



Original Article

Does surgical decompression alleviate neglected cauda equina syndromes attributed to lumbar disc herniation and/or degenerative canal stenosis?

Sulaiman Sath

Department of Spine Services, Indian Spinal Injuries Centre, New Delhi, India.

E-mail: *Sulaiman Sath - sulaiman185@gmail.com



*Corresponding author:

Sulaiman Sath,
Department of Spine Services,
Indian Spinal Injuries Centre,
New Delhi, India.

sulaiman185@gmail.com

Received : 11 August 2020
Accepted : 18 August 2020
Published : 05 September 2020

DOI
10.25259/SNI_512_2020

Quick Response Code:



ABSTRACT

Background: Most studies recommend urgent decompression (e.g., within 48–72 h) of the symptomatic onset of a cauda equina syndrome. As patients in our area typically underwent >3 months delayed surgery for cauda equina syndromes due to disc disease/stenosis, we asked whether surgery was still worthwhile.

Methods: This was a retrospective analysis of 12 patients (2012–2018) who underwent delayed surgical decompression for cauda equina syndromes secondary to lumbar disc herniations and/or degenerative lumbar canal stenosis.

Results: After a mean postoperative duration of 8.22 months, nine patients experienced the complete restoration of bladder status; two patients required intermittent self-catheterization, while one patient had some residual symptoms (e.g., urgency but able to void with some difficulty).

Conclusion: For 12 patients who originally presented with cauda equina syndrome with complete incontinence, nine exhibited delayed full recovery of bladder function with average of 8.22 months postoperatively. We would, therefore, advise that delayed surgical decompression be offered to these patients, irrespective of the preoperative duration of cauda equina syndromes with complete incontinence.

Keywords: Bladder recovery, Cauda equina syndrome, Delayed presentation, Disc herniation, Lumbar canal stenosis, Neglected presentation

INTRODUCTION

Cauda equina syndrome most commonly occurs due to lumbar disc prolapse and/or degenerative lumbar canal stenosis.^[1] Classical cauda equina syndrome is accompanied by complete loss of bowel and bladder function.^[1] Most studies recommend urgent surgical decompression within 48–72 h of symptom onset to reap the maximal benefits of surgery.^[6] However, lack of access to healthcare in the developing countries leads to marked delayed in diagnosis and surgery. Due to extremely late presentations of patients with cauda equina syndromes/sphincter incontinence in our country, we retrospectively analyzed the long-term outcomes for 12 patients with complete cauda equina syndromes and sphincter loss who underwent lumbar decompressions delayed by an average of 8.2 months.

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MATERIALS AND METHODS

This was a retrospective study (2012–2018) of 12 patients undergoing delayed surgical decompression for cauda equina syndromes (e.g., >3 months/average 8.2 months) secondary to lumbar disc herniation/degenerative lumbar stenosis. Multiple variables were studied, but we predominantly focused on postoperative restitution of continence up to 2 years postoperatively [Tables 1 and 2].

All 12 patients were followed for a minimum period of 2 years and averaged 56.58 years of age. There were eight females and four males. Seven cases were due to prolapsed intervertebral discs; out of which two were recurrent, while five cases were secondary to lumbar canal stenosis, (two were multilevel lumbar canal stenosis, one of them associated with degenerative lumbar scoliosis). Preoperatively, six patients in our study had bladder retention and incontinence (cauda equina syndrome-retention [CES-R]), while six had incomplete bladder involvement (cauda equina syndrome – incomplete [CES-I]).

Bladder dysfunction histories

Duration of preoperative bladder symptoms ranged from 3 to 24 months (mean of 6.9 months. Patients with CES-I had relatively longer duration of symptoms before surgical intervention (mean of 8.250 months), while those with CES-R had relatively shorter duration of symptoms (mean of 5.500 months).

Surgery

Posterior decompression alone or with discectomy was performed in seven patients, while five had discectomy/decompression and transforaminal lumbar interbody fusion (TLIF), with one additionally undergoing deformity correction in TLIF group. Representative pre-operative and post-operative radiological images of 2 patients in Figures 1 - 6.

Statistical evaluation

Descriptive statistics for continuous variables were presented in Mean \pm Standard deviation and for categorical variables in count (n) and percentages (%). Chi-square test/Fisher's exact test was used to find association between two categorical variables. Pearson's correlation was used to assess the correlation between the two continuous outcomes such as age, visual analog scale (VAS), and Oswestry Disability Index (ODI). T-test of two independent means and one-way analysis of variance was used to find significant difference between the two groups and more than 2 groups. Statistical analyses were performed using SPSS software (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp) and P -value is considered significant at 5% level.

RESULTS

Outcomes

ODI and VAS preoperatively versus postoperatively [Graph 1]

Mean ODI of our patients before surgery was 72.08 while at 2 years, it was 25. The VAS for back pain before surgery was 4.4 but at final follow-up was 1.75, while the mean VAS for leg pain before surgery was 7.9 and at final follow-up was 0.67 [Tables 1 and 2].

Motor function preoperatively versus postoperatively

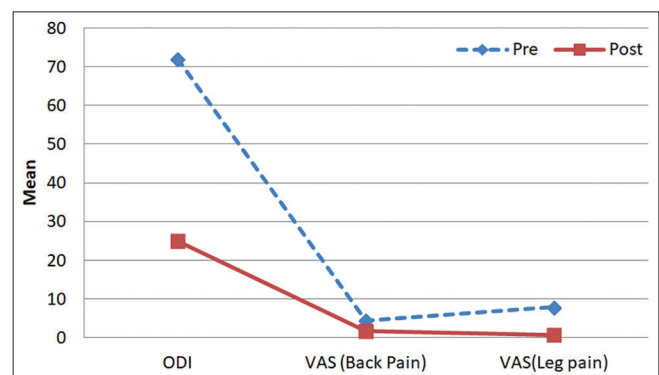
Preoperatively, motor power was affected in nine patients, three of them had bilateral involvement of affected myotomes (among patients with bilateral involvement, one had complete motor loss), while six had unilateral involvement (among patients with unilateral involvement, one had complete motor power loss). The remaining three patients were normal. At final follow-up, motor power was normal in seven patients and affected in rest five patients (even among five affected patients, functional motor power was restored in three patients while two still had nonfunctional motor power).

Preoperative peri-anal Sensation)/voluntary anal contraction (PAS/VAC) versus postoperative

Preoperative PAS was normal in three patients, decreased in eight patients, and absent in one patient while PAS at final follow-up was normal in four patients, decreased in seven patients, and absent in one patient. Preoperative VAC was absent in four patients, decreased in eight patients while VAC at final follow-up was normal in four patients, decreased in five patients, and absent in three patients.

Restoration of bladder status [Graph 2]

Complete restoration of bladder status was experienced in nine patients after a mean duration of 8.22 months postsurgery



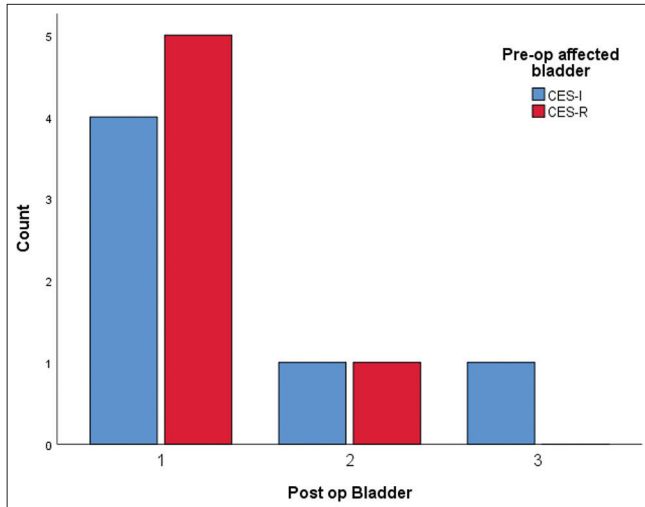
Graph 1: Relation pre- and postoperative change in clinical parameters, namely, Oswestry disability index and visual analog scale for back and leg pain.

Table 1: Demographic and preoperative clinical and surgical details of patients.

Age	Sex	Diagnosis	ODI	VAS (back pain)	VAS (leg pain)	Motor power	Type of surgery	PAS/VAC	Duration of bladder symptoms before surgery
38	F	L5-S1 recurrent disc prolapse	66	7	8	Right S1-1/5	TLLIF L5-S1	PAS-50%, VAC- decreased	3 months
72	F	LCS L4-L5, L5-S1	61	0	5	Bilateral L5-3/5	Posterior decompression	PAS normal, VAC -absent	4.5 months
35	M	L4-L5 sequestered disc	58	4	8	Left L4, L5 2/5	TLLIF L4-L5	PAS- decreased 50%, VAC- decreased	3.5 months
68	F	LCS L4-L5,	72	2	7	Left L5 2/5	Posterior decompression	PAS-50%, VAC -decreased	5 months
57	F	L4-L5, L5-S1 PIVD	80	5	9	Bilateral-0/5 L4, L5	Discectomy with decompression	PAS- 60%, VAC -absent	6 months
50	M	Multilevel LCS	76	4	8	Left -L4, L5-0/5	Posterior decompression	PAS-30%, VAC- reduced	7 months
47	F	L4-L5 recurrent disc prolapse	88	8	5	Bilateral L5-2/5 and S1-3/5	TLLIF L4-L5	PAS- NoRMAL, VAC- decreased	3 months
61	M	L5-S1 disc prolapse	81	6	9	Right S1-2/5	TLLIF L5-S1	PAS-50%, VAC -decreased	3.5 months
71	F	LCS L4-L5	62	3	8	Normal	Posterior decompression	PAS-absent, VAC-absent	12 months (1 year)
41	F	L4-L5 disc prolapse	62	6	9	Normal	Discectomy with decompression	PAS- 60%, VAC -absent	5 months
65	M	L3-L4 PIVD	78	3	9	Left L4-2/5	Discectomy with decompression	PAS- 50%, VAC- decreased	6 months
74	F	Degenerative scoliosis with multilevel LCS	81	5	10	Normal	Deformity correction with decompression and multilevel tlfif	PAS-normal, VAC-reduced	24 months (2 years)

Table 2: Complications and follow-up clinical details of patients.

Postsurgery final vas (back pain)	Postsurgery final vas (leg pain)	Postsurgery ODI	Restoration of bladder function (time) after surgery	PAS/VAC at final follow-up	Bladder status final	Motor power final	Complications
3	2	25	Restored at 7 months	PAS-90%, VAC-normal	Self-voiding	5/5 Power	None
0	0	22	Restored at 12 months	PAS-normal, VAC-absent	Self-voiding with high PVR	5/5 Power	None
2	2	18	Restored at 9 months	PAS -80%, VAC- decreased	Self-voiding	3/5 Power left	Dural tear
0	1	31	Restored at 13 months	PAS -80%, VAC decreased	Self-voiding	3/5 Power left	None
4	0	29	Restored at 15 months	PAS- 80%, VAC-reduced	Self-voiding with high PVR	Bilateral-0/5	None
2	1	26	Not restored at final follow-up	PAS-40%, VAC-reduced	Not able to self-void , persistent incontinence	1/5 Power left	Superficial wound infection
1	0	34	Restored at 2 months	PAS-normal, VAC-normal	Self-voiding	5/5 Power	None
0	1	14	Restored at 6 months	PAS-normal, VAC-normal	Self-voiding	5/5 Power	None
1	0	24	Not restored at final follow-up	PAS-absent, VAC-absent	Not able to self-void	Normal	None
3	1	32	Partially restored, even at 2 years follow-up	PAS -80%, VAC- absent	Self-void with some residual symptoms like urgency	Normal	None
1	0	12	Restored at 4 months	PAS-90%, VAC-normal	Self-voiding	4/5 Power left l4	None
4	0	33	Restored at 6 months	PAS-normal, VAC reduced	Self-voiding	Normal	None



Graph 2: Final bladder status with one representing completely recovered nine patients, two representing patients who failed to recover while three representing recovered patient with residual difficulty in relation to preoperative affected bladder in the form of cauda equina syndrome – incomplete and cauda equina syndrome-retention.

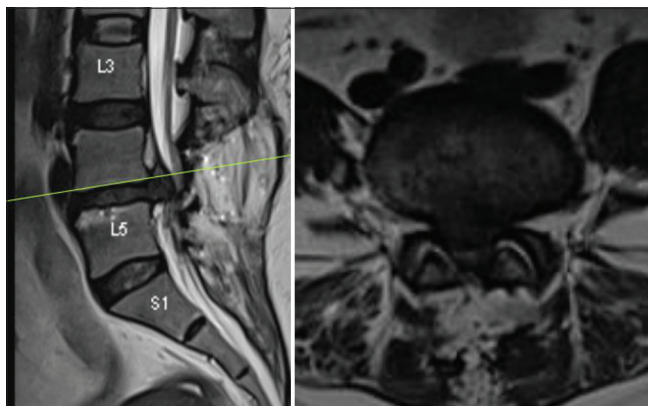


Figure 1: Preoperative sagittal and axial magnetic resonance imaging sections of patient with recurrent L4-L5 disc prolapse of patient 1.

(ranging from 2 to 15 months). Two patients had persistent symptoms and continued on self-intermittent catheterization while one patient had some residual symptoms like urgency but was able to self-void with some difficulty. These two patients who persisted with symptoms had relatively longer duration of preoperative symptoms (7 and 12 months) and nearly absent perianal sensation (absent in one and 30% in other).

DISCUSSION

The presence of cauda equina syndromes with bladder and bowel symptoms in patients with lumbar disc herniation/canal stenosis typically requires emergent surgical intervention (e.g., within 48 h to achieve the better surgical outcomes).^[6] Bydon *et al.* did discrete analysis of patients at 12, 24, 36, 48, 60, and 72 h, operated for cauda equina syndrome, and found no

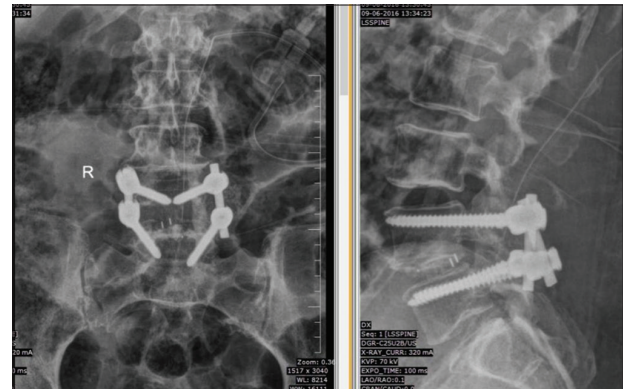


Figure 2: Postoperative anteroposterior and lateral X-rays on follow-up showing interbody cage, rods, and pedicle screws between L4-L5 (TLIF L4-L5) of patient 1.

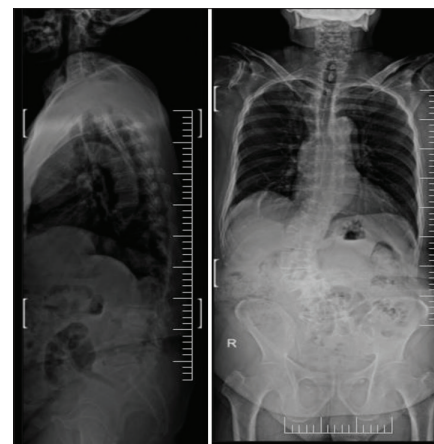


Figure 3: Preoperative lateral and anteroposterior whole spine X-rays of patient 2 showing degenerative scoliosis.

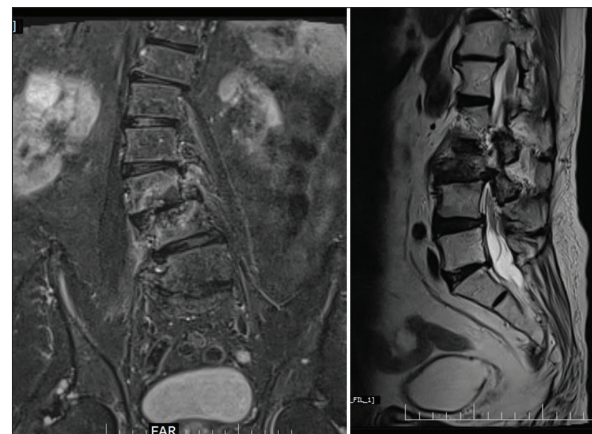


Figure 4: Preoperative coronal and sagittal magnetic resonance imaging sections of patient 2 showing degenerative scoliosis with lumbar canal stenosis.

specific advantages of earlier surgery.^[3] Chau *et al.* concluded that both early and late surgery beyond 48 h may result in improved surgical outcomes.^[4] In addition, Kostuik *et al.*^[7]

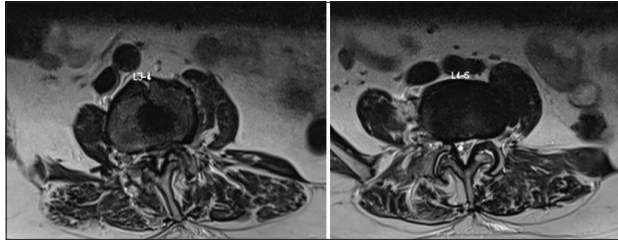


Figure 5: Preoperative axial magnetic resonance imaging sections at L3-L4, L4-L5 showing severe canal stenosis at both levels, more at L3-L4 of patient 2.

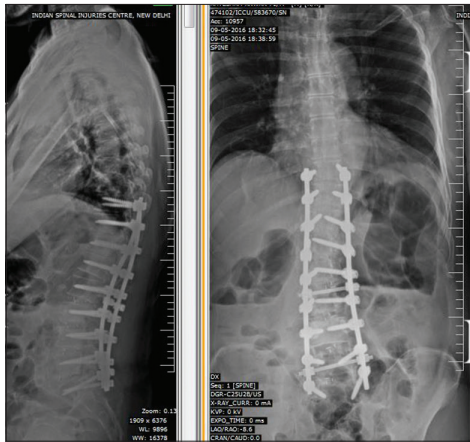


Figure 6: Postoperative lateral and anteroposterior whole spine X-rays of patient 2 on follow-up showing pedicle screw instrumentation from T10-S1 with correction of scoliosis.

found no correlation between the length of time between the onset of symptoms and surgery.

Outcomes for delayed surgery for CAS (cauda equina syndrome)

Longer delays in surgery with CAS have also been analyzed. Sarvdeep *et al.* operated 50 cases of cauda equina syndrome with a mean delay of 12.2 days and found near total recovery in 44 patients with six patients showing partial recovery; they stressed the importance of performing decompressions in all patients irrespective of the delay.^[5] Kostuik *et al.*^[7] and McCarthy *et al.*^[8] also reported favorable outcomes, even after very late surgical decompression for cauda equina syndrome patients.

Delayed surgery resulting in bladder recovery

Aly *et al.* reported that 12 of 14 patients who presented within 1–3 months of bladder/bowel involvement with CAS regained full sphincter control; thus, they advocated surgery whether or not, it was delayed.^[2] Here, we found that 9 (75%) patients regained full bladder control, 1 (8.33%) regained near total control with some residual symptoms, while only two patients failed to regain control (e.g., required continued self-intermittent catheterization).

CONCLUSION

We conclude that although all patients with symptoms of cauda equina syndrome should ideally be surgically decompressed within 48–72 h, as our study showed statistically significant recovery of bladder symptoms in more than 80% of patients with surgery delayed for an average of 8.2 months, delayed decompression should not be withheld.

Declaration of patient consent

Patient's consent not required as patients identity is not disclosed or compromised.

Financial support and sponsorship

Publication of this article was made possible by the James I. and Carolyn R. Ausman Educational Foundation.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Ahn UM, Ahn NU, Buchowski MS, Garrett ES, Sieber AN, Kostuik JP. Cauda equina syndrome secondary to lumbar disc herniation: A meta-analysis of surgical outcomes. *Spine (Phila Pa 1976)* 2000;25:1515-22.
2. Aly TA, Aboramadan MO. Efficacy of delayed decompression of lumbar disk herniation causing cauda equina syndrome. *Orthopedics* 2014;37:e153-6.
3. Bydon M, Lin JA, De la Garza-Ramos R, Macki M, Kosztowski T, Sciubba DM, *et al.* Time to surgery and outcomes in cauda equina syndrome: An analysis of 45 cases. *World Neurosurg* 2016;87:110-5.
4. Chau AM, Xu LL, Pelzer NR, Gragnaniello C. Timing of surgical intervention in cauda equina syndrome: A systematic critical review. *World Neurosurg* 2014;81:640-50.
5. Dhatt S, Tahasildar N, Tripathy SK, Bahadur R, Dhillon M. Outcome of spinal decompression in cauda equina syndrome presenting late in developing countries: Case series of 50 cases. *Eur Spine J* 2011;20:2235-9.
6. Kalidindi KK, Sath S, Vishwakarma G, Chhabra HS. Magnetic resonance imaging findings in intervertebral disc herniation: Comparison of canal compromise and canal size in patients with and without cauda equina syndrome. *Surg Neurol Int* 2020;11:171.
7. Kostuik JP, Harrington I, Alexander D, Rand W, Evans D. Cauda equina syndrome and lumbar disc herniation. *J Bone Joint Surg Am* 1986;68:386-91.
8. McCarthy MJ, Aylott CE, Grevitt MP, Hegarty J. Cauda equina syndrome: Factors affecting long-term functional and sphincteric outcome. *Spine (Phila Pa 1976)* 2007;32:207-16.

How to cite this article: Sath S. Does surgical decompression alleviate neglected cauda equina syndromes attributed to lumbar disc herniation and/or degenerative canal stenosis? *Surg Neurol Int* 2020;11:278.