabilitation and less bleeding. The limitation of this study has been lack of comparable control to compare and quantify that in MED there is less bleeding and early rehabilitation compared to standard or microdiscectomy. A well-designed double-blind prospective randomized control trial needs to be done comparing MED and microdiscectomy and standard discectomy to prove these facts.

Generally, on the basis of above discussion microscopic discectomy after laminotomy is still considered the gold standard' but recently numerous studies involving endoscopic discectomy have been reported, and the outcomes have been improving gradually.[26–31] In comparison with microscopic discectomy, return to work or sports activities is more rapid, and thus it is accepted by patients more readily with a high patient acceptance.[32,33] In addition, epidural scarring develops in more than 10% of patients after conventional laminectomy and discectomy[34–37] and in posterolateral endoscopic discectomy, such scars have not been detected by MRI or during revision surgery. Therefore, subsequent endoscopic or conventional procedures are easy.[38,39]

Despite such numerous advantages, endoscopic discectomy is not universally accepted because endoscopic procedural skill is difficult to acquire, with a flattened and lengthy learning curve, and in comparison with the microscopic discectomy, surgical outcomes after endoscopic discectomy are not hugely superior and its indications are limited due to anatomical limitations such as endoscopic discectomy using a lateral approach is through the iliac wing, and thus the iliac wing and the height of the working disc space should be adequate.[40] One has to approach the working disc space through the foraminal space, which is difficult similarly the approach in cases with high-grade migration and high canal compromise is also difficult.[41,42] To overcome such limitations, it is important to understand the anatomic relationship of the lesion disc and adjacent structures prior to surgery.[43–45]

So the endoscopic approach, as its feasibility and proven safety in other surgical specialities, is same incase of neurosurgery. Endoscopic discectomy is on a rise all over the world due to the minimal invasive approach and improved outcomes but long term outcomes are yet to be established. But the safe removal of the prolapsed disc and improved VAS resulted in the tilt of neurosurgeons from MED to percutaneous endoscopic lumbar discectomy (PELD). We performed PELD in our institution and our results showed that PELD is superior to MED in VAS and hospital stay but long term outcome is yet to be established.

Our experience of Endoscopic Lumbar discectomy was comparable to that of other international published studies. Haung *et al*,[22] showed that the pain VAS in patients of endoscopic lumbar discectomy was 1.4±0.1.Teli *et al*,[23] showed that the average post-operative pain was 3±1 on VAS in endoscopic discectomy. Hsien-Ta Hsu *et al*,[24] showed that patients who underwent endoscopic Lumbar discectomy had a post-operative VAS of 1.6. Lee *et al*,[25] showed that the average hospital stay was in endoscopic lumbar discectomy was 0.9±0.5day. Haung *et al*[22] showed that the postoperative hospital stay was, 3.57±0.9818. Teli *et al*[47] showed that the average hospital stay was 54±12 hours19. As our VAS 1.57±1.1 and mean hospital stay was 1.83±0.95 days. So the short term efficacy of PELD is obvious but comparison of long term outcomes are yet to be established

CONCLUSION

Percutanous endoscopic lumbar discectomy (PELD) is a minimally invasive procedure for discectomy with early encouraging results. It has a learning curve initially but once expertise is acquired over the technique, the results of this procedure are acceptable, safe and effective.

REFERENCES

1. Cypress BK. Characteristics of physician visits for back symptoms: A national perspective. Am J Public Health 1983;73:389–95.
2. Martin BI, Deyo RA, Mirza SK, Turner JA, Comstock BA, Hollingworth W, *et al*. Expenditures and health status among adults with back and neck problems. JAMA 2008;299:656–64.
3. Wahlstrom J, Burstrom L, Nilsson T, Jarvholm B. Risk factors for hospitalization due to lumbar disc disease. Spine 2012;37:1334–9.
4. Akbar A, Mahar A. Lumbar disc prolapse: Management and outcome analysis of 96 surgically treated patients. J Pak Med Assoc 2002;52(2):62–5.
5. Friberg S, Hirsch C. Anatomical and clinical studies on lumbar disc degeneration. Acta Orthop Scand 1949;19:222–42.
6. Schultz A, Andersson G, Ortengren R, Haderspeck K, Nachemson A. Loads on the lumbar spine. J Bone Joint Surg Am 1982;64:713–20.
7. Deyo RA, Rainville J, Kent DL. What can the history and physical examination tell us about low back pain? JAMA 1992;268:760–5.
8. Taher F, Essig D, Lebl DR, Hughes AP, Sama AA, Cammisa FP, *et al*. Lumbar degenerative disc disease: current and future concepts of diagnosis and management. Adv Orthop 2012; 2012:970752. doi:10.1155/2012/970752.

9. Fager CA. Observations on spontaneous recovery from intervertebral disc herniation. Surg Neurol 1994;42:282–6.
10. Mixter WJ, Barr JS. Rupture of the intervertebral disc with involvement of the spinal canal. N Engl J Med 1934; 211:210–5.
11. Love JG. Protruded intervertebral disc (fibrocartilage): section of orthopaedics and section of neurology. Proc R Soc Med 1939;32:1697–721.
12. Yasargil MG. Microsurgical Operation of Herniated Lumbar Disc. In: Wullenweber R, Brock M, Hamer J, Klinger M, Spoerri O, (Eds). Advances in Neurosurgery, Vol 4. Berlin, New York: Springer-Verlag; 1977.p. 81–94.
13. Caspar W. A new surgical procedure for lumbar disc herniation causing less tissue damage through a microsurgical approach. Adv Neurosurg 1977;4:74–7.
14. Williams RW. Microlumbar discectomy: a conservative surgical approach to the virgin herniated lumbar disc. Spine (Phila Pa 1976) 1978;3(2):175–82.
15. Kambin P, Gellman H. percutaneous lateral discectomy of the lumbar spine: A preliminary report. Clin Orthop 1983;174:127–32.
16. Foley KT, Smith MM. Microendoscopic discectomy. Tech Neurosurg 1997;3(4):301–7.
17. Yeung AT. Minimally invasive disc surgery with the Yeung Endoscopic Spine System (YESS). Surg Technol Int 1999;8:267–77.
18. Katayama Y, Matsuyama Y, Yoshihara H, Sakai Y, Nakamura H, Nakashima S, *et al*. Comparison of surgical outcomes between macro discectomy and micro discectomy for lumbar disc herniation: A prospective randomized study with surgery performed by the same spine surgeon. J Spinal Disord Tech 2006;19:344–7.
19. Perez-Curet MJ, Fessler RG, editors. Outpatient spine surgery. 1st ed. St. Louis (MO): Quality Medical Publishing; 2002.
20. Ranjan A, Lath R. Microendoscopic discectomy for prolapsed lumbar intervertebral disc. Neurol India 2006;54:190–4.
21. Schizas C, Tsiridis E, Saksena J. Microendoscopic discectomy compared with standard microsurgical discectomy for treatment of uncontained or large contained disc herniations. Neurosurgery 2005;57(4 Suppl):357–60.
22. Huang CJ, Tang HW, Liang DB, Lou YM, Guan W. Treatment of the recurrent lumbar disc herniation: a comparison between endoscopic surgery and open surgery. Zhongguo Gu Shang 2013;26:810–4.
23. Teli M, Lovi A, Brayda-Bruno M, Zarga A, Corriero A, Giudici F, *et al*. Higher risk of dural tears and recurrent herniation with lumbar micro-endoscopic discectomy. Eur Spine J 2010;19:443–50.
24. Hsu HT, Chang SJ, Yang SS, Chai CL. Learning curve of full-endoscopic lumbar discectomy. Eur Spine J 2013;22(4):727–33.
25. Lee DY, Shim CS, Ahn Y, Choi YG, Kim HJ, Lee SH. Comparison of percutaneous endoscopic lumbar discectomy and open lumbar micro discectomy for recurrent disc herniation. J Korean Neurosurg Soc 2009;46:515–21.
26. Fritsch EW, Heisel J, Rupp S. The failed back surgery syndrome: Reasons, intraoperative findings, and long-term results: A report of 182 operative treatments. Spine (Phila Pa 1976) 1996;21:626–33.
27. Donceel P, Du Bois M. Fitness for work after surgery for lumbar disc herniation: A retrospective study. Eur Spine J 1998;7:29–35.
28. Ahn Y, Lee SH, Park WM, Lee HY, Shin SW, Kang HY. Percutaneous endoscopic lumbar discectomy for recurrent disc herniation: Surgical technique, outcome, and prognostic factors of 43 consecutive cases. Spine (Phila Pa 1976) 2004;29:E326–32.
29. Andrews DW, Lavyne MH. Retrospective analysis of microsurgical and standard lumbar discectomy. Spine (Phila Pa 1976) 1990;15:329–35.
30. Lee SH, Kang BU, Ahn Y, Choi G, Choi YG, Ahn KU, *et al*. Operative failure of percutaneous endoscopic lumbar discectomy: A radiologic analysis of 55 cases. Spine (Phila Pa 1976) 2006;31:E285–90.
31. Wu X, Zhuang S, Mao Z, Chen H. Microendoscopic discectomy for lumbar disc herniation: Surgical technique and outcome in 873 consecutive cases. Spine (Phila Pa 1976) 2006;31:2689–94.
32. Lee S, Kim SK, Lee SH, Kim WJ, Choi WC, Choi G, *et al*. Percutaneous endoscopic lumbar discectomy for migrated disc herniation: Classification of disc migration and surgical approaches. Eur Spine J 2007;16:431–7.
33. Ozer AF, Oktenoglu T, Sasani M, Bozkus H, Canbulat N, Karaarslan E, *et al*. Preserving the ligamentum flavum in lumbar discectomy: A new technique that prevents scar tissue formation in the first 6 months postsurgery. Neurosurgery. 2006;59:ONS126–33.
34. Park YK, Kim JH, Chung HS. Outcome analysis of patients after ligament-sparing microdiscectomy for lumbar disc herniation. Neurosurg Focus. 2002;13(2):E4.
35. Ross JS, Robertson JT, Frederickson RC, Petrie JL, Obuchowski N, Modic MT, *et al*. Association between peridural scar and recurrent radicular pain after lumbar discectomy: Magnetic resonance evaluation. ADCON-L European Study Group. Neurosurgery 1996;38:855–61.
36. Ruetten S, Komp M, Godolias G. An extreme lateral access for the surgery of lumbar disc herniations inside the spinal canal using the full-endoscopic uniportal transforaminal approach-technique and prospective results of 463 patients. Spine (Phila Pa 1976) 2005;30:2570–8.
37. Ruetten S, Meyer O, Godolias G. Epiduroscopic diagnosis and treatment of epidural adhesions in chronic back pain syndrome of patients with previous surgical treatment: first results of 31 interventions. Z Orthop Ihre Grenzgeb 2002;140:171–5.
38. Segnarbieux F, Van de Kelft E, Candon E, Bitoun J, Frèrebeau P. Disco-computed tomography in extraforaminal and foraminal lumbar disc herniation: Influence on surgical approaches. Neurosurgery 1994;34:643–7.
39. Tomecek FJ, Anthony CS, Boxell C, Warren J. Discography interpretation and techniques in the lumbar spine. Neurosurg Focus 2002;13:E13.
40. Gill K. Retroperitoneal bleeding after automated percutaneous discectomy. A case report. Spine (Phila Pa 1976) 1990;15:1376–7.
41. Choi G, Lee SH, Bhanot A, Raiturker PP, Chae YS. Percutaneous endoscopic discectomy for extraforaminal lumbar disc herniations: Extraforaminal targeted fragmentectomy technique using working channel endoscope. Spine (Phila Pa 1976) 2007;32:E93–9.
42. Ditsworth DA. Endoscopic transforaminal lumbar discectomy and reconfiguration: A postero-lateral approach into the spinal canal. Surg Neurol 1998;49:588–97.
43. Tsou PM, Yeung AT. Transforaminal endoscopic decompression for radiculopathy secondary to intra-canal noncontained lumbar disc herniations: outcome and technique. Spine J 2002;2:41–8.
44. Tsou PM, Alan Yeung C, Yeung AT. Posterolateral transforaminal selective endoscopic discectomy and thermal annuloplasty for chronic lumbar discogenic pain: A minimal access visualized intradiscal surgical procedure. Spine J. 2004;4:564–73.
45. Williams RW. Microlumbar discectomy. A 12-year statistical review. Spine (Phila Pa 1976) 1986;11:851–2.

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