Prevalence Of Cervical Spine Injuries In Association With Maxillofacial Injuries In A Tertiary Care Hospital In Central India

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Abstract

Background: Facial fractures can be accompanied by serious and life-threatening injuries such as cervical spine injury (CSI), which can lead to serious consequences if misdiagnosed or missed. **Aim:** This study aimed to determine the prevalence of cervical spine injuries in patients with maxillofacial fractures in a superspeciality teaching hospital. **Material and Methods:** This is a retrospective study conducted in the department of neurosurgery, super speciality hospital, SSMC, Rewa, India**.** All patients diagnosed with cervical spine injuries by CT scan were enrolled in our study. The prevalence and types of neurologic deficits and its relation with etiology were assessed in patients with combined facial and cervical spine injuries. **Result:** A total of 92 patients of cervical spine injury, with ages ranging from 15 to 78 years old were enrolled in our study. Majority of the patients were male (66.3%), Mode of the injury in most cases involved blunt trauma, 58 (63%) resulting from motor vehicle accidents followed by fall (14.1%). The most common type of the CSIs was the vertebral fracture (54.3%). Mandible was the most common site of the observed maxillofacial fractures (41.3%). Increased age was significantly associated with the presence of CSI. **Conclusion:** Although uncommon, cervical spine injury must be thoroughly ruled out before evaluation and management of facial trauma. Concomitant cervical spine injury should not delay appropriate and timely treatment of facial fractures because adequate means of intraoperative stabilization are readily available.

Keywords: facial injuries, cervical spine injuries, mandibular fracture, road traffic accident

INTRODUCTION:

Maxillofacial fractures are traumatic injuries to the face which result in fracturing of the bones of the upper, middle, or lower facial regions [1] The causes of maxillofacial fractures vary between different age groups and among various communities due to differences in social, economic, and cultural factors [2]. However, road traffic accidents, falls, assaults, sports, and industrial incidents are common causes of maxillofacial fractures occurrence [3]. Other factors such as poor roads and exceeding speed limits can also lead to traffic accidents, and consequently maxillofacial fractures [4].

The incidence of traumatic cervical spine fractures (CS-fx) in the general population is largely unknown. Several reports describe the incidence of CS-fractures in different subpopulations, such as trauma center patients, specific age groups, head injury patients, military populations and osteoporotic patients [5-6]. Maxillofacial fractures can occur alone or in conjunction with other serious and sometimes life-threatening injuries to the head, chest, spine, and other regions of the body [7].

Maxillofacial fractures have been recognized as high risk factor for concomitant CSI [8-9].

CSIs are more common in males than females. With respect to age, the highest incidence rate is reported to be among patients aged 15–45 years, with a second peak in those aged 65-80 years [10-11].

The purpose of this study was to assess the patterns of maxillofacial fractures and to explore the association between these fractures and CSIs in patients who had a traumatic facial injury.

MATERIAL AND METHODS:

A retrospective analysis was conducted in the department of neurosurgery in our tertiary care super specialty hospital for a period of one year. All patients with history of any kind of blunt trauma to the head and neck during the study period suspected with CSIs or maxillofacial fracture were enrolled in our study.

The data were collected from the medical records of the subjects after receiving plain radiography and computed tomography (CT) scans in order to differentiate between different types of maxillofacial fractures/CSIs and magnetic resonance images in order to explore the potential associated injuries. Patients were enrolled as subjects if they had confirmed CSIs or facial fractures according to the findings from the radiography and the CT scans

The following data were recorded: sex, age, socio-demographic factors, anatomical level of injury, number of cervical levels injured, trauma mechanism according to ICD-10, [12]

Statistical analysis: All statistical data were analyzed using SPSS, version 22 software. Categorical data were presented as frequency and percentages. P value <0.05 was considered as significant

RESULT:

A total of 92 subjects of CSIs/maxillofacial fractures were reported during the study period. Incidence of Cervical spine injury with maxillofacial fracture was 1.6%. The age ranged were 15-75 years, with mean age (SD) of the subjects was 33.5 ± 19.29 years. Among them most of the patients (31.5%) were of age group 46 – 60 years. Majority of the patients were male (66.3%) while 33.7% were female as shown in table: 1. Road traffic accidents were the most prevalent cause of the fractures in the patients of this study (frequency 63%), followed by fall (14. 1%).assault (10.9%), sport injuries etc. were the other common causes.

Table 1: characteristic of the study subjects

Characteristics		**Frequency**	**Percentage**
Age group (in years)	15-30	17	18.5%
	31-45	26	28.3%
	46-60	29	31.5%
	>60	20	21.7%
Gender	Male	61	66.3%
	Female	31	33.7%
Causes of CSIs	Road traffic accidents	58	63.0%
	Falls	13	14.1%
	Assault	10	10.9%
	Sports	5	5.4%
	Industrial accidents	4	4.4%
	Gunshot	2	2.2%

Vertebral fractures was most common (54.3%) among cervical spine injuries. Majority of the patients (68.5%) have fracture at the level of C3-C7 [table: 2].

Table 2: Distribution of cervical spine injury among the study subjects

Cervical spine injury	**Frequency**	**Percentage**
Vertebral fracture	50	54.3%
Cervical vertebra dislocation	15	16.3%
Disc herniation	10	10.9%
Spinal cord contusion	3	3.2%
Cervical subluxations	10	10.9%
Ligament tear	4	4.4%

C-level fracture		
C1 C2 C3-C7	18 11 63	19.5% 12.0% 68.5%

Data also showed that the pattern of maxillofacial fractures was as follows: mandibular fractures (41.3%) maxillary fractures (16.3%), zygomatic fractures (18.5%) and orbital fractures were (23.9%**).**

Table 3: Distribution of the anatomic site of the maxillofacial fractures

Maxillofacial fractures	**Frequency**	**Percentage**
Mandible fractures	38	41.3%
Maxilla fractures	15	16.3%
Zygoma fractures	17	18.5%
Orbital fractures	22	23.9%
Total	**92**	**100%**

Skull fracture was most common among brain injury (40.2%), followed by extradural hematoma (26.1%), subdural hematoma (20.7%) and subarachnoid hemorrhage (13.0%).

Table 4: Distribution of the brain injuries

Brain injury	**Frequency**	**Percentage**
Extradural hematoma	24	26.1%
Subdural hematoma	19	20.7%
Subarachnoid hemorrhage	12	13.0%
Skull fracture	37	40.2%

DISCUSSION:

The prevalence of cervical spinal injury in association with facial injury was not high in this study, the study has observed a prevalence of 1.6% of combined injuries when all etiologies were considered and this outcome has been supported by many past research studies [13-14].

The current study showed a high male: female ratio (1.96: 1), with the highest prevalence of CSI with maxillofacial fractures reported in the age group of 46–60 years, (finding are concordant with those reported by Fredø et al [15] and Schoenfeld AJ et al [16]).

The majority of the current study subjects reported road traffic accidents (63%), followed by falls (14.1%) as the most common causes of CSI and maxillofacial fractures, our finding are comparable with many other studies [17-20].

The crash mechanism among the bike/car accidents in the study group was due to collision with motionless objects like posts and related blocks. This resulted in probable severe whiplash injuries in patients. Majority of the patients were found not bearing safety equipment such as helmets and/or seat belts at the time of accident. A high frequency of alcohol consumption was noted in many patients (of our study) involved in vehicular mishaps.

When exploring the factors associated with CSI in the present study, the results showed that increased age was associated with an increased risk of developing CSI. this finding is consistent with that of previous studies [21-22].

In our study among maxillofacial injuries, mandibular fracture was most common followed by orbital bone fracture**,** zygomatic fracture and maxillary bone fractures, accordance to the Jarab et al [23].

In current study among cervical spine injury, vertebral fracture was the most common followed by cervical vertebra dislocation. Most common site of CSI were C3-C7 level, our finding are consistent with that of Robert M et al [24] and Sigaroudi et al [25].

In this study, among various types of skull fractures, frontal bone fracture had the highest frequency. This is consistent with the findings of Yadave et al. [26]. In the study of

Yadave et al. [26], extradural hematoma, subdural hematoma and subarachnoid hemorrhage in patients with maxillofacial fractures were reported to be 22, 17 and 14 percent, respectively.

In this study, no significant association was found between the site of facial fracture and the site of cervical spine injury. Important relationships were noted between fractures of mandible and lower cervical spine and soft tissue injuries of the upper face and fractures of the lower cervical spine. Moreover, closed head injuries and facial fractures did not contributed much in increasing the risk for cervical spine injury. In this study, the presence of mid facial fractures was seen to be associated with a relatively lower risk for cervical spine injuries.

CONCLUSION:

We have concluded that: road traffic accident was the most common trauma mechanism of CSI. A male predominance was observed, and the incidence increased with advancing age.

Although uncommon, cervical spine injury must be thoroughly ruled out before evaluation and management of facial trauma, and concomitant cervical spine injury should not inhibit appropriate and timely treatment of facial fractures because adequate means of intraoperative stabilization are readily available.

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