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Original Research Article

Traumatic Brain Injury and its Findings on Computed Tomography

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Abstract: ***Background:*** Traumatic brain injury is leading cause of death in developing countries. TBI mostly occurs due to RTA. Patients with TBI must assessed thoroughly and must notice the changes if present. Ct scan has become the best implement in radiological assessment due to a feature that it can properly characterize the temperament and site of the lesions. ***Method:*** It is retro-respective cross sectional study stated that 200 patients, admit in ED, from October 2019- January 2021 Medcare International Hospital Gujranwala, Pakistan. The results were evaluated by computed tomography for the type and location of the lesions identified. ***Results*:** By performing CT-scan it has been evaluated that Scalp hematoma was seen more. About 4.5% were seen in extra-Dural hematoma, 4% in non-hemorrhagic contusion, 12.5% hemorrhagic contusion, 82.5% in Scalp hematoma, 8% in subarachnoid hemorrhage, 17% with age related atrophy, 13.5% in subdural hematoma, 4% in inflammatory changes, skull fracture about 30% and plain examination were seen about 44.5% and mostly man (n=58) are involved in RTA as compare to the female (n=14). ***Conclusion:*** In Conclusion the frequency of scalp hematoma is 82.5% and the incidence of non-hemorrhage contusions and extradural hematoma has the same frequency. RTA patients have a higher risk of developing intra cranial hemorrhage and mostly occur in males as compare to females because mostly males are exposed to outer environment. Tables were used to describe the results.

Key words: Computed Tomography, RTA, Skull fractures, lesions, Hemorrhage, Intra cranial hemorrhage.

INTRODUCTION

Head injuries, poly-trauma, multi-trauma are mainly due to huge accidents in road (road traffic accident) RTA [1]. High illness and death rate in low and middle income countries are present with traumatic head injuries [2]. Traumatic brain Injury can be defined as changed brain function, confusion, coma and change in consciousness or neuromotor deficit [3]. TBI is very much related to traumatic head injuries which occur mostly due to RTA in young people [4]. and fall history in children [5]. Any patient with a head injury and alter state of consciousness should be evaluated for brain trauma. The radiological valuation changed affectedly with the aid of computed tomography as the location and type of lesions were carefully examined [6]. Head injuries are mostly seen in males as compare to females [7, 21]. In the previous studies about 81% in male and 19% in females and the age group with 20% include 20-29 years old males and 21% included for the 19-20 years age. Male to female ratio is 4.41: 1. The death rate in 2013-2017 is about 33.3% because of RTA [8]. Male are highly involve because they are mostly outdoor like driving, vehicles, working outdoors [5, 9]. Previous study found intra-cerebral hematoma (46.33%), skull fracture (62.04%), subdural hematoma (19.37%), brain swelling and edema (63.35%), midline shift (24.34%), subarachnoid hematoma (28.79%), epidural hematoma (30.36%) and pneumocranium (12.04%) [1]. All type of injuries but basically death and disability mostly occur due to brain injuries [10]. Brain injures involves the contusions, intracranial injuries, skull fracture, bruising, hematomas, brain swelling, edema and hemorrhages [1, 11].

In the study researchers have find that CT procedures demonstrates more predictable radiography. RTA is about 62% mild injuries includes 76% moderate and severe head injuries are about 14 % to 10 % [11]. The decrease in the amount and seriousness of injuries

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advances the amount of operative to develop the health repute of society [12]. In RTA patients hyper dense subdural hematoma is seen frequently but non-accidental patients showed mixed density subdural hematoma [13]. Patients with brain injuries usually involve the symptoms of loss of consciousness, short term memories loss, amnesia, behavior change, irritability, vomiting and headache are all after traumatic injuries but the post injuries includes traffic accidents, slipped down, fall down injuries etc [14-16]. CT scan examination may be important in some cases however in most cases it is challenging to achieve as for the troubles with radioactivity contact and bulk motions. In addition, if no intracranial abnormality is detected immediately after injury, irregular findings might seem several hours later [17]. The study purpose was to evaluate frequency of traumatic brain injury on computed tomography including RTA and fall history patients.

MATERIAL AND METHODS

It is retro-respective cross sectional study stated that 200 patients had the head injurynwho were admit in the ED from October 2019 to January 2021 in Medcare International Hospital Gujranwala, Pakistan. Patients included in this study were those who met the inclusion criteria. Patient with traumatic brain injury, RTA and history of fall with scale of 13 to 15 GCS with symptoms of dizziness, nausea, headache, vomiting and altered state of consciousness were included. Patients who died before the stage of Computed tomography arriving at ED after 24 hours of injury and alcoholic were excluded. Data was collected from emergency departments with consent. Data was analyzed by SPSS software 21 version. Numerical data was describing in mean and standard deviation. Frequencies and percentage was used to display the qualitative data. Chi square test were applied to evaluate the relationship between variables. P value ≤ 0.05 were measured as noteworthy value. All outcomes were calculated at 95% confidence level.

RESULTS

It has been seen that male as compared to females had more risk of Traumatic brain injury and mostly seen in 1 to 14 years olds patients as shown in table 1 and 2.

Table-1: Gender

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	143	71.5	71.5	71.5
	female	57	28.5	28.5	100.0
	Total	200	100.0	100.0	

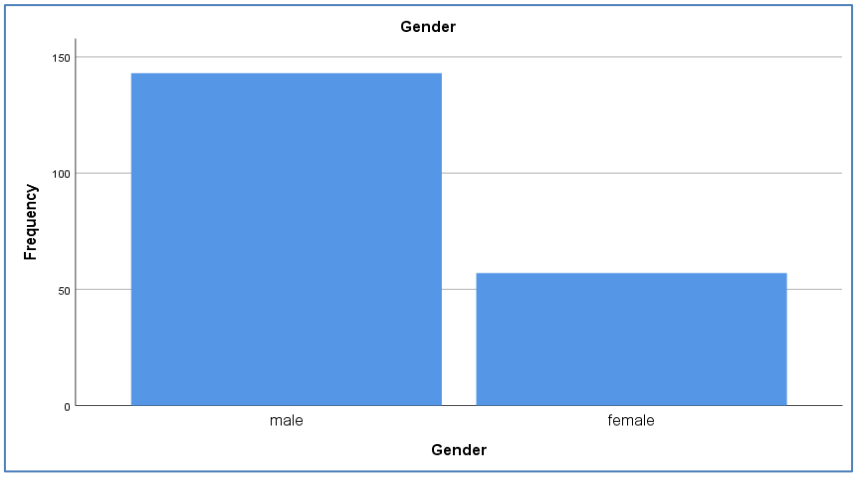


Table-2: Age

Age of patients					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	1 to 14	74	37.0	37.0	37.0
	15 to 30	51	25.5	25.5	62.5
	31 to 50	25	12.5	12.5	75.0
	51 to 65	33	16.5	16.5	91.5
	Above 65	17	8.5	8.5	100.0
	Total	200	100.0	100.0	

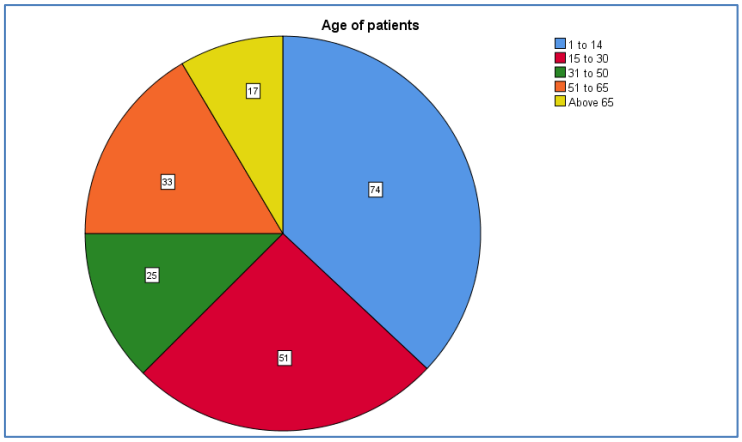


Table-3: Findings seen in CT scan

Findings	n (%)
Extra dural hematoma	9(4.5%)
Non hemorrhagic contusion	8(4%)
Hemorrhagic contusion	25(12.5%)
Scalp hematoma	165(82.5%)
Subarachnoid hemorrhage	16(8%)
Age related cerebral atrophy	34(17%)
Subdural Hematoma	27(13.5%)
Inflammatory changes	8(4%)
Normal plain CT examination of brain	89(44.5%)
Skull fracture	60(30%)

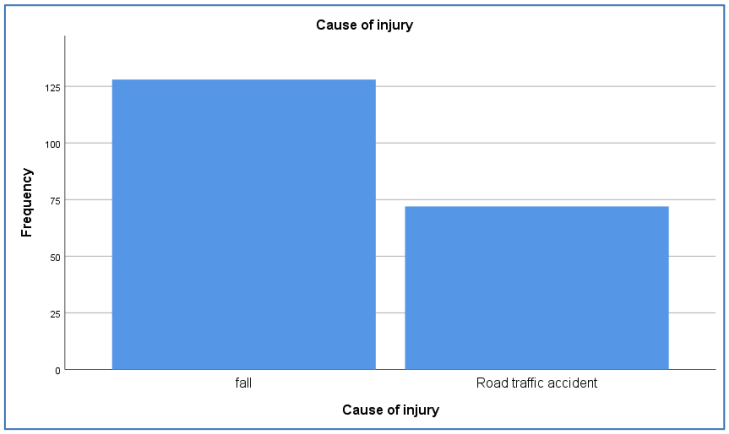
It was seen that Extra Dural hematoma is 9(4.5%), non-hemorrhagic contusion is 8(4%), hemorrhagic contusion is 25(12.5%), Scalp hematoma were 165(82.5%), subarachnoid hemorrhage were 16(8%), age related cerebral atrophy 34(17%), subdural hematoma were 27(13.5%), inflammatory changes were seen about 8(4%), normal plain CT examination 80(454.5%) and skull fracture were seen about 60(30%) as shown below table 3.

The results were concluded that mostly in Traumatic head injuries, scalp hematoma were seen about 82.5% and skull fracture were 30% respectively.

Out of total it has seen that the most cause of injury is due to fall 128(64%) and the RTA were seen about 72(36%) in patients.

Table-4: Cause of injuries

Cause of injury					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	fall	128	64.0	64.0	64.0
	Road traffic accident	72	36.0	36.0	100.0
	Total	200	100.0	100.0	



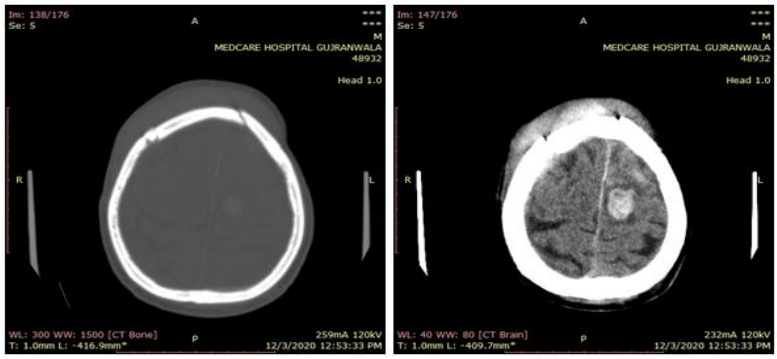


Fig-1: 75 Years, Male, CT BRAIN, H/O RTA

Evidence of multiple fracture involving frontal bone and top parietal bone. Brain parenchymal hemorrhage is appreciated in left top centrum semiovale area measuring 2.7 x 2.0 cm with mild surrounding oedema. Areas of hemorrhagic contusion are also appreciated involving anterior cortical and subcortical portion of both frontoparietal lobes anteriorly. Thin strip of subdural hematoma is also appreciated around right frontal lobe.

Fig-2: 20 Year, Male, H/O RTA, VOMTING

Evidence of small linear non depressed fracture involving frontal bone including anterior and posterior bony boundary of right frontal sinus. It extends caudally upto the junction of frontal and ethmoid bone including medial edge of roof of orbit on right side. Very tiny stirp of extra dural hematoma is appreciated in right frontal lobe. Tiny areas of hemorrhagic contusions are noted along inferior surface of both frontal lobes specially on left side. Very tiny strip of subdural hematoma is appreciated along tentorium cerebelli and posterior portion of the falx cerebri.

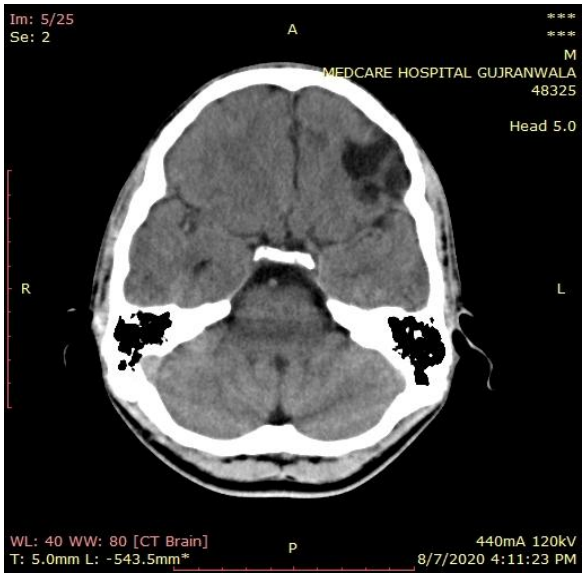


Fig-3:15 Year, Male, H/O Fall, Unbalance, Headache

Evidence of low density lesion involving outer aspect of left frontal lobe just anterior to left sylvian fissure. Possibility of differential would be with porencephalic cyst either because of previous trauma or infection or ischemic insult.

Fig-4: 16 Years, H/O Fall, FITS

Evidence of brain parenchymal hemorrhage involving right temporoparietal lobe with surrounding oedema. Irregular highly dens calcification is appreciated in adjacent brain parenchyma which could be calcified thrombosed vascular malformation.

DISCUSSION

In our consequences it is reliable throughout prior studies that showed head injury is common in RTA the majority dynamic time of years. A study reported that head injury during RTA were seen 63% [18]. Whereas in another study it was reported about that 59-69% of head injuries happen in adolescent [19]. During another research it accomplished that behind head injury to affect results age is solitary reason. Result was not as good as through the rising generation.

In recent study the result shows that about 71.5% injury occurs in male as compared to female and they were about 28.5% and mostly the incidence is present from age 1 to 14 about 37%. CT-scan had become the one to find the changes that occurs in brain after trauma. Our research reports that the mostly trauma occurs in man as compared to female. It is concluded that extra dural hematoma were about 4.5%, non-hemorrhagic contusion 4%, age related cerebral atrophy 17%, inflammatory changes were seen about 4%, fracture in skull were seen in about 30%.

It was initially stated that head trauma sufferers were mostly men as compare to females because they have more outside exposures outside in roads and other activities that are out doors compared to females seen in Pakistan. In another research who report that men largely occupied with head injuries (86%) [18]. One study found that epidural hematomas were associated with skull fractures in approximately 91% of patients [20].

CONCLUSION

According to my research, the prevalence of scalp hematoma for all types of head trauma is 82.5 percent. Non-hemorrhage contusions and extradural hematoma have almost an equivalent frequency. Males have a higher rate of intracranial hemorrhage than females. Patients who have been in road traffic accident have a higher risk of developing a scalp hematoma than those who have had other types of traumatic injuries. GCS reliability is insufficient since computed tomography is needed for diagnosis and confirmation of the patient's condition.

According to my results, it is suggested that patients who have suffered a brain injury must undergo an acute non-contrast computed tomography to determine the best course of treatment. It is very helpful in unconscious patients and who have allergies to contrast media.

In order to determine the mode of injury, the patient's history should be thoroughly examined. A follow-up scan should be performed within 24-48 hours of the incident to identify the effects of bleeding. The GCS ranking system isn't enough for accident classification. For such patients, a CT scan is prescribed as the first line of examination.

REFERENCES

1. Gupta, P. K., Krishna, A., Dwivedi, A. N., Gupta, K., Madhu, B., Gouri, G., & Shivani, A. (2011). CT scan findings and outcomes of head injury patients: A cross sectional study. Journal of Pioneering Medical Sciences, 1(3), 78.
2. Onwuchekwa, C. R., & Alazigha, N. S. (2017). Computed tomography pattern of traumatic head injury in Niger Delta, Nigeria: A multicenter evaluation. International journal of critical illness and injury science, 7(3), 150.
3. Paci, M., Infante-Rivard, C., & Marcoux, J. (2017). Traumatic brain injury in the workplace. Canadian journal of neurological sciences, 44(5), 518-524.
4. Hans, P., Mehrotra, A., Kumar, P., Agarwal, M., Kumar, L., Parakh, P., & Tyagi, S. (2017). Role of Computerized Tomography as Prime Imaging

Modality in the Evaluation of Traumatic Brain Injury. Int J AdvInteg Med Sci, 2(1), 17-23.
5. Hassan, N., Ali, M., Haq, N. U., Azam, F., Khan, S., Khan, Z., & Ahmad, S. (2017). Etiology, clinical presentation and outcome of traumatic brain injury patients presenting to a teaching hospital of Khyber Pakhtunkhwa. Journal of Postgraduate Medical Institute (Peshawar-Pakistan), 31(4).
6. AHMAD, I., RAZA, M. H., ABDULLAH, A., & SAEED, S. (2020). Intracranial CT Scan Findings in the Patients of Head Injury: An Early Experience at Dera Ghazi Khan Teaching Hospital. Pakistan Journal Of Neurological Surgery, 24(3), 248-252.
7. Khan, M., Yaqoob, U., Hassan, Z., & Uddin, M. M. (2020). Immediate Outcomes of Traumatic Brain Injury at a Tertiary Care Hospital Of Pakistan-A Retrospective Study.
8. Naheed, K., Pal, M. I., Naeem, M., Qasim, A. P., Yunis, S., & Misbah, Z. (2019). ANALYSIS OF DEATHS DUE TO ROAD TRAFFIC ACCIDENTS IN FAISALABAD CITY-PAKISTAN. Journal of University Medical & Dental College, 10(3), 38-43.
9. Mehta, R. A., & Bambhaniya, A. B. (2018). Profile of Fatal Head Injuries in and Around Jamnagar Region. Indian Journal of Forensic Medicine and Pathology, 11(3), 187.
10. El Hendawy, M. M., Mohammed, M. S., & Saad, A. H. (2020). Surgical Management of Open Traumatic Head Injury. The Egyptian Journal of Hospital Medicine, 78(1), 42-47.
11. Ibrahim, S. Y. A. (2018). Study of Traumatic Head Injuries Using Computerized Tomography Among sudanese Population (Doctoral dissertation, Sudan University of Science and Technology).
12. Syed, A. T., Lone, N. A., Wani, M. A., & Bhat, A. S. (2007). Clinical management of patients with minor head injuries. International journal of health sciences, 1(1), 131.
13. Tung, G. A., Kumar, M., Richardson, R. C., Jenny, C., & Brown, W. D. (2006). Comparison of accidental and nonaccidental traumatic head injury in children on noncontrast computed tomography. Pediatrics, 118(2), 626-633.
14. Du Su Kim, M. H. K., Jang, S. Y., Kim, J. H., Kang, D. S., & Song, K. Y. (2013). The usefulness of brain magnetic resonance imaging with mild head injury and the negative findings of brain computed tomography. Journal of Korean Neurosurgical Society, 54(2), 100.
15. Polinder, S., Cnossen, M. C., Real, R. G., Covic, A., Gorbunova, A., Voormolen, D. C., ... & Von Steinbuechel, N. (2018). A multidimensional approach to post-concussion symptoms in mild traumatic brain injury. Frontiers in neurology, 9, 1113.
16. Cnossen, M. C., van der Naalt, J., Spikman, J. M., Nieboer, D., Yue, J. K., Winkler, E. A., ... & Lingsma, H. F. (2018). Prediction of persistent post-concussion symptoms after mild traumatic brain injury. Journal of neurotrauma, 35(22), 2691-2698.
17. Shiomi, N., Echigo, T., Hino, A., Hashimoto, N., & Yamaki, T. (2016). Criteria for CT and initial management of head injured infants: a review. Neurologia medico-chirurgica, ra-2015.
18. Bharti, P., Nagar, A. M., & Umesh, T. (1993). Pattern of trauma in western Uttar Pradesh. Neurology India, 41, 49-50.
19. Reverdin, A. (1990). Head injury in children. NIMS: Head injury, clinical management and research. Elizabeth Frost (ed), Geneva, Switzerland: Airsen, 193-204.
20. Phonprasert, C. H. A. R. E., Suwanwela, C. H. A. R. A. S., Hongsaprabhas, C. H. A. T. U. R. A. P. O. R. N., Prichayudh, P. R. A. C. H. A., & O'Charoen, S. U. P. A. T. (1980). Extradural hematoma: analysis of 138 cases. The Journal of trauma, 20(8), 679-683.
21. Nazeeha, W. (2020). East African Scholars J Med Surg; 2(11) (Dec, 2020): 205-211.

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