

Original Research Article

Lower cervical trauma an orthopaedician domain

Rajat Charan*

Department of Orthopaedics, NMCH, Patna, Bihar, India

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***Correspondence:**

Dr. Rajat Charan,

E-mail: drrajatcharan@gmail.com

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ABSTRACT

Background: Lower cervical spinal injuries are potentially devastating injuries of the axial skeleton. Many effective procedures are available for degenerative cervical spinal injuries that are unresponsive to conservative management. Our present aimed to observe the outcome for the treatment of different types of spinal injuries based on ASIA impairment scale (modified Frankels scoring system) by using different treatment concepts.

Methods: This study was conducted at Indira Gandhi institute of medical sciences and Nalanda medical college during the period 2012 – 2015. 14 patients with lower cervical spine injury attended to emergency department were included in the study. All the 14 cases were operated by different surgical procedures based on type of injury. The outcome was measured by using ASIA impairment scale (modified Frankels scoring system).

Results: Out of 14 cases, 3 were burst fractures, 4 were unilateral facet dislocations, 5 were bilateral facet dislocations and 2 with distractive extension injury. Cases with burst fractures operated with corpectomy with cage and plate, for unilateral and bilateral dislocations open reduction and Bohlman triple-wiring and posterior fusion was done and for distraction injury, open reduction and anterior plating was done. Improvement in Frankel scoring system was good in about 3 cases with unilateral dislocations. Overall, neurological recovery was observed in 35% cases. Recovery was much better in Quadripareisis patients. None of the patients had iatrogenic paresis.

Conclusions: Satisfactory results and outcome was observed in unilateral facet dislocations after treatment by open reduction and Bohlman triple-wiring and posterior fusion. The outcome in bilateral facet dislocations was poor as they are easily reduced with closed traction methods.

Keywords: Lower cervical trauma, Unilateral facet dislocation, Bilateral facet dislocation, Open reduction method

INTRODUCTION

Injury of lower cervical spine is one of the most common and potentially most devastating injuries involving the axial skeleton.¹ An effective cervical internal fixation system for lower cervical fracture-dislocation should provide immediate functional and anatomical continuity of the spinal cord and nerve roots, restore spinal alignment, establish spinal stability and provide freedom from post injury pain or delayed neurological problems after treatment.²

It has been described that 2.4% of blunt trauma victims had the cervical spine injury.³ The demographic factors involved in lower spinal injury was age greater than 65 years and male sex. The most common mechanism of injury was observed to be accidental falls, followed by injuries due to motor vehicle/transport accidents. Injuries of the cervical spine produce neurological damage in approximately 40% of patients. Approximately 10% of traumatic cord injuries have no obvious radiographic evidence of vertebral injury.⁴

Lower cervical injuries were better categorized by Allens classification.⁵ This system helps to identify the mechanism of injury based on biomechanical studies and patient histories. It divides the cervical injuries based on mode of injury into five types such as compressive flexion, vertical compression, distractive flexion, compressive extension, distractive extension, and lateral flexion. These were further subdivided into different stages based on severities.

The present study was aimed to review the treatment concepts for lower cervical spine injuries.

METHODS

This study was conducted at Indira Gandhi institute of medical sciences and Nalanda medical college during the period 2012 – 2015. 14 patients with lower cervical spine injury attended to emergency department were included in the study. Patients with cervical injury without significant displacement and without neurological deficit were excluded from the study.

The degree of impairment was graded according to ASIA impairment scale (modified Frankel's).⁶

- A = Complete: No motor or sensory function is preserved even in sacral.
- B = Incomplete: Sensory but not motor function is preserved below the level.
- C = Incomplete: Motor function is preserved below the neurological level (power<3).
- D = Incomplete Motor function is preserved below the neurological level (power>3).
- E =Normal.

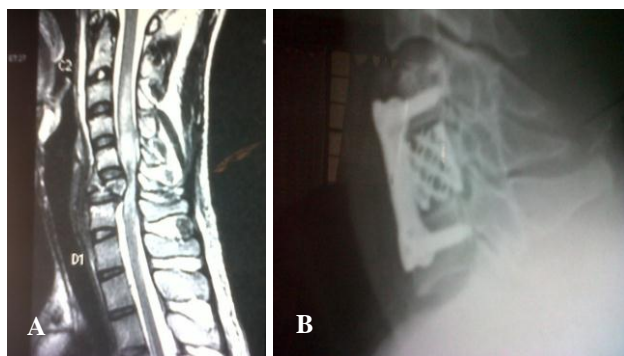


Figure 1: (A) Preoperative MRI of burst #; (B) Postoperative x-ray with cage and plate fixation after decompression.

In our series of 14 cases that required operative intervention, 3 were of burst resulting from vertical compression with neurological deficit of Frankel A, B, C respectively. 4 were of unilateral facet dislocation presented with a neurological deficit of different grades of Frankel. 5 had bilateral facet dislocation of which 3 of them presented with neurological deficit Frankel A, and

other two cases with C and B respectively. 2 had distractive extensive injury with post subluxation of body into the canal with neurological deficit of Frankel A and B.

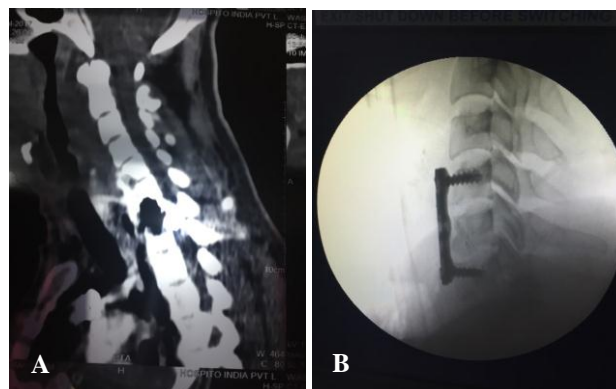


Figure 2: (A) Preoperative burst # following gunshot injury; (B) Postoperative after decompression bone grafting and plate.

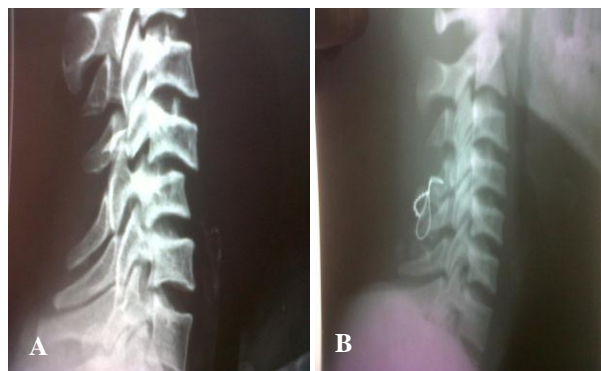


Figure 3: (A) Preoperative of unilateral facet dislocation; (B) Postoperative after open reduction and Bohlman wiring.

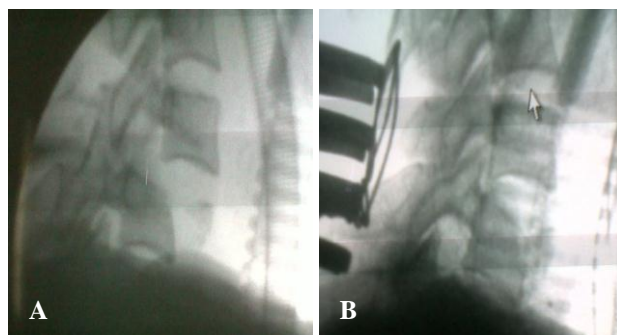


Figure 4: (A) Preoperative of bilateral facet dislocation; (B) Postoperative after open reduction and Bohlman wiring.

2 of the burst cases were treated with corpectomy from anterior approach and filling the defect with cage filled with bone graft and anterior cervical locking plate. The cervical locking plates were H plates or Casper's plate

which is a locking plate allowing unicortical purchase. One was treated with strut bone graft.



Figure 5: (A) Preoperative of distractive extension injury; (B) Postoperative after open reduction and plating.

Facet dislocations were treated from posterior approach with open reduction and Bohlman triple-wiring and posterior fusion. The unilateral dislocations were difficult to reduce conservatively and bilateral dislocations were usually associated with burst of the articular facet hence they were not stable after reduction hence required ORIF with fusion. Bilateral facet dislocations alone were

treated similarly as they were easier to reduce but neurological recovery was poor.

Distractive extension injury was treated with open reduction and stabilization with anterior cervical locking plate from anterior route because the major burst of injury is in anterior ligament complex which needed augmentation.

Postoperative management consists of immobilization in a rigid cervical orthosis by using Philadelphia collar for 6 to 8 weeks for stabilized cases while those with corpectomy required immobilization for at least 12 weeks.

RESULTS

Treatment and outcome in different cases with cervical injury was depicted in Table 1. In this study out of 14 patients, 3 patients with burst fractures were treated with corpectomy with cage and plate. Of them patient with neurological deficit of Frankel C became normal after surgery. In one case slight improvement was seen (level improved from B to D) and in the other case no improvement was observed even after surgery.

Table 1: Pre and postoperative neurological status of the study participants by using ASIA impairment scale (modified Frankel's scoring).

S No	Type of injury	Pre OP neurological status (modified Frankel's)	Surgery performed	Post OP neurological status (modified Frankel's)
1	Burst	C	Corpectomy with cage and plate	E
2	Burst	B	Corpectomy with cage and plate	D
3	Burst	A	Corpectomy with strut graft and plate	A
4	Unilateral facet dislocation	D	Open red and Bohlmantriple-wiring and posterior fusion.	E
5	Unilateral facet dislocation	A	Open reduction and Bohlmantriple-wiring and posterior fusion.	C
6	Unilateral facet dislocation	E	Open reduction and Bohlmantriple-wiring and posterior fusion.	E
7	Unilateral facet dislocation	C	Openreduction and Bohlmantriple-wiring and posterior fusion.	E
8	Bilateral facet dislocation	A	Openreduction and Bohlmantriple-wiring and posterior fusion.	A
9	Bilateral facet dislocation	C	Openreduction and Bohlmantriple-wiring and posterior fusion.	E
10	Bilateral facet dislocation	A	Open reduction and Bohlmantriple-wiring and posterior fusion.	A
11	Bilateral facet dislocation	B	Openreduction and Bohlmantriple-wiring and posterior fusion.	D
12	Bilateral facet dislocation	A	Open reduction and Bohlmantriple-wiring and posterior fusion.	A
13	Distractive extension injury	A	Open reduction and anterior plating	A
14	Distractive extension injury	B	Open reduction and anterior plating	D

Four patients with unilateral facet dislocation were operated by open reduction and Bohlman triple-wiring and posterior fusion. Of them 3 cases were improved to normal and in other improvement was observed (from level A-C)

In this study 5 patients with bilateral facet dislocation were operated by open reduction and Bohlman triple-wiring and posterior fusion. Of them improvement in neurological condition was not changed in 3 cases. In one case it was improved from Frankel grade B-D and in other case improvement was observed from Frankel grade C to normal.

2 patients were presented with distractive extension injury and were operated by open reduction and anterior plating. No improvement in neurological condition in one case and slight improvement were noted in another case.

Out of 14 cases, neurological recovery was observed in 35% cases. Recovery was much better in Quadripareisis patients. None of the patients had iatrogenic paresis.

DISCUSSION

Lower cervical spinal injury cause a heterogeneous group of injuries ranging from ligamentous inadequacy to unstable fracture, involving both posterior and anterior structures in the spinal cord.⁷ Spinal cord and root injuries associated with fracture dislocation have been treated effectively using a number of different procedures. However perfect reduction of fracture dislocation associates to some extent with neurological recovery. From the results of our study it is evident that treating the fractures by posterior fusion using interspinous wiring will produce anatomically better results compared to conservative treatment.

In majority of the patients we did surgical stabilization and fusion because majority of patients associated with bony injury and were unstable after reduction. Also if there is no associated injury close reduction is difficult and requires open reduction. Unilateral facet dislocations may be difficult to reduce in skeletal traction.⁸ Closed reduction was successful in less than 30% of patients, and we do not routinely do manipulative reduction of the cervical spine. The patients who underwent open reduction and fusion had better results than the patients whose fractures were left unreduced. In our experience, open reduction and internal fixation of unilateral facet dislocations have provided consistently good results.

Bilateral facet dislocations produce up to 50% anterior subluxation of one vertebral body on the vertebra below. Usually facet capsules, the posterior longitudinal ligament, and the posterior anulus fibrosus and disc are disrupted.⁴ These injuries are more frequently associated with neurological deficits than are unilateral facet dislocations. These dislocations are more easily reduced

with closed traction methods than unilateral dislocations, but because they are so unstable, redislocation is frequent even if they are treated with prolonged skeletal traction. In this study, open reduction and internal fixation of bilateral facet dislocations produced good results only in one case. No improvement was seen in other 4 cases.

In burst spinal injuries, decompression is a must which can only be achieved by corpectomy. But the challenge is to fill the defect and provide stable spine. The advent of combination technique of cage filled with bone graft and ant cervical locking plate is the best. Cage with bone grafts is good to sustain axial loading and the locking plates in addition to preventing rotation provides good load sharing device.⁹ In our series, out of 3 cases with burst fractures neurological deficit was improved to normal only in one case.

Distractive extension injuries represent approximately 8% of all subaxial cervical spine injuries. It is recommended to treat these fractures by anterior reconstruction using a plate and graft to restore the normal tension band.¹⁰ In our series similar technique was employed but still no significant improvement was observed in Frankels grading.

CONCLUSION

Satisfactory results and outcome was observed in unilateral facet dislocations after treatment by open reduction and Bohlman triple-wiring and posterior fusion. The outcome in bilateral facet dislocations was poor as they are easily reduced with closed traction methods. By open end traction methods redislocation is frequent even if they are treated with prolonged skeletal traction.

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Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

1. Zhou F, Zou J, Gan M, Zhu R, Yang H. Management of fracture-dislocation of the lower cervical spine with the cervical pedicle screw system. *Ann R Coll Surg Engl.* 2010;92(5):406–10.
2. Vaccaro AR, Cook CM, Mccullen G, Garfin SR. Cervical trauma: rationale for selecting the appropriate fusion technique. *Orthop Clin North Am.* 1998;29:745–54.
3. Goldberg W, Mueller C, Panacek E, Tigges S, Hoffman JR, Mower WR, et al. Distribution and patterns of blunt traumatic cervical spine injury. *Ann Emerg Med.* 2001;38:17–21.
4. Charan R, Kumar S, Kumar I. Management of facet joint dislocation of cervical spine. *J Evid Based Med Health.* 2017;4:2558-63.
5. Allen BL, Ferguson RL, Lehmann TR, O'Brien RP. A mechanistic classification of closed, indirect

- fractures and dislocations of the lower cervical spine. *Spine.* 1982;7(1):1–27.
6. American Spinal Injury Association. International Standards for Neurological Classification of Spinal Cord Injury, revised 2000. Atlanta, GA; Reprinted 2008.
 7. Koivikko MP, Myllynen P, Santavirta S. Fracture dislocations of the cervical spine: a review of 106 conservatively and operatively treated patients. *Eur Spine J.* 2004;13(7):610–6.
 8. Cotler HB, Miller LS, DeLucia FA, Cotler JM, Davne SH. Closed reduction of cervical spine dislocations. *Clin Orthop Relat Res.* 1987;(214):185–99.
 9. Song KJ, Choi BY. Current Concepts of Anterior Cervical Discectomy and Fusion: A Review of Literature. *Asian Spine J.* 2014;8(4):531–9.
 10. Fehlings MG, Sekhon LH, Tator C. The role and timing of decompression in acute spinal cord injury: what do we know? What should we do? *Spine (Phila Pa 1976).* 2001;26(24):101-10.

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