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Endoscopic versus conventional discectomy in lumbar disc prolapse

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Abstract

Background: Discectomy is an accepted surgical treatment with better outcome, in the management of disc prolapsed. This discectomy is being done conventionally for several decades whereas endoscopic microdiscectomy is slowly picking up and more frequently being done in the past two decades. Though there were several advantage and disadvantages prevails among both procedures, the outcome remains controversy and thus this study was conducted.

Methods: This study was done as a Prospective Randomized comparative study, among patients undergoing lumbar discectomy in the department of orthopedics at Sri Muthukumaran Medical College and Research Institute during January 2019 to January 2020. A total of 60 cases with disc prolapsed were included in the study. Thirty patients were randomized to each conventional and endoscopic discectomy group. Oswestry Disability Index (ODI- for Low Back Pain) and VAS score (10 point scale) were used as clinical tool for assessment. Data analysis was done using Statistical Package for Social Sciences, version 20.

Results: Significant higher duration of surgery, was reported in endoscopic discectomy compared to conventional discectomy whereas mean post operative pain score (VAS) and mean duration of hospital stay were significantly higher among the conventional group. Though ODI scores were high among the conventional group, it was not significant.

Conclusion: Endoscopic discectomy is a novel, safe and effective method that minimizes invasiveness of the surgical approach.

Keywords: Endoscopic discectomy, conventional discectomy, disc prolapsed, low back pain

Introduction

Low back pain is one of the common symptoms reported in almost all the outpatient departments. The most pronounced cause for low back pain is lumbar disc herniation ^[1, 2]. Management of disc herniation is a challenge for orthopaedic surgeon because of availability of various surgical techniques and methods for the excision of the prolapsed/herniated disc. Since its first description by Mixter Barr in 1934, lumbar disc herniation is one of the few abnormality in the lumbar spine, where a clear relationship between the morphological alteration and pain seems to exist ^[3]. While pure mechanical compression was considered previously as a source of radiculopathy, there is increasing evidence that chemical irritation of the nerve root plays an essential role perhaps even most important role ^[4, 5].

Discectomy is an accepted surgical treatment with better outcome, in the management of disc prolapsed ^[6, 7]. This discectomy is being done conventionally for several decades whereas endoscopic microdiscectomy is slowly picking up and more frequently being done in the past two decades ^[8, 9].

Microdiscectomy remains the standard procedures for symptomatic lumbar disc prolapse for many decades ^[10]. The procedure is a minimally invasive that involves partial removal of the intervertebral disc compressing the nerve root or spinal cord with the aid of magnifying loupes. The potential benefits of the procedure includes lesser surgical trauma, increased safety owing to good visualization of operative field, lesser postoperative morbidity, and shorter hospitalization ^[11, 12]. with most of patients leading a pain-free existence ^[13]. However, this procedure is associated with few disadvantages.

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Hence this study was conducted to compare the outcome in terms of duration of surgery, post operative pain and post operative ODI (Oswestry Disability Index) score among the cases underwent discectomy through endoscopic and conventional methods.

Objectives

To compare the conventional and endoscopic discectomy in terms of duration of surgery, post operative pain and post operative ODI (Oswestry Disability Index) score.

Methods

This study was done as a Prospective Randomized comparative study, among patients undergoing lumbar discectomy in the department of orthopedics at Sri Muthukumaran Medical College and Research Institute. Patients who were already operated for lumbar disc prolapsed were excluded from this study. The study was conducted from January 2019 to January 2020. A total of 60 cases with disc prolapsed were included in the study.

Written informed consent was gathered from the patients before the conduct of study. Patients were randomized to conventional discectomy group and endoscopic discectomy group based on computer generated random numbers. Thirty patients were randomized to each conventional and endoscopic discectomy group. Following the surgical procedure, each patient were examined and assessed by the principal investigator using a questionnaire. Outcome measured includes duration of surgery, post operative pain and post operative ODI (Oswestry Disability Index) score among the cases underwent discectomy through endoscopic and conventional methods. Oswestry Disability Index (ODI- for Low Back Pain) and VAS score (10 point scale) were used as clinical tool for assessment.

Data entry was done in Microsoft excel and statistical analysis was done using Statistical Package for Social Sciences, version 20. Descriptive statistics, Chi square test and independent sample t test were done appropriately, to test the hypothesis. p value of less than 0.05 were considered as statistically significant.

Results

Among the sixty study participants, thirty patients underwent conventional discectomy and another thirty cases underwent endoscopic discectomy, in this study. On assessing the age group of the study participants, majority (43.3%) of the cases belongs to the age group of 31-40 years in the conventional discectomy group and 30% in the endoscopic discectomy group. Least proportion of cases was reported in the age group more than 50 years with 13.3% and 16.7% of cases in conventional and endoscopic discectomy group, respectively. The mean of the study participants were 41.8 ± 14.2 years and 41.8 ± 14.2 years in the conventional and endoscopic discectomy group, respectively. Majority of the study subjects were male in both the groups with 80% and 66.7% in conventional and endoscopic discectomy group, respectively. (Table 1)

Table 1: Age and gender of the study participants

Variable	Conventional discectomy N (%)	Endoscopic discectomy N (%)
Age group		
≤ 30 years	05 (16.7)	07 (23.3)
31-40 years	13 (43.3)	09 (30)
41-50 years	08 (26.7)	09 (30)
> 50 years	04 (13.3)	05 (16.7)
Mean ± SD (in years)	41.8 ± 14.2	39.54 ± 12.4
Gender		
Male	24 (80)	20 (66.7)
Female	06 (20)	10 (33.3)

On assessing the site of disc prolapse, 70% and 76.7% of participants had paracentral disc prolapse in the conventional and endoscopic discectomy group, respectively. Similarly there were 30% and 23.3% of cases with central disc prolapse in the conventional and endoscopic discectomy group, respectively. The commonest level of disc prolapse reported in both the groups was L4-L5 with 53.5% and 46.7% of subjects in conventional and endoscopic discectomy group, respectively. Followed by disc prolapsed at L5-S1 was common with 30% and 43.3% of cases in conventional and endoscopic discectomy group, respectively. Also there were 13.3% and 6.7% of cases with L3-L4 disc prolapsed in conventional and endoscopic discectomy group, respectively. The least common level was reported as L2-L3 and no case was reported to have L1-L2 disc prolapsed in this study. (Table 2)

Table 2: Proportion of participants with different Site and level of disc prolapsed

Variable	Conventional discectomy N (%)	Endoscopic discectomy N (%)
Site of disc prolapsed		
Central	09 (30)	07 (23.3)
Paracentral	21 (70)	23 (76.7)
Level of disc prolapsed		
L2-L3	01 (3.3)	01 (3.3)
L3-L4	04 (13.3)	02 (6.7)
L4-L5	16 (53.3)	14 (46.7)
L5-S1	09 (30)	13 (43.3)

Significant higher duration of surgery was reported in endoscopic discectomy compared to conventional discectomy in this study ($P < 0.000$). Mean post operative pain score (VAS) was reported as 6.7 ± 3.1 and 4.8 ± 2.5 in the conventional and endoscopic discectomy group, respectively. The differences in VAS score between the groups were found to be statistically significant ($P = 0.012$). Mean duration of hospital stay was 5.4 ± 2.2 days and 4.1 ± 2.3 days, in the conventional and endoscopic discectomy group, respectively. The differences in duration of hospital stay between the two groups were found to be statistically significant ($P = 0.029$). Post operative ODI score was reported as 26.45 ± 10.3 and 25.48 ± 12.8 in the conventional and endoscopic discectomy group, respectively. The differences in mean ODI scores between the two groups were found to be statistically insignificant ($P = 0.747$). (Table 3)

Table 3: Comparison of duration of surgery and post operative findings in both groups

Variable	Conventional discectomy (Mean±SD)	Endoscopic discectomy (Mean±SD)	P value
Duration of surgery (in mins)	91.4 ± 15.8	122.1 ± 26.7	0.000*
Post operative pain score (VAS)	6.7 ± 3.1	4.8 ± 2.5	0.012*
Duration of hospital stay (in days)	5.4 ± 2.2	4.1 ± 2.3	0.029*
Post operative ODI score	26.45 ± 10.3	25.48 ± 12.8	0.747

*Significant

In this study there were 30% and 36.7% of cases with excellent ODI scores in conventional and endoscopic discectomy group, respectively. Also there were 70% and 63.3% of cases with good ODI scores in conventional and endoscopic discectomy group, respectively. But the association between the categories of ODI scores in the two groups was found to be statistically insignificant. ($p=0.584$). (Table 4)

Table 4: Association between post operative ODI score category in both groups

ODI score category	Conventional discectomy N (%)	Endoscopic discectomy N (%)	P value
Excellent (0-20)	09 (30)	11 (36.7)	0.584
Good (21-40)	21 (70)	19 (63.3)	

Discussion

Pan *et al.* ^[14] reported that patients who underwent percutaneous endoscopic lumbar discectomy had less blood loss, shorter hospitalization hours and smaller surgical wounds than the patients underwent conventional discectomy. There was no significant difference in pain index between the two groups.

In this study, the patients underwent endoscopic discectomy had less recovery time and shorter hospital stay compared to the patients treated with conventional discectomy. Thus, the endoscopic method had promotional value in a long time for long learning curve. Recently, minimally invasive surgery had a significant rising trend in every surgery departments, especially in spinal surgery, with quite obvious helps to patients ^[15].

Ruan *et al.* ^[16] in their study they reported that there were no superiority exists between the two surgical approaches for the treatment of lumbar disc herniation in terms of functional outcome, complication rate and reoperation rate, in spite of that endoscopic procedure group can achieve shorter operation time and hospital stay than conventional discectomy group.

Kambin *et al.* ^[17] introduced a minimally invasive spine surgery, namely, percutaneous endoscopic lumbar discectomy (PELD) in 1983 which could meet the above requirements. And the most important advantage of percutaneous endoscopic lumbar discectomy is that local anesthesia can be used as was described by Choi *et al.* ^[18].

Percutaneous endoscopic lumbar discectomy produces fewer traumas to soft tissues and results in rapid recovery. Parker *et al.* ^[19] report that 32% of patients suffered above moderate back pain after open lumbar discectomy. In addition, Dvorak *et al.* ^[20] report that 70% of patients suffered low back pain during long-term follow-up after open lumbar discectomy.

Vora *et al.* ^[21] reported that average operative time for endoscopic discectomy was higher than conventional discectomy. However, there was minimal blood loss compared to conventional discectomy. Based on ODI score, both endoscopic and conventional discectomy offered similar results in all grades.

Chen *et al.* ^[22] reported that mean blood loss, operating time and hospital stay were significantly less in the PELD group as compared to the open lumbar surgery group. Immediate postoperative pain improvement in VAS was 3.5 in the PELD group and 0.56 in the open lumbar surgery group.

Kim *et al.* ^[23] reported that though percutaneous endoscopic lumbar discectomy showed better results than open lumbar microdiscectomy the later still showed good clinical results.

Conclusion

Endoscopic discectomy is a novel, safe and effective method that minimizes invasiveness of the surgical approach. Results achieved with this method are comparable to those achieved with open discectomy in terms of relief of symptoms on longer follow up, and is significantly better in terms of early mobilisation and morbidity as there is minimal tissue trauma. The technique must be mastered and the choice of going for open or endoscopic discectomy rests on the surgeon after consulting the patient and only if it is indicated.

Though endoscopic discectomy is better as compared to open discectomy but it requires a steep learning curve and also good knowledge of the anatomy and the surgeon must be ready to convert the operative procedure into an open one if any complication arises.

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Declarations

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References

1. Atlas SJ, Keller RB, Chang Y, Deyo RA, Singer DE. Surgical and non surgical management of sciatic secondary to lumbar disc herniation. *Spine*. 2001; 26:1179-87.
2. DePalma AF, Rothman RH. Surgery of lumbar spine. *Clin Orthop*. 1969; 63:162-70.
3. Mixter WJ, Barr JS. Rupture of intervertebral disc with involvement of spinal canal. *New Eng. J Med*. 1934; 211:210-14.
4. Rothman RH, Simeone FA. *The Spine*, 2nd ed. Philadelphia: Saunders, 1982.
5. Love JG. Root pain resulting from intraspinal protrusion of vertebral discs: diagnosis and treatment. *J Bone Joint Surg*. 1939; 19:776-80.
6. Tay ECK, Chach PB. midline prolapse of lumbar intervertebral disc with compression of cauda equine. *J Bone Joint Surg Br*. 1979; 61:43-6.
7. Hanley EN Jr, Shapiro DE. The development of low-back pain after excision of a lumbar disc. *J Bone Joint Surg Am*. 1989; 71:719-21.
8. Kambin MH Savitz. Arthroscopic microdiscectomy: an alternative to open disc surgery, *Mt. Sinai J Med*. 2000; 67(4):283e287.
9. Yeung AT, Tsou PM. Posterolateral endoscopic excision for lumbar disc herniation: surgical technique, outcome, and complications in 307 consecutive cases, *Spine Phila Pa*. 1976-2002; 27(7):722e731.
10. Apostolides PJ, Jacobowitz R, Sonntag VK. Lumbar discectomy microdiscectomy: "the gold standard". *Clin Neurosurg*. 1996; 43:228-38.
11. Kelly A, Griffith H, Jamjoom A. Results of day-case surgery for lumbar disc prolapse. *Br J Neurosurg*. 1994; 8(1):47-9.

12. Lorish TR, Tanabe CT, Waller FT, London MR, Lansky DJ. Correlation between health outcome and length of hospital stay in lumbar microdiscectomy. *Spine*. 1998; 23(20):2195-200.
13. McCulloch JA. Focus issue on lumbar disc herniation: macro and microdiscectomy. *Spine*. 1996; 21(24):45S-56S.
14. Pan L, Zhang P, Yin Q. Comparison of tissue damages caused by endoscopic lumbar discectomy and traditional lumbar discectomy: a randomised controlled trial. *International Journal of Surgery*. 2014; 12(5):534-7.
15. Verhage R, Hazebroek E, Boone J, Van Hillegersberg R. Minimally invasive surgery compared to open procedures in esophagectomy for cancer: a systematic review of the literature, *Minerva Chirurgica*. 2009; 64:135e146.
16. Ruan W, Feng F, Liu Z, Xie J, Cai L, Ping A. Comparison of percutaneous endoscopic lumbar discectomy versus open lumbar microdiscectomy for lumbar disc herniation: a meta-analysis. *International Journal of Surgery*. 2016; 31:86-92.
17. Jasper GP, Francisco GM, Telfeian AE. Endoscopic transforaminal discectomy for an extruded lumbar disc herniation, *Pain Physician*. 2013; 16(1):E31eE35.
18. Choi G, Lee SH, Raiturker PP, Lee S, Chae YS. Percutaneous endoscopic interlaminar discectomy for intracanalicular disc herniations at L5-S1 using a rigid working channel endoscope, *Neurosurgery*. 2006; 58(1):S59eS68. S59-S68.
19. Parker SL, Xu R, McGirt MJ, Witham TF, Long DM, Bydon A. Long-term back pain after a single-level discectomy for radiculopathy: incidence and health care cost analysis, *J Neurosurg. Spine*. 2010; 12(2):178e182.
20. Dvorak J, Gauchat MH, Valach L. The outcome of surgery for lumbar disc herniation. I. A 4-17 years' follow-up with emphasis on somatic aspects, *Spine Phila Pa*. 1976-1988; 13(12):1418e1422.
21. Vora P, Thaker P, Gandhi J, Gupta Y, Panchal H, Prabhakar M. Comparing results of Endoscopic microdiscectomy and conventional discectomy for lumbar disc disease: A short term study. *International Journal of Orthopaedics*. 2019; 5(1):30-3.
22. Chen HC, Lee CH, Wei L, Lui TN, Lin TJ. Comparison of percutaneous endoscopic lumbar discectomy and open lumbar surgery for adjacent segment degeneration and recurrent disc herniation. *Neurology research international*, 2015.
23. Kim M, Lee S, Kim HS, Park S, Shim SY, Lim DJ. A comparison of percutaneous endoscopic lumbar discectomy and open lumbar microdiscectomy for lumbar disc herniation in the Korean: a meta-analysis. *BioMed research international*, 2018.