A Prospective Epidemiological Study of Subaxial Cervical Spine Injury in a Tertiary Care Centre In South India

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ABSTRACT

Introduction: Injuries to the cervical spine occur in only 2 to 3% of all patients with CNS injuries, because of their associated mortality and morbidity to the patient, socioeconomic impact over the family of the injured patients, they are highly significant. Aim: The aim of this study was to record the incidence of subaxial spine injury patients in a neuro surgical unit in our institution.

Material and Methods: Spine injury cases referred to Neuro surgery unit were included in the study. Anatomical level of injury, number of cervical levels injured, trauma mechanism involved in fall injuries, associated head injury, neurological deficit at the time of diagnosis were recorded.

Results: About 36% of the patients has fractures at more than one cervical level. 2 patients had high cervical and subaxial fractures among the 36 patients. The modes of injury were motor vehicle accidents 76%, fall from height 18%, swimming related injuries 6%. The relative incidence of subaxial cervical spine injury increased significantly with age.

Conclusion: RTA is the majority to cause subaxial injury. Male predominance was observed and the incidence increased with age.A proper uniform referral system to tertiary center and further study with longer duration is essential.

Keywords: Cervical Vertebrae, Spinal fractures, Trauma

INTRODUCTION

A spinal cord injury (SCI) is the injury to the spinal cord that effects temporary or permanent alterations in its function. Symptoms may include loss of muscle function, sensation, or autonomic function in the parts of the body served by the spinal cord below the level of the damage. Injury can occur at any level of the spinal cord and can be full injury, with a complete loss of sensation and muscle function, or incomplete, meaning some nervous signals can travel past the damaged area of the cord. Depending on the location and severity of the injury, the symptoms differ, from numbness to paralysis to incontinence. Long-term outcomes also range widely, from full recovery to permanent tetraplegia (also called quadriplegia) or paraplegia. Complications can include muscle atrophy, pressure sores, infections, and breathing problems.1-3 Not all cervical spine injuries are of clinical significance about the need for specific treatment. Isolated cervical spinous process fractures, minor vertebral body compression fractures (with less than 25% vertebral body height reduction) and isolated end plate fractures are examples of injuries that do not require operative stabilization or other specific treatment and patients can expect a good longer-term outcome when the fracture heals. While they may experience symptoms for some time after the injury, and require pain relief, physiotherapy, and ongoing supportive care, these patients do not require emergency imaging to prevent longer-term spinal instability and resulting injury to the spinal cord.4-7 Identification of unstable CSI is, therefore, an essential aspect of the trauma evaluation in preventing subsequent neurological damage. This task is especially challenging in patients who are not clinically evaluable (unevaluable group) because of intoxication or concomitant head injury and has led to the use of advanced imaging techniques such as CT and MR imaging for radiological clearance.

The aim of this study was to record the incidence of subaxial spine injury patients in a neuro surgical unit in our institution.

MATERIAL AND METHODS

This study was conducted in Rajiv Gandhi Government hospital. About 80 to 100 patients are admitted daily in the trauma unit and nearly 10 to 15 patients are admitted under neurosurgery unit for surgical and non-surgical management. To determine the incidence of subaxial cervical spine injury, we prospectively registered all cervical injury patients after CT cervical spine and cervical MRI from January 2016 to December 2017.

Ethical Committee, the medical records of all patients admitted and managed for traumatic spinal cord injury were retrieved and data collected in a pre-designed proforma. Patient characteristics including age, gender, occupation were noted. Details of etiology, mechanism of injury, level of injury, extent of neurological deficits, details of investigations, details of management and immediate outcome were recorded.

The following data were recorded with 968 patients who were admitted during that period and gender, age, anatomical level of injury, number of cervical levels injured, trauma mechanism involved in fall injuries, associated head

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injury, neurological deficit at the time of diagnosis (normal, radiculopathy, incomplete SCI, complete, SCI or unknown), surgical or conservative treatment we're noted.

RESULTS

The median age of the patients was 48 years, 36 patients were included. The relative incidence of subaxial cervical spine injury increased significantly with age.

The modes of injury were motor vehicle accidents 67%, fall from height 22%,swimmingrelated injuries 6%.The patients involved in Motor vehicle accidents were younger in age. The female patients in the study had motor vehicle accidents as the only mode of injury.

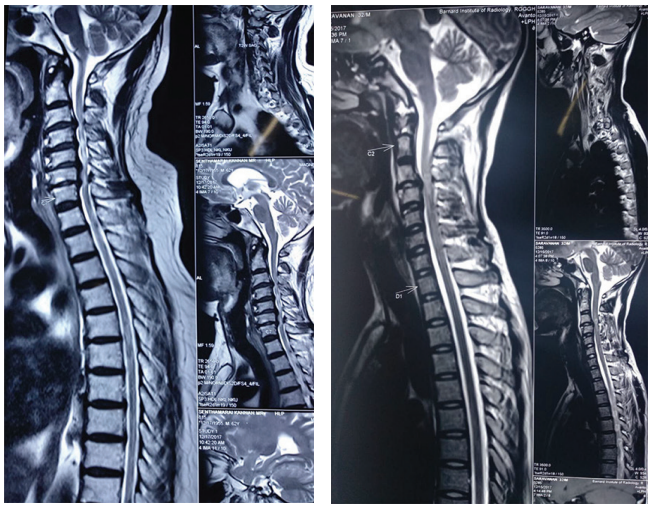

Figure-1: cervical spine injury in OPLL patient with cord contusion;
Figure-2: C3 C4 fracture dislocation with cord contusion

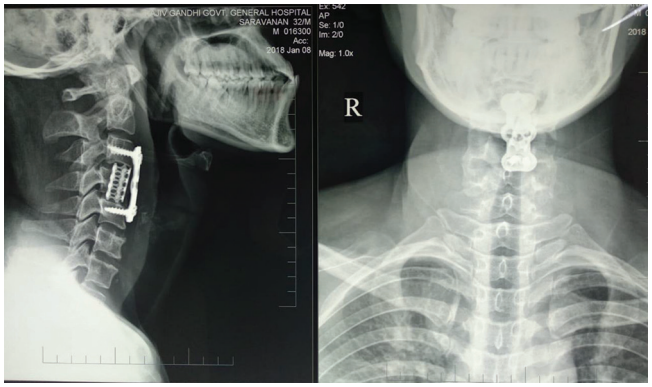

Figure-3: C4 corpectomy and cage/plate fixation

Figure-4: C3-C5 Disc ligamentous injury

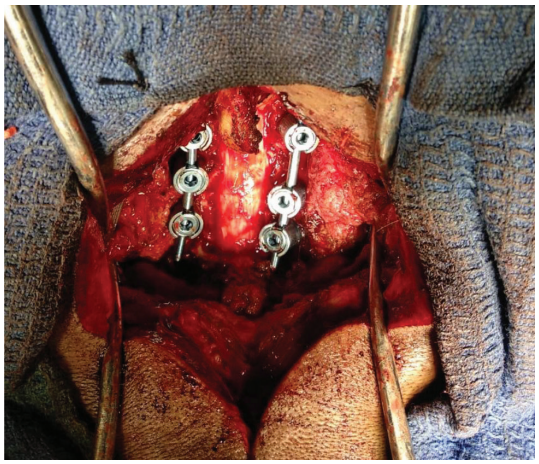

Figure-5: Posterior Decompression and lateral mass fixation

About 36% of the patients had fractures at more than one cervical level.2 patients had high cervical and subaxial fractures among the 36 patients. The Median age of the patients with Subaxial fracture was 48 years and 98% were males.

2 patients had concomitant thoracolumbar injuries.3 patients had severe traumatic brain injury.4 patients dies during the hospital stay. 12 patients were absent for follow up at 3 months after discharge. (Table 1) cervical spine injury in OPLL patient with cord contusion, C3 C4 fracture dislocation with cord contusion, C4 corpectomy and cage/plate fixation, C3-C5 Disc ligamentous injury, Posterior Decompression and lateral mass fixation. (Figure 1 to 5)

Variables		N	Percentage
Age	10-20	1	3%
	21-30	5	14%
	31-40	12	33%
	41-50	9	25%
	51-60	6	17%
	61-70	3	8%
Gender	Male	33	92%
	Female	3	8%
Level of injury associated	High-Cervical C1/C2	2	6%
	Thoraco Lumbar	2	6%
	with head injury	3	8%
	Subaxial spine alone	8	22%
Mode of Injury	RTA	24	67%
	Fall height	8	22%
	Others	4	11%
Treatment	Operated	8	22%
	Conservative	28	78%

DISCUSSION

The treatment of spinal trauma ranges from dealing with patients with minor damages requiring no interventive treatment, through to major complex, spinal cord, and life-threatening spinal column damages. Extensive expertise is required for the optimum assessment, decision making and treatment of this patient group and, in this article, the various

options of treatment done will be outlined.8

Traditionally, management of injuries of the cervical spine has been a bolt-on extra in managing the complicated injured patient, but the widespread adoption of the Advanced Trauma Life Support protocols has highlighted the importance of assuming a cervical spine injury in all patients with a history of trauma until proven otherwise.9,10

The evaluation of spinal cord injury is dealt with elsewhere; essentially, the clinical and radiological assessments, especially, the CT cervical spine and MRI scan cervical spine should allow the clinician to identify the anatomical and functional level of the spinal cord injury, the degree of spinal cord injury, i.e., partial or complete and some quantification of the degree of soft tissue damage to the cord, including the presence of spinal shock.

Up to 20% of spinal injuries occur at multiple levels, and there is evidence that in the upper cervical spine one identified injury is associated with an 80% chance of a second injury in the cervical spine.

In determining, which patients are suitable for surgery, the grade of instability as shown by the degree of injury to the two spinal columns, or any significant displacement should be considered. A surgical choice should be balanced against the non-surgical option by using an evidence-based approach to predict the likely outcome of neurological sequelae, pain, deformity and degenerative change with one or other treatment method.11-13

CONCLUSION

In this prospective study, RTA is the majority to cause subaxial injury. Male predominance was observed and the incidence increased with age. The 3 month follow up for spine injury patients vary, as the surgically treated patients were available for 3 month follow up more than the conservatively treated patients. The actual incidence of subaxial spine injury may be more as cervical fractures which are considered stable are not referred. Some cervical spine injury patients, with fractures causing immediate death at the scene of the accident are also missed. Further epidemiological study for longer duration with longer follow upperiod are needed.

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