



Original Article

Cauda Equina Syndrome Outcome: Early Vs Late Surgery

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ABSTRACT

There is no reservation that the superlative result for Cauda Equina Syndrome (CES) requires decompression by surgery. **Objective:** The goal of our study was to determine the effect of surgical procedure, with relation to time, on bladder and bowel symptoms. **Methods:** A retrospective analysis of patients undergoing surgical decompression by CES was done. The subjects with persistent symptoms were surveyed for at least two-years. BASS criteria were applied to classify CES: painless urinary retention (CESR), incomplete (CESI) and CES suspicious (CESS). The resolution of presenting autonomic symptoms was assessed following surgery. **Results:** A total of 120 patients were confirmed with CES and referred for surgery. Surgical treatment included all cases of laminectomy or lumbar discectomy. 60 patients reported CESR, 24 cases of CESI and 36 cases of CESS. No statistical alteration in sex, age, alcohol comorbidities score and smoking by the time of surgery was noted. All patients with CESR and CESI showed a positive response in bladder and bowel dysfunction following surgery. There was no substantial change in the recovery of autonomic dysfunction associated with the time of surgery. **Conclusions:** Surgical decompression is an operative method of treatment that suggestively alleviates the symptoms of CES involved autonomic system. Early decompression by surgery 24 hours after start of symptoms does not seem to improve resolving of bladder or bowel dysfunction significantly.

INTRODUCTION

In 1858, Luschka 1st defined the lumbar disc prolapse. It was 50 years formerly the 1st discectomy was performed and another three decades a description of Cauda Equina Syndrome (CES) [1,2]. Fortunately, it is an infrequent ailment with a frequency contributing to 2-4% of lumbar disc surgery [3,4]. The natural history and pathogenesis of CES are not evidently well-defined. One theory is that a huge prolapse of the medial or central disc causes lumbosacral nerve roots compression beneath the Conus Medullaris level [5,6]. It is not clear what measures significant compression of canal resulting in CES [7], as it happened in cases with less than 25% compromise of spinal canal. Additional theory is that CES is chemically facilitated by inflammatory and swollen structures of neuron originate in pathological samples [8,9], like that happen in compartment syndrome. It can manifest as a

number of signs. These comprise sensory deficits in the lower limbs and perineum, back pain, leg weakness, leg pain and impaired bowel and bladder function [10]. Consequently, the CES clinical diagnosis is devoid of specificity and sensitivity without a single sign or symptom that effectively predicts the outcome and management [11]. The goal of our study was to determine the effect of surgical procedure, with relation to time, on bladder and bowel symptoms.

METHODS

This retrospective analysis was held in the Department of Neurosurgery of a tertiary care referral center for three-years duration from January 2019 to January 2022. All subjects with confirmed or suspected CES were included, making a total of 120 cases. All CES cases were surgically

decompressed as soon as possible after admission. Surgical treatment consisted in all cases of laminectomy or lumbar discectomy. 60 patients reported CESR, 24 cases of CESI and 36 cases of CESS. The patients were followed-up in the OPD to evaluate the improvement. Data gathered encompassed patients' age, sex, prior medical history, duration of onset of symptoms and time to surgery, and postoperative results. For the purposes of this analysis, we define the beginning of symptoms as the moment when the patient returns with worsening of chronic symptoms or any new symptoms, prompting him to pursue medical help. The patient's medical record was assessed. All statistics were composed and analyzed. Charlson Co-morbidity Index (CCMI) was applied to assess the past medical history. The CCMI is an approved scoring system for estimating additional mortality and morbidity. The results are classified as high risk (5+), moderate (3-4) and mild (1-2). MRI confirmed CES in 116 patients; 4 patients were confirmed by CT myelogram due to non-compatibility with MRI. The study used the CES classification of the British Association for Spine Surgery.

CESR (painless retention with urinary or fecal incontinence)

CESI (CESS plus urgency, dysuria or change in urine sensation)

CESS (suspected CES without dysfunction of sphincter)

The subjects with persistent symptoms were surveyed for at least two-years to make sure there were no patients with previous CES problems. The primary results were to assess the effect of BASS CES classification and operative time on clinical results after decompression by surgery. Secondary outcomes were to evaluate the other variables that might forecast the results of surgery. SPSS 21.0 was applied for Statistical analysis. Statistical significance was assessed using the chi-square test and Fisher's exact test. The level of significance was established at 0.05.

RESULTS

120 total patients had surgical treatment consisted in all cases of de-compressive laminectomy and discectomy. 60 patients reported CESR, 24 cases of CESI and 36 cases of CESS. No patient was lost during followed-up upto 24 months. Postoperative symptoms remained constant after 6 months. Secondary measures of outcomes such as gender, age and smoking did not differ statistically from time to operation (all exact Fisher p values > 0.05). No statistically substantial association between poor outcome and elevated CCMI score in any of the subgroups was noted. (P-values were > 0.05 in Fisher's Exact test). Table 1 defines the studied populace.

Variables	CESR (n=60)	CESI (n=24)	CESS (n=36)	Total (n=120)
Age; mean (range)	42.2 (27.9,82.8)	35.6 (26.6,62.1)	43.5 (25.1,76.5)	40.0 (22.1,75.9)
Male	30 (50%)	9 (37.5%)	20 (55.5%)	59 (49%)
Female	30 (50%)	15 (62.5%)	16 (44.5%)	61 (51%)
Smoker status: Non-Smoker	46 (77%)	23 (96%)	21 (58%)	90 (75%)
Smoker	14 (23%)	1 (4%)	5 (42%)	30 (25%)
Charlson index; mode (range)	1 (0,6)	1 (0,4)	1 (0,8)	1 (0,7)

Table 1: Demographics of studied patients

Variables	Total (n=120)	CESR (n=60)	CESI (n=24)	CESS (n=36)
<24 h	6 (5%)	4 (6.6%)	1 (4%)	1 (2.7%)
24-48 h	21 (17.5%)	14 (23.3%)	2 (8%)	5 (14%)
>48 h	93 (77.5%)	42 (70%)	21 (88%)	30 (83%)

Table 2: Timing to surgery

Most patients were operated after 24 hours due to delayed presentation (95%) with greater proportion in after 48 hours category (77.5%). Every possible measure was taken to have de-compressive laminectomy as soon as reasonably feasible after the diagnosis was made and hence there was no intentional delay from the surgeons'. Chi-square analysis showed no significant differences in <24 and >24 hrs (P 0.14). 10 patients experienced problems after surgery. This comprised dural tears in 5 patients (4%), 1 re-operated for persistent compression, and in the remainder wound infection was noted (4 patients) (Table 2).

Variables	Total (%) 120		CESR (%) 60		CESI (%) 24	
	Pre-operative	Post-operative	Pre-operative	Post-operative	Pre-operative	Post-operative
Incomplete urinary	19 (15.8%)	7 (5.8%)	1 (1.6%)	4 (6.6%)	18 (75%)	3 (12.5%)
Painless Urinary retention	56 (46.7%)	10 (8.3%)	56 (93%)	8 (13%)	0 (0%)	2 (8.3%)
Faecal incontinence	17 (14.2%)	2 (1.6%)	17 (28%)	2 (3%)	0 (0%)	0 (0%)

Table 3: Complete and Incomplete Bladder and Bowel Symptoms

Table 3 shows the frequency of fecal incontinence, complete and incomplete urinary symptoms. The subjects were not transferred to other subgroups of CES after surgery. This was to help check for improvement or even deterioration after surgery

CESR n=60	Painless urinary retention		Fecal incontinence		Incomplete urinary	
	Pre-operative	Post-operative	Pre-operative	Post-operative	Pre-operative	Post-operative
<24 hrs	5	2	1	0	0	0
24-48 hrs	11	2	3	1	0	1
>48 hrs	40	4	13	1	1	3
P value	0.02		0.31		0.77	

Table 4: Impact of timing to surgery on CESR group

DISCUSSION

Fortunately, CES is a non-frequent disorder that accounts for 2-4% of lumbar disc surgery [3,4]. Regardless of the cause and presenting symptoms, the recommendation by almost all the surgeons is to treat CES as emergency

[12,13]. The main goal of this analysis was to analyze the autonomic symptoms accompanying CES and to recognize the in-hospital outcome predictors for the disease. This is a retrospective analysis, though collection of data was performed systematically on the basis of admission notes. The ultrasound for post-void and bladder function were not routinely accomplished on every subject in the ward. So, subjective patients reported about symptoms of bladder were cast-off in this study. This study originates that timing did not affect outcomes significantly in people with incomplete urination symptoms or faecal incontinence. Although we followed these patients for at least 2 years, we noticed that no additional development was found in residual bowel and bladder symptoms after six-months. However, we noticed that one study showed sustained improvement for up to 3 to 4 years. There were a significant number of people at CESR who saw significant improvements, or even improvements, in symptoms after surgery, regardless of the timing. The procedure must be achieved under ideal environments and not as early as possible basis, irrespective of the time of day. There are different clarifications of the CES in the meta-analysis [14-20]. CES was defined based on the frequency of symptoms or classified conferring to the clinical picture at the onset time. It is generally recognized that a CES critical aspect is the cauda equine compression, which leads to autonomic dysfunction. It is suitable to view CES as a development of an ongoing process that ultimately results in possible bladder and bowel dysfunction. In adding, protracted pressure may be related with greater neurological damage even after CESR. Instead, the focus should be on recognizing other determinants of poor performance and increased time of recovery [21,22]. Perhaps the 1984 Rydevik pig model is worth considering. It is worth noting that longer compression times may only extend recovery time, not eventual morbidity, but compression pressure is more critical. While CES classifications allow for group data analysis, CES is more likely to behave like many biological systems and degrade in a linear rather than incremental manner [23,24]. Therefore, it may be difficult to establish boundaries for subclasses. This study revealed that there is a significant improvement in bladder and bowel function after decompression surgery that is not dependent on the subclass of CES or the timing to surgery. Although it is still recommended that the earlier the surgery, the better the outcome is expected.

CONCLUSION

CES have a disturbing impact on life quality, put a heavy load on medicinal facilities, and have significant medico-legal ramifications in terms of the supposed consequences

of postponements. There was no strong indication in this study that operative time adversely affects post-surgical decompression outcomes for Cauda Equina Syndrome. The CES may progress gradually from CESS to CESI and then CESR. Though timing does not affect the results, classification does have an impact and so medically attended patients should not be allowed worsening in CES class after admission. We believe that surgery should be considered pragmatically as quickly as possible, but not at the cost of safety of the patients.

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