

Original article

Endoscopic lumbar discectomy: Experience of first 32 cases

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Abstract:

Aim: To study the efficacy of micro endoscopic method (MED) of disc removal in patients of lumbar disc prolapse.

Material and methods: A total of 32 patients were operated by the MED procedure for lumbar PIVD and were evaluated for the results. The inclusion criteria were patients having MRI proven lumbar disc prolapse at L4-5 or L5- S1 level with unilateral radiculopathy and the surgery was done by the Destandeu system.

Results: The mean duration of surgery was 90 minutes (ranged 45 to 160 min). In three patients conversion to open surgery was needed due to difficult anatomy. There were no complications. All the patients were discharged after 24-48 hours of surgery. A total of 24 patients had an excellent outcome, 5 patients had a good outcome, 2 patients had a fair outcome and 1 had a poor outcome requiring repeat surgery. Overall, 90% of patients had excellent-to-good results.

Conclusion:

Micro endoscopic discectomy is a safe and minimally invasive method of disc removal and has comparable or better outcome in selected group of patients.

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INTRODUCTION

Yasargil¹ and Casper² and Williams³ introduced the concept of microscopic disc removal and ever since then, micro discectomy has become a gold standard procedure for prolapsed discs. The advances in optics and instrument design have led to the successful application of endoscopes for less invasive surgical procedures in the abdomen, the thoracic cavity, and several joints where the surgical efficacy is at least similar to that of the conventional, more invasive approaches, but with decreased hospital stays and shorter recovery times. Hence the use of an endoscope for disc excision through posterior approach was introduced. This procedure is known as micro endoscopic discectomy (MED). The new systems for endoscopic posterior discectomy are either a conic "freehand" working channel (the Endospine by J. Destandeu) or a tubular retractor (Metrix system, Medtronic), introduced by Foley and Smith.⁴

MATERIALS AND METHODS

A total of 32 consecutive cases aged 19-65 years operated by the MED procedure for L4-5 or L5-S1 PIVD from August 2016 to July 2019 were retrospectively evaluated for the result. All the cases were operated on by a single surgeon. The inclusion criteria were patients having MRI proven lumbar disc prolapse at L4-5 or L5- S1 level with unilateral radiculopathy. Any patients with bilateral symptoms, involvement of two levels and cauda equina syndrome were excluded. All patients were operated only after proper conservative management for minimum 6 weeks which consisted of rest, modification of activities, physiotherapy and analgesics and anti-inflammatory drugs. The duration of symptoms ranged from 6 weeks to 5 years. The surgery

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was done by the Destandeu system.

Operative technique

All the procedures were done under general anesthesia. The patient was placed in prone position with the abdomen free and the spine flexed to open the interlaminar space. The surgeon stood on the side of the disc prolapse, the TV monitor was at the head end. The incision was marked in lateral projection under fluoroscope guidance. Once the entry point was marked about 1-1.5 cm lateral to the midline, a skin incision was made. The subcutaneous tissue and fascia were incised. The muscles were separated subperiosteally. The sheath and obturator was introduced and the final position was checked under fluoroscope. The endoscope was connected to the camera, and light source.

Once the endoscope was inserted the first step was the orientation of the image. The inferior edge of the lamina was identified after removing the soft tissues by coagulation and rongeur. The ligamentum flavum below the inferior edge of the lamina was identified and with the help of dissector the space was created between the flavum and the lamina. The overhang lamina was removed with the help of Kerrison rongeur till the edge of the flavum is reached. The flavectomy is done by punches after protecting it from the underneath dura. Once the flavectomy was done, the dural margin and nerve root were identified the nerve root was then gently retracted. After retraction of the root, epidural dissection was carried out. Once the disc space was reached, the sequestered pieces could be removed or if annulotomy was required then it could be carried out with a micro-knife. Any loose pieces inside the disc space were removed with disc forceps. After discectomy, the final check of the root mobility was done. The scope was removed and the lumbodorsal fascia was sutured. Subcuticular skin sutures and skin staples or sutures were applied.

The patients were allowed to walk as soon as the patient was comfortable and surgical pain decreased. The patients were discharged between 24-48 h. Patients were encouraged walking till pain tolerance for 3 weeks. They were allowed to return to work after 3 weeks. The patients were followed up after 2, 6 and 12 weeks. The mean follow up was 12 months, (range 3 months-4 years). They were evaluated for symptoms of back pain, leg pain, and neurological deficit. Any new symptoms, complications of surgery, or the need for conversion to open surgery were also evaluated. The results were graded as excellent, good, fair, or poor depending on relief of back and leg

pain, use of analgesics, and any complications. We have used modified Macnab criteria for grading the results. Excellent - no pain/restriction of activity and being able to do all activities; good - occasional pain with relief of presenting symptoms and returning to work with some modification; fair - some improved functional capacity but still handicapped or unemployed and poor results- having objective symptoms of root involvement or repeat surgery at the index level.

RESULTS

Surgery was successfully completed in all the patients. The mean duration of surgery was 90 minutes (ranged 45 to 160 min). In three patients conversion to open surgery was needed due to difficult anatomy. None of these patients had any clinical problem in the postoperative period. All the patients were discharged after 24-48 h of surgery. Up to 3 weeks, patients had some residual back or leg pain. The post-operative MRI was done only if the patients had persistent or new symptoms.

Complications were minimal like dural punctures (n=2), postoperative discitis (n=1) who was treated conservatively on four weeks antibiotic therapy. (table 1) One patient had residual disc for which he had to be re-operated. A total of 24 patients had an excellent outcome, 5 patients had a good outcome, 2 patients had a fair outcome and 1 had a poor outcome requiring repeat surgery. Overall, 90% of patients had excellent-to-good results. (Tabe2)

Table 1: Clinical profile of the study patients

Male	18
Female	14
Mean Age	38.2 ± 5.2
Involved Segment L4/5 L5/S1	17 15
Mean duration (months)	15 ± 3.7
Complications Dural tear Discitis	2 1
Conversion to open type	3
Postoperative stay(days)	1-2 days
Reoperation for residual disc	1

Table 2: showing outcome of the study patients in

Mac Nab criteria

Excellent-no pain/restriction of activity and being able to do all activities	25
Good - occasional pain with relief of presenting symptoms and returning to work with some modification	4
Fair - some improved functional capacity but still handicapped or unemployed	2
Poor-having objective symptoms of root involvement or repeat surgery at the index level	1

DISCUSSION

Katayama et al⁵. compared the results of macro discectomy versus micro discectomy. They concluded that there was no difference between the surgical outcome of both of them but micro discectomy gave better lighting, magnification and therefore decreased the length of incision and tissue invasion. They also found that micro discectomy allowed the patients to return early to work with lesser use of postoperative narcotic analgesics. It is but natural that if both the procedures have overall same outcome than the procedure with lesser tissue invasion, lesser length of incision, lesser use of postoperative analgesics with an early return to work is the procedure of choice.

MED introduced by Foley et al. 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 micro discectomy. Because the MED procedure causes significantly less iatrogenic injury to the Para spinal 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 micro discectomy and the lesser tissue invasiveness than micro discectomy.

Many reports are presented which prove the efficacy of MED with overall comparable results⁶⁻¹⁰. Our study had an overall result of 90%. We compared our results with the series of Perez-Cruet et al.⁶ (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



Figure 1: Showing small one inch incision overlying the L5/S1 disc space



Figure 2: Showing Destandau system inserted at the trough 2.5 cm skin incision



Figure 3: Showing Duramater and nerve root being retracted and underlying prolapsed disc is seen

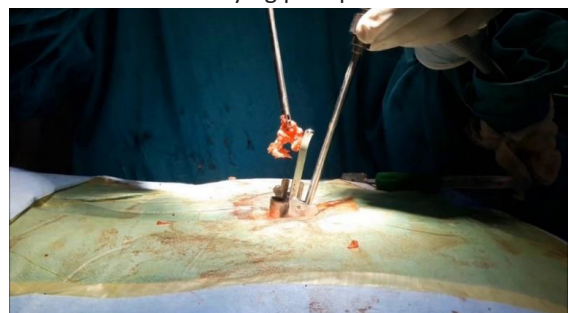


Figure 4: Showing removal of the prolapsed disc

rate was 4%, and average return to work was 17 days with an overall result of 94%. We had 24-48 hrs of hospital stay compared to 7.7 h of their study and greater operating time (66 vs. 90 min), complication rate (5% both series), reoperation rate (4% vs. 3%), return to work (17 vs. 21 days), and overall results (94% vs. 90%) are comparable in both series. Similar results are reported by Ranjan et al.⁹ in their series of 107 cases. Their average surgical time was 120 min, hospital stay was of 24–48 h, complication rate was 6.5% with open surgery conversion in one patient and recurrence in two patients. Our series had one recurrent disc. 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, micro discectomy, and standard discectomy.

In our series, the complication rate is 5% and the recurrence rate is 3% which also match with the results of macro- and micro discectomy. The complications which we had are due to initial learning curve. MED has a definite learning curve because of two-dimensional visions, orientation with scope, handling of the scope, less space available for dissection, and managing epidural bleeding^{11,12}.

Though from our initial experience, 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 micro discectomy. A well-designed double-blind prospective randomized control trial needs to be done comparing MED and micro discectomy and standard discectomy to prove these facts.

CONCLUSION

Micro endoscopic discectomy is a minimally invasive procedure for discectomy with encouraging results in selected group of patients with adequate safety and minimal morbidity.

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