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Research Article

ENDOSCOPIC DISCECTOMY BY DESTANDEAU TECHNIQUE: AN INITIAL EXPERIENCE

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ABSTRACT

Background: Endoscopic lumbar discectomy has now become a standard modality of treatment for lumbar disc prolapse with several advantages in comparision to open discectomy. This article retrospectively reviews the experience of 20 cases performed by Destandeau system for technical problems, complications and overall results.

Material and method: Total of 20 consecutive cases aged 25-55 years operated by the MED procedure (Destandeau system) for L4-5 or L5-S1 PIVD from March 2013 to October 2017 were retrospectively evaluated for the result. All the cases were operated on by a single surgeon.

Result: Surgery was successfully completed in all the patients. None of the patient had any root injury or dural injury. Two of them required conversion to open surgery for residual disc causing radicular pain. None of other patients had any clinical problem in the postoperative period. All the patients were discharged after 24-48 h of surgery. A total of 15 patients had an excellent outcome, 3 patients had good outcome, two had poor outcome. Overall, 90% of patients had excellent-to-good results.

Conclusion: Microendoscopic discectomy is a minimally invasive procedure for discectomy with lesser hospital stay and lesser need of analgesics early encouraging results and early return to work.

INTRODUCTION

Endoscopic lumbar discectomy has now become a standard modality of treatment for lumbar disc prolapse. Advantage in comparison to open discectomy being better visualization so lesser chances of radicular injury, small skin incision and less muscle and epidural handling and scarring. Patients had less postoperative pain, early rehabilitation, and early return to work less hospital stay and lesser use of analgesics. Any disc pathology along with elements of bony lateral stenosis can be dealt with this approach. The use of an endoscope for disc excision through posterior approach was introduced. The Microendosystem allows the use of micro-instruments through a tube, making it possible, under endoscopic control, to perform a true discectomy. This procedure is known as microendoscopic discectomy (MED). The new systems for endoscopic posterior discectomy are either a conic "freehand" working channel (the Endospine by J. Destandeau) or a tubular retractor (Metrx system, Medtronics), introduced by Foley and Smith.[1]

The author has been using the Destandeau system on a regular basis since August 2013.

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This article retrospectively reviews the experience of 20 cases from August 2013 till October 2017 for technical problems, complications and overall results.

MATERIALS AND METHODS

A total of 20 consecutive cases aged 25-55 years operated by the MED procedure for L4-5 or L5-S1 PIVD from March 2013 to October 2017 were retrospectively evaluated for the result. All the cases were operated on by a single surgeon. The inclusion criteria were patients having lumbar disc prolapse with unilateral radiculopathy, on clinical evaluation, positive straight leg raising test and identification of a single nerve root lesion. Any patient with bilateral symptoms, double root involvement were excluded. On imaging, 12 patients had L4-5 and 8 had L5-S1 PIVD. 11 patients had disc prolapse on left side and 9 on the right side. All were posterolateral discs including sequestrated or minimally migrated or retained disc protrusions with radicular compression and selected central discs with unilateral symptoms. All patients had MRI of Lumbosacral spine and X ray LS spine in extension and flexion lateral views. All patients were operated only after proper conservative management for minimum 4 weeks which consisted of rest, modification of activities, physiotherapy and analgesics and anti-inflammatory drugs. The duration of symptoms ranged from 4 weeks to 3 years. The surgery was done by the Destandeau system.

Operative technique

All the procedures were done under general anesthesia. Surgery was performed in prone position on a spinal frame, with the abdomen free and the spine slightly flexed to open the interlaminar space. The level of disease was localized under C-arm using special localizer and/or 22G needle. The surgeon stood on the side of the disc prolapse, the TV monitor was on opposite side in front of the surgeon. At the marked point, a 15mm skin incision was made which was deepened up to paravertebral muscles. Using 12mm osteotomeparaspinal muscle was separated from the spinous process and the lamina to reach the posterior vertebral arch.

Again under C-arm AP projection was taken and the site of port placement was at the inferior edge of the superior lamina and in lateral projection, it was parallel to the disc space. The endospine operating tube with obturator was placed in the direction of posterior arch. The obturator was removed and the operating insert containing 4 channels was put in.

The endoscope was connected to the coupler, camera, and light source. The whole assembly was introduced through the telescope channel Once the endoscope was inserted the first step was the orientation of the image. A proper image orientation occurs when the underlying anatomy show the medial part on the top of the screen (12 o'clock) and the lateral one on the bottom (6 o'clock). The inferior edge of the lamina was identified after removing the soft tissues by coagulation and rongeur. The ligamentumflavum below the inferior edge of the lamina was identified and with the help of penfield space is created between the flavum and the lamina. The overhang lamina is removed with the help of Kerrisonrongeur 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 with root retractor in separate channel. If there was large disc, tight root, sequestrated disc or lateral recess stenosis, the laminoforaminotomy was widened for adequate root decompression. After retraction of the root, epidural dissection was carried out. The veins could be coagulated with bipolar coagulation if required. Once the disc space was reached, the sequestrated pieces were removed or if annulotomy was required then it was 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.

After a thorough wash the scope was removed and the lumbodorsal fascia was sutured. Subcuticlar skin sutures were taken and dressing was applied.

All the patients were operated by destandeau system through 15 mm incision. 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 sitting, standing and walking in the next morning after surgery. They were advised paracetamol twice daily for two days and injectable antibiotic (ceftriaxone) for 2 days. They were discharged on oral antibiotics for 5 days after which skin suture was removed. Bending forward and lifting weight were restricted till 30 days postoperative. They were allowed to return to work after two weeks. The patients were followed up after 1, 6 and 12 weeks. The mean follow up was 12 months, (range 2 months to 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 same level.

RESULTS

Surgery was successfully completed in all the patients. None of the patient had any root injury or dural injury. Two of them required conversion to open surgery for residual disc causing radicular pain. Both patients were re-explored through open surgery with little increase in size of laminotomy and residual disc was removed. The mean duration of surgery was 105 minutes (ranged 60 to 150 min). No peroperative complication occurred except 2 cases of residual disc who had significant pain postoperatively. None of other patients had any clinical problem in the postoperative period. All the patients were discharged after 24-48 h of surgery. Up to one week, 8 patients had some residual back or leg pain. The postoperative MRI of 6 patients showed complete decompression in 4 and residual disc causing compression in 2

Two cases who had residual disc were our initial cases. No patient had postoperative discitis. None of the patient had recurrence of disc at the same level. A total of 15 patients had an excellent outcome, 3 patients had good outcome, and two had poor outcome requiring repeat surgery. Overall, 90% of patients had excellent-to-good results.

DISCUSSION

The overall results of standard discectomy range from 68% to 95% in different series.[2-6] Though the results of standard discectomy are equally good, microdiscectomy introduced by Yasargil and Caspar (1977) is considered a gold standard. The results of microdiscectomy also range from 88% to 98.5%.[7-9] Both the procedures are time-tested procedures giving a good surgical result in patients having disc prolapse. Katayama *et al*.[10] compared the results of macrodiscectomy versus microdiscectomy. They concluded that there was no difference between the surgical outcomes of both of them but microdiscectomy gave better lighting, magnification and therefore decreased the length of incision and tissue invasion. They also found that microdiscectomy 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 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.

Many reports are presented which prove the efficacy of MED with overall comparable results.[11-15] Our study had an overall result of 90%. We compared our results with the series of Amit Jhala*et al* (n=100)[16]where the average surgical time was 70 min, hospital stay was 24-48 h, complication rate was 5%, reoperation rate was 3%, and average return to work was 21 days. We also had 24-48 hrs of hospital stay. Other factors like surgical time (70 vs.105 min), complication rate (5% vs 10%), reoperation rate (3% vs 10%), return to work (21 vs. 15 days), are comparable in both series except for longer operating time and bit higher reoperation rate. This is because of initial experience of the technique. Similar results are reported by Perez-Cruet *et al*Ranjan *et al*.[14] in their series of 150 and 107 cases. From these data, it can be concluded that MED is safe and effective. There is one nonrandomized study by Schizas[17] 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.

Microendoscopic discectomy (MED) has claimed even lesser tissue invasion than microdiscectomy with even smaller skin incision, lesser use of analgesics, and early return to work. Least tissue invasion is established by many reports comparing the postoperative MRI signal of paraspinal muscles.[18] Our personal opinion is similar as all patients had only a 15mm skin incision and postoperative MRI done in six cases showed very less signal changes in the paraspinal muscles though these were not the parameters studied in our series.

Minimally invasive microendoscopic decompression technique has been used not only for single level paracentral discectomies but also for multilevel lateral as well as central disc herniations,[19] recurrent disc her niations,[20] decompressions of lumbar canal stenosis.[21]

In our series, the complication rate is 10% and the recurrence rate is 10% which also match with the results of macro- and microdiscectomy. 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.[22,23]

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 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.

CONCLUSION

Microendoscopic discectomy is a minimally invasive procedure for discectomy with lesser hospital stay and lesser need of analgesics early encouraging results and early return to work. It has a learning curve initially but once expertise is acquired over the technique, the results of this procedure are acceptable and are safe and effective.

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