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Retrospective Study of Pattern of Skull Fractures in Different Medicolegal Autopsies

[1]G. Hema Latha, [2]M. Ramesh Babu, [3]B. Sugnan, [4]K. Lakshmi, [5]N. Dinesh Varma

[1]Assistant professor, Department of Anatomy, [2]Assistant professor, Department of Forensic Medicine, Guntur medical college, [3]Assistant professor, Department of Forensic Medicine, Anantapur, [4,5]Postgraduate, Department of Forensic Medicine, Guntur medical college.

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ABSTRACT

Skull fractures occurred in RTAs, Assaults and other cases are the most common cause for hospitalization, disability, financial loss and death of the individual. Skull fractures are of various types i.e., linear, comminuted, depressed, hinge etc. Some of the skull fractures may cause rupture of dura mater and injury to brain matter thereby, causing permanent neurological damage and death. In this present study, we focused on the pattern of skull bone fractures involved in various manners like Accidental, Homicidal, Suicidal, also pattern of distribution among male and female, age wise distribution, time of death in a day, and also discussed about any other associated injuries that contributes to cause of death. 165(92%) skull fractures are observed in accidents, 141(78%) cases involve linear fracture. region wise distribution most commonly involved is base of skull region alone in 63(35%) cases commonly seen in fall from height cases, parieto-temporal and base of skull together 36(20%) cases seen in road traffic accidents, temporal and base of skull region 14(7.8%). In other associated injuries commonly involved intracranial haemorrhages and scalp contusions.

Keywords: skull fractures pattern, manner of death, age wise distribution, region of fracture

INTRODUCTION

Skull fractures occurred due to RTAs, Assaults and other cases are the most common cause for hospitalization, disability, financial loss and death of the individual. Skull fractures are of various types i.e., linear, fissured, comminute and depressed. Some of the skull fractures may cause rupture of the dura mater and brain matter thereby causing damage to the brain and leads to permanent neurological damage and leads to death. In this study we scientifically want to study the pattern of skull bone fractures involved in various manners like Accidental, Homicidal, Suicidal and also pattern of distribution among male and female, age wise distribution, time of death in a day, and also discuss about any other associated injuries that contributes to cause of death.

MATERIALS AND METHODS

In this study total 180 cases post-mortem conducted in mortuary of GGH Mortuary, Guntur Medical, Guntur. These cases are presented with skull fractures for post-mortem examination in which manner such as accidental,

Corresponding author: M. Subba Rao, Associate Professer, Department Of Forensic Medicine, Guntur Medical College, Guntur,522004, Andhara Pradesh.

Email: Subbufm123@Gmail.com; Mobile:9246484787

homicidal, suicidal to be assessed during the period of April 2022 to September 2022. All the necessary information is collected from the inquest papers, investigating officer and relatives of the deceased. All the findings are described in detail in the prescribed proforma and the collected data analysed with suitable statistical tools to find out the significance of the results.Autopsy dissection techniques are used with references from Otto saphir[2]

RESULTS AND DISCUSSION

Head injury is a morbid state, which is produced by mechanical force which indicates the severity of force applied to the skull region to cause fractures and effect on brain such as transient concussions up to some extent. mostly due to blunt force impact and causing gross and subtle structural changes in the scalp, skull, and contents of the skull. There are two types of forces that leads to causing head injury 1. Direct Force like compression of skull under the heavy objects like vehicle wheels commonly seen in road accidents. 2. Indirect force from heavy objects like bricks and metal sticks hitting the head in motion which is seen in assault cases, in other way head is in motion and it is hitting the stable objects observed in fell on hard surfaces.

Outer table of skull bone is comparatively thicker than inner table, approximately two times[1]. The thickness of skull bone varies from region to region such as thicker in temporal, sphenoid greater wing, sagittal ridges and protuberance of occipital and thinner, vulnerable at parietotemporal lateral parts of frontal bone and lateral parts of occipital bone. It is rare that the skull fracture itself is dangerous to life, but the concomitant effect of transmitted force upon the cranial contents.

In present study total 180 cases of deaths with skull fractures were included of which 153 cases are male, 27 are female. Among the selected population, male predominance is seen (85%) when compared to Female (15%) it indicates that male persons are mostly accompanied with outdoor chores and it is similar to study conducted by Dr. R. Ravi Kumar[7] mentioned in his study, male victims are 87.75%.

All the cases are divided according to the age group as shown in Table1, In age group wise distribution more in age groups 41-50 years i.e., 30%, 20% in 21-30 years, and it is almost equal to age group 31-40 years (18%), 51-60 years (17%) indicate that skull fractures are more common in younger and middle age groups. Inference from above, highest number of cases belongs to the age group between 41-50 years and least number in the age group between 0-10 years (Table 1).

Distribution of cases among manner of death 165(92%) cases are due to accidental ,9 (5%) cases are due to homicidal,6(3%) cases are due to suicidal in manner of death (Table 2). Manner of death in skull fractures seen are mostly accidental (92%), followed by homicidal (5%), suicidal (3%) which indicates that reason for skull fractures commonly are road traffic and other accidents, least common in assault, and suicidal falls.

In present study total 180 cases of deaths with skull fractures were included of which 66(37%) died at 6AM to 11.59PM,48(27%)

Table 1: Age group wise distribution of cases

Age groups	Number cases of deaths with skull fractures	Percentage (%)
0-10	3	2%
11-20	6	3%
21-30	36	20%
31-40	33	18%
41-50	54	30%
51-60	30	17%
61-70	12	7%
71-80	6	3%
Total	180	100%

Table 2 : Distribution among manner of death

Manner of Death	Number of Autopsies	Percentage
Homicidal	9	5%
Suicidal	6	3%
Accidental	165	92%
Total	180	100%

died at 12NOON to 5.59PM,33(18%) cases died at 6PM to 11.59PM,33(18%) died at 12AM to 5.59AM. Time of death in a 24 hours framework as shown in table 3, commonly occurs in road traffic accidents morning hours 6 AM -11.59 AM i.e. (37%), followed by 12 PM- 5.59 PM (27%), indicate that most of the incidents causing head injuries occurs in between 6 AM – 11.59 AM, it is almost equal to total cases happened during night hours 6 PM -5.59 AM (Table 3).

In present study total 180 cases of deaths with skull fractures were included of which the following region wise distribution ,63(35%) is present in base of skull region ,36(20%) is present in parieto-temporal and base of skull ,14(7.8%) is present in temporal and base of skull region fracture and remaining all regions wise distribution in below (table 4). Skull fractures region wise distribution most commonly involved is base of skull region alone in 63(35%)cases commonly seen in fall from height cases ring fractures are commonly seen[3], parieto-temporal and base of skull together 36(20%)cases seen in road traffic accidents, temporal and base of skull region 14(7.8%)cases ,when compared to study done by Anh, Nguyen Tuan[4] et.al, where the temporal bone and base of skull are most common and when compared to study done by Sunil Kumar soni[5] et al, where most common site of fracture is frontal (40.35%) followed by temporal (28.94%) (Table 4).

In present study, deaths with skull fractures(table 5) were included of which 141(78%) are Linear type of fractures,24(13%) is comminuted type of fractures, 6(3%) are Hinge type of fracture and depressed, depressed+ hinge, comminuted + hinge each share 3(2%) of distribution. Type of fractures distribution in our study most common type is linear or fissure (78%) followed by comminuted fracture (13). It is similar to the study conducted by the Sunil Kumar Soni[5] et.al where the 56.14% are linear fractures and comminuted fracture are 10.52% and also in the study conducted by Anh, Nguyen Tuan[4] et.al, the most common type is linear (46%) and as per Author David dolinak[8] most encountered skull fractures in post-mortem examination are linear and curvilinear fractures (Table 5).

In present study total 180 cases of deaths with skull fractures were included of which 75(42%) cases are associated with intracranial haemorrhages, 35(20%) cases are associated with contusion of scalp,19(10%) each are associated with black eye and blunt injury to neck,16(9%) each are associated with laceration of scalp and blunt injury to chest (fracture of rib). Other injuries associated with skull fractures are

Table 3: Distribution among time of death in a day

Time of death	Number of Autopsies	Percentage
12AM to 5.59AM	33	18%
6AM to 11.59AM	66	37%
12NOON to 5.59PM	48	27%
6PM to 11.59 PM	33	18%
Total	180	100%

Table 4 : Distribution among skull region wise injury

Area of fracture	Number of persons affected	Percentage (%)
Frontal	3	1.7
Temporal	3	1.7
Parietal	8	4.4
Occipital	3	1.7
F+P+T	3	1.7
P+T	9	5
F-P-MCF	3	1.7
Orbital+F-P	3	1.7
O+BOS	11	6.1
P-T+Base of skull	36	20
P+O	3	1.7
T+O+F+BOS	3	1.7
F+BOS	3	1.7
F-P+BOS	3	1.7
T+BOS	14	7.8
BOS	63	35
F-T+BOS	3	1.7
P-O+BOS	6	3.3
Total	180	100

Table 5: Distribution among type of fracture

Types of fracture	Number cases of deaths with skull fractures	Percentage *%)
Linear	141	78
Comminuted	24	13
Depressed	3	2
Hinge	6	3
Depressed +Hinge	3	2
Comminuted fracture+ Hinge	3	2
Total	180	100

Table 6: Distribution of other associated injuries along with skull fractures

Associated injuries	**Number of affected**	**Percentage**
Intracranial haemorrhage	75	42%
Black eye	19	10%
Laceration of scalp	16	9%
Contusion of scalp	35	20%
Blunt injury to neck	19	10%
Blunt injury to chest (rib fracture)	16	9%
Total	180	100%

as shown in Table 6, intracranial haemorrhages (42%) are more common[6] and least with blunt injury to the neck causing spinal cord fracture (10%) (Table 6).

CONCLUSION

Skull fractures are more common in accidents and causing more deaths in male population belongs to middle age which are mostly preventable in nature by providing early medical assistance to the victims can decrease the death rate and effective implementation of preventive measures and strengthen the medical policies. Most common region of skull involved in road traffic accidents are parietotemporal and base of skull, region involved in fall from height is base of skull and in assault cases parietal region.

Conflict of interest statement: None.

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Ethical consideration: This study is approved by Institutional Ethics Committee of Guntur Medical College, Guntur, vide reference no. GMC/IEC/015/2022, Dated 29-09-2022.

REFERENCES

1. Reddy KSN, Murty OP. The essentials of forensic medicine & toxicology the essentials of forensic medicine & toxicology. 35th ed. New Delhi, India: Jaypee Brothers Medical; 2022.P 186-190.
2. Otto saphir. Autopsy Diagnosis and technique. Paul Hober Inc. Third edition.
3. Saukko PJ, Knight B. Knight's forensic pathology fourth edition [Internet]. 4th ed. London, England: Hodder Arnold; 2015,P 174-181
4. Anh,Nguyen Tuan. Skull Fracture Patterns Morphologies Among Fatal Motorcycle Traffic Accident Victims in Vietnam, The American Journal of Forensic Medicine and Pathology . March 2021;42(1) :P 30-35.
5. Sunil Kumar Soni, Sanjay K. Dadu , Bajrang K.Singh; Pattern of Skull Fracture in Fatal Road Traffic Accident Victims: An Autopsy Based Study. Sch. J. App. Med. Sci., 2016; 4(5F):1819-1822.
6. Sandeep k Giri,Jitender k Jakhar,Pradeep Yadav, Dhattarwal SK,Tarun K Dagar Naveen Yadav; Pattern of Fatal Cranio-Cerebral Injury in Road

Traffic Accidents - An Autopsy Based Study. J Indian Acad Forensic Med. October-Decmeber 2018, Vol. 40, No. 4, P 339-341.

7. Dr. R. Ravikumar, M.D An autopsy Study of Patterns of Skull fractures in Road Traffic Accidents Involving Two Wheelers. JKAMLS Jan - Jun 2014; vol 23(1) : Pages 9-14.

8. Dolinak D, Matshes E, Lew EO. Forensic pathology: Principles and practice. San Diego, CA: Academic Press; 2005.