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Assessment of Traumatic Axial Cervical Spine Injuries

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Abstract

Background: To assess traumatic axial cervical spine injuries in 84 patients. **Subjects and Methods:** Eighty- four patients with traumatic axial cervical spine injuries of either gender were enrolled. Magnetic imaging resonance (MRI) was performed in all. Conservative treatment was given to those with minimal no bony injuries with or without spinal cord contusion and decompression and fixation was performed in moderate to severe bony injuries with compression of spinal cord. Patients were treated for anterior fixation i.e., corpectomy with either autologous bone graft or with titanium cage and plate fixation and with corpectomy with tricorticate graft. **Results:** Out of 84 patients, males comprised 54 (64.2%) and females had 30 (35.8%). Aetiology in present found to be assault in 9, road traffic accident in 48, sports injury in 17 and work place injury in 10 cases. Body fracture was evident in 24 and ligamentous injury in 60 patients. Type of body fractures was C3 in 3, C4 in 2, C5 in 12, C6 in 3 and C7 in 4 patients. Management performed was corpectomy with tricorticate graft in 26 cases and corpectomy with fixation with titanium cage and plate/screws in 58 cases. **Conclusion:** Discoligamentous was major type of injury and road traffic accident was main cause of injury among patients with subaxial cervical spine injuries.

Keywords: Subaxial Cervical Spine Injuries, Discoligamentous, Road Traffic Accident.

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Introduction

Subaxial cervical spine injuries carry high mortality and morbidity. These comprises of facet joint fractures and disruption of joint capsule.[1] Subaxial cervical spine injuries involve either anterior column injuries such as those involving body fractures, middle column injuries such as facets injuries or posterior column injuries such as laminar injuries and posterior osteoligamentous injuries.[2] In case of anterior column injuries, compression and comminuted fracture injuries of vertebral body are common.[3] It is indicated when there is evidence of compression of the spinal canal resulting from fractured segment breaching into spinal canal.[4] Correction of kyphotic deformity occurred due to wedge fracture. Posterior column injuries comprise of injuries of lamina and various ligaments.[5,6]

Various treatment modalities have emerged over the period of time regarding treatment of traumatic axial cervical spine injuries. Both anterior and posterior approaches with the help of autologous and synthetic bone grafts for fixation have been tried by Neurosurgeons.[7,8] There is variation in management of traumatic subaxial cervical spine injuries. Stabilization of facet joint either by immobilization or fixation of levels above and below the level of fracture is main treatment option.[9]

Considering this, we attempted present retrospective, observational study to assess traumatic axial cervical spine injuries in 84 patients.

Subjects and Methods

A sum total of eighty- four patients with traumatic axial cervical spine injuries of either gender. They became part of the study with their written consent. Ethical clearance was obtained from review and clearance committee.

Demographic profile of each patient was entered in case history proforma. All cases were managed in casualty with primary resuscitation with trauma protocol and spine immobilization. They underwent clinical and radiological investigations. Magnetic imaging resonance (MRI) was performed in all. Conservative treatment was given to those with minimal no bony injuries with or without spinal cord contusion and decompression and fixation was performed in moderate to severe bony injuries with compression of spinal cord. Patients were treated for anterior fixation i.e., corpectomy with either autologous bone graft or with titanium cage and plate fixation and with corpectomy with tricorticate graft. Results were compiled and spread along MS excel sheet for correct inference. SPSS version 18.0 with Chi- square test was performed for comparison with the level of significance set below 0.05.

Results

Out of 84 patients, males comprised 54 (64.2%) and females had 30 (35.8%) [Table 1, Figure 1].

Aetiology in present found to be assault in 9, road traffic

accident in 48, sports injury in 17 and work place injury in 10 cases. A significant difference was observed (P< 0.05) [Table 2, Figure 2].

Body fracture was evident in 24 and ligamentous injury in 60 patients. The difference found to be significant (P< 0.05) [Table 3, Figure 3].

Type of body fractures was C3 in 3, C4 in 2, C5 in 12, C6 in 3 and C7 in 4 patients. The difference found to be significant (P< 0.05) [Table 4, Figure 4].

Management performed was corpectomy with tricorticate graft in 26 cases and corpectomy with fixation with titanium cage and plate/screws in 58 cases. The difference was significant (P< 0.05) [Table 5].

Table 1: Patients distribution

Gender	Frequency	Percentage
Male	54	64.2%
Female	30	35.8%

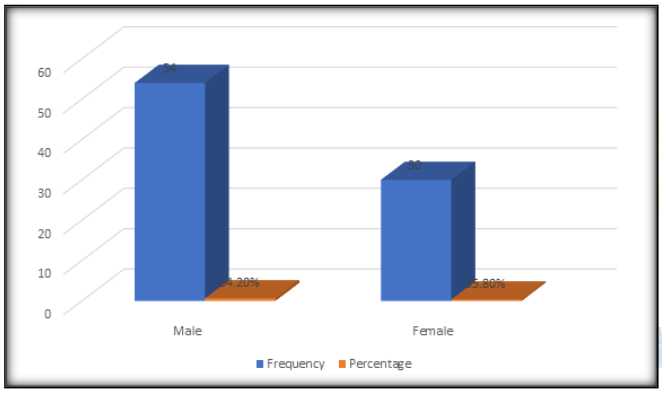

Figure 1: Patients distribution

Table 2: Aetiology of injury

Aetiology	Number	P value
Assault	9	<0.05
Road traffic accident	48	
Sports injury	17	
Work place injury	10	

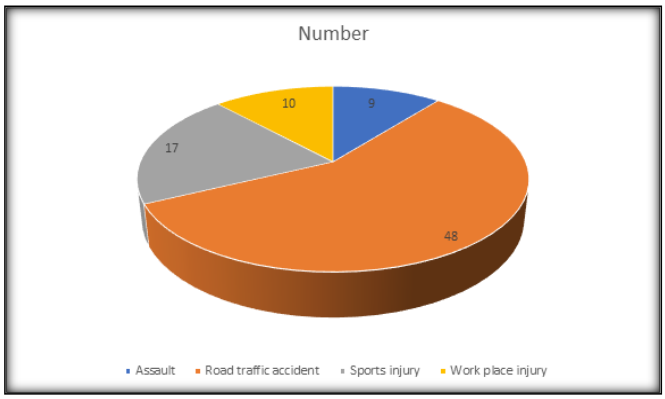

Figure 2: Aetiology of injury

Table 3: Type of injury noted in patients

Type of injury	Number	P value
Body	24	<0.05
Discoligamentous	60	

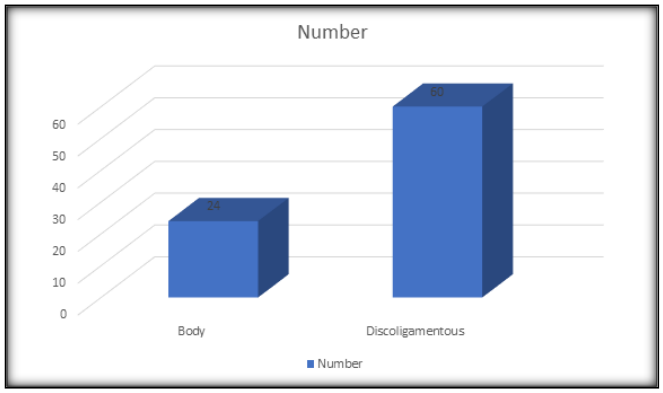

Figure 3: Type of injury noted in patients

Table 4: Type of body fractures

Body fractures	Number	P value
C3	3	<0.05
C4	2	
C5	12	
C6	3	
C7	4	

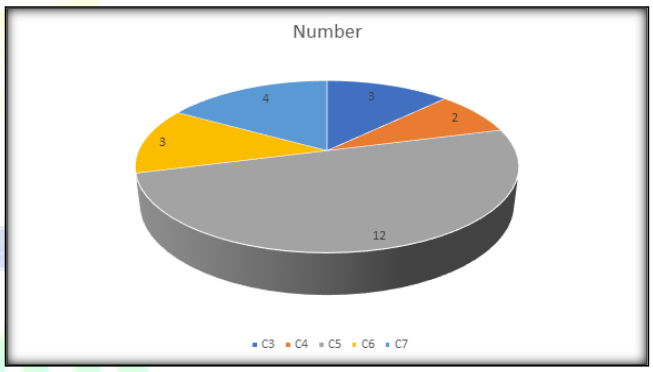

Figure 4: Type of body fractures

Table 5: Management performed in cases

Management	Number	P value
Corpectomy with tricorticate graft	26	<0.05
Corpectomy with fixation with titanium cage and plate/screws	58	

Discussion

Spinal cord injuries (SCIs) are a major cause of disability and mortality in modern world.[10] Cervical spine injuries occur in 2% to 3% of all blunt trauma.[11,12] The permanent disability and lack of societal and vocational integration associated with SCI makes it a burden on the patient and the family.[13,14] Since quadriplegia or quadriparesis resulting from cervical spine injuries cause major disability, it becomes more important to promptly manage these injuries in the hope of a better functional recovery.[15,16] The present retrospective, observational study assessed traumatic axial cervical spine injuries in 84 patients. Out of 84 patients, males comprised 54 (64.2%) and females had 30 (35.8%)

Aetiology in present found to be assault in 9, road traffic

accident in 48, sports injury in 17 and work place injury in 10 cases. Dhakal et al,[17] in their study 30 subaxial cervical trauma patients were divided into 4 groups based on the timing to surgery: within 2 days, 3 to 7 days, 8 to 30 days, and >31 days. There were 27 male and 3 female patients. 44 had injury due to fall. No patients were treated within the first 48 hours; only 9 were treated between 3 and 7 days, 16 between 8 and 30 days, and 5 a month later. Major delay was finance and operating room availability. Thirteen patients had a C6C7 involvement followed by C5C6 in 6 patients. Seven patients had complete neurological deficit while 18 patients had incomplete deficit. A total of 46.7% improved their neurology in 6 months. No neurological recovery was observed in complete deficit patients.

Our results showed that body fracture was evident in 24 and ligamentous injury in 60 patients. Type of body fractures was C3 in 3, C4 in 2, C5 in 12, C6 in 3 and C7 in 4 patients. Ulrich et al and Coe et al tested several implants in cadaver and bovine spines,[18,19] and they concluded that posterior approach is far better than the anterior one especially in associated ligamental injuries Ulrich et al,[18] said an additional external immobilization should be combined with anterior fixation, whereas Coe et al recommended posterior wiring techniques.

Management performed was corpectomy with tricorticate graft in 26 cases and corpectomy with fixation with titanium cage and plate/screws in 58 cases. Venkati et al,[20] conducted a study on 172 patients of subaxial cervical spine injuries, off which 44 patients suffered from vertebral body fracture while 108 patients had spinal canal compromise due to other injuries. 16 patients had quadriplegia, 24 patients had grade 4 power in upper and lower extremities, and roots were involved in 46 patients. In 44 patients complete corpectomy was performed with placement of tricorticate graft taken from fibula, this graft was fixed in place with titanium plate and four screws.

Asher et al,[21] conducted a study on 452 patients, off which 69.7% were males and 30.3% were females. 52.4% patients were between age group 30-60 years of age and about 56.1% had hospital stays lasting < 10 days. 46.6% of patients exhibited road traffic accidents as the main common mechanism of injury. Neck pain was the most common symptom and cervical spine straightening was the most common radiological abnormality. The severity of injuries was more severe in patients who were not restrained by seat belt or using a helmet.

The shortcoming of present study is that small sample size was included. We did not include those who died during the treatment.

Conclusion

Discoligamentouswas major type of injury and road traffic accident was main cause of injury among patients with subaxial cervical spine injuries.

References

1. Bohlmann HH. Acute fractures and dislocations of the cervical spine: An analysis of three hundred hospitalized patients and review of the literature. I Bone Joint Surg. 1979;61(8):1119–42.
2. Capen DA, Garland DE, Waters RL. Surgical stabilization of the cervical spine. Clin Oñhop. 1985;(196):229–37.
3. Co¢JD, Warden KE, Sutterlin CE, e PCM. Biomechanical Evaluation of cervical spinal stabilization mcthods in a human cadaveric model. Spine. 1989;14(10):1122–31.
4. Argenson C, Lovet J, Sanouiller JL, Peretti FD. Traumatic rotatoiy displacement of the lower cervical spine. Spine. 1988;13(7):767–73.
5. Bombard M, Canevet D, l ID. Comparison over the entire series of the results of anterior and posterior surgery. Rev Chir Orthop. 1984;70:533–6.
6. Oliveira D, C J. Anterior reduction of interlocking facets in the lower cervical spine. Spine. 1979;4(3):195–202.
7. Stauffer ES, Kelly EG. Fracture-dislocations of the cervical spine. I Bone Joint Surg. 1977;59(1):45–8.
8. Castaing J. Prior surgical treatment in recent trauma to the lower cervical spine. Rev Chir Oñhop. 1984;70:519–22.
9. Castaing J. Arguments in favor of the anterior approach in traumatic chinirgia of the cervical spine. Rev Chir Orthop. 1984;70:556–7.
10. Reid DC, Henderson R, Saboe L, Miller JD. Etiology and clinical course of missed spine fractures. J Trauma. 1987;27(9):980-6.
11. McCleary AJ. A fracture of the odontoid process complicated by tenth and twelfth cranial nerve palsies. A case report. Spine. 1993; 18(7):932-5.
12. Arias MJ. Bilateral traumatic abducens nerve palsy without skull fracture and with cervical spine fracture: case report and review of the literature. Neurosurgery. 1985;16(2):232-4.
13. Stiell IG, Clement CM, McKnight RD, Brison R, Schull MJ, et al. The Canadian C-spine rule versus the NEXUS low-risk criteria in patients with trauma. N Engl J Med. 2003;349(26):2510-8.
14. Yadollahi M, Paydar S, Ghaem H. Epidemiology of cervical spine fractures. Trauma Mon. 2016;21(3):33608.
15. Fredo HL, Rizvi SA, Lied B, Ronning P, Helseth E. The epidemiology of traumatic cervical spine fractures: a prospective study from Norway. Scand J Trauma Resusc Emerg Med. 2012;20:85.
16. Kiwerski J, Weiss M, Chrowstowwska T. Analysis of mortality of patients after cervical spine trauma. Spinal Cord. 1981;1(6):347-51.
17. Dhakal GR, Bhandari R, Dhungana S, Poudel S, Gurung G, Kawaguchi Y, Riew KD. Review of subaxial cervical spine injuries presenting to a tertiary-level hospital in Nepal: challenges in surgical management in a third world scenario. Global spine journal. 2019 Oct;9(7):713-6.
18. Ulrich C, Wiirsdiirfer O, Claes L, Magerl F. Comparative study of the stability of anterior and posterior cervical spine fixation procedures. Arch Orihop Trauma Surg. 1987;106:226–31.
19. Roy-Camille R. Arguments in favor of the posterior approach in traumatic cervical spine surgery. Rev Chir Orthop. 1984;70:550–7.
20. Venkati GS, Satpaty A, Pandey N, Prasad RS. Observational retrospective study of subaxial cervical spine trauma at tertiary care centre. IP Indian J Neurosci 2021;7(4):306-310.
21. Asher P, Joseph JJ, Pendro VS, Peethambaran A, Prabhakar RP. Epidemiological study of cervical spine injury in a tertiary care center in South India. Int Surg J 2020;7.

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