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ORIGINAL ARTICLE

Incidence of Cervical Spine Injuries Among Patients with Maxillofacial Trauma

SONIA MUBEEN[1], MARIA RASHEED[2], SADDIQUE ASLAM KHATTAK[3], KHURRAM NADEEM[4], MUHAMMAD MOHSIN TAHIR[5], IKRAM MANZOOR[6]

[1]*Senior Registrar, Oral and Maxillofacial Surgery, Shahida Islam Medical and Dental College*
[2]*Postgraduate Resident, Oral and Maxillofacial Surgery, Lahore Medical & Dental College, Lahore*
[3]*Professor, Oral and Maxillofacial Surgery, KMU Institute of Dental Sciences, Kohat*
[4]*Associate Professor Oral Medicine, Lahore Medical and Dental College, Lahore*
[5]*Senior Registrar/ Medical Officer, The Children's Hospital & University of Child Health Sciences, Lahore*
[6]*Bachelor of Dental Surgery, Rawal General and Dental Hospital, Islamabad*
Corresponding author: Maria Rasheed, Email: drmariarasheed@hotmail.com

ABSTRACT

A substantial portion of cervical spine injuries occurs due to maxillofacial trauma. A delay in the identification of cervical injuries can result in major neurological issues, paralysis, and even death. Therefore, early detection of cervical fractures in patients with maxillofacial trauma is crucial.

Aim: The goal of the study is to assess the incidence of cervico-spinal injuries in patients with oral and maxillofacial trauma.

Methods: This cross-sectional study was carried out at the Oral and Maxillofacial Surgery department of Mayo Hospital, Lahore for the duration of one year from January 2021 to January 2022. A total of 120 maxillofacial trauma patients treated at the oral surgery department. By using computed tomography, lateral and anteroposterior X-rays; all patients were evaluated for cervical spine injuries. The dependent and independent variables' information was gathered using a structured questionnaire.

Results: In 4 (3.3%) patients, cervical spine and maxillofacial injuries were found. Six males and two women were involved in the ten Cervical-spine injuries. The ratio of men to women was 4:1. Despite the low frequency of cervical injuries related with maxillofacial fractures, suitable and precise recommendations for the diagnosis and treatment of these cervical injuries must be adopted to avoid permanent disability and even death.

Keywords: Frequency, Maxillofacial trauma, Cervical spine injury

INTRODUCTION

Spinal cord injuries are thought to be highly likely following head and neck fractures, particularly when the cervical spine is involved[1-2]. It is crucial for all patients with facial trauma and cervical injuries to make the conclusive diagnosis in order to maintain airway, proper surgical treatment, and management of other facial fractures[3]. As forces transmitted directly or indirectly from the facial skeleton are transferred to the cervical bone and cervical connective tissue and results in C-injuries, head and neck trauma are assumed to play a significant part in cervical injuries[4-5]. The cervical spine fractures are thought to be more common in traffic accidents, which are classified as high-speed injuries, compared to low-risk injuries like falls and workplace accidents[6]. The literature does not have enough local data to support the link between maxillofacial fractures and cervical injuries. Between 2% and 10% of patients with maxillofacial fractures also have cervical spine injury[7]. Although motor vehicle accidents and alls are the most frequent causes of combined maxillofacial and cervical injuries, MVAs and physical assaults are the main sources of isolated maxillofacial fractures. The treatment of facial fractures caused by occult trauma or a cervical spine fracture might increase the injury and complications, hence it is crucial to identify cervical fractures as soon as possible[8]. Furthermore, cervical injuries must be treated before craniofacial fractures are managed, and if these injuries are not identified, there is a high risk of neurological diseases, long-term impairment, and even death. Any collarbone damage raises the chance of a potential cervical injury, according to the American College of Surgeons, thus it's crucial to accurately check and diagnose the cervical spine in any patient who has had facial injuries[9]. Pakistan has a higher incidence and severity of head and neck fractures than the West, primarily because of the country's poor road conditions and lax enforcement of traffic rules. The study's objectives were to offer guidelines for diagnosis and treatment and to ascertain the prevalence of cervical spine injuries in individuals with maxillofacial trauma[10-11]. Although several studies have been carried out all around the world, Pakistan currently has very little data available. Maxillofacial surgeons will use the epidemiological information from this study for proper management and treatment planning.

METHODOLOGY

This cross-sectional study was carried out at the Oral and Maxillofacial Surgery department of Mayo Hospital, Lahore for the duration of one year from January 2021 to January 2022. The Open Epi sample size calculator was used to determine the sample size. In patients with maxillofacial trauma, the anticipated frequency of cervical injuries is 1.86%. A purposive sampling technique was used to determine the sample size, which came out to be 120, with a confidence interval of 95% and a required precision of 2%. All patients who participated have given the informed consent. Patients of all ages and genders with maxillofacial injuries treated in the oral and maxillofacial surgery department and had radiologically and clinically obvious craniofacial fractures were included in the study. On lateral and anteroposterior radiographs of the cervical spine, injuries to the spine were confirmed. To further assess the injury, computed tomography (CT) was done. Road traffic accidents, falls, assaults, sports injuries, and other incidents were classified as the trauma causes. The dependent and independent variables' information was gathered using a structured questionnaire. SPSS 21.0 was used to enter and analyse data. All quantitative variables, including age, were estimated using the mean (standard deviation). For qualitative factors like gender, age group, and injury cause, frequencies and percentages were determined. After stratification, the chi-square test was applied, and p 0.05 was regarded as significant.

RESULTS

A total of 120 patients with maxillofacial trauma selected in the study group. Table 1 shows the trauma causes.

Table-1: Shows the Cervical Spine Injuries in Relation to Causative Factors

Cause of Cervical Spine Injury		Total
Yes	No	
Assault 0	5	5
Rta 2	102	104
Fall 1	3	4
Contact 1 sports	2	3
Others 0	4	4

Road traffic accidents were the most frequent reason for injuries (86.7%). The Cervical spine injury was found in 4(1.9%) RTA patients out of 104 patients, fall account for 1(25%) patient out of 4 patients and 1(33.3%) patient acquired cervical spine injury due to contact sports. The gender distribution by cervical spine injuries is shown in Table 2.

Table-2: Shows the Cervical Spine Injuries in Relation to Gender

Gender	Cervical Spine Injury	Total
Yes	No	
Male 3	100	103
Female 1	16	17

Three males (2.9%) out of 103 have C-spine injury and 1 females (5.8%) out of 17 have C-spine injuries

The distribution of cervical spine injuries by age is shown in Table 3. With a 95% confidence interval (26.19, 29.01) of the mean, patients with maxillofacial trauma have the mean age of 27.21 ± 9.9.

Table-3: Shows the Cervical Spine Injuries in Relation to Age-Groups

Age	Cervical Spine Injury		Total
Groups	Yes	No	
10-20 years	1	15	16
20-30 years	2	6	8
30-40 years	1	26	27
40-45 years	0	40	40
45-50 years	0	29	29
Total	4	116	120

In 4 (3.3%) patients, cervical spine and maxillofacial injuries were found. Three males and one female were involved in the Cervical-spine injuries. The ratio of men to women was 4:1. (Fig. 1).

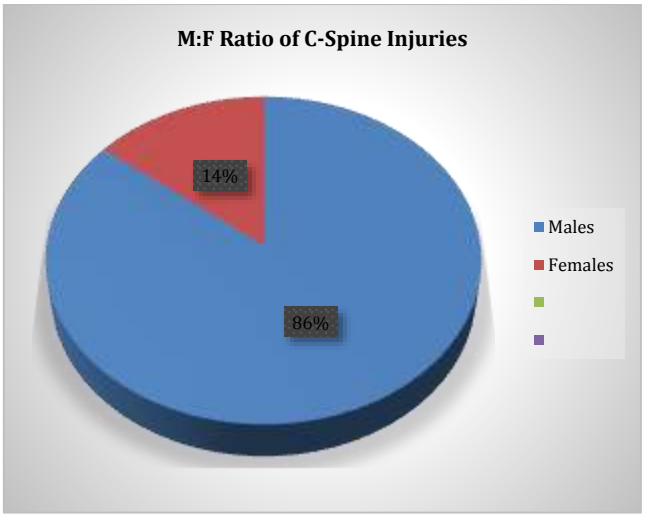

Figure 1:

DISCUSSION

About 2–3% of all trauma patients suffer from cervical injuries, which are also responsible for 8.2% of traumatic deaths[12]. The ratio of men to women was 4:1. Most cervical injury sufferers have active lifestyle before their accidental trauma. 64.7 percent of patients are in the 40 to 45 age range. The maxillofacial fracture following a cervical spine injury results in long term disabilities. However, it is unclear and challenging to pinpoint the precise frequency, shape, location, aetiology, and treatment of facial fractures[13-14]. Despite the fact that numerous researches have been done recently, the prevalence reported by each study appears to vary. The majority of these studies concentrated on certain fracture types, such as those of the mandible or maxilla, or on a grouping of all craniomaxillofacial fractures. This study found a 3.3% cervical and maxillofacial fracture rate, which is comparable to earlier studies' findings of 0% to 4.3%[15]. In this study, traffic accidents were the leading cause of cervical spine injuries associated with maxillofacial fractures, which is consistent with the majority of studies in the literature. Jamal BT et al. reported that falls were the leading cause of cervical spine injuries with maxillofacial fractures[16]. Numerous authors claim that when there has been mandibular trauma from a car collision, the risk of cervical injuries is increased. This study found that the chances of cervical injuries related with facial fractures rises when caused by high-speed incidents, such as car accidents[17-18]. This can be explained by the fact that the maxillofacial area receives more force from impacts, which is seldom or rarely transmitted to the neck. According to Robertson et al., cervical injuries are more frequent in automobile collisions than in motorcycle collisions, which are typically characterized by thoracic or lumbar spine injuries[19]. Numerous studies have found a connection between cervical spine injuries and mandibular fractures. Babock's assertion that fractures in the upper third of the face are crucial in cervical injuries is assumed by the fact that forces are transferred from the midface to the cervical spine directly. In relation to the location of the facial fracture, In their discussion of the standard cervical injury model, Lalani and Bonanthaya discovered that injuries to the lower third of the face are mostly responsible for mandibular fractures and upper cervical spine injury while midface fracture results in lower cervical spine injuries[20-21]. Few individuals in the current study prevented us from determining the relation between the location of a maxillofacial fracture and the severity of the cervical spine injury, but it is obvious that multiple-bone craniofacial fractures and cervical spine injuries are closely associated. In 424 individuals, 2.8% of cases of cervical spine injury related with mandibular fractures were described by Jamal BT et al. 90% of cervical injuries occurred in the C1 to C2 and C5 to C7 spinal regions[22].

The radiography of the lateral cervical spine is frequently regarded as a routine technique in patients with maxillofacial fractures. However, not all cervical injuries are picked up by standard X-rays. Fortunately, plain X-rays, CT scans, and/or MRI scans were used to diagnose all cervical injuries in this investigation2[23-25]. In the meanwhile, patients with unstable spinal injuries should get meticulous care, total spinal immobilization, and head support. To prevent disastrous outcomes, proper clinical and radiological evaluation, early detection of suspected C-spine injuries, and their rapid therapy should be carried out in the emergency room.

CONCLUSION

In this study, a frequency of 3.3 percent of cervical injuries denotes a high suspicion index. It has been determined that the primary cause of cervical spine injuries related with craniofacial fractures is traffic accidents. The majority of the patients (n=3) were male and younger in age.

REFERENCES

1. Braun TL, Xue AS, Maricevich RS. Differences in the management of pediatric facial trauma. InSeminars in plastic surgery 2017 May (Vol. 31, No. 02, pp. 118-122). Thieme Medical Publishers.
2. Abhinav RP, Selvarasu K, Maheswari GU, Taltia AA. The patterns and etiology of maxillofacial trauma in South India. Annals of maxillofacial surgery. 2019 Jan;9(1):114.
3. Vujcich N, Gebauer D. Current and evolving trends in the management of facial fractures. Australian dental journal. 2018 Mar;63:S35-47.
4. Viozzi CF. Maxillofacial and mandibular fractures in sports. Clinics in sports medicine. 2017 Apr 1;36(2):355-68.
5. Chukwulebe S, Hogrefe C. The diagnosis and management of facial bone fractures. Emergency Medicine Clinics. 2019 Feb 1;37(1):137-51.

6. Gómez Roselló E, Quiles Granado AM, Artajona Garcia M, Juanpere Martí S, Laguillo Sala G, Beltrán Mármol B, Pedraza Gutiérrez S. Facial fractures: classification and highlights for a useful report. Insights into imaging. 2020 Dec;11(1):1-5.
7. Fama F, Cicciu M, Sindoni A, Nastro-Siniscalchi E, Falzea R, Cervino G, Polito F, De Ponte F, Gioffre-Florio M. Maxillofacial and concomitant serious injuries: An eight-year single center experience. Chinese journal of traumatology. 2017 Feb;20(01):4-8.
8. Sweis R, Biller J. Systemic complications of spinal cord injury. Current neurology and neuroscience reports. 2017 Jan;17(1):1-8.
9. Smereka J, Ladny JR, Naylor A, Ruetzler K, Szarpak L. C-MAC compared with direct laryngoscopy for intubation in patients with cervical spine immobilization: a manikin trial. The American Journal of Emergency Medicine. 2017 Aug 1;35(8):1142-6.
10. Werlinger F, Villalón M, Duarte V, Acevedo R, Aguilera R, Alcocer D, Arriola M, Badillo O, Briones R, Condal C, Del Río M. Trends of maxillofacial trauma: An update from the prospective register of a multicenter study in emergency services of Chile. Medicina oral, patologia oral y cirugia bucal. 2019 Sep;24(5):e588.
11. Saperi BS, Ramli R, Ahmed Z, Nur AM, Ibrahim MI, Rashdi MF, Nordin R, Abd Rahman N, Yusoff A, Rahman RA, Razak NA. Cost analysis of facial injury treatment in two university hospitals in Malaysia: a prospective study. ClinicoEconomics and outcomes research: CEOR. 2017;9:107.
12. Bresler AY, Hanba C, Svider P, Carron MA, Hsueh WD, Paskhover B. Craniofacial injuries related to motorized scooter use: a rising epidemic. American journal of otolaryngology. 2019 Sep 1;40(5):662-6.
13. Ahuja CS, Wilson JR, Nori S, Kotter M, Druschel C, Curt A, Fehlings MG. Traumatic spinal cord injury. Nature reviews Disease primers. 2017 Apr 27;3(1):1-21.
14. Evans C, Chaplin T, Zelt D. Management of major vascular injuries: neck, extremities, and other things that bleed. Emergency Medicine Clinics. 2018 Feb 1;36(1):181-202.
15. de Macedo Bernardino Í, Santos LM, Ferreira AV, de Almeida Lima TL, da Nóbrega LM, d'Avila S. Intimate partner violence against women, circumstances of aggressions and oral-maxillofacial traumas: A medical-legal and forensic approach. Legal medicine. 2018 Mar 1;31:1-6.
16. Yee TJ, Swong K, Park P. Complications of anterior cervical spine surgery: a systematic review of the literature. Journal of spine surgery. 2020 Mar;6(1):302.
17. Holan G, McTigue DJ. Introduction to dental trauma: Managing traumatic injuries in the primary dentition. InPediatric Dentistry 2019 Jan 1 (pp. 227-243). Elsevier.
18. Hsieh CH, Hsu SY, Hsieh HY, Chen YC. Differences between the sexes in motorcycle-related injuries and fatalities at a Taiwanese level I trauma center. Biomedical journal. 2017 Apr 1;40(2):113-20.
19. Robertson B, Kesterke MJ, Bhattacharjee R, Weber W, Mynar K, Reddy LV. Craniofacial injuries seen with the introduction of bicycle-share electric scooters in an urban setting. Journal of Oral and Maxillofacial Surgery. 2019 Nov 1;77(11):2292-7.
20. Lalani et al Injuries of extracranial, cranial, intracranial, spinal cord, and peripheral nervous system structures. InVolpe's Neurology of the Newborn 2018 Jan 1 (pp. 1093-1123). Elsevier.
21. Bonanthaya, SM, Nahmias JT, Young DA. Advanced trauma life support® Update 2019: management and applications for adults and special populations. Anesthesiology clinics. 2019 Mar 1;37(1):13-32.
22. Jamal BT, Day E. The craniocervical junction: embryology, anatomy, biomechanics and imaging in blunt trauma. Insights into imaging. 2017 Feb;8(1):29-47.
23. Sukegawa S, Kanno T, Furuki Y. Application of computer-assisted navigation systems in oral and maxillofacial surgery. Japanese Dental Science Review. 2018 Aug 1;54(3):139-49.
24. McTigue DJ. Managing traumatic injuries in the young permanent dentition. InPediatric Dentistry 2019 Jan 1 (pp. 497-511). Elsevier.
25. Flores MT, Onetto JE. How does orofacial trauma in children affect the developing dentition? Long-term treatment and associated complications. Journal of endodontics. 2019 Dec 1;45(12):S1-2.