

Posterior Cervical Microdiscectomy

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ABSTRACT

Background: Posterior cervical foraminotomy was first described by Spurling and Scoville. With the incorporation of the operating microscope and microsurgical techniques, there has been renewed interest in this approach for laterally placed cervical disk prolapse.

Materials and methods: Twenty-nine patients (20 males and 9 females) with ages varying from 31 to 55 years underwent posterior cervical microdiscectomy for laterally placed cervical disk prolapse at 30 levels. Surgical procedure employed by us for the posterior cervical microdiscectomy is described in the article.

Results: All the patients had relief from radiculopathy following the surgery. No major complication was noted in our series. One patient developed transient nerve root deficit which improved, over 6 weeks. No fusion was required in any case. Hence, all the complications of anterior approach and fusion could be avoided.

Conclusion: Posterior cervical microdiscectomy is a safe and effective approach for the treatment of laterally placed cervical disk prolapse. In selected cases, this approach provides excellent results with minimal complications.

Keywords: Cervical disk, Cervical radiculopathy, Laminoforaminotomy, Minimally invasive, Posterior cervical microdiscectomy.

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INTRODUCTION

Posterior cervical foraminotomy was conceived and described by Spurling and Scoville in 1951 for the surgical treatment of laterally placed cervical disk prolapse.¹ In properly selected cases symptomatic improvement is noted in 93 to 97% of patients who underwent posterior laminoforaminotomy. However, with the introduction

of the anterior cervical discectomy by Cloward in 1958 and its subsequent growing popularity among spinal surgeons, the posterior cervical discectomy took a backseat. This was further supported by the presence of postoperative pain in about 18 to 60% patients due to extensive stripping of paraspinal musculature.¹ However, with the introduction of the operating microscope and microsurgical techniques this extensive muscle dissection could be avoided and postoperative pain reduced significantly. Endoscopic techniques also have been adopted to this approach with excellent results.¹ Experience gained from microlumbar discectomy was successfully used in the posterior cervical approach. We present our series of posterior cervical microdiscectomy performed in selected patients with lateral cervical disk prolapse presenting with radiculopathy with excellent results.

MATERIALS AND METHODS

Twenty-nine patients (20 males and 9 females) with ages varying from 31 years to 55 years underwent posterior cervical microdiscectomy for laterally placed cervical disk prolapse at 30 levels. All cases except one were single level disk prolapses. All the patients suffered from laterally placed soft disk prolapse with radiculopathy (Figs 1A and B). Patients with significant posterior osteophyte, OPLL, centrally placed disk prolapse and myelopathy were considered unsuitable for this procedure and excluded. All the patients underwent preoperative magnetic resonance imaging (MRI). The various levels involved are enumerated in Table 1.

POSITION

All the patients were placed in the prone position with the head fixed in the Sugita head frame. The shoulders were pulled down by wrist straps especially to visualize the lower cervical levels better on the C arm image intensifier.

INCISION

A small 3 cm long midline incision was used after identifying the level through the C arm image intensifier.

EXPOSURE

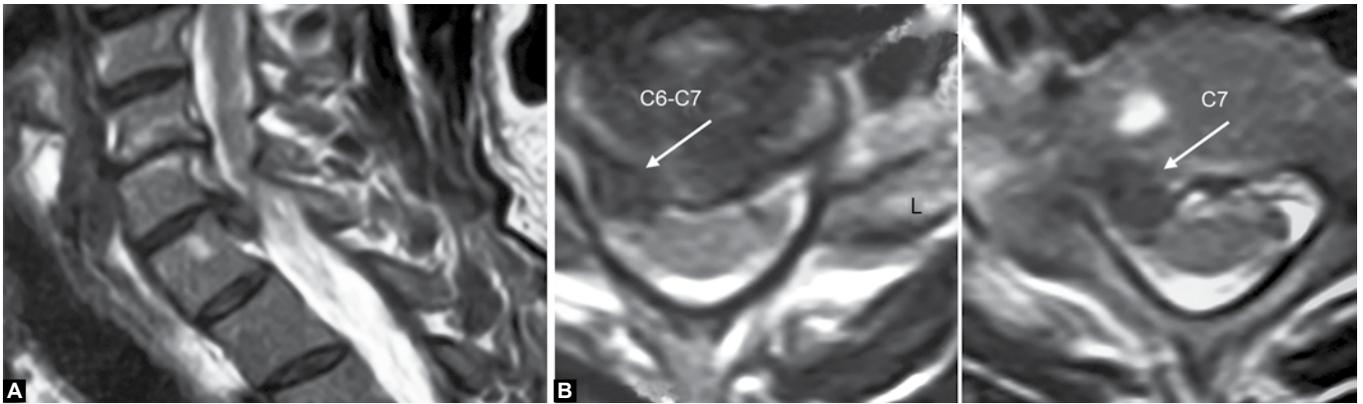
The paraspinal muscles are separated only on the side of the disk prolapse and also to a limited extent. Subperiosteal dissection is carried out laterally upto the

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Figs 1A and B: (A) Sagittal MRI image showing a paracentral cervical disk prolapse and (B) axial MRI showing a soft right posterolateral cervical disk prolapse at C6-C7

facet joint of the involved level. After this a William’s hemilaminectomy retractor is placed in such a way that the involved lamina and facet joint is exposed. A window in the form of a laminoforaminotomy is made using a high speed drill (Fig. 2). Medial 25% of the facet joint is drilled and excised. Ligamentum flavum is then excised exposing the dura and the corresponding root. The root is adequately deroofed using the drill and Kerrison punch.

Table 1: The distribution of level among the patients

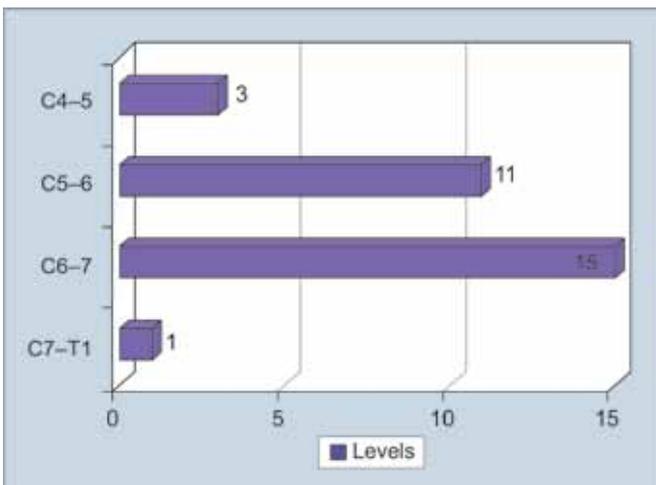


Fig. 2: Illustration showing the area of laminoforaminotomy

Troublesome extradural venous bleeding is sometimes encountered at this stage which is usually comfortably controlled using bipolar cautery and surgical.

DISCECTOMY

The root is now retracted to visualize the disk bulge, which is usually noted inferior to the root (Fig. 3). The posterior longitudinal ligament (PLL) is incised using a 11 blade knife and discectomy done (Fig. 4). Small disk forceps are used and not the usual pituitary rongeurs² (Fig. 5). Usually, only the prolapsed and sequestered portions of the disk is removed and vigorous discectomy avoided. However, the root is adequately decompressed both anteriorly by removal of the disk bulge and posteriorly by the laminoforaminotomy (Fig. 6). After perfect hemostasis the wound is closed.

RESULTS

All the patients had excellent relief from radicular pain (Table 2). One patient suffered transient weakness of the muscles supplied by the corresponding root probably due to excessive usage of bipolar cautery in close proximity of the root. This weakness recovered spontaneously over 2 weeks. All patients received analgesics and steroids for 24 hours after surgery. Postoperative stay in all cases was not more than 2 days. Philadelphia or a soft cervical collar was advised for 6 weeks after surgery after which it was discontinued. Neck exercises were taught and patient advised to be regular with the same. No wound infection or disk space infection was encountered. No patient suffered from significant postoperative muscular pain or spasm. Follow-up of these patients did not reveal any clinical or radiological sign of instability. No recurrence of the disk prolapse was noted on follow-up.

DISCUSSION

In 1951, Spurling and Scoville described the posterior decompressive keyhole operation for cervical discectomy.¹





Fig. 3: After laminoforaminotomy and ligamentum flavum removal the disk bulge (green arrow) is seen after retracting the nerve root (yellow arrow) superiorly

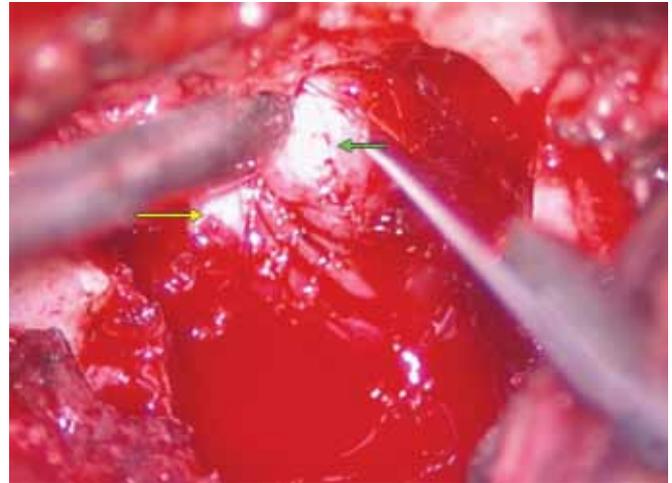


Fig. 4: The nerve root (yellow arrow) is retracted superiorly and the disk bulge (green arrow) is cut using a 11 blade

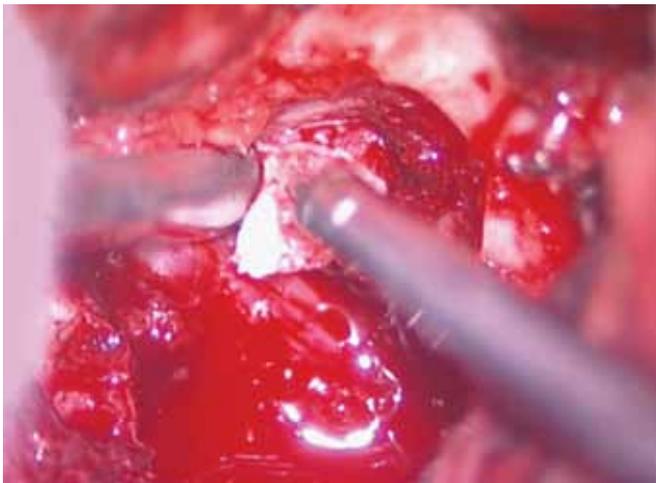
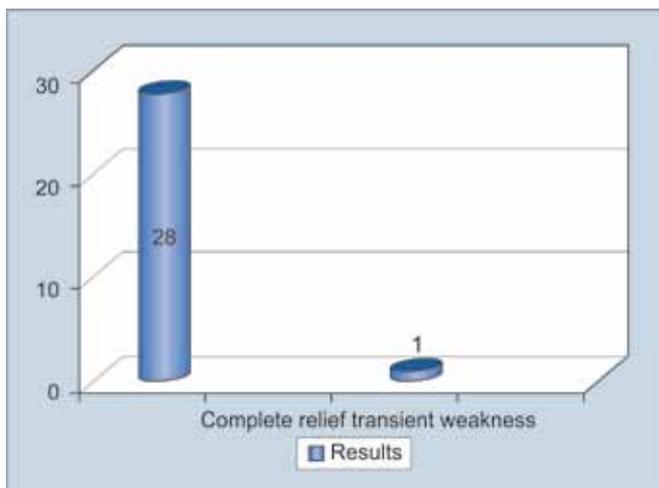


Fig. 5: The disk is removed using disk forceps



Fig. 6: The nerve root (yellow arrow) is adequately decompressed after disk removal and hemostasis

Table 2: The result of the surgery regarding pain relief and fresh neurological deficit



This approach rapidly gained acceptance and popularity among neurosurgeons. However, in 1955 Smith and Robinson and later in 1958 Cloward developed the anterior approach.¹ The pendulum gradually swung towards

the anterior approach for cervical disk prolapse and continues to be so even today.³ Some neurosurgeons, however, have performed the posterior laminoforaminotomy regularly and reported their large series with excellent results.⁴ Henderson et al with a large series of 846 patients, Simeone and Dillin and Herkowitz et al are some of the authors who have reported excellent results with this approach.⁵

As in any surgical procedure, selection of the patient is crucial to the outcome of the surgical procedure. The ideal candidate for this procedure would be a patient with a lateral disk herniation presenting with radiculopathy. Central disk herniations, patients with myelopathy and those with posterior osteophytes compressing the cord or root are not good candidates for this approach. These patients should be approached anteriorly.

The posterior approach fell into disrepute initially, because of the postoperative pain and spasm due to extensive paraspinal musculature dissection.⁶ With incorporation of microsurgical technology the surgery

became more precise and less traumatic. The incision became small with lesser and unilateral muscle dissection resulting in minimal postoperative pain and spasm.⁵ The size of the laminoforaminotomy too has decreased with the introduction of the operating microscope in this surgical procedure.

The obvious advantages of this procedure include the following:

- Preservation of most of the disk (disk saving procedure), and hence, motion at the level.
 - Avoiding fusion.^{2,3}
 - Global (anterior and posterior) decompression of the nerve root by removing the disk anteriorly and foraminotomy posteriorly.
 - Sequestered disk is encountered early after the exposure unlike in the anterior approach, where the prolapsed disk is reached only after the normal disk is removed.
 - Adjacent level degeneration seen after fusion is avoided.
 - Some of the complications of the anterior approach, like tracheal injury, esophageal injury, stroke etc. are avoided.^{3,4}
 - Cost of posterior cervical discectomy is less.⁷
- The limitations of this procedure include:
- This procedure cannot be used in central disk herniations or where a posterior osteophyte is compressing the nerve root or cord. Hence, the indication is limited unlike the anterior approach which can be used for almost all pathologies.
 - Epidural venous bleeding can be extremely troublesome and can adversely affect the visualization of the root and the disk. Some authors have adopted the sitting position to overcome this epidural ooze.³

However, this can increase the risk of air embolism and cardiac instability.⁵

- If more than 50% of the facet has been drilled instability may result necessitating a lateral mass fixation on the opposite side or an anterior fusion.⁶
- Sometimes manipulation of the nerve root is required to remove the disk which is not required in the anterior approach.

CONCLUSION

Posterior cervical microdiscectomy is a safe and effective procedure in patients with lateral cervical disk prolapse. In selected cases, this procedure is superior to the anterior alternative.

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