Original article

Preliminary results of lumbar disk herniation surgery by Endoscopic Destandau Method

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ABSTRACT

Background: The incidence of Disc herniation is about 2–3% of population. Each year 300,000 procedures performed in USA. The aim of this paper is to describe the utility of endoscopic procedure in treatment of lumbar disc herniation.

Methods: We operated 359 patients from September 2013 to December 2016 for lumbar disk herniation by Endoscopic DESTANDAU method (EDM). The average length of surgery was 47 min. We operated 211 male and 148 female patients. In average, patients had pain for 4.3 months before surgery.

Results: 310 patients became pain free in six weeks and 332 after 3 months. We had 7 recurrent herniation. Among these patients 4 have been operated for the second time with success. Three patients refused to be operated. And had infiltration. We had 1 deep infection and 3 cutaneous infections. We have 7 two SCF fluid leak. Among them 3 needed second operation.

Conclusions: The patients are admitted the day of surgery and are discharged the day after surgery. EDM is a good alternative surgery for lumbar disk herniation in comparison with classical surgery. The duration of hospitalization is shorter and recovery is faster.

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1. Introduction

The incidence of Disc herniation is about 2–3% of population.¹⁷ Typically, it is presented by lombalgia and Sciatic pain. sometimes the patient can present numbness and weakness in his leg in the same territory than radiculalgia. The management is first conservative including Analgesia and Anti-inflammatory product and maybe epidural injection and percutaneous nerve root block. A fast and urgently surgery is performed in case of neurologic deficits, saddle anaesthesia, and bowel or bladder dysfunction or hyperalgesic hernia. Very frequently, the symptoms are prominently resolved after six weeks. After this period, the surgery will be proposed if there is any improvement with adequate treatment. Conventional surgery consists of simple discectomy by posterior interlaminar approach for posteromedial and posterolateral herniation or foraminal and lateral approach for foraminal and extraforaminal disk herniation. Several minimally invasive and endoscopic techniques have been proposed in the literature in the

past three decades. Endoscopic Destandau's method(=EDM) proposed since 1993 is a suitable alternative to conventional open discectomy(=OP). In this paper, we present our experience and outcomes of patients operated by this technique

2. Material and methods

From September 2013 to December 2016, we operated 359 patients by EDM for lumbar disk herniation. The average age of patients was 43.6 (19–72). We operated 211 male patients and 148 female patients (Female/Male ratio = 1/1,32) 178 patient had a L5-S1 disk herniation, 165 had L4-L5, 9 patients had a L3-L4 disk herniation, 5 patients had a L2-L3 and 2 Patients had L1-L2 herniated disk. 15 patients had two levels discectomy. 12 patients in L4-L5 and L5-S1 and 2 patients L3-L4 and L4-L5 and one patient L3-L4 and L5-S1. Table 1 demonstrates the patients baseline and characteristics.

The diagnosis of lumbar disk herniation was based on data from IRM in 348 patients. In 11 patients the lumbar disk herniation was diagnosed in TDM. In 35 patients an EMG examination is performed. In average, patients had pain for 4.3 months (17 days–17 months). The patients are seen 6 weeks, 3 months and six months after surgery. There was any imaging in

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Table 1

Patients baseline and characteristics.

Patients	age	Female		Male	
359	19–72(42,71)	148		211	
Level	L1-L2	L2-L3	L3-L4	L4-L5	L5-S1
	2	5	12	172	182

postoperative appointments unless symptoms persisted or new signs appeared.

2.1. Procedure

The surgery takes place under general anaesthesia in 350 patients and under spinal anaesthesia in 9 patients. The position is Knee-chest. After preliminary x-ray image, skin incision is made paramedian just lateral to spinous processes. Paraspinal muscles will be detached and pushed laterally by sharp raspars and curved. Mayo scissors and The ENDOSPINE be inserted and placed against the lamina. A hemilaminectomy of superior vertebra will be realized, The opening of the lamina provides access to the spinal canal. The surgeon removes ligamentum flavum. After a satisfactory opening of the spinal canal, the posterior longitudinal ligament will be cut. The discectomy will then be carried out. The disc herniation will be identified by the hook and will be removed with the rongeur. the procedure is described more completely and in greater detail in a further article published recently.¹³

3. Results

The patients were visited in outpatient control six weeks, 3 months and 6 months after surgery. The outcomes were evaluated by Macnab Criteria.¹¹ In six weeks after surgery, in 201 patients, outcomes were excellent (55.9%). 134 were good (37.3%), 14 patients had fair outcomes (3.90%) and 10 patients had poor outcome (2.57%). In 3 months, 298 patients had excellent outcome (83.01%), 46 patients had good outcome (12.81%), 9 patients had fair outcome (2,50%) and 6 patients had poor outcomes (1.67%). In six months, 301 patients had excellent outcomes (83.84%), 43 patients had good outcomes (11.98%), 9 patients had fair outcomes (2,50%) and 6 patients had poor outcomes (1.67%). This total amounts to 95.82% of excellent and good outcomes. 310 patients became pain free in six weeks and 332 after 3 months for their radiculalgia. 7 patients had recurrent herniation. Among these patients 4 have been operated for the second time with success and 2 patients had infiltration. 234 patients restarted their work 2 months after surgery, 47 patients 3 months and 31 patients 6 months after surgery. 47 patients did not return to work or took the opportunity of professional re-orientation. We have 9 SCF fluid leak. Among them 3 needed second operation. 7 infections were observed. Among them there was 1 deep infection. Other 6 patients had superficial infection and delayed wound healing. 2 patients had cauda equine syndrome: one patient had loss of bladder function and the second erectile dysfunction and loss of bowel and bladder function. Both had inadvertent opening of Dura-mater during the procedure. In the two first years, we used to employ non absorbable 3.0 suture thread. From July to December 2016, we operated 51 patients. Among them, 45 patients had skin adhesive for wound closure. None of them had infection. Since February 2016, Patients have been sent from Recovery to their rooms in wheelchairs and not on the stretcher if their physical conditions allowed it. And they began to walk 1 h after the return in their rooms. Patients were discharged the operation day or the day after surgery. Mean hospital stay was 21 h (Figs. 1–3).

Fig. 1. Endospine with three channels, red arrow for: surgical instruments; black arrow for suction; double arrow: for nerve root retractor. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

Fig. 2. Incision of 3 cm et le speculum in place.

Fig. 3. Operating field seen through endoscopic Arrow shows the emergence of the nerve.

4. Discussion

The surgery of lumbar disk herniation –discectomy- have greatly evolved in the past three decades. The first lumbar discectomy is successfully performed in 1908 by Heinrich O. Oppenheim and the surgeon Fedor Krause in Germany.⁴ In the late 1960s the use of the Operating Microscope allowed surgeons to do discectomy with smaller incision and much better visualization. Alternative mini-invasive approaches have been developed for lumbar discectomy. Posterolateral mechanical decompression of

the herniation lumbar disc was introduced in the early 1970s. In 1975 Sadahisa Hijikata described percutaneous discectomy for the first time.¹⁴ The endoscopic approach to lumbar disc herniation by Destandau's method[EDM] was proposed in 1993. The latter gives maximum exposure to disc space with the goal of minimizing cutaneous incision.^{7,13} The incision is smaller than conventional discectomy and do not exceed 3 cm. We need a preoperative X-ray control and sometimes an intraoperative one. In full endoscopy discectomy, while the incision is smaller but an x-ray must be taken after each passage. As a result, a non-negligible dose of x-ray will be administered in every procedure. The visual field in EDM is broad, and depending on the workability of the ENDOSPINE, an adequate access even to two lumbar levels is possible.¹³ The learning curve is maybe longer for surgeons who are not accustomed to using endoscopy. There are no many studies to assess clinical outcome in literature for lumbar discectomy by EDM. We find only some retrospective studies in PubMed.^{1–3,5,8–10} Our study contains more patients than other studies as we know. Kaushal al had 90% excellent to good outcomes after one year in 300 patients.⁸ In the study of Lysoń et al. good to excellent outcome was achieved in 89% of patients.¹⁰

Mahesha presented 96% excellent and good outcome with Percutaneous endoscopic discectomy. Mean hospital stay was 1.6 days.¹² In our study mean hospital stay was 18 h. Phan et al. in their meta-analysis of Full-endoscopic versus micro-endoscopic and open discectomy which includes 23 studies did not find significant difference in overall complications, wound infections in minimally invasive endoscopic discectomy versus open discectomy. However, they found that endoscopic approaches overall demonstrated significantly lower estimated blood loss.¹⁵ Ruan W et al. demonstrated that endoscopic discectomy can achieve shorter operation time and hospital stay than open discectomy surgical group.¹⁶

According to systemic cytokine, systemic IL-6 and CRP response to surgical trauma, Huang TJ et al. showed that the latter, was significantly less following endoscopic discectomy than following Open discectomy.⁶

5. Conclusion

Surgical treatment of lumbar disk herniation by EDM offers a safe and minimal procedure in comparison with open or microdiscectomy. This technique allows early postoperative mobilization and faster discharge and faster return to work.

Conflict of interest

The authors declare that there is no conflict of interest.

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References

1. Akshulakov SK, Kerimbaev TT, Sekenova GT, Makimova GS. Analysis of the results of endoscopic surgical treatment for hernias of the lumbosacral disks. *Zh Vopr Neurokhir Im N Burdenko*. 2005;(October–December).
2. Destandau J. Technical features of endoscopic surgery for lumbar disc herniation: 191 patients. *Neurochirurgie*. 2004;50(March (1)):6–10.
3. Gotfryd A, Avanzi O. A systematic review of randomised clinical trials using posterior discectomy to treat lumbar disc herniations. *Int Orthop*. 2009;33:11–17.
4. Gruber P, Böni T. Von der Streckbank zur Mikrodiskektomie. *Unfallchirurg*. 2015;118(December Suppl):53–65.
5. Hovorka I, Damotte A, Arcamone H, Argenson C, Boileau P. Lumbar videodisectomy. Results in a prospective consecutive series. *Rev Chir Orthop Reparatrice Appar Mot*. 2004;90(June (4)):312–318.
6. Huang TJ, Hsu RW, Li YY, Cheng CC. Less systemic cytokine response in patients following microendoscopic versus open lumbar discectomy. *J Orthop Res*. 2005;23(March (2)):406–411.
7. Kambin P, Zhou L. History and current status of percutaneous arthroscopic disk surgery. *Spine*. 1996;21:575–615.
8. Kaushal M, Sen R. Posterior endoscopic discectomy: results in 300 patients. *Indian J Orthop*. 2012;(January (1)):4681–4685.
9. Korobova AN, Stepanian MA, Onopchenko EV, Kadin LA, Grigorian luA. Endoscopic microdiscectomy in the treatment of lumbar disk herniation. *Zh Vopr Neurokhir Im N Burdenko*. 2007;32(April–June (2)):34–35.
10. Lysoń T, Mariak Z, Jadeszko M, Kochanowicz J, Lewko J. Results of Destandau microendoscopic lumbar discectomy. *Neurol Neurochir Pol*. 2008;42(March–April (2)):105–111.
11. 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.
12. Mahesha K. Percutaneous endoscopic lumbar discectomy: results of first 100 cases. *Indian J Orthop*. 2017;51(January–February (1)):36–42.
13. Mostofi K, Destandau J. *Interdisciplinary Neurosurgery: Advanced Techniques and Case Management*. 10.1016/j.inat.2016.11.009.
14. Nihon Rinsho. Development of percutaneous endoscopic approach for lumbar disc herniations 2010 68 July (7) 1383–90.
15. Phan K, Xu J, Schultz K, et al. Full-endoscopic versus micro-endoscopic and open discectomy: a systematic review and meta-analysis of outcomes and complications. *Clin Neurol Neurosurg*. 2017;154(March):1–12.
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. *Int J Surg*. 2016;31(July):86–92.
17. Vialle LR, Vialle EN, Henao JE, Giraldo G. Lumbar disc herniation. *Rev Bras Ortop*. 2010;45(January (1)):17–22.