



CODEN [USA]: IAJPBB

ISSN : 2349-7750

INDO AMERICAN JOURNAL OF PHARMACEUTICAL SCIENCES

SJIF Impact Factor: 7.187

Available online at: <http://www.iajps.com>

Research Article

A CROSS SECTIONAL STUDY ON SKULL FRACTURES IN ROAD TRAFFIC ACCIDENTS INVOLVING TWO WHEELERS

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Article Received: November 2020

Accepted: December 2020

Published: January 2021

Abstract:

Objective: Objective of present study was to assess the patterns of skull fractures in road traffic accidents involving two wheelers.

Material and methods: This cross-sectional study was conducted at Department of Forensic Medicine Quaid-e-Azam Medical College/Bahawal Victoria Hospital Bahawalpur from January 2019 to December 2019 over the period of one year. Total 245 death cases due to fata road traffic accident accidents involving two-wheel riders either male or female, all age groups, treated and untreated, irrespective of duration of survival was included in the study.

Results: Out of 245 death cases, 232 (95%) were male and 13 (5%) were female. Total 133 (54.29%) cases belonged to age group 15-30 years followed by 74 (30.2%) to age group 31-45 years, 33 (13.47%) cases to age group 46-60 years and 5 (2.04%) cases belonged to age group >60 years. Linear fracture of vertex was seen in 37 (15.10%) cases, comminuted fracture of vertex was seen in 2.45% cases, depressed fracture of vertex was noted in 9 (3.67%) cases, basal fracture was seen in 29 (11.84%) cases, basal fracture and linear fracture of vertex was seen in 55 (22.45%) cases, crush fracture of skull was seen in 30 (12.24%) cases.

Conclusion: Results of present study showed that most of the cases were male. Most of the cases were between 15-30 years. Basal fracture + linear fracture of vertex were the most common type of skull fracture.

Key words: Death, skull fracture, linear fracture, road traffic accident

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Please cite this article in press Syed Hamid Anwer et al, A Cross Sectional Study On Skull Fractures In Road Traffic Accidents Involving Two Wheelers., Indo Am. J. P. Sci, 2021; 08(1).

INTRODUCTION:

Road Traffic Injuries (RTIs) are one of the leading causes of deaths, hospitalizations, disabilities and socioeconomic loss.¹⁻² Large number of poor and middle income family is compelled to use two wheelers, as they are not highly expensive.³ In the case of two wheeler occupants, the rider or the pillion can hit the colliding object, (which can be an incoming vehicle, a roadside stationary object or the ground) (at different speeds and velocities).⁴ The resulting energy release and its impact on the brain is determined by the amount of energy generated, presence or absence of protective equipment, viz., helmet, physiological characteristics of the injured person and energy threshold levels.⁵⁻⁶ Skull and brain injuries are produced by either static or dynamic forces.⁶ Skull fractures with or without brain damage is possible.⁷ Skull fractures can be linear, depressed or compound depressed fractures. When pieces of skull bone penetrate or impact the brain, structural and neurological damage is commonly seen.⁸⁻¹⁰

In this study a sincere effort has been made to study the pattern and distribution of skull fractures in riders involving two wheelers road traffic accidents and to suggest measures to be taken to decrease the road traffic accidents involving two wheelers.

MATERIALS & METHODS:

This cross-sectional study was conducted at Department of Forensic Medicine Quaid-e-Azam Medical College/Bahawal Victoria Hospital Bahawalpur from January 2019 to December 2019 over the period of one year. Total 245 death cases due to fata road traffic accident accidents involving two-wheel riders either male or female, all age groups, treated and untreated, irrespective of duration of survival was included in the study. Cases other than two-wheeler road traffic accidents were excluded from the study. Detailed autopsy examination was done. Relevant information was collected from police, relatives and friends of deceased. Autopsy was

conducted and findings was entered on pre-designed performa.

Data was analyzed by using SPSS version 20. Mean and SD was calculated for numerical data. Frequencies and percentages were calculated for categorical data.

RESULTS:

Out of 245 death cases, 232 (95%) were male and 13 (5%) were female. (Table 1) Cases were divided into four groups i.e. age group 15-30 years, age group 31-45 years, age group 46-60 years and age group >60 years. Total 133 (54.29%) cases belonged to age group 15-30 years followed by 74 (30.2%) to age group 31-45 years, 33 (13.47%) cases to age group 46-60 years and 5 (2.04%) cases belonged to age group >60 years. (Table 1)

Linear fracture of vertex was seen in 37 (15.10%) cases, comminuted fracture of vertex was seen in 2.45% cases, depressed fracture of vertex was noted in 9 (3.67%) cases, basal fracture was seen in 29 (11.84%) cases, basal fracture and linear fracture of vertex was seen in 55 (22.45%) cases, crush fracture of skull was seen in 30 (12.24%) cases. (Table 2)

Total 3 (8.11%) cases belonged to frontal region followed by 11 (29.73%) to parietal region, 5 (13.51%) cases to occipital, 3 (8.11%) cases to temporal, 2 (5.41%) cases to fronto parietal region, 9 (24.32%) cases to parieto temporal region, 2 (5.41%) cases to temporo occipital region and 2 (5.41%) cases to temporo-prieto occipital region. (Table 3)

We observed Sub dural haemorrhage (SDH) in 92.80% followed by sub arachnoid haemorrhage (SAH) in 76.80%, Intra cranial haemorrhage (ICH) in 17.60% and least is extra dural haemorrhage (EDH) in 4.83% in riders in this study.

Fig. 1: Gender Distribution

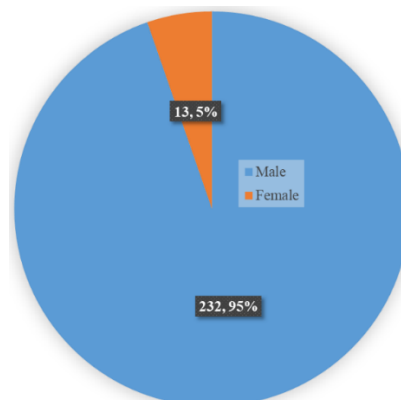


Table 1: Age distribution of cases

Age group (Years)	N	Percentage
15-30	133	54.29
31-45	74	30.20
46-60	33	13.47
>60	5	2.04
Total	245	100

Table 2: Distribution of cases according to type of skull fracture

Type of skull fracture	N	Percentage
Linear fracture of vertex	37	15.10
Comminuted fracture of vertex	6	2.45
Depressed fracture of vertex	9	3.67
Basal fracture	29	11.84
Basal fracture + linear fracture of vertex	55	22.45
Crush fracture of skull	30	12.24
No fracture	79	32.24
Total	245	100

Table 3: Localization of linear fracture of vertex

Linear fracture of vault only	N	Percentage
Frontal	3	8.11
Parietal	11	29.73
Occipital	5	13.51
Temporal	3	8.11
Fronto parietal	2	5.41
Parieto temporal	9	24.32
Temporo occipital	2	5.41
Fronto-prieto occipital	0	0
Temporo-prieto occipital	2	5.41
Total	37	100

DISCUSSION:

Objective of present study was to assess the Patterns of Skull fractures in road traffic accidents involving two wheelers. In this study, out of 245 death cases, 232 (95%) were male and 13 (5%) were female. Similar findings were reported by studies of Kumar et al⁴ where males were 88.22% and females were 11.77% and in the study of Singh YN et al⁵ males 86.96% and females were 13.04%.

Cases were divided into four groups i.e. age group 15-30 years, age group 31-45 years, age group 46-60 years and age group >60 years. Total 133 (54.29%) cases belonged to age group 15-30 years followed by 74 (30.2%) to age group 31-45 years, 33 (13.47%) cases to age group 46-60 years and 5 (2.04%) cases belonged to age group >60 years.

Most Vulnerable age group is the active population of the study resulting were those persons of third decade 54.29% followed by fourth decades 30.20%. Study by Kumar A et al⁴ reported that the younger economical active groups 21-30years followed by 31-40 years. Helmet use was infrequent among Motor cyclists in our study. Total 67(35.82%) Riders have not been wearing a helmet at the time of accident. Lack of wearing the helmet resulted in increased incidence of head injuries. Failure to wear a helmet resulted in a significantly higher incidence of head injury and death. Similar to studies by Cawich SO et al.⁷ Study by Mumtaz B et al⁸ showed frequency of helmet use is 56.6% and that of non-users in 43.3%. It is observed that head injuries constituted as a major pathology behind the death of the deceased, similarly studies by

Bairagi KK *et al*⁹, Most of the head injuries are associated with skull fractures which increases the fatality of victims Kraus JF *et al*.¹⁰ Skull fractures are not a dictum to be present in all fatal head injury cases. In this study skull fractures were present in 166 (67.75%) cases. Compared to 69.63% of cases in the study by Kumar A *et al* and Singh B *et al*.^{4,11}

Cranial Vault was involved in 31.32%, base of skull in 17.47% and both Vault and Base in 33.13% of cases. Compared to 62% of cases of skull fractures, cranial vault involved in 38%, base of skull in 34% and both Vault and Base of skull in 28% of cases in study conducted by Menon A (2005)¹².

Linear fracture of vertex was seen in 37 (15.10%) cases, comminuted fracture of vertex was seen in 2.45% cases, depressed fracture of vertex was noted in 9 (3.67%) cases, basal fracture was seen in 29 (11.84%) cases, basal fracture and linear fracture of vertex was seen in 55 (22.45%) cases, crush fracture of skull was seen in 30 (12.24%) cases. These findings are in consistent with Akhilesh Pathak's study.¹³ Fissured fracture was the most commonly observed fracture (57%) in study of Menon A *et al*.¹²

In present study total 3 (8.11%) cases belonged to frontal region followed by 11 (29.73%) to parietal region, 5 (13.51%) cases to occipital, 3 (8.11%) cases to temporal, 2 (5.41%) cases to fronto parietal region, 9 (24.32%) cases to parieto temporal region, 2 (5.41%) cases to temporo occipital region and 2 (5.41%) cases to temporo-prieto occipital region. Findings were in contrast to 22%, 20% and 26% Parietal, Temporal and middle cranial fossa in study by Menon A *et al*¹² Similar involvement of parietal and temporal bones are found in Kumar A. *et al* [4] and according to Vij. K(2008)¹⁴ and in Knight's(2004)¹⁵. In Basal fractures, middle cranial fossa was commonly involved which was also observed in Harnam Singh's study.¹⁶

The commonest variety of Intra Cranial Haemorrhage found was subdural haemorrhage 90.83%, followed by sub arachnoid haemorrhage 70.53%, Intra cerebral haemorrhage 20.64% and least is extra dural haemorrhage found in 4.75% of cases as studied by others.[5] The most common cause of death which was Intra Cranial Haemorrhage from head injury in study by Nzegwu.*et al*.¹⁷

CONCLUSION:

Results of present study showed that most of the cases were male. Most of the cases were between 15-30 years. Basal fracture + linear fracture of vertex were the most common type of skull fracture.

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