

Percutaneous endoscopic spinal surgery for lumbar disc prolapse in Erbil city of Iraq: A study on 60 patients

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Abstract

Background: As an alternative to back surgeries, endoscopic spinal operations is the most effective and safe procedure that does not impose the fear reaction to the patients.

Objective: In this study the results, complications, and outcomes of 60 patients complaining from prolapsed lumbar inter-vertebral discs who experienced prolapsed endoscopic lumbar discectomy (PELD) were reported.

Patients and Methods: This is a prospective study conducted in three sentinel hospitals over a period of 3 years (2013-2015) in Erbil city of Iraq. Clinical findings in addition to pre-operative MRI were the main diagnostic methods used for including patients who were suffering from lumbar disc herniation at different levels. Clinical appraisal was done utilizing the modified Macnab criteria. The Storz lens spinoscope was utilized to perform PELD.

Results: Sixty patients (37 males and 23 females) with lumbar disc herniation were included in the study. The mean operative time was 50 minutes. Patients were discharged during 1st 24 hours post-operatively. After surgery, patients were followed up for two months to three years with a mean of 18 months. Seven (11.7%) patients developed complications including one (1.7%) instance of shallow nerve injury, three (5%) with dural tears, two (3.3%) instances of intermittent delayed disc prolapse and one patient (1.7%) had post-operative discitis. Modified Macnab criteria (excluding patients with long dural tear) showed excellence results for 36 patients, while good results were observed for 17 patients, reasonable results for 3 patients and poor results for 2 patients. The achievement rate was 91.4% .

Conclusion: Although endoscopic spinal discectomy is a compelling procedure for management of lumbar disc prolapse, and although its final outcome is reasonable it is not devoid from complications.

Key words: Prolapsed lumbar disc, Lumbar disc surgery, Endoscopic spine surgery, Endoscopic lumbar discectomy, Storz lens spinoscope.

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Received: 17th January 2018

Accepted: 17th July 2018

<https://doi.org/10.26505/DJM>

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Introduction

Percutaneous endoscopic lumbar discectomy (PELD) is essentially indicated for management of disc prolapse. It is less invasive procedure that benefit from endoscopic apparatus in treating different disc lesions (herniation, protrusion,

extrusion, or degeneration) that aggravate leg and back pain[1]. When the annulus became weak and fail to keep the core of the disc, disc prolapse takes place. Usually no particular situation causes the disc prolapse unless there are prior predisposing events like

shortcoming or degeneration [2]. Continuous improvement of most prolapsed cases takes place when the patient keeps strategies that prevent further stress or exercise on the erupted disc lesion. On other hand, in serious disc lesions invasive interference must be considered.³ Many authors documented infrequent surgical interventions to treat disc lesions and back disorders like PELD, percutaneous dissection, laser dissection, etc. [3,4]. This study reports the surgical procedure, results and difficulties seen in the use of PELD in Erbil city of Iraq in the treatment of 60 patients with prolapsed lumbar discs.

Patients and Methods

A descriptive study over a period of three years between January 2013 and August 2015 in three sentinel hospitals was conducted in Erbil city of Kurdistan region of Iraq. Clinical findings in addition to pre-operative MRI were the main diagnostic methods used for inclusion of patients suffering from lumbar disc herniation at different levels. All patients had intra or extra foraminal lumbar disc lesions that located at different lumbar levels and associated with typical disc lesion pain. Pre-operatively trial of traditional treatment before surgery was advised for all patients. This included around 6 weeks of treatment with analgesics and rest. Data was abstracted from the patient's medical records in especially designed questionnaire to cover the socio-demographic data, the actual pain situation and comorbidities, the follow-up, assessment and clinical appraisal with modified Macnab

criteria [5,6]. The PELD in present study was found to be failed for 2 patients with disc relapse (focal) and those 2 patients were turned into classical microsurgery. In this way PELD was not attempted for focal disc prolapse. An ethical approval was obtained from College of Medicine-Hawler Medical University Ethics Committee in addition to an oral informed consent from each selected patient before being enrolled in the study. Descriptive analysis was performed and results are presented in tables.

Operative procedure

In all surgical procedures the Storz lens spinoscope was utilized to perform the PELD.

All patients were given a general anesthesia and lying flat on surgical theater with flexion of hip and knees like Wilson outlines and the surgical operation was implemented by posterolateral approach with help of C-arm. Firstly, there was a penetration of intervertebral disc between lumbar 5 and sacral 1 vertebrae by discography needle which directed to center through Kambin's triangle in addition to wire placed toward the disc. The dilator (cone shaped) passes easily through the wire to reach space of disc and sleeve with endoscope were placed which internally decompressed target disc. Following this procedure, the cannula was drawn from disc space to foramen. After some movement with rotation, migrated disc fragment with displaced protruding nerve root could be identified. It is important to be careful to Kambin's triangle substances, removal of prolapse and removal of

endoscope and sleeve Figures (1-3)[7,8]. Antibiotics were given perioperatively for 48 hours. Patients discharged on 2nd postoperative day, and clinical appraisal was conducted by using modified Macnab criteria Table (1)[5,6].

Results

The current study included 60 patients, of which 37 (61.1%) were males. Patient's age ranged between 17 and 73 years. All patients were complaining from foraminal and posterolateral disc lesion Figures(4-6) that lies most commonly at lumbar 4-5 and lumbar 5- sacral 1 levels Table (2). The mean operative time was 50 minutes.

Patients were monitored for six hours and discharged within 24 hours postoperatively, except for 2 patients who suffered from long dural tear and the operation changed to open

surgical operation. Patients were followed up for 34 months postoperatively and follow-up mean was 18 months.

Seven patients (11.7%) developed postoperative complications, which includes nerve injuries (1.7%), dural tears (5.0%), delayed disc prolapse (3.3%), and postoperative vertebral osteomyelitis (1.7%) which was treated by long term antibiotics with rest Table (3). Evaluation of the results using the modified Macnab criteria, [5,6] revealed that outcome was excellent for 36 patients, while the results were good for 17 patients, reasonable results for 3 and 2 patients were with poor results Table (4). Generally, the achievement rate for endoscopic spinal discectomy was 91.4%.

Table (1): Modified Macnab criteria [5,6].

Criteria	Clinical features
Excellent	Free of pain No restriction of mobility Able to return to normal work and activities
Good	Occasional non radicular pain Relief of presenting symptoms Able to return to modified work
Fair	Some improved functional capacity
Poor	Continued objective symptoms of root involvement Additional operative intervention needed at the index level Irrespective of repeat or length of post-operative follow up

Table (2): Distribution of herniated disc lesions of patients (n=60) according to the site of lumbar disc herniation.

Disc lesion levels	Number of patients	(%)
Lumbar 2-3	1	(1.67)
Lumbar 3-4	2	(3.33)
Lumbar 4-5	20	(33.33)
Lumbar 5- sacral 1	37	(61.67)

Table (3): Type of complications encountered in the 60 patients operated on.

Complications	Number of patients	(%)
Nerve injury	1	(1.7)
Dural tears	3	(5.0)
Intermittent disc prolapse	2	(3.3)
Postoperative discitis	1	(1.7)
Total	7	(11.7)

Table (4): Clinical appraisal using Macnab criteria.

Criteria	Number of patients	(%)
Excellent	36	(62.1)
Good	17	(29.3)
Fair	3	(5.2)
Poor	2	(3.4)
Total	58*	(100.0)

* Exclusion of 2 patients which failed in treatment and turned to classical micro-discectomy.



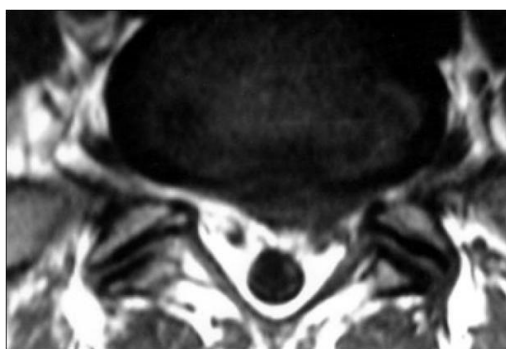
Figure (1): The discogram following trocher inserted inside the disc.



Figure (2): Cannulation



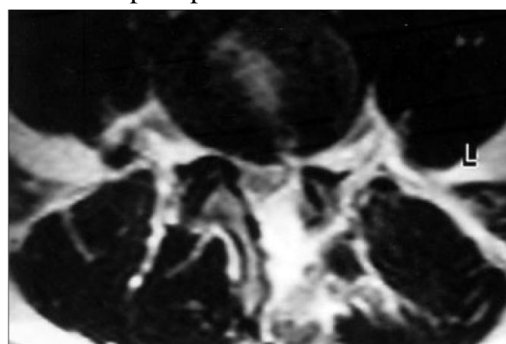
Figure(3): The site of spinoscope in transforaminal approach.



Figure(4): MRI of L5-S1 disc prolapse preoperatively.



Figure(5): MRI of L4-5 disc prolapse with lateral recess stenosis preoperatively.



Figure(6): Post-operative MRI of decompression of disc done by PELD as second hand surgery.

Discussion

Lumbago/sciatica disorder correlation with disc herniation had presented for discussion in the 1930's. From that point forward there have been steady attempts to accomplish decompression of nerve root by different agent methods and developments. Without doubt, microsurgical discectomy that is firstly applied by Yasargil and Casper at 1977 represented the highest quality level for surgical operations regarding lumbar disc [1]. This endoscopic technique that is characterized by low invasiveness is indicated for treatment of leg or back pain risk factors like vertebral disc herniation, protrusion, extrusion and degeneration. Endoscopically, the surgeons would be able to apply a small incision and reach herniated disc, in addition to prevent losing tissues and muscles. As a result, the endoscopy is useful in minimizing tissue loss, post surgery pain, shorter duration of post surgery resuscitation and rehabilitation with shorter anesthesia duration. Furthermore, the endoscopy has better imaging power that enables the surgeon to precisely move away herniated nucleus pulposus portion which is responsible for pain[1,9]. Shorter hospital stay duration is also another most interesting advantage of endoscopic spine surgery with avoidance of hospitalization specifically for the young worker patients. The short duration of resuscitation and hospital stay is related to low cost of surgery while short duration of rehabilitation leads to earlier back to life activities and daily working

jobs.10In this study, surgically operated patients could walk in about 6 hours after surgery and discharged out of hospital in about 24 hours after surgery.

Outcomes of PELD according to Macnab criteria in the current study were excellent or good in 91.4% and poor in 3.4% of cases with a follow-up period of 18 months. This finding is better than that of a study done on 47 patients where the outcomes were excellent or good in 85% and poor in 11% of the cases, although the period of follow up was the same[11]. The finding is also better than that of another study done on 43 patients which showed excellent or good outcome of 81.4% with a mean follow-up period of 31 months[12]. However, astounding results have been accounted for in up to 94% of patients experiencing PELD [13].

In a study done on 66 patients treated with PELD, 5 patients were re-operated on after PELD, [14] while in the current study only 2 patients were operated on again by microsurgical discectomy. In the same study 64% of the patients had herniated disc at L4-L5, while in this study 61.7% of the patients had herniated disc at L5-S1.

The complications reported in another study 15 in patients experiencing PELD included nerve injury (from 0 to 0.8%), discitis (from 0 to 0.8%), dural tears (from 2.3 to 7.1%) and recurrent disc prolapse (from 2.6 to 2.9%); these ranges are lesser than the rates revealed by current study which showed

injury in 1.7%, discitis in 1.7%, dural tears in 5.0% and intermittent disc prolapse in 3.3%. Another study on 816 patients underwent PELD, revealed that 1.1% of them developed symptomatic dural tears [16], a finding which is much lower than that reported in this study.

Conclusion

Although endoscopic spinal discectomy is a compelling procedure for management of lumbar disc prolapse, and although its final outcome is reasonable, it is not devoid from complications.

References

- [1] Johansson AC, Linton SJ, Rosenblad A, Bergkvist L, Nilsson O. A prospective study of cognitive behavioural factors as predictors of pain, disability and quality of life one year after lumbar disc surgery. *Disabl Rehabil.* 2010;32(7):521-9.
- [2] Van den Windt D, Simons E, Riphagen I. Physical examination for lumbar radiculopathy due to disc herniation in patients with low-back pain (Protocol). *Cochrane Database Syst Rev.* 2010;2.
- [3] Dang L, Liu Z. A review of current treatment for lumbar disc herniation in children and adolescents. *Eur Spine J.* 2010;19(2):205-14.
- [4] Brötz D, Maschke E, Burkard S, Engel C, Mänz C, Ernemann U, et al. Is there a role for benzodiazepines in the management of lumbar disc prolapse with acute sciatica? *Pain.* 2010;149(3):470-5.
- [5] Macnab I. "negative disc exploration: an analysis of the cause of nerve root involvement in sixty-eight patients." *J Bone Joint Surg (AM).* 1971;53:891-903.
- [6] Ahn Y, Lee SH, Chung SE, Park HS, Shin SW. Percutaneous endoscopic cervical discectomy for discogenic cervical headache due to soft disc herniation. *Neuradiology.* 2005; 47:924-30.
- [7] Manchikanti L, Falco F, Benyamin R, Caraway D, Deer T, Singh V, et al. An update of the systematic assessment of mechanical lumbar disc decompression with nucleoplasty. *Pain Physician.* 2013;16(2 Suppl):SE25-54.
- [8] Nakagawa H, Kamimura M, Uchiyama S, Takahara K, Itsubo T, Miyasaka T. Microendoscopic discectomy (MED) for lumbar disc prolapse. *J Bone Joint Surg.* 2003;10(2):231-5.
- [9] Schick U, Döhnert J, Richter A, König A, Vitzthum H. Microendoscopic lumbar discectomy versus open surgery: an intraoperative EMG study. *Eur Spine J.* 2002;11(1):20-6.
- [10] Palmer S. Use of a tubular retractor system in microscopic lumbar discectomy: 1 year prospective results in 135 patients. *Neurosurg Focus.* 2002;13(2):1-4.
- [11] Lew SM, Mehalic TF, Fagone KL. Transforaminal percutaneous endoscopic discectomy in the treatment of far-lateral and foraminal lumbar disc herniations. *J Neurol Neurosurg Spine.* 2001;94(2):216-20.
- [12] Ahn Y, Lee S-H, Park W-M, Lee H-Y, Shin S-W, Kang H-Y. Percutaneous endoscopic lumbar discectomy for recurrent disc herniation: surgical technique, outcome,

and prognostic factors of 43 consecutive cases. *Spine*. 2004;29(16):326-32.

[13] Thongtrangan I, Le H, Park J, Kim DH. Minimally invasive spinal surgery: a historical perspective. *Neurosurg Focus*. 2004;16(1):1-10.

[14] Sasani M, Ozer A, Oktenoglu T, Canbulat N, Sarioglu A. Percutaneous endoscopic discectomy for far lateral lumbar disc herniations: prospective study and outcome of 66 patients. *Minim Invasive Neurosurg*. 2007;50(2):91-7.

[15] Sherk HH, Vangsness CT, Thabit G, Jackson RW. Electromagnetic surgical devices in orthopaedics, Lasers and radiofrequency. *JBJS*. 2012;84(4):675-81.

[16] Ahn Y, Lee HY, Lee S-H, Lee JH. Dural tears in percutaneous endoscopic lumbar discectomy. *Eur Spine J*, 2011;20(1):58-64.