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Orignal Article

Frequency of Intracranial Hematomas Related To Traumatic Skull or Facial Injuries Evaluated On Computed Tomography

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ABSTRACT

Patients sustaining maxillofacial fractures are at a risk of accompanying traumatic intracranial hematomas(ICH), which are a major cause of morbidity and mortality. Prompt recognition of the clinical signs, followed by a neurosurgical inspection and diagnosis, is crucial for improving patient survival and recovery **Objective:** To determine frequency of ICT related to traumatic skull and facial injuries evaluated on Computed Tomography **Methods:** This study was conducted on 195 patients from radiological department of Lahore General hospital who had road traffic accident. In this cross-sectional study conduction advance 16 multi-slice CT device which shows advanced desire 3D and was used to assess ICT in patients with skull and facial fractures. All patients with ICTs related to skull and facial injuries in trauma center and all age groups without any gender specificity were included in this study. All patients having bleeding disorders or using anti-coagulant were excluded **Results:** Out of 195 patients in which 48(24.6%) were females and 147(75.4%)were males. 132(67.7%)patients out of 195 patients had headache, 64 (32.8%) patients had nausea, 116 (59.5%) patients had vomiting, 149 (76.4%) patients had speaking difficulty, 71 (36.4%) patients had external bleeding and 133(68.2%) had consciousness. Out of 195 patients, 179(91.8%)had ICT **Conclusions: H**ead and facial injury had higher frequency rate in people with road traffic accident but no significant difference was observed between head and facial fracture cases with ICH.

INTRODUCTION

Top most part of human body is human head. It provides supporting help for face and is itself covered by the skull[1]. Brain is divided in to several lobes' frontal, parietal, temporal and occipital lobe [2]. Any damage to brain structure or any disruption in its anatomy results in serious condition. Condition such as skull injuries and facial injuries are life threatening. Both are caused by the trauma caused to the head or face and commonly occur due to road traffic accidents [3]. Incidence of road traffic accidents are very high (1.2 million die and 20 million injured) throughout the world [4]. Head injuries in USA (united states of America) are estimated to be around 1.7 million per year [5]. On the contrary, prevalence of facial injuries is estimated to be around 23 per every 10000 people [6]. Any trauma to jaw, face, mouth and eye socket is called facial trauma[7]. Brain damage or skull damage due to trauma is known as head or skull injuries [8]. An injury which result in blood clot collection inside the skull is known as ICH. It normally occurs as a result of a head or facial injury. It causes brain damage by placing a pressure on the brain tissues. The prevalence of ICH is estimated to be 24.6 per 100000 annually[9]. Hematomas can be acute or chronic. An acute ICH requires immediate medical attention as it is life threatening on the other hand chronic ICH are less dangerous hence can be treated to reduce the impact on mobility. On the basis of origin and the mechanism response ICH is divided in to different types of hematoma. CT scan detect soft tissue injuries and any facial fractures [10]. It is a serious life-threatening condition which needs immediately medical attention. Mostly facial fracture is neglected after trauma in road traffic accidents. Skull fracture is given more attention if ICH is detected. Aim of

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this study is to find the frequency of ICH in patients with traumatic skull or facial injuries to decrease the morbidity as well as mortality rates in the society.

METHODS

This study was conducted on 195 patients from Department of Radiology, Lahore General Hospital. Advance multislice CT device Toshiba Aquilion 16 slice CT Scan was used for the evaluation. History/ complaints/ clinical diagnosis, age, etc. been asked from the participants. Questions such as age, gender, headache, vomiting, nausea, consciousness, speech difficulty, external bleeding and CT findings. All patients with ICH related to skull and facial injuries in trauma center along with all age groups without any gender specificity were included and all patients having bleeding disorders or using anti-coagulant were excluded in this study.

RESULTS

Out of 195 patients in which 48 (24.6%) were females and 147 (75.4%) were males. 132(67.7%) patients out of 195 patients had headache, 64 (32.8%) patients had nausea, 116 (59.5%) patients had vomiting, 149 (76.4%) patients had speaking difficulty, 71 (36.4%) patients had External bleeding and 133(68.2%) had consciousness. Total number of 195 patients out of which 179 (91.8%) had ICH. 16 (8.2%) had Epidural ICH, 85 (43.6%) had Extradural ICH, 8 (4.1%) had no ICH and 86 (44.1%) had subdural ICH. 42 (21.5%) had ICH in frontal region, 11(5.6%) had no ICH, 71(36.4%) had ICH in occipital region, 9 (4.6%) had ICH in parietal region, and 62 (31.8%) had ICH in temporal region. Skull Fractures ICH comprise total number of 195 patients in which 120 (61.5%) answered no and 75 (38.5%) answered yes. 24 (12.3%) had skull fracture in frontal region, 13(6.7%) had skull fracture in the left temporal bone, 119 (61.0%) had no skull fracture, 19 (9.7%) had skull fracture in occipital region, 6 (3.1%) had skull fracture in parietal region, and 14 (7.2%) had skull fracture in the right temporal region.

According to Table No 1 from 195 patients, 5(31.3%) patients had skull fracture with no ICH and 70(39.1%) people had skull fracture with ICH. 11 (68.8%) had no ICH with no skull fracture and 109 (60.9%) patients had ICH with no skull fracture. Facial Fractures ICH comprise total number of 195 patients in which 130 (66.7%) answered no and 65 (33.3%) answered yes. 26 (13.3%) had fracture in Mandible, 130 (66.7%) had no fracture, 4 (2.1%) had fracture in Maxillary site, 19 (9.7%) had fracture in Orbit site, and 16 (8.2%) had fracture in Zygomatic site. 33(16.9%) had bruising, 39(20.0%) had Cerebral contusions, 54(27.7%) had Intraparenchymal contusions and 69(35.4%) had no midline shift. 5 (31.3%) had epidural hematoma, 28 (32.9%) people had extradural ICH, 1 (12.5%) people had no ICH and remaining 31(36.0%) people had subdural ICH with facial fractures. 11 (68.8%) had epidural ICH, 57 (67.1%) had extradural ICH, 7 (87.5%) had no ICH and 55 (64.0%) had subdural ICH without any facial fracture. 3 (18.8%) had epidural ICH,39 (45.9%) people had extradural ICH, 2 (25.0%) people had no ICH and remaining 31(36.0%) people had subdural ICH with skull fractures. 13 (81.3%) had epidural ICH, 46(54.1%) had extradural ICH, 6(75.0%) had no ICH and 55 (64.0%) had subdural ICHs without any skull fracture.

			Skull Fractures		Total
			No	Yes	
Intracranial hematoma	No	Count	11	5	16
		% within Intracranial hematoma	68.8%	31.3%	100.0%
	Yes	Count	109	70	179
		% within Intracranial hematoma	60.9%	39.1%	100.0%
Total		Count	120	75	195
		% within Intracranial hematoma	61.5%	38.5%	100.0%

Table 1: Cross tabulation of frequency distribution of Intracranial hemtoma * Skull Fractures Cross tabulation

Table No 2 from 195 patients, 2 (12.5%) patients had facial fracture with no ICH and 63 (35.2%) people had facial fracture with ICH. 14 (87.5%) had no ICH with no facial fracture and 116 (64.8%) patients had ICH with no facial fracture.2 (12.5%) patients had facial fracture with no ICH and 63 (35.2%) people had facial fracture with ICH. 14 (87.5%) had no ICH with no facial fracture and 116 (64.8%) patients had ICH with no facial fracture. 5 (31.3%) patients had skull fracture with no ICH and 70(39.1%) people had skull fracture with ICH. 11 (68.8%) had no ICH with no skull fracture and 109 (60.9%) patients had ICH with no skull fracture.

			Facial Fractures		Total
			No	Yes	
Intracranial hematoma	No	Count	14	2	16
		% within Intracranial hematoma	87.5%	12.5%	100.0%
	Yes	Count	116	63	179
		% within Intracranial hematoma	64.8%	35.2%	100.0%
Total	Count		130	65	195
	% within Intracranial hematoma		66.7%	33.3%	100.0%

Table 2: Cross tabulation Between Frequency of Intracranial hematoma Facial Fractures

DISCUSSION

Head is the top most part of a human body which is covered by a bony structure known as skull. Skull consist of

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command center of the CNS called brain [11]. Any damage to brain structure or any disruption in its anatomy results in serious condition. Condition such as skull injuries and facial injuries patient are life threatening. Both are caused by the trauma caused to the head or face [12]. Any trauma to jaw, face, mouth and eye socket is called facial trauma. In result of both facial as well as skull injuries ICH developed. An injury which result in blood clot collection inside the skull is known as ICH. For evaluation of ICH both CT scan and MRI are used [13]. CT scan is considered gold standard modality to assess ICH. It is the approach which evaluates the localized pathologies such as ICH, contusions etc [14]. CT scan detect soft tissue injuries and any facial fractures [15]. Previous studies had conflicting argument related ICH. In study conducted in 2020 by Subhani Ali M, et al it was concluded that the frequency rate of intracranial hemorrhage was less in people with no skull fracture and higher incidence of intracranial hemorrhage was seen in male in comparison to females which were similar to our findings that male population is more prevalent but it this study had some conflicting arguments. Our study states that ICH were seen more in people with no skull fractures [16]. Results of this study states that RTA is a prior risk factor which was supported by Itanti U, *et al* study which was done in order to assess head injuries by CT scan in peads ward. On the basis of these results it was concluded that road traffic accident is an etiological factor in developing ICH specially in case of skull injuries [17]. ICH affects age groups but it is more prevalently seen in young adults with age group between 20 to 30 with high prevalence of skull fracture. In this study male population were slightly more affected by ICH with a percentage of 61.9% in comparison with female cases. This was supported by the study conducted in 2017 by Chinwe Regina Onwuchekwa et al which also stated that male cases are more prevalent than females as they are more at a risk of getting trauma and head injuries due to their occupational activities. Similar pattern was also observed in another study where 60% male cases were involved. Another study S Yasir in 2014 concluded that majority of the people who had RTA faced facial injuries and it was evident in the age group from 15 years to 30 years in male participants [18]. The cases of extradural hematoma were seen to be more in patients with skull fracture and the cases of subdural hematoma were seen more in facial fracture cases which was similar to 2017 study by Amir S, et al according to which frequency of extra Dural hematoma in people with skull fractures was calculated to be around 26.5 percent. This skull fractures were due to RTA(44), fall(20) and assault(10) [19]. After analysis epidural hematoma was found in thirty-one patients in which majority of the people belong to the age group ranging from 21 to 30 years in the study conducted in 2012 by Iftikhar ul Haq, et al. people with EDH in temporal area cases were more but in this study hematoma cases were seen more in frontal area than temporal area [20]. In 2004 Hohlrieder M et al conducted a research in order to see masking of ICH through maxillofacial fractures. On the basis of results, it was concluded that people with maxillofacial fracture are more likely to have intracranial hemorrhage than normal patientswhich also differs our results showing more cases with mandible fracture site with percentage of 13.3% and least cases of maxillary fracture with percentage of 2.1% [21]. According to the results of this study it was observed that there is an associative relationship between facial and skull fracture with hematoma cases which was supported by Ralph G Dacey et al study who stated in a research that there is a relationship between number of cases of skull fracture and ICH [22]. Associated risk pattern was also observed in our study which was also supported by study conducted in 2018 Udupikrishna M. Joshi according to which the risk of hematomas increases with head and facial injuries [23]. In 2018 Peter Esezebor EGBOR et al conducted a research in order to evaluate head and facial injury patients with CT scan in Nigerian hospital. On the basis of the results it was concluded that head and facial injury had increased prevalence rate in people with motor bike accident and there is an associative relationship between ICH and facial fractures which also supports the result of this study that there is a correlated link between skull and facial fracture due to road traffic accident cases with ICH but no correlation link was seen between facial and skull fracture cases [24]. Previous studies showed many conflicting arguments which proved as an evidence base for our study results. This study is performed on a smaller scale with a limited number of patients in a very short span of time and the frequency required a large sample size and large period of duration. The study was done on hospital based patients who survived for the evaluation process after a road traffic accident. Due to financial condition no follow up was performed.

CONCLUSION

No significant difference is observed between skull and facial cases with ICHs. Men countering more road side accidents as compared to women. Symptoms such as, headache speech difficulty, consciousness, vomiting are most common in these patients. Most common site of hematoma in skull fracture is occipital region and mandible in facial fracture. And other findings included are bruising, cerebral contusion, and intraparenchymal contusion.

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