Original Article

Transdural Approach in Difficult Giant Disc Herniation Cases

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Abstract

Background: Massive central lumbar disc herniations can pose a significant operative challenge. A protruding disc can be approached either through the axilla of the cord or transdurally. **Aim of Study:** This study aimed to study the outcome of transdural approach in a massive disc prolapse causing cauda equina syndrome. **Materials and Methods:** Of all the cases of disc prolapse, only patients presenting with massive disc protrusion/cauda equina syndrome were selected for the transdural approach. Seven males and three females in the age group of 40–60 years were treated by this method. **Results:** The transdural approach in a cauda equina patient was remarkably safe, short duration, and satisfactory results. **Conclusion:** Paraspinal approach through the axilla was superior for disc prolapse were exiting nerve root compression was present. For a fully blown cauda equina syndrome, the trandsural approach was easy, safe, and satisfactory.

Keywords: Cauda equina syndrome, lumbar disc herniation, transdural approach

Introduction

Massive central lumbar disc herniations (LDH) can pose a significant operative challenge. A protruding disc can be approached either through an extradural approach or transdurally. Clinically, these patients are at risk of serious disability, not only due to preoperative neural compromise caused by the protrusion itself but also due to the potential iatrogenic risks associated with the standard extradural discectomy technique.

- In 1934, Mixter and Barr described the first surgical lumbar discal hernia ablation technique through transdural approach
- In 1939, Love described an approach to retracting the dural sac and releasing the nerve root by disc resection. These basic procedures are still employed today, although the technique has been refined, with a smaller standard unilateral 5-cm approach, striping the multifidus muscle and creating a limited interlaminar space, instead of the original L3 to sacrum approach. This is standard discectomy
- Over the years, many variants have been described, to reduce muscle trauma and improve visibility. Introduction of surgical microdiscectomy and endoscopic technique intended to reduce postoperative pain and hospital stay and costs, with earlier return to work. Reducing lumbar pain and periradicular fibrosis (scar) resulted in good clinical outcome
- Open discectomy is still required in difficult situations where there is a high chance of neural injury, especially giant disc herniations and severe canal stenosis.

Cauda equina syndrome is caused by severe compression of the nerve roots in the thecal sac of the lumbar spine, most commonly due to an acute LDH. Early diagnosis is critical and is made clinically by characteristic symptoms of saddle-like paresthesias combined with acute back and radiating leg pain. Sometimes it may be associated with neurogenic dysfunction of the bladder and bowel. Urgent magnetic resonance imaging is performed to confirm the cause. Treatment is prompt surgical decompression. Many scales have been described for the assessment of recovery. We use Oswestry Disability Index (ODI) as our tool of assessment.

The Oswestry Disability Index

A patient-completed questionnaire gives a subjective percentage score of level of function (disability) in activities

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of daily living in those rehabilitating from low back pain. It was developed by Jeremy Fairbank and Graham Pynsent in Oswestry, England in 1980 and is considered one of the best-accepted tools for the assessment of low back pain.

Cerebro oswestry low back pain disability questionnaire

The questionnaire examines the level of disability in 10 everyday activities of daily living.

1. Pain intensity
2. Personal care
3. Lifting
4. Walking
5. Sitting
6. Standing
7. Sleeping
8. Sex (if applicable)
9. Social
10. Travel.

Each item consists of 6 statements which are scored from 0 to 5. With 0 indicating the least disability and 5 the greatest, then the total score is calculated as a percentage, with 0% indicating no disability and 100% indicating the highest level of disability.

Materials and Methods

Over the past 8 years from 2016 to 2023, more than 250 lumbar discectomies have been performed at KMCH, Katihar, Bihar by standard laminectomy and retraction of dura (extradural), but only 10 patients underwent transdural disc excision. These patients had massive disc herniation occupying almost the whole diameter of the spinal canal. Only these 10 cases were included in this study. Seven males and three females in the age group of 40–60 years were treated by this method. Six patients had herniated discs at L4–L5 level and 4 at L5–S1. Results were evaluated by comparison of pre- and postoperative ODI. We achieved excellent results as far as relief of sciatica was concerned. However, the incidence of residual heaviness in the legs was similar to any discectomy surgery.

Surgical technique

LDH is known to resorb in the course of time even without surgery,[1] but surgery may be indicated in the following cases:[2,3]

- Cauda equine syndrome (absolute emergency)
- Paralyzing sciatica, Grade <3 (other than toe muscles, where isolated palsy is not an indication for surgery)
- Residual disabling unilateral leg pain despite 6–8-week full medical treatment. The predominance of radicular over lumbar pain is an essential criterion
- Imaging should confirm the level of involvement consistent with the patient's examination
- When these criteria are met, surgery is recommended, informing the patient as to the absence of alternative medical strategies, with surgery as the remaining resort.

Conus medullaris ends at the L1-L2 junction; hence, most of the lumbar disc presentation occurs in relation to cauda equina. Theoretically, the transdural approach at and below L2 will meet only a bundle of nerves and escape the cord.[4,5]

With the patient in the prone position on the spinal frame or pillows under the pelvis and chest, the hip and knees were flexed at 30°–40° by another pillow under the legs. Spinous process palpation located the interspinous space for incision. L4-L5 lied caudally and L3-L4 cranially to the horizontal axis between the two posterosuperior iliac crests. Image intensification confirmed the level. The spine was exposed through the 5 cm–6 cm midline incision. The skin was pulled back using Allis forceps or cat paw retractors. The aponeurosis was incised using a cautery, and the multifidus was released from the spinous process on both sides, using a Cobb periosteum elevator, until the facet joint was visible. The muscle was retracted using a Taylor retractor on the lateral side of the joint, or self-retaining retractors. The location of the disc space was confirmed with intraoperative fluoroscopy and a standard laminectomy was performed. Hypertrophic ligamentum flavum was carefully excised to reveal a dorsally displaced tense thecal sac. We opened the dura. A 2 cm–3 cm vertical median incision was made through the dura and arachnoid of the dorsal aspect of the thecal sac with its center overlying the palpable bump of the herniated disc. The cauda equina rootlets were gently retracted. A 1.5 cm vertical durotomy was made over the maximal bulge of the ventral dura. Intact posterior longitudinal ligament overlying the bulge was absent in a few cases. If intact, it was incised with the ventral dura without trying to separate it. As the ventral dura was incised, the disc material popped out which could be easily taken out with the disc forceps. After the removal of the herniated disc, the ventral sac appeared sufficiently decompressed. A gush of cerebrospinal fluid (CSF) presented, as the pressure of herniated disc was released.[6] Ventral-side dural repair is a controversial and technically demanding procedure.[7-9] We omitted it altogether and placed a piece of Abgel instead. Repairing edges of the dorsal dura with continuous Prolene 3-0 suture with a round body needle controlled this CSF flow.[10] A piece of Abgel was placed over the dura. A suction drain was placed, and the wound was closed in standard three layers.

Postoperative course

The patient was advised bed rest till the sutures were removed. Physiotherapy started on the third postoperative day. Patients were allowed to walk morning and evening by the 7th day with or without walker. Full activity was allowed after 6 weeks.

Results

Decompression gave immediate relief from pain. Bladder and bowel symptoms started improving from day 1, but some persistent heaviness of the legs remained which usually improved over time. CSF leakage was not seen if the dorsal dura was repaired carefully.

Conclusion

Although the present series is still small, the posterior transdural approach seems an appealing and promising procedure for the removal of a difficult central massive disc herniation.[11]

Discussion

Surgical treatment should be considered earlier in patients with a massive LDH. Micro or endoscopic discectomy or partial laminectomy may not work in such cases. To make enough working space, complete laminectomy and durotomy may be a safer option.

Extradural approach is more popular for discectomy, but it suffers from cramped visualization of the working field and at times iatrogenic stretching of nerve roots leading to transient palsy.[7]

The transdural approach is simpler, offers better exposure, and is less time-consuming.[12,13]

Intervertebral instability and recurrence/persistence of pain because of a completely displaced nucleus pulposus are anticipated in many cases. Interbody fusion for massive LDH has been reported to have good results. For these reasons, sometimes, we combine interbody fusion surgery. However, only disc resection gives great relief from cauda equina symptoms immediately.

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Conflicts of interest

There are no conflicts of interest.

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