

## A study of pattern and distribution of intra-cranial haemorrhages in fatal road traffic accidents at a tertiary care centre in Indore region of Madhya Pradesh

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### Abstract

Head injuries are the most serious injuries in the term of morbidity and mortality. This study was conducted in mortuary of MGM Medical College, Indore over the period of one year from 1<sup>st</sup> October 2014 to 30<sup>th</sup> September 2015. A total of 200 post-mortem cases of road traffic accident victims were studied. Objective of the study was to find out pattern and distribution of intracranial hemorrhages in fatal road traffic accident victims. In the present study males (n=156, 78.0%) outnumbered females (n=44, 22.0 %). Most affected age group was between 21-30 years having total 65 cases (32.5%), followed by 31-40 years in 38 (19.0 %) cases. Sub Dural Hemorrhage (SDH) alone was present in 32 (16.0%) cases which was most common, followed by Sub Arachnoid Hemorrhage (SAH) in 31 (15.5%) cases. In combination SDH with SAH was most common hemorrhage i.e. in 88 (44.0%) cases. RTAs were more common in the younger age groups and in male sex. Head injury was the major cause of death in majority cases of RTAs mostly due to Subdural and Subarachnoid Haemorrhages. This further shows the need of strict implementations of rules for controlling the speed of vehicle.

**Keywords:** Road traffic accident, Extra dural hemorrhage, Sub dural hemorrhage, Sub arachnoid hemorrhage.

### Introduction

Head injury has been defined as “a morbid state, resulting from gross or subtle structural changes in the scalp, skull, and/or the contents of skull, produced by mechanical forces”.<sup>1</sup> It has also been defined as physical damage to the scalp, skull or brain produced by an external force. However, such force/impact, responsible for the injury needs not be applied directly to the head.

### Extradural hemorrhage

Bleeding between inner surface of skull and duramater is least common of three types of brain membrane hemorrhage. The dura is closely applied to the interior of the skull except in the posterior fossa, that extradural bleeding does not occur over the skull floor. Most extradural hemorrhage is associated with fractures of the skull. The usual site is unilateral in a parietotemporal area caused by the rupture of middle meningeal artery that run between the dura and the skull.<sup>2</sup>

### Subdural Haemorrhage

Bleeding into relatively wide space between the dura and arachnoid membrane is much more common than extradural hemorrhage. It results from the rupture of the bridging veins that connect the venous system of the brain to the large intradural venous sinuses.<sup>2</sup>

### Subarachnoid haemorrhage

The third type of brain hemorrhage bleeding is even more common than subdural hemorrhage. It is usually associated with extradural or subdural hemorrhage. The subdural hemorrhage caused by trauma varies greatly according to the nature and extent of injury. When it is secondary to laceration of the brain or extensive cortical contusions then its localization and severity depends upon primary injury.<sup>2</sup>

### Material and Methods

This study was conducted in mortuary of Mahatma Gandhi Memorial Medical College and M.Y. Hospital Indore, over the period of one year from 1<sup>st</sup> October 2014 to 30<sup>th</sup> September 2015 and 200 post mortem cases of road traffic accident victims were studied.

### Observations

It was observed in the study that most affected age group affected was between 21-30 years having total 65 cases (32.5%), followed by 31-40 years in 38 (19.0 %) cases. All age groups were dominated by males with maximum sex differentiation in 21-30 years age group. (Table 1) Females were affected equally in age group of 21-30 and 31-40 years, whereas males were affected maximum in 21-30 years age group. In the present study males (n=156, 78.0%) outnumbered females (n=44, 22.0 %) significantly with male to female ratio of nearly 3.54:1. (Table 2)

It was observed that out of 200 cases, in 165 cases intra-cranial haemorrhages present and in 35 cases intra-cranial haemorrhages was absent. (Table 3) SDH alone was most common seen in 32 (19.40%) cases, followed by SAH in 31 (18.78%) cases and least common was EDH. In combination SDH with SAH was most common haemorrhage i.e. in 88 (53.33%) cases and least common was SAH with Intra Cerebral haemorrhage i.e. in 2 (1.21%) cases (Table 4).

In the present study it was observed that hemorrhage in frontal region alone was found in 12 (7.270%) cases which was most common involved region, followed by hemorrhage in occipital region alone in 7 (4.24%) cases and least common hemorrhage in parietal region alone in 1 (0.6%) cases. In combination most common involved region was parieto-temporal in 51 (30.90%) cases followed by

fronto-parietal and parieto-occipital in 39 (23.63%) and 15 (9.09%) cases respectively and least common was fronto-temporal+occipital and parieto-temporal+fronto-Parietal region in 1(0.6%) cases. (Table No.05)

**Table 1:** Distribution of cases of RTA according to age and sex. (n=200, either sex)

Age in years	Female (%)	Male (%)	Total
Less than 10 years	1 (2.3)	1 (0.6)	2(1.0)
11 – 20	8 (18.2)	19 (12.2)	27(13.5)
21 – 30	11 (25.0)	54 (34.6)	65(32.5)
31 – 40	11 (25.0)	27 (17.3)	38(19.0)
41 – 50	9 (20.5)	28 (17.9)	37(18.5)
51 – 60	4 (9.1)	21 (13.5)	25(12.5)
61 – 70	0	6 (3.8)	6(3.0)
Total	44 (100)	156 (100)	200(100.0)

**Table 2:** Distribution of cases of RTA according to sex.

Sex	No. of cases	Percentage (%)
Female	44	22.0
Male	156	78.0
Total	200	100.0

**Table 3:** Distribution of cases according to intracranial haemorrhages present and absent (n=200, either sex)

Intracranial haemorrhages	No. of cases	Percentage (%)
Present	165	82.5
Absent	35	17.5
Total	200	100.0

**Table 4:** Distribution of cases according type of intracranial haemorrhages. (n=165, either sex)

Haemorrhages	No. of cases	Percentage (%)
SDH	32	19.40
SAH	31	18.78
IC	3	1.81
EDH	00	00
EDH+SDH	6	3.63
EDH+SDH+SAH	3	1.81
SAH+IC	2	1.21
SDH+SAH	88	53.33
Total	165	100.0

**Table 5:** Distribution of cases according to regions of intracranial haemorrhages. (n=165, either sex)

Regions	No. of cases	Percentage (%)
Frontal	12	7.27
Temporal	5	3.03
Parietal	1	0.60
Occipital	7	4.24
Parieto-Temporal	51	30.90
Fronto-Parietal	39	23.63
Parieto-Occipital	15	9.09
Frontal+Occipital	4	2.42
Frontal+Parieto-Occipital	2	1.21
Frontal+Parieto-Temporal	2	1.21
Fronto-Parietal+Parieto-Occipital	2	1.21
Fronto-Parietal+Parieto-Temporal	7	4.24
Fronto-Temporal+Occipital	1	0.60
Parieto-Temporal+Fronto-Parietal	1	0.60
Parieto-Temporal+Frontal	2	1.21
Parieto-Temporal+Fronto-Parietal	1	0.60

Parieto-Temporal+Occipital	4	2.42
Parieto-Temporal+Parieto-Occipital	5	3.03
Temporal+Fronto-Parietal	2	1.21
All	2	1.21
Absent	35	17.5
Total	200	100.0

## Discussion

In the present study we observed that the age of the victims varies from 05-70 years. In males maximum deaths were observed between age group 21-30 years in 54 (34.6%) cases followed by 31-40 years 27 (17.3%) cases, least death occur in victim below 10 years in 1(0.6%) cases, i.e. maximum deaths were between 21-40 years (51.9%), whereas in females equal number of cases were observed in age group 21-30 and 31-40 years i.e. 11 (25.0%) cases. This finding is consistent other studies where most of the peoples were from age group 21-40 years. Study done by Kamdar BA and Arden GP<sup>3</sup> found 62% victims were between the ages of 12-60 years; of these, 28% were between 12-30 years and 34% between 30-60 years; Chandra J et al<sup>4</sup> found most common age group involved was 21-40 years in 46.01% cases, Salgado MSL and Colornbage SM<sup>5</sup> found highest numbers of fatalities were found in the age group 20-29 years, Tirpude BH et al<sup>6</sup> found 31-40 years of age as the most susceptible group. This observation may be because of the fact that adult age group is mostly involved in the outdoor activities and so they are more vulnerable for accidents.

In the present study it was observed that SDH alone was most common in 32(19.40%) cases, followed by SAH in 31 (18.78 %) cases while EDH alone was not seen in any case. In combination, SDH along with SAH was most common haemorrhage in 88 (53.33%) cases and least common was SAH with Intra Cerebral haemorrhage in 2 (1.21%) cases. This finding was consistent with Sharma BR et al<sup>7</sup> who found in head injury victims most common type of hemorrhage is SDH seen in 62.40% of victim, while EDH, SAH and intracerebral haemorrhages were seen in 23.5%, 16% and 9% cases respectively and Ravikumar R<sup>8</sup> found SDH in 92.80% cases followed by SAH in 76.80% cases, Intra cranial haemorrhage (ICH) in 17.60% cases and least common was EDH in 4.83% cases.

In the present study it was observed that frontal region alone was most common involved in 12 (7.27%) of cases, followed by occipital region alone in 7 (4.24%) cases and least common in parietal region alone in 1(0.60%) case. This is consistent with study done by Pothireddy S and Karukutla N<sup>9</sup> who found involvement of Frontal lobes region most common in 91% cases.

Government and public encourage enforcement of traffic safety laws and regulations and campaign for firm and swift punishment for traffic offenders. Government and public have responsibly by Abiding by the speed limit on

roads, always wearing a seat-belt and properly restraining children, even on short trips, wearing a crash helmet when riding a two-wheeler.<sup>10</sup>

## Conclusion and Recommendations

In this study, RTAs were more common in the younger age groups and in male sex. Head injury was the major cause of death in majority cases of RTAs mostly due to Subdural and Subarachnoid Haemorrhages. This further shows the need of strict implementations of rules for controlling the speed of vehicle. Government and public should identify local safety problems. Use of safety measures like use of seat belts while driving four wheelers and use of helmets by the rider and pillion rider should be made compulsory.

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## Conflict of interest

None.

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