ORIGINAL ARTICLE

FREQUENCY OF CERVICAL SPINE INJURIES IN MAXILLOFACIAL TRAUMA

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ABSTRACT

Maxillofacial injuries constitute a substantial proportion of cases of cervical spine injuries. Early identification of cervical fractures in patients with maxillofacial trauma is very important because delay in the diagnosis of cervical injuries can cause severe neurological problems, paralysis, and even death. The main aim of this research was to determine the frequency of cervical spinal injuries in oral and maxillofacial trauma patients. This was a cross-sectional study conducted at Oral and maxillofacial surgery Ward Civil Hospital, Karachi from august 2012 to january 2013.A total of 356 patients with maxillofacial trauma were admitted to oral surgery department for treatment. All patients were assessed for cervical spine injuries through lateral and anteroposterior X-rays images and CT scans. A structured questionnaire was used to collect information about dependent and independent variables. Ten(2.8%) patients suffered injuries to the maxillofacial and cervical spine. Out of ten C-spine injury cases, 8 were males and 2 were females. The male to female ratio was 4:1. Despite the low incidence of cervical spine injuries associated with maxillofacial fractures, proper and clear guiding principles should be set for the assessment and management of these cervical spine injuries to prevent longterm disabilities and decease.

Keywords: *Cervical spine injury, Maxillofacial trauma, Frequency*

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INTRODUCTION

Head and neck fractures are considered at high risk for spinal cord injury especially the cervical spine.[1,2] The definitive diagnosis of cervical spinal injury in all patients with facial trauma is very important because it can change the technique of airway management, diagnostic imaging, surgical treatment, and other facial fracture management. It is considered that head and neck injuries play an important role in cervical spine injuries as forces that are transmitted indirectly or directly from facial skeleton transmitted to cervical connective tissues and cervical bone and cause injuries.[3] Road traffic accidents which are considered to be high-velocity injuries are considered to be at greater risk of cervical spine fracture as compared to low risk injuries like falls and workplace accidents.[4,5] There is however insufficient local data available to support the relationship between maxillofacial fractures and cervical spine injury in literature.

The incidence of cervical spine injuries ranged from 2% to 10% in patients with facial fractures.[6,7] While motor vehicle accidents (MVA) and physical assaults are the main causes of isolated maxillofacial fractures, the most common causes of combined maxillofacial and cervical spine injuries are MVA and falling.[8] Prompt recognition of cervical fractures is of paramount importance, as the repair of facial fractures with occult cervical spinal injury or fracture can exacerbate the injury. In addition, the management of cervical spine injuries prevails over the repair of facial fractures, and

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failure to diagnose these injuries poses a significant risk of neurological abnormalities, long - term disability, and even death.[9,10]

According to the American College of Surgeons, any injury above the clavicle increases the chances of a potential injury to the cervical spine and it is important to include proper evaluation and diagnosis of the cervical spine in any patient with a facial injury[11].

The incidence and severity of fractures in the head and neck are quite common in Pakistan as compared to the western world, main reason being that traffic rules and regulations are not completely and properly followed along with the poor conditions of roads and mechanically uninspected and uncertified vehicles are running on the roads. The aim of the study was to determine the frequency of injuries to the cervical spine in patients with maxillofacial trauma to provide proper guidance in diagnosis and in its management. Although many studies have been conducted around the world yet there is a little data is available in Pakistan. The epidemiological data obtained from this study will provide information to the maxillofacial surgeons for proper management and treatment planning.

METHODOLOGY

This was a cross-sectional study done at the Oral & Maxillofacial Surgery ward of Civil Hospital, Karachi over a period of six months from August 8th, 2012 to January 31st, 2013. The sample size was calculated using an Open Epi sample size calculator with an anticipated frequency of cervical spinal injury in patients with maxillofacial trauma of 3.69 percent . Confidence Interval at 95% and the desired precision was 2%, the sample size was calculated to 360 using purposive sampling technique.

An informed consent was taken from all participating patients. Patients of any age and gender presenting in the emergency department having maxillofacial trauma and admitted at Oral & Maxillofacial Surgery ward for management showing facial fractures on radiographs and clinically were included in the study.

Cervical spinal injuries were confirmed by lateral and anteroposterior radiographs of the cervical spine . Computerized Tomography (CT) scans were carried out for further assessment of the injury.Cause of trauma was divided into road traffic accident, assault, falls and sports injuries and others. Information regarding independent and dependent variables was collected by using a predesigned questionnaire.

The data were entered and analyzed using the statistical program for social science (SPSS) software version 16. Mean (deviation standard) calculated for all quantitative variables, such as age. Frequencies and percentages were calculated for qualitative variables such as gender, age group and cause of trauma. post stratification chi square test was applied . of and p-value <0.05 was taken as significant.

RESULTS

A total of 356 patients suffering from maxillofacial trauma formed the study group.

Cause of trauma represented in Table 1.Road traffic accident was the most common cause 88.5%. Table 2 Represented gender distribution with repect to cervical spine injury.table 3 represented age distribution with respect to cervical spine injury.mean age of patient suffering from maxillofacial trauma were 28.51±7.56 with 95% Confidence Interval (27.27, 28.21) of Mean.

10(2.8%) patients had both maxillofacial and cervical spine injuries(figure 1). There were 10 men (median age 31, range 18) and 2 women (median age 35.5, range 1)

DISCUSSION

Cervical spinal injuries affects around 2–3% of all trauma patients and is associated with 8.2% of deaths resulting from trauma.[12] The male-to-female ratio is 4:1.[13] Most patients with a cervical spine injuries lead an active lifestyle prior to injuries. Approximately 80% of patients are aged 18-25 years.[14]

Maxillofacial fracture has long been a prospect of injuries to the cervical spine.[13] However, the exact frequency and facial fracture pattern, the location of fractures, the fracture mechanism and their management have not been clearly defined and remain elusive. Although many studies have been conducted over the past few decades, each research seems to have different incidences. Many of these reports concentrated on specific types of fractures such as maxilla or mandible or a group of all craniomaxillo fractures. This study shows a 2.8% incidence of the cervical spine and maxillofacial fractures close to previous research showing the incidence of the cervical spine and maxillofacial fractures from 0 to 4.3%.[2,15,16,17.]

Though Jamal BT et al,[17] reported that fall was the main cause of cervical spine injury with maxillofacial fracture but in present study road traffic accident was the main cause of cervical spine injuries associated with maxillofacial fractures which is consistent with the majority of the studies in literature.[18] Many authors[1,2,18,19] have reported that the frequency of injuries to the cervical spine is higher when the maxillofacial trauma is caused by a road traffic accident. When only cervical injuries caused by high velocity injuries such as road accidents were included in this study, the chances of facial fracture related injuries to the cervical spine increased. This can be explained by the increased impact

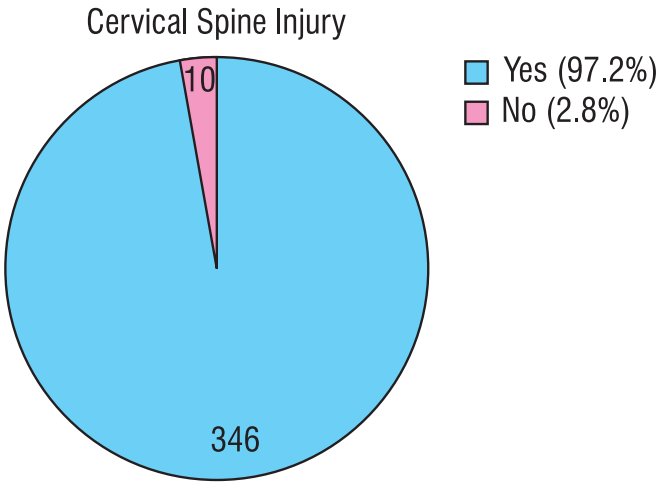

Fig 1: Frequency Distribution of Cervical Spine Injuries

TABLE 1: CERVICAL SPINE INJURIES WITH RESPECT TO CAUSE OF INJURY

Cause of injury	Cervical Spine Injury		Total
	Yes	No	
Rta	9	306	315
Assault	0	16	16
Fall	1	14	15
Contact sports	0	5	5
Others	0	5	5

TABLE 2: CERVICAL SPINE INJURIES WITH RESPECT TO GENDER

Gender	Cervical Spine Injury		Total
	Yes	No	
Male	9	273	282
Female	1	73	74

TABLE 3: CERVIVAL SPINE INJURIES WITH RESPECT TO AGE GROUP

Age Groups	Cervical Spine Injury		Total
	Yes	No	
10-15 years	2	34	36
16-20 years	0	15	15
21-25 years	2	58	60
26-30 years	0	97	97
31-35 years	1	47	48
36-40 years	5	95	100

force on the maxillofacial area, which is transferred to the neck or, more rarely, to the neck.[20] As Robertson et al reported ,cervical spine injuries are frequent in car accidents than motor bike accidents, which are mostly associated with thoracic or lumbar spine injuries.[20]

Many researchers have reported that mandibular fractures and cervical spine injuries are closely associated.[2,6,7,21] This contradicts the statement made by Babock that fractures in the upper third of the face play an important role in the fracture of the cervical spine injury because forces are transmitted directly to the cervical spine from the midface.[22] In relation to the facial fracture site, Lalani and Bonanthaya[23] discussed a typical model of cervical spinal injury in which they reported that lower third of face like mandibular fracture are mainly related to injuries to the upper part of cervical spine areas while mid face fracture is mainly related to trauma to the lower part of the cervical spine. In current research, very few numbers of patients did not allow us to assess the correlation between the maxillofacial fracture site and level of cervical spine injury but it is clear that cervical spine injuries are closely linked with pan facial fractures which comprise of multiple bone fractures in each individual. Jamal BT[17] et al reported 2.8 percent incidence from 424 patients with cervical spine injury associated with mandibular fracture and 90 percent cervical spine injuries were located at C1 to C2 and C5 to C7.

In patients with maxillofacial fractures, the cervical spine is usually evaluated as a routine procedure involving a lateral x-ray of the cervical spine.[24] However, plain X- rays do not detect all cervical spinal injuries.[25] Fortunately, all cervical spinal injuries were diagnosed with a combination of plain films, computed tomography and/or magnetic resonance imaging in this research.[24] Patients with an unstable spinal injury with complete care and complete spinal immobilization with head support should be treated until such investigations are carried out.

Proper clinical and radiographical assessment and timely diagnosis of suspected C spine injuries and its immediate management should be carried out in the emergency department to prevent disastrous consequences

CONCLUSION

The 2.8 percent frequency in this study shows the high suspicion index. It was concluded that road traffic accidents were the main cause of cervical spine injuries associated with facial fracture. Most of the patient were male (n=8)and were from young age group.

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