Efficacy of Delayed Decompression of Lumbar Disk Herniation Causing Cauda Equina Syndrome

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abstract

Cauda equina syndrome (CES) is a rare but serious neurosurgical emergency that can have devastating long-lasting neurologic consequences. Compression of the cauda equina can result in paralysis of bowel and bladder function. Such compression has been considered the only absolute indication for surgery in cases of lumbar disk disease. Therefore, it is extremely important that physicians be aware of the condition so that a surgeon is consulted before neurological damage becomes permanent. This article reports the results of delayed surgical decompression in cases of lumbar disk herniation with CES.

The study group comprised 14 patients (11 men and 3 women) with a mean age of 48 years (range, 36-57 years). Clinical presentation was chronic low back pain, sciatica, and impaired sphincter function. All patients had a fenestration at the affected level and site, and the disk fragments were excised and the disk space cleared. The surgeries were performed 1 to 3 months after onset of sphinctric disturbance. Postoperatively, all patients were relieved of back and/or leg pain and showed sensory improvement. Twelve patients regained full control of urination and defecation. Lower extremity strength improved in 9 patients.

The classical presentation of CES is not obvious. Even if surgery is performed late due to delayed presentation, significant improvement in neurologic and bladder function can still be expected.

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Cauda equina syndrome (CES) is a rare but serious neurosurgical emergency that can have devastating long-lasting neurologic consequences. The majority of ruptured or sequestrated disk fragments migrate in upward, downward, or lateral directions owing to anatomic properties of the anterior epidural space. Compression of the cauda equina could result in paralysis of bowel and bladder function. Such compression has been considered the only absolute indication for surgery in cases of lumbar disk disease. Few reports of cauda equina compression owing to lumbar disk prolapse have been published, and the prognosis for the recovery of bowel and bladder function postoperatively has been uniformly gloomy, although the recovery of motor function has generally been considered likely. Sphincter paralysis is a rare (2%) but potentially disastrous complication of lumbar intervertebral disk prolapse. Patients usually present first in general practice and then in general medical, surgical, or orthopedic or rheumatology departments. Therefore, it is extremely important that physicians be aware of the condition so that a neurosurgeon can be consulted before the neurological damage becomes permanent. The urgency of the diagnosis and treatment of lumbar disk herniation or sequestration may be compared with that for extradural hematoma in head injury.

This article reports the results of delayed surgical decompression in cases of lumbar disk herniation with CES.

Materials and Methods

The study group comprised 14 patients (11 men and 3 women) with a mean age of 48 years (range, 36-57 years). The clinical presentation was chronic low back pain with sciatica bilateral in 12 patients and unilateral in 2 patients (Figure 1). Impaired sphincter function had occurred from 24 hours to 3 months preoperatively. Complete loss of sphincter control, meaning that catheterization was required to treat urinary retention (providing objective evidence of a severe lesion), occurred in 8 patients. Partial sphincter loss occurred in 6 patients, where they were able to urinate by bladder compression, either by breath holding or by manually compressing the abdomen.

All but 2 patients had weakness in their legs, varying from weak dorsiflexion and eversion of 1 foot to bilateral weakness severe enough to prevent walking. Reflexes were absent at the knee and ankle in 9 patients.

All patients had a sensory loss in the perineum. Eleven patients had sensory loss in the skin of the buttocks and upper posterior thighs (“saddle area”), but in 3 patients it was confined to the perineum (ie, the depths of the natal cleft: perineal, perianal, and posterior labial or scrotal areas). Perineal sensory impairment was total (anesthetic) in 2 patients, dense (analgesic) in 7, and moderate (hypalgesic and hypesthetic, but with discrimination preserved) in 5 patients. In 10 male patients, erection and ejaculation were affected.

Plain radiographs of the lumbar spine were examined for spondylotic changes, narrowing of the bony canal in the sagittal plane, and disparity in the distance between the superior facets and the pedicles. Magnetic resonance imaging (MRI) was performed for all patients to demonstrate any compression on the thecal sac (Figures 2-3).

The results were rated as follows: excellent indicated a return to normal bladder function; good indicated a definite improvement; and poor indicated no improvement.

Results

The lesion was at the L4/5 level in 11 patients, at the lumbosacral level in 2, and at the L3/4 level in 1. All patients had a fenestration at the affected level and site, and the disk fragments were excised and the disk space cleared. The surgeries were performed 1 to 3 months after onset of sphincter disturbance because of late presentation of the patients to the authors’ institution. Twelve patients regained full control of urination and defecation. In 2 others, sphincter recovery was incomplete. They were able to urinate by straining. Postoperatively, all patients were relieved of their back and/or leg pain, and all patients showed sensory improvement. Strength in the lower extremities improved in 9 patients within 1 to 4 months. Among 10 men in whom erection and ejaculation were affected, 8 patients completely recovered and 2 reported painful incomplete erections and uncontrolled ejaculations.

The overall results were excellent in 8 (57%) patients, good in 4 (29%), and poor in 2 (14%).

Discussion

Cauda equina syndrome is a term applied to the clinical picture of perineal sensory loss with disorder of voluntary control of both anal and urethral sphincters as well as sexual responsiveness. Clinical signs accompanying CES may differ in different patients, but tradition-
ally the syndrome is characterized by low back pain; bilateral or unilateral sciatica; saddle hypoesthesia or anesthesia; motor weakness of the lower extremities; impairment of anal, bulbar, and perineal function; and sexual impotence. However, most patients do not present with all the characteristic features of CES. The most frequent symptoms at initial diagnosis are acute low back pain with unilateral or bilateral sciatica and unilateral or bilateral muscle weakness of the lower extremities. Perineal sensory loss is a sensitive and relatively specific sign in the diagnosis of CES.

Cauda equina syndrome is a relatively uncommon condition, with an incidence of approximately 2% to 3% of all herniated lumbar disks. Cauda equina syndrome occurs more commonly in men, with onset usually in the fourth decade, and is characterized by sciatica, saddle (perianal) anesthesia, urinary retention, and variable sensory and motor deficits of the lower extremity.

The timing of the treatment of CES is controversial. It is considered a surgical emergency. Early decompression has been shown to improve functional recovery. In Shapiro’s experience, all patients recovered urinary or stool continence if they underwent surgery within 48 hours of developing symptoms, compared with one-third of patients who underwent surgery after 48 hours. However, bladder function may take years to recover; therefore, long-term follow-up is indicated. Gleave and Macfarlane showed no significant difference in time to surgical decompression. Several studies have demonstrated no correlation between the time to surgical decompression and recovery of neurologic and bladder functions.

Using animal models of CES, Sayegh et al found no differences in neurologic outcomes with early vs delayed intervention. Kostiuk et al found no correlation between neurologic recovery and decompression delay over a range of hours to weeks. In the current study, although all surgeries were performed late (1-3 months after the onset of CES symptoms), most patients recovered. What variable accounts for the fact that some patients do well with delayed decompression? The variable proposed is the magnitude (amount) of compression that the contents of the thecal sac can withstand. Delamarter et al showed that at a constant pressure (75% constriction of cauda diameter), the time to decompression did not play a role in functional or histologic outcome. This may be explained by recovery being more dependent on the nature of the prolapse than the speed at which the nerve roots are compressed.

### Conclusion

The current study has limitations. The number of cases was small, which reflects the difficulty in evaluating a relatively infrequent emergency presentation. Further study is required to assess the effect of varying grades of urological deficit in CES, determined by urodynamic studies, on postoperative outcome.

### References


