Profile of Fatal Head Injury Cases Autopsied at District Government Hospital Mortuary

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Abstract

Background and Objectives: the study of profile of skull fractures is important as head being the most exposed and prominent part of body; it becomes most susceptible to injuries, as a result of criminal violence or accident. The present study was taken up to know the incidence of head injuries, age relationship, sex relationship, agent causing skull fractures, common skull bone fractures. Methodology: data in the current study was collected from the autopsy reports and from police inquest of all fatal skull fractures from the period of june 2012 to may 2014 irrespective of age and sex with history of death due to head injuries brought for postmortem examination to the department of forensic medicine & toxicology, al-ameen medical college mortuary and district hospital mortuary, bijapur between june 2012 to may 2014.

Results: most common circumstance causing skull fractures are road traffic accidents in 77 cases (81.94 %). Male preponderance over females noted in this study with males constituting 80 cases (85.10 %) and females 14 cases (14.89 %). The most common age group affected was 21-30 years. Blunt force is the most common agent causing the skull fracture in 90 cases (95.74 %) and least is sharp in 4 cases (4.25 %). Among skull fracture comminuted fracture were seen in 46 cases (48.93%); linear fracture in 38 cases (40.42%); depressed fracture in 8 cases (8.5%); and sutural fracture in 1 case and gutter fracture in 1 case (1.06%) respectively. Temporal bone was the commonest bone fracture in 17 cases (18.08%).

Conclusion: the study had concluded that incidence of skull fractures were common at the age group of 21-30 years, with male predominance, most common cases were those of RTA, cause of death that were given in majority of cases was that of Head injury as a consequence of injuries sustained.

Keywords: Road traffic accident, Skull fracture, Head injury

Introduction

“Head injury” as defined by the National Advisory Neurological Diseases and stroke council, is a morbid state, resulting from gross and subtle structural changes in the scalp, skull and/or the contents of the skull produced by mechanical forces. Mechanical forces is restricted to the forces applied externally to the head, thus excluding surgical ablations and internally acting forces such as increased intracranial pressure resulting from edema, hydrocephalus, or mass occupying lesion without antecedent head trauma.1

It Introduction of helmet in view of protecting head from crashes following motorcycle accidents dates back to 1885 when the first helmet was used. It was crude compared to modern helmets which had given little protection. This had lead for the introduction of helmet in 1931. Professor C.F. Lombard created helmet which will absorb the crash. The ultimate function of a motorcycle helmet is to protect the skull from a type of punctures

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and to provide a cushion that will de-accelerate a rider’s head during impact. This will lead to a decrease in force that is placed on the skull of rider.\textsuperscript{2}

Along with this mode certain sports can also involve in producing serious injury to the brain. The sports of football, boxing, horseback riding, winter sports (hockey and skiing), and soccer, all of which contribute significantly to the incidence of injury to a player’s head and brain.

Head and neck are most common of all the regional injuries in forensic practice. Some reasons for dominance of skull fractures are- head is the target of choice in great majority of assaults involving blunt trauma. When the victim is pushed or knocked to the ground, he/she often strikes his/her head. The brain and its coverings are vulnerable to degrees to blunt trauma that would rarely be lethal if applied to other areas.\textsuperscript{3}

**Methodology**

The present study was done for one year retrospective and two years prospective study from June 2012 to may 2014 at Al-Ameen medical college and district hospital mortuary, Bijapur.

All the cases that are autopsied were screened for skull fractures resulting from deaths due to road traffic accidents, railway accidents, assault, firearm injuries and fall from height. A detailed information and data pertaining to the cases were collected. After receiving the details, post-mortem examination was conducted.

Some of the particulars of the victim were also obtained from the direct interrogation with relatives, friends and others along with the police. Following points were noted with respect to age, sex, cause or mode and manner of injury sustained, object causing the injury following the incident and the cause of death.

All the findings thus obtained were noted down in a separate proforma for each case. Then the master chart is prepared. The statistical analysis of the data collected was done and presented results in the tabular forms, bar diagrams and pie charts. Photographs and x-rays taken whenever necessary. The results are tabulated, analyzed, discussed and concluded.

**Inclusion criteria** – All the victims of skull fractures autopsied at Al-Ameen Medical College Mortuary and District Hospital Mortuary, Bijapur.

**Exclusion criteria** – All the victims autopsied at Al-Ameen Medical College Mortuary and District Hospital Mortuary Bijapur other than victims of skull fractures.

**Results**

**Table-1 Age-wise distribution of the victims**

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>No. of Victims</th>
<th>Total</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td></td>
</tr>
<tr>
<td>0 – 10</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>11 – 20</td>
<td>9</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>21 – 30</td>
<td>24</td>
<td>2</td>
<td>26</td>
</tr>
<tr>
<td>31 – 40</td>
<td>19</td>
<td>5</td>
<td>24</td>
</tr>
<tr>
<td>41 – 50</td>
<td>15</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>51 – 60</td>
<td>8</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>&gt;60</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>80</td>
<td>14</td>
<td>94</td>
</tr>
</tbody>
</table>
Table no-1 shows age wise analysis of the victims of skull fractures showed a maximum number of deaths in the age group of 21-30 years (27 %) followed by 31-40 (25.53%) and minimum deaths in the age group of 0-10 (6.38 %) and above 60 years (4.2%). The average mean age is 13.42 years.

**Table-2: Sex-wise distribution of the victims**

<table>
<thead>
<tr>
<th>Sex</th>
<th>No. of victims</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>80</td>
<td>85.10 %</td>
</tr>
<tr>
<td>Female</td>
<td>14</td>
<td>14.89 %</td>
</tr>
<tr>
<td>Total</td>
<td>94</td>
<td>100</td>
</tr>
</tbody>
</table>

Table no-2 describes that male preponderance over females noted in this study with males constituting 80 cases (85.10 %) and females 14 cases (14.89 %).

**Table- 3 Agent causing skull fracture**

<table>
<thead>
<tr>
<th>Agent</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blunt injury</td>
<td>90</td>
<td>95.74%</td>
</tr>
<tr>
<td>Sharp injury</td>
<td>4</td>
<td>4.25%</td>
</tr>
<tr>
<td>Total</td>
<td>94</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table no-3 reveals that blunt injury is the most common agent causing the skull fracture in 90 cases (95.74 %) and least is sharp in 4 cases (4.25 %). Blunt force trauma commonly associated with road traffic accidents.

**Table-4: Type of skull Fracture**

<table>
<thead>
<tr>
<th>Type of skull Fracture</th>
<th>No. of cases</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear</td>
<td>38</td>
<td>40.42%</td>
</tr>
<tr>
<td>Comminuted</td>
<td>46</td>
<td>48.93%</td>
</tr>
<tr>
<td>Depressed</td>
<td>8</td>
<td>8.5%</td>
</tr>
<tr>
<td>Sutural</td>
<td>1</td>
<td>1.06%</td>
</tr>
<tr>
<td>Gutter</td>
<td>1</td>
<td>1.06%</td>
</tr>
<tr>
<td>Total</td>
<td>94</td>
<td>100%</td>
</tr>
</tbody>
</table>

Among skull Fracture Comminuted fracture were seen in 46 cases (48.93%), Linear Fracture in 38 cases (40.42%) followed by Depressed fracture in 8 cases (8.5%), sutural fracture in 1 case and Gutter fracture in 1 case (1.06%).
Table no-5 shows that Temporal bone was the commonest bone fracture in 17 cases (18.08%), Frontal bone in 14 cases (14.89 %), Occipital bone in 13 cases (13.82%), Fronto-Temporal in 12 cases(12.76%), Fronto-Parietal in 9 cases (9.5%), Temporo-Occipital & Temporo-Parietal & Fronto-Occipital in 7 cases each (7.44 %), Parieto-Occipital in 3 cases (3.19%) & Fronto-Parieto-Occipital in 8 cases (8.5%) & Fronto-Temporo-Occipital in 1 case (0.01%).

**Discussion**

In the present study of Skull fractures showed a maximum number of deaths in the age group of 21-30 years(27 % ) followed by 31-40 (25.53%) and minimum deaths in the age group of 0-10 (6.38 %) and above 60 years (4.2%).

The results were consistent with the Manish K et al⁴, Dr.Nagesh KR⁵, Pradipkumar Singh et al⁶ and shivendre jha et al⁷ the maximum number of fatalities were in the 21-30 years age group.

A large number of cases in this age group can be explained by the fact that younger persons are primary bread earners of the family in this age group and more active, have tendency to take undue risk, thereby subjecting themselves to the hazards of the accidents and fractures.

In the present study it is observed that male preponderance over females noted with males constituting 80 cases (85.10 %) and females 14 cases (14.89 %). The male and female ratio is M: F=5.71:1

This dominance of the males has also been reported by various workers -Dr. B. C. Shivakumar et al⁸, R. Ravikumar⁹ and Hetal C. Kyada et al¹⁰.

The dominance of males is explained by the fact that males are more exposed to the hazards of road, industry, violence as they constitute working and earning member in majority of the families, while females usually stay at the home and look after the house hold work in this
In the present study it is found that agent responsible for skull fractures is blunt injury in 90 cases (95.74%) and least is sharp in 4 cases (4.25%). Blunt force trauma commonly associated with road traffic accidents.

Our findings are consistent with - Dr. Pradeepkumar Mishra and Dr. Sandeep Singh 11, O. Gambhir Singh, B. D. Gupta 12.

But it is contrast to the study done by Samina Rehman et al 13 shows among the fatal cases, firearms were the most common assault weapon used in 37% of cases followed by blunt instruments 27%. Sharp weapons were the least common weapon used in 20%. In the present study it is found that least agent responsible for skull fractures is sharp in 4 cases (4.25%).

In the present study it is observed that Temporal bone was the commonest bone fracture in 17 cases (18.08%), Frontal bone in 14 cases (14.89%), Occipital bone in 13 cases (13.82%), Fronto-Temporal in 12 cases (12.76%), Fronto-Parietal in 9 cases (9.5%).

Ravi Rautji et al 14 study is similar with our study with Fracture of Temporal bone is common bone involved 10.1% (10 cases). Our study is nearer to the studies of Ahmed M et al 15 showing Temporal bone was most prone to be fractured (23%) followed by parietal bone (17%).

Manish K et al 16 and Arvind Kumar et al 17 studies showing Temporal bone was most prone to be fractured which is comparable with our study.

Raja Rupani et al 18, Chaudhary B L et al 19 and Mohd Kaleem Khan et al 20 observed highest numbers of fractures seen in Temporal bone which is consistent with our study.

Samina Rehman et al 13, Ravindra S Honnunagar et al 21 & Manoj Kumar et al 22 study shows that Frontal bone fracture was the common bone fracture. This is contrast with our results.

The thinnest area is in the temporal bone where it may be only 4mm, while in the occipital bone in the midline it may be 15 mm or even more. So Temporal bone was the commonest bone fracture in our study due to direct impact over it due to RTA.

In our study among skull fracture Comminuted fracture were seen in 46 cases (48.93%), Linear Fracture in 38 cases (40.42%), Depressed fracture in 8 cases (8.5%), Sutural fracture in 1 case and Gutter fracture in 1 case (1.06%) respectively. It is in accordance with the studies of Shivendre Jha et al 7, Saurabh Chattopadhyay and Shamshuddin R Kakkeri et al 23, Samina Rehman et al 13, Rajesh DR et al 24, Ravi Rautji et al 14.

Nagesh KR et al have noticed Fissured fracture was the most commonly observed fracture (57%). Whereas comminuted fracture, Diastatic fracture and depressed fracture were seen in 18%, 16% and 9% cases respectively. This study is contrast with our results.

This may be explained as road traffic accident constitutes a complex phenomenon of multiple causation. The rise in number of RTA is due to carelessness of the drivers and pedestrians, tiredness, fatigue of the drivers, poor visibility due to lack of street lights, urbanization and tremendous growth in road transport sector. Population explosion is the major factor causing increasing the numbers of RTA. Congested roads, speeding, inadequate traffic planning, low use of helmets, consumption of alcohol and violation of the traffic rules have contributed much of the occurrences of RTA.

**Conclusion**

Out of 752 victims, 94 sustained head injuries with skull fractures. In this 77 cases (81.94%) were due to RTA followed by homicide in 12 cases (12.7%) & 5 cases (5.3%) due to fall from height. Males outnumbered females in the ratio of 5:1. Young adults between 21 to 30 years (27%) are more vulnerable to the head injuries with skull fractures. Manner of death is commonly road traffic accident in 77 cases (81.94%). In road traffic accidents maximum number of victims were observed in two wheeler riders involved in 54 cases (70.12%) formed the major victims Blunt force is the most common agent causing the skull fractures in 90 cases (95.74%) and blunt force trauma commonly associated with road traffic accidents. Comminuted fracture were seen in 46 cases (48.93%), Linear Fracture in 38 cases (40.42%). Temporal bone was the commonest bone fracture in 17 cases (18.08%).
Ethical Clearance- Taken from institutional Ethics committee

Source of Funding- Self

Conflict of Interest- Nil

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