Original Article

Cauda Equina Syndrome: Earlier is the Best

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Abstract:

Background: *Cauda equina syndrome (CES) is usually secondary to central/ centrolateral lumbar disc herniation and includes the presence of low back pain/ sciatica, motor deficits (may progress to paraplegia), sensory deficits (± saddle anaesthesia), erectile dysfunction and bladder/ bowel dysfunction. Urgent surgical decompression with laminectomy and discectomy is the standard treatment. No large series has examined the controversy of timing of surgical decompression in relation to functional recovery. Here, we present our experience with outcome of early surgery of cauda equina syndrome cases.*

Materials and Methods: *This is a retrospective study of all discogenic 28 cauda equina syndrome cases that were presented and operated in Neurosurgery Center, CMH Dhaka for a period of 5 years from 2011 to 2016 followed by evaluating surgical outcome. The time from referral to surgery was noted. Follow up, at a mean of 3 months and 2 years, involved urinary outcome assessment using three categories normal, fair, poor.*

Results: *Among 28 patients in our study, 24 are males and 4 females with age ranged from below 20 years to 60 and above There are 10 patients within the range of 41-50 years. Most common level is L4/5, 19 patients (67.1%) out of 28, and second most common is L5/S1 (6 patients). All 28 patients presented with Saddle Anesthesia and bladder involvement, 19 had Bowel involvement, 6 had foot drop and 20 had sexual dysfunction. Two patients underwent surgery within 6 hours of onset of symptom, 14 patients within 7-24 hours, 8 patients within 24-48 hours and 4 patients after 48 hours. Among them 10 patients show normal outcome (35.7%), 11 patient had fair outcome (39.3%) and 7 had poor outcome (25%). Those who had normal outcome had undergone surgery within 24 hours.*

Conclusion: *Cauda Equina Syndrome due to lumber disc herniation is always an emergency situation. Whenever the patient arrives in hospital, as soon as possible surgery should be done after proper investigations and preparation. Decompression performed within 48 hours from onset of symptoms save the surgeon from any legal responsibility and offers to the patient maximum improvement of symptoms.*

Key words: *Cauda equine syndrome, saddle anesthesia, urinary incontinence.*

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Introduction:

Cauda equina syndrome (CES) is a complex of clinical symptoms and signs most commonly secondary to a massive prolapsed intervertebral disc.[1] Although the clinical presentation varies according to the involved nerve roots, the salient clinical features include altered perineal sensation and disturbance of bladder and bowel function.[2] Problems arise in perceived delay in management and there are a variety of opinions regarding the optimum timing for surgery. Definitions of cauda equina syndrome vary in the literature, but micturition dysfunction is generally required.[3] Saddle anesthesia and urinary retention greater than 500 ml may be the best positive predictive indicators for cauda equina syndrome; however, there are no reliable negative markers.[1,4,5] The etiology is frequently compressive, some 1% to 3% of herniated lumbar discs requiring surgery may

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cause cauda equina syndrome[6-8] but inflammatory, ischemic, and other causes are also possible.

Currently, there is no strong evidence for safely delaying surgery up to any time point, although many authors refer to 48 hours since symptom onset as the recommended upper limit.[9] Axonal viability is said to rapidly decline 6 hours after compression,[10] but intervening before this time point is rarely practicably feasible.[11] Apart from the primary compressive insult, prolonged compression induces secondary mechanisms of cell death.[12]

Therefore, there are extremely important implications to when surgery is performed by the spine surgeon because delays in intervention (perceived or otherwise) may lead to devastating morbidity and litigation. In this article, we concisely review the evidence regarding the timing of surgical intervention for cauda equina syndrome.

Materials and Methods:

We have taken all discogenic 28 cauda equina syndrome. Cases that were presented and operated in Neurosurgery Center, CMH Dhaka for a period of 5 years from 2011 to 2016. This is a retrospective study. For a diagnosis of CES, one or more of the following must be present: (1) bladder or bowel dysfunction, (2) reduced sensation in the saddle area, or (3) sexual dysfunction, with possible neurologic deficit in the lower limb (motor/sensory loss, reflex change). All the patients were subjected to thorough clinical evaluation and investigations especially Magnetic Resonance Imaging (MRI). All underwent surgery and followed by evaluating surgical outcome. The time from referral to surgery was noted. Follow up, at a mean of 3 months and 2 years, involved urinary outcome assessment using three categories normal, fair, poor as used by Delong et al.[14] Here, 'normal' means the patient perceives his or her urinary function to be normal. 'Fair' means the patient has some degree of difficulty with urination, such as having straining, stress and nocturnal incontinence. 'Poor' means the patient requires catheterization. We also considered the outcome as poor if patient had incontinence of bowel.

Results:

In our study, we have taken 28 patients, among them 24 are males and 4 females (Table 2), age ranged from below 20 years to 60 and above for period of 5 years from 2011 to 2017 (Table 1). There is male preponderance. There are 10 patients (9 male and 1 female) within the range of 41-50 years. Most common level is L4/5, 19 patient out of 28, and second most common is L5/S1 (6 patients) (Table 3). All 28 patients presented with Saddle Anesthesia and bladder involvement, 19 had Bowel involvement, 6 had foot drop and 20 had sexual dysfunction (Table 4). Two patients underwent surgery within 6 hours of onset of symptom, 14 patients within 7-24 hours, 8 patients within 24-48 hours and 4 patients after 48 hours (Table 5). Among them 10 patients show normal outcome (35.7%), 11 patient had fair outcome (39.3%) and 7 had poor outcome (25%) (Table 6). Those who had normal outcome underwent surgery within 24 hours.

Table-I

Distribution of patients by age.

Age range (in years)	No. of cases	Percentage
11 – 20	01	3.6
21 – 30	05	17.8
31 – 40	07	25.0
41 – 50	10	35.7
51 – 60	04	14.3
> 60	01	3.6
Total	28	100.0

Table-II

Distribution of patients by sex

Sex	No. of cases	Percentage
Male	24	85.7
Female	04	14.3
Total	28	100.0

Table-III

Distribution by disc levels causing Cauda Equina Syndrome.

Disc Level	No. of cases	Percentage
L3/4	03	10.7
L4/5	19	67.9
L5/S1	06	21.4
Total	28	100.0

Table-IV

Distribution by clinical features of Cauda Equina Syndrome.

Clinical features	No. of cases	Percentage
Saddle Anesthesia	28	100.0
Bladder involvement	28	100.0
Bowel Involvement	19	67.9
Foot Drop	06	21.4
Sexual Dysfunction	20	71.4

Multiple occurrence of clinical features

Table-V

Distribution by Timing of Surgery.

Timing of Surgery (in hours)	No. of cases	Percentage
0 - 6	02	7.1
7 - 24	14	50.0
25 - 48	08	28.6
>48	04	14.3
Total	28	100.0

Table-VI

Distribution by Outcome of surgery.

Outcome of surgery	No. of cases	Percentage
Normal	10	35.7
Fair	11	39.3
Poor	07	25.0
Total	28	100.0

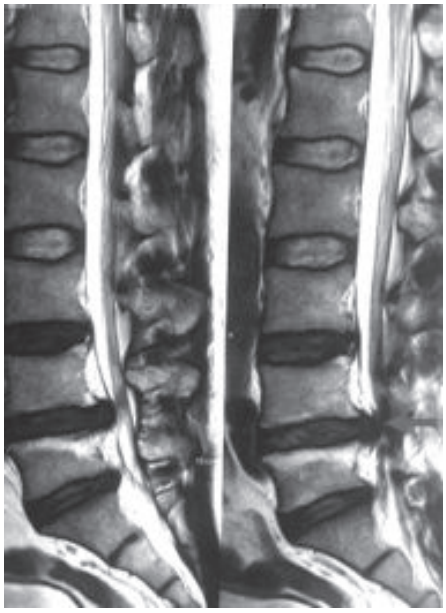

Fig.-1: *A case of Cauda Equina Syndrome, MRI of Lumbosacral Spine T2WI in sagittal view demonstrating Disc herniation causing compression of Spinal Canal at L4/5 (red arrow head).*

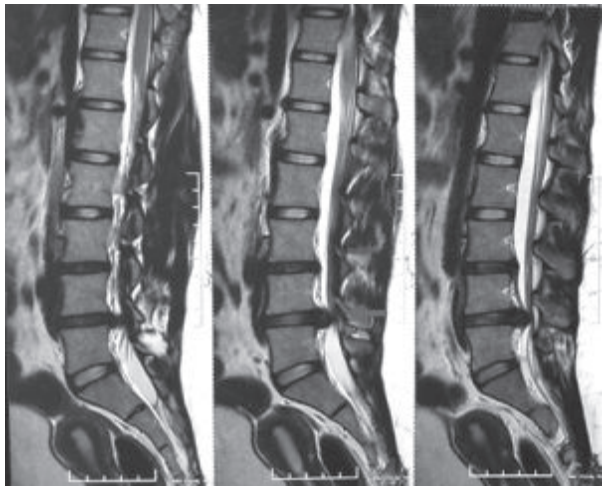

Fig.-2: *Another case of Cauda Equina Syndrome, MRI of Lumbosacral Spine T2WI sagittal view demonstrating Disc herniation causing Complete canal block at L4/5 (red arrow head).*

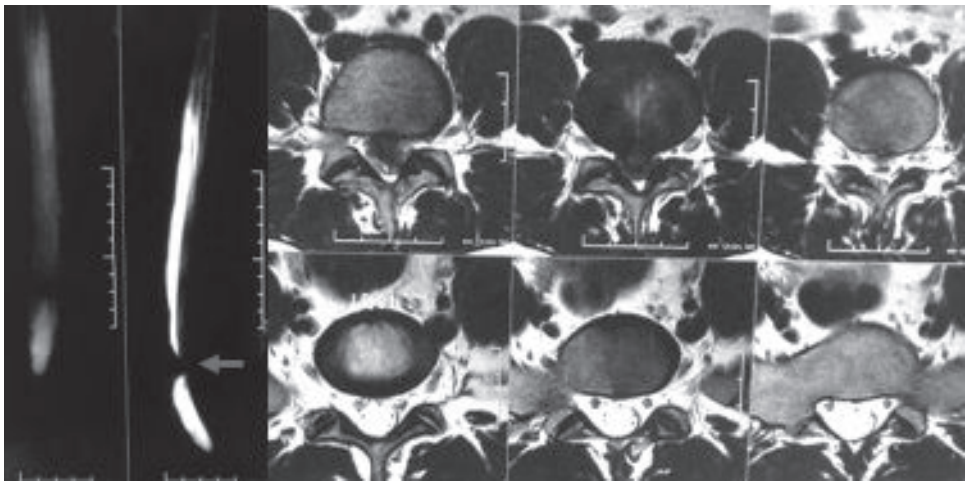

Fig.-3: *Another case of Cauda Equina Syndrome, MRI of Lumbosacral Spine axial view with MR Myelogram demonstrates extruded Disc causing Complete canal block at L4/5.*

Discussion:

The most important issue regarding cauda equina syndrome is timing. There are many articles about surgical outcomes and timeliness of surgery, and much confusion has arisen from the studies that have been reported. Early investigations of cauda equina syndrome outcomes tended to show little evidence for early decompression. a recent article suggested that intervention after the 48 hour time point was associated with an adverse legal decision against the treating surgeon, which was not necessarily correlated with the degree of functional loss suffered.[13] Jennett,[15] who in 1956 was one of the first authors in the modern literature to report on CES, treated 25 patients but provided no evidence for early decompression. Shephard[1] in 1959 studied a series of 13 patients with cauda equina syndrome. Two had CESI (Incomplete Cauda equina syndrome); the other 11 had CESR (Cauda equina syndrome with true Retention) of 5 days' to 2 years' duration. The author concluded that CES duration is less important than presence of either visceral or sensory involvement. He advocated for early decompression but provided no clear analysis of patient outcomes.

In 1979, Tay and Chacha[16] reviewed the cases of 8 cauda equina syndrome patients, 7 of whom presented with urinary retention. Time to surgical decompression was 1 to 14 days for 7 patients; the eighth had an indolent course over 3 months. All patients obtained immediate pain relief and partial vesicular control at 14 days. Seven patients recovered full bladder control at 5 months, though post-void residuals were not measured. Overall motor recovery was "good," but all patients had poor sensory and sexual function recovery. There was no discrimination between patients decompressed before the currently accepted 48-hour mark and patients decompressed after that mark. In our study, all 28 patients presented with Saddle Anesthesia and bladder involvement, 19 had Bowel involvement, 6 had foot drop and 20 had sexual dysfunction (Table 4).

In 1981, O'Laoire and colleagues[17] studied 29 patients and found no correlation between time from onset to decompression and level of recovery.

Kostuik and colleagues[7] retrospectively reviewed the cases of 31 cauda equina syndrome patients, 1 of whom had refused surgery. Patients were divided into 2 groups: (a) those who had acute-onset cauda equina syndrome and underwent surgery within 48 hours of onset and (b) those who had insidious onset of symptoms and underwent surgery within 5 days of hospital admission secondary to uncertainty surrounding their diagnosis because of lack of urinary retention at presentation. Fifty percent of the acute onset patients and 10% of the insidious-onset patients had residual bladder dysfunction. Although the authors implied that patients with acute-onset cauda equina syndrome had a worse outcome, the result can be framed differently—that the outcome is worse for CESR patients (acute-onset group) than for CESI patients (insidious onset group). There was no correlation between time from onset to decompression and recovery, though the authors recommended that CESI not be allowed to progress to CESR. At 2 years, 27% of the patients had residual sexual dysfunction, 10% had residual weakness, and 20% had residual sensory changes.

Shapiro[18] retrospectively reviewed 14 patients with cauda equina syndrome on the basis of the 48-hour time frame set forth by Kostuik.[7] Out of 13 patients who presented with incontinence (implied CESR),[7] underwent surgery within 48 hours of presentation and subsequently regained bladder control and returned to unassisted ambulation, and an 8 had chronic sciatic pain. Out of 7 patients who underwent surgery after 48 hours, only 2 (of 6) regained continence (1 was never incontinent), 3 (of 7) had permanent weakness requiring an assistive device for ambulation, and 2 (of 7) had chronic sciatica.[18]

In another referenced article on decompression timing, Shapiro[19] (2000) reported retrospectively reviewing 44 patients. Twenty of these patients underwent surgery within 48 hours of symptom onset: 17 patients within 12 hours, 1 within 12 to 24 hours, 2 within 24 to 48 hours. All patients who underwent surgery within 24 hours returned to full strength by 1 year; the 2 patients who underwent surgery within 24 to 48 hours regained 4/5 strength by 2 weeks. By 6 months, 95% of the patients who were decompressed within 48 hours had normal bladder function; 100% of the men resumed sexual activity, though there were subjective reports of decreased erection strength or sensation; and 6 of the 7 women resumed sexual activity, though all reported increased difficulty having an orgasm, and 1 could not achieve orgasm. Of the 24 patients who were decompressed more than 48 hours after symptom onset, 58% had 0/5 to 2/5 weakness, 63% continued to catheterize,

71% had chronic sciatic pain, and 31% of men were unable to achieve erection at 1 year.

In our study, 2 patients underwent surgery within 6 hours of onset of symptom, 14 patients within 7-24 hours, 8 patients within 24-48 hours and 4 patients after 48 hours (Table 5). Among them 10 patients show normal outcome (35.7%), 11 patient had fair outcome (39.3%) and 7 had poor outcome (25%) (Table 6). Those who had normal outcome had undergone surgery within 24 hours. This study demonstrates early surgery reveals good outcome for the patient.

Conclusion:

Cauda Equina Syndrome due to lumber disc herniation is always an emergency situation. This should not be an elective procedure. Whenever the patient arrives in hospital, as soon as possible surgery should be done after proper investigations and preparation. Decompression performed within 48 hours from onset of symptoms save the surgeon from any legal responsibility and offers to the patient maximum improvement of symptoms.

Conflicts of Interest: There are no conflicts of interest.

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