

## Original Research Article

## A study on outcome of facet joint dislocation of cervical spine

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**Abstract**

**Background:** Cervical spine dislocations, subluxations and dislocations are more common in the lower segments of cervical spines. This study was undertaken in order to study the outcome of cervical spine in a tertiary care centre.

**Material and methods:** A prospective study of 25 cases was undertaken in a tertiary care centre. Cases with unilateral and bilateral facet dislocation were operated and they were followed up for a period of 6 months with radiological examination. JOA score, CC index and ASIA scale were used to assess the improvement.

**Results:** Majority of the cases belonged to more than 40 years of age group and males outnumbered females. The preoperative JOA score was improved from 10.92 to 12.72 and CCI decreased from 19.12 to 10.56. The ASIA grade had also shown significant improvement in most of the patients. **Conclusion:** This study concludes that, a better outcome in cervical facet injuries which are performed at earliest possible point of time.

**Key words:** Cervical facet injuries, Closed reduction, Anterior approach, ASIA grading, CCI.

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**Introduction**

Cervical facet dislocation is said to be present when upper cervical vertebra is anteriorly displaced over body of another two facet joints are located posterior to each vertical vertebral level. The lower cervical vertebral injury is the most common type of injury of the cervical spine which amounts to 6 – 15% of lower cervical vertebral injuries[1]. Excessive Flexion – distraction (seat belt injury) of flexion – rotation results in this type of injuries displacing one or both of the inferior facets of the superior vertebra to shift anteriorly to the superior facet of the vertebra below. Fall from height or high velocity trauma are the common causes of this type of injuries[2]. The disruption of longitudinal ligaments, ligamentum flavum, apophyseal joint ligaments, the annulus fibrosis and the interspinous ligaments is common following lower face dislocations[3]. Nerve root injuries either as complete or incomplete are common. The patient should be managed with decompression, reduction and stabilization in order to

optimize the chance of neurological recovery. The management can be either closed reduction with anterior – posterior approach is effective than the anterior only approach which is beneficial to the recovery of the neurological function. The literature regarding management of cervical spine facet dislocation is scant in this part of the country. Hence this study was undertaken in order to evaluate the outcome of cervical spine face dislocation.

**Material and methods**

A prospective study was undertaken in the department of Orthopaedics of a tertiary care centre. About 25 patients who were operated for cervical injury with bilateral facet dislocations from January 2018 to June 2020 constituted the sample size. The patients with pulmonary complications and severe head injury were excluded from the study. Clearance from institutional ethics committee was obtained before the study was started. An informed, written and bilingual consent was obtained before including the patients in to the study. All the cases were subjected for radiological evaluation including X ray of cervical spine, CT scan with coronal and sagittal reconstruction and MRI of the cervical

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spine. American spinal association (ASIA) impairment scale was used for the classification and grading of complete injury (grade A) to normal (grade E). All the patients were graded before and after surgery according to Japanese Orthopaedic Association (JOA) score and Cervical Curvature Index (CCI) in order to evaluate the stability of the cervical spine.

#### Operative technique

The patients were placed in supine position before surgery with a neck collar. The neck collar was removed following general anaesthesia and patients were moved in to a position of mild cervical flexion. The skull traction was performed using 5 kg weights, with the weight increased at the rate of 1 kg every ten minutes. The measurement of spinal cord evoked potentials (SCEPs) after spinal cord stimulation was used to monitor the neurological function of each patient during surgical reduction. The reduction process was assessed by using intra-operative fluoroscopy. Slight stretching of the head of the patients was used to unlock the unilateral facet dislocation and thus allowing the inferior articular process of the dislocated vertebra to cross the superior process of the lower vertebra. The bilateral facet reduction was carried out by slight rotation of the neck towards the dislocated side allowed

#### Results

the bilateral facet dislocation to be reset. The traction weight was gradually reduced to 5kg after reduction and stopped in cases where the traction weight exceeded 15 kg, the dislocation was unable rest or neurological deterioration was observed through SCEP monitoring. After closed traction, the decompression and fixation through anterior approach was performed. Fusion was ensured by fixation of plates with screws and inter body cages. A caspar cervical distracter was used to distract the intervertebral space after discectomy followed by use of thin distractor for insertion to achieve reduction. The caspar distractor was used to expand inter vertebral space to twice that if its normal height in patients with unilateral facet dislocation. A suitable blunted instrument was then placed on the locking side of the posterior third of the endplate of the lower vertebrae to act as a lever after discectomy. The bilateral face dislocation was reset by pushing on instrument in a caudal direction with simultaneous pressure on anterolisthetic upper vertebra in a dorsal direction. A neck collar was used for 1.5 – 2 months after surgery. The data thus obtained was collected in a proforma and analyzed using Statistical Package for Social Services (vs 22).

**Table 1: Demographic and clinical characteristics of the patients**

		Frequency	Percent
Sex	Male	14	56.0
	Female	11	44.0
Age	Mean $\pm$ SD	44.72 $\pm$ 14.32	
Cause of injury	Fall from height	9	36.0
	RTA	14	56.0
	Other	2	8.0
Duration of injury to surgery	Mean $\pm$ SD	4.64 $\pm$ 1.38	
Injured segment	C3 – C4	3	12.0
	C4 – C5	5	20.0
	C5 – C6	4	16.0
	C6 – C7	13	52.0
Type of fracture dislocation	Bilateral	15	60.0
	Unilateral	10	40.0
Duration of reduction	Mean $\pm$ SD	67.96 $\pm$ 20.08	

This study had shown that males outnumbered females. The mean age of the study group was 44.72 ( $\pm$  14.32) years. High velocity road traffic accidents were the common cause for the injury. The duration of injury to

surgery was 4.64 days. More than half of the patients had dislocation of C6 – C7 vertebra. The facet dislocation was bilateral in 60% of the cases. The mean duration of reduction was 67.96 minutes in this study.

**Table 2: Pre and post operative American Spinal Injury Association (ASIA) grade**

ASIA grade Preop	ASIA grade – post op				
	A	B	C	D	E
A	1 (100)	5 (100)	0	0	0
B	0	0	2 (100)	3 (37.5)	0
C	0	0	0	3 (37.5)	0
D	0	0	0	2 (25.0)	6 (66.7)
E	0	0	0	0	3 (33.3)

 $\chi^2$  value=47.396

df=16

p value=0.000, Sig

The pre operative American Spinal Injury Association grading was A in 1 patient who was also grade as A after surgery. About 5 patients with Grade A before surgery were moved to grade B after surgery. 2 patients with grade B before surgery were moved to grade C

after surgery. About 37.5% of the patients each in grade B and C before surgery moved to grade D. About 66.7% of the grade D patients before surgery were moved to grade E. This difference in grading was statistically significant.

**Table 3: Pre and post operative Japanese Orthopedic Association (JOA) score and Cervical Curvature Index (CCI)**

Parameters Mean ( $\pm$ SD)	Pre operative	Post operative	T value	P value, Sig
JOA	10.92 ( $\pm$ 2.12)	12.72 ( $\pm$ 2.11)	8.05	0.000, Sig
CCI	19.12 ( $\pm$ 3.07)	10.56 ( $\pm$ 2.58)	10.086	0.000, Sig

Mean Japanese Orthopedic Association score was 10.92 before surgery and increased to 12.72 after surgery which was statistically significant. The mean Cervical curvature index was 19.12 before surgery and decreased to 10.56 after surgery. This difference was also statistically significant.

## Discussion

This study was mainly undertaken to study the outcome of cervical facet injuries in a group of patients attending a tertiary care center. The lower cervical facet dislocation with anterior displacement can result in neurological impairment and can also be life threatening. This study had shown that, males were more affected than the females due to their higher movement in daily living. The mean age of the study group was middle age of 44.72 years. High velocity injuries and fall from height are the common cause for injury of the cervical spinal cord. In this study, high velocity injuries were the common cause for the injury. More than half of the patients had dislocation of C6 – C7 vertebra in this study and facet dislocation was bilateral in 60% of the cases. The timing of surgery is one of the important factor for better outcome of the patients undergoing surgery. A study advocate that, surgical intervention should occur at an earliest possible point of time following spinal cord injury can result in

good neurological function and reduction of the complications of the surgery[4]. Another study showed that, the delay in surgery allowed better preoperative preparation and safe decompression after subsidence of edema[5]. Miao et al had recommended that the surgery for cervical facet dislocation should be performed within 72 hours to improve the likelihood of recovery of neurological function[3]. The American Spinal Injury Association grading had improved after the surgery which was statistically significant. This study had shown improvement in mean Japanese Orthopedic Association score which was statistically significant and significant decrease in Cervical curvature index. A study by Miao et al had shown similar results for ASIA grade, JOA score and CCI[3]. A study by Brodke et al found no significant difference in the neurological recovery, stability or rate of pseudoarthrosis[6]. Du et al reported that the reconstruction of cervical lordosis and strengthening of cervical stability can reduce the occurrence of axial symptoms[7]. A study by Lee et al had shown that, the incidence of permanent neurological complications after closed reduction was 1% and transient injury occurred in 2% to 4%[8]. In this study the duration of follow up was short to report the long term clinical outcome of cervical facet fractures.

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**Conclusion**

This study had shown a better outcome in cervical facet injuries. Surgery at earliest possible point of time can help in reduction of neurological impairment and complications.

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