

Variability of Head Injury & Intracranial Hemorrhages in Relation to Sex & Different Age Groups - A study.

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ABSTRACT

Background: With growing population, rapid urbanization and industrialization associated with high materialistic mind of human beings, incidence of unnatural deaths increasing in geometrical progression. Out of all unnatural deaths trauma plays the major role and head is the most vulnerable part to receive injuries in different manners. **Methods:** The present work was conducted in the department of Forensic Medicine & Toxicology of M.K.C.G Medical College, Berhampur during the period from 01.01.2004 to 31.12.2005 and 207 cases of head injuries brought for post-mortem examination were taken into consideration as study materials. Each individual case was analyzed thoroughly with special attention to different types of intra cranial hemorrhage with relation to nature of trauma & other modified intrinsic and extrinsic factors. **Results:** It was found that all types of ICH are significantly found in males in all age groups of 11-40 years i.e. 86 Males out of total 182(47.25 %) in compare to females i.e. 20 out of 182 (10.98%) and the type of hemorrhage was the SDH followed by mixed varieties. No remarkable sex wise differences were detected in the age group of 0-10 and 70 years and above. **Conclusion:** The autopsy surgeons are advised to open the cranial cavity in every case and to inspect the intracranial structures in detail.

Keywords: Trauma, Intracranial hemorrhage, EDH, SDH, Sex.

INTRODUCTION

With growing population, rapid urbanization and industrialization associated with high materialistic mind of human beings, incidence of unnatural deaths increasing in geometrical progression throughout world and now becomes a major health problem. Out of all unnatural deaths trauma plays the major role. Head is the most vulnerable part to receive injuries in different manners. During last decade there has been considerable increase in deaths due to head injuries in Southern Orissa in general and Berhampur Zone in particular both from accidents and assaults. ICH being one of the major entities amongst all types of intracranial lesions is not only responsible for death but also impart numerous complications in life. Patients with head injuries sustaining sub lethal intracranial damage normally tend to recover unless secondary complications set in. These are often referred as epiphenomena or the second accidents. These epiphenomena signify the onset and perpetuation of post traumatic intracranial hypertension. A common and treatable cause of post traumatic intracranial hypertension is an expanding intracranial hematoma which also ranks the number one lesion among the trauma to the intracranial structures. It is stated that a small amount of hemorrhage i.e. a drop in Pons or 50 ml. of free blood in subdural space is sufficient to cause death.

The different types of intracranial hemorrhage like EDH, SDH, SAH and Intracerebral haemorrhage are of complex and diversity in nature to occur in traumatic head injuries. The survival rate of the victims sustaining such type of intracranial injuries depends to a large extent on the timely reorganization and treatment of ICH. However, many authors highlighted deaths and complications of ICH in details still no appropriate attempt had been made to evaluate such lesions in relation to sex & different age group. Very little information regarding the epidemiology of ICH in head injuries with reference to sex & different age is available. Hemorrhage inside the skull cavity may occur at different levels, at different sites, and by different manners. It may also be due to violence, disease or the effects of injuries upon the disease. In such cases the role of age and sex of the person, need to be thoroughly evaluated to form any conclusive opinion.

Present work "Variability of Head injury Intracranial Hemorrhage in relation to sex & different age group" is an attempt to establish the demographic profile, mode and extent of ICH due to head injuries by conducting a post-mortem study on the corpse brought for medico legal autopsy to this medical college. The result of the study will be useful for both forensic pathologist in forming concluding opinion as to the cause of death and instruments responsible for producing such injury, as such suggesting a vital guideline to the autopsy surgeon and for clinicians in facilitating appropriate evaluation and decisions making in management of head injuries to full extent.

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MATERIALS AND METHODS

The present work on “Variability of head injury & intracranial hemorrhage in relation to sex & Head injury different age group” was conducted in the department of Forensic Medicine & Toxicology of M.K.C.G Medical College, Berhampur during the period from 01.01.2004 to 31.12.2005. 207 cases of head injuries brought for post-mortem examination were taken into consideration as study materials. Each individual case was analyzed thoroughly with special attention to different types of intra cranial hemorrhage with relation to nature of trauma & other modified intrinsic and extrinsic factors. The circumstances of sustaining the injuries were collected from the relatives accompanying the corpse, from the investigating police officers and from available hospital records. The collected information and data were individually compiled and collectively evaluated to find out a specific conclusion.

RESULTS

During this present study upon 1077 number of medico legal autopsies conducted in the Morgue of F.M.&T Department of M.K.C.G. Medical College, Berhampur during period starting from 01.01.2004 to 31.12.2005 out of which 207 cases were isolated who died due to Head Injuries.

The commonest cause of head injury in Road Traffic accident 107 in number followed by fall from height 32 numbers. Railway related head injuries are almost par with falling from height 31 numbers. Head injuries caused by assault as a whole are of having significant in number i.e. 37 next to RTA. Amongst the head, injury caused by assaults hard and blunt weapon was the most common causative agents i.e. 24 out of 37 (64.86%). Cutting instruments although less frequently used to cause head injury very list number were produced by firearms. It was found that males are the most common victim of RTA i.e.86 out of 107(80.37%) in compare to Females 21 out of 107 (19.63%).It also observed in the above table that males are most vulnerable to all types of head injury be it accident or assaults. [Table 1].

Table 1: Sex wise distribution of head injuries in relation to causative agents

	Sex	Male	%	Female	%	Total	Percentage
ACCIDENT	RTA	86	53.08	21	46.66	107	51.69
	Railway accidents	21	12.96	10	22.22	31	14.97
	Fall from height	22	13.54	10	22.22	32	15.45
ASSAULT	Hard and Blunt	22	13.54	2	4.44	24	11.59
	Cutting weapon	9	5.55	2	4.44	11	5.31
	Fire arm	2	1.23	0	0	2	0.96
	Total	162	100%	45	100%	207	100%

In our study age and sex wise distribution of victims of head injuries where the age of the victims varies from minimum 3 years to maximum 79 years. Maximum number of cases were observed ion the age group 21-30 years i.e. 56 out of 207(27.05 %) followed by 31-40 years i.e. 46 out of total 207 (22.22 %). It is also observed, in all age groups the males outnumbered the females but it is less in extremes of ages [Table 2]. Our study depicts that out of these 162 ICH cases males are 143 which constitutes 88.27 % of total head injuries in the in comparison to 39 females out of 45 head injuries i.e. 86.66%. By considering the sex wise distribution of head injuries as a whole the ratio of male to female in ICH (78.57 : 21.42) is almost equal to the ratio of male to female of head

injuries (78.26 : 21.73) [Table 3]. It is observed that the most vulnerable age group died due to ICH is 21-30 years followed by 31 - 40 years while comparing the findings of [Table no – 4] with that of table no II. It is found that all deaths occurring due to head injury in the age group of 0-10 and 61 and above were having some sort of ICH i.e. 8 of the 8 in age group 0-10, 20 of 20 in age group 61-70 and 6 out of 6 above the age group 70 which indicates ICH is more common in extreme age groups in comparison to young and middle age persons. The same table also reveals that SDH is comparatively commoner in age group 0-30 and above 70 where as a combination different types of ICH is more common in 31 -70 years [Table 4].

Ray; Relation of Intracranial hemorrhage to age & Sex

Table 2: Age and sex wise distribution of head injury cases.

Age Group in Year	Male	Female	Total	Percentage
0-10	5	3	8	3.86
11-20	16	1	17	8.21
21-30	47	9	56	27.05
31-40	36	10	46	22.22
41-50	25	8	33	15.94
51-60	15	6	21	10.14
61-70	14	6	20	9.66
>70	4	2	6	2.89
Total	162	45	207	100%

Table 3: Sex incidence in ICH

Sl. No	Sex	Total number of head inj.	% of ICH of head inj.
1	Male	162	88.27
2	Female	45	86.66
3	Total	207	87.92

It was found that all types of ICH are significantly found in males in all age groups of 11-40 years i.e. 86 Males out of total 182(47.25 %) in compare to females i.e. 20 out of 182 (10.98%) and the type of hemorrhage was the SDH followed by mixed varieties. No remarkable sex wise differences were detected in the age group of 0-10 and 70 years and above [Table 5].

Table 4: Type of ICH in relation to age

Age Group in years	EDH	SDH	SAH	IC	MIXED	TOTAL
0-10	1	3	2	0	2	8
11-20	0	7	2	2	3	14
21-30	5	23	4	7	13	52
31-40	5	12	4	2	17	40
41-50	2	7	1	1	14	25
51-60	1	2	1	1	12	17
61-70	5	2	3	0	10	20
>70	1	2	0	0	3	6
TOTAL	20	58	17	13	74	182

Table 5: Age and sex distribution of ICH

TYPE OF ICH	EDH		SDH		SAH		INT. CER.		MIXED		TOTAL	
	M	F	M	F	M	F	M	F	M	F	M	F
0-10	0	1	2	1	2	0	0	0	1	1	5	3
11-20	0	0	7	0	2	0	2	0	2	1	13	1
21-30	4	1	21	2	3	1	5	2	10	3	43	9
31-40	4	1	11	1	3	1	2	0	10	7	30	10
41-50	2	0	6	1	1	0	1	0	11	3	23	2
51-60	0	1	2	0	0	1	1	0	10	2	13	4
61-70	3	2	2	0	1	2	0	0	8	2	14	6
>70	1	0	2	0	0	0	0	0	1	2	4	2
TOTAL	14	6	53	5	12	5	11	2	53	21	143	39

DISCUSSION

During the study of sex wise distribution of head injuries in relation to causative agents [vide Table No – 1] it has been observed that, maximum head injury victims were males. Out of 207 cases the

males were 162 (78.26%) whereas females were 45 (21.73%). The males were almost 3 – 4 times more affected in comparison to that of the female population. It is also observed Road Traffic Accident is the commonest cause of head injuries in both males and females. The findings are almost

similar to those of other workers like W. Mc. Kisson et al^[2] (1960) – the head injury in road traffic accident involves the male victims 78.4%, T.H. Edna et al^[4] (1979 – 1980) in his prospective study of traumatic head injury found the preponderance of males in all categories of age groups and Singh Dalbir et al^[10] (1996) reported male to female 91.09% : 8.91% in his retrospective study of head injury. It is because the males are more exposed to outside, more mobile and have more public contact in contrast to the females.

Age and sex wise analysis of head injury victims of the present study [vide Table no – 2] it is found that the maximum number of cases were in the age group 21 – 30 years followed by 31 – 40 years. People in two extremes of life i.e. in between 0 – 10 and above 70 years are least affected. This observation in connection with age in our study found to be similar with the study of Wolfgang, M.^[1] (1958) who in his study, found most of the victims belongs to 31 – 40 years of age group, with male preponderance. Dixit P.C.^[3] 1979 who found 21 – 30 years age group were most commonly involved with 41.99% of victims and male are four times more commonly involved than females. Loya, F.^[5] (1986) observed that the victims were mostly men with the age incidence between 24 – 35 years. Das Sanjay 1989, found majority of victims were males in age group of 20 – 30 years. Other author like Fimate, L. et al^[6] (1989), Ghosh, P.K. et al^[7] (1991), Pillay, V.V.^[8] (1992), Ghosh P.K. (1992), Subramanyam and Sheikh^[9] (1994), Banerjee K.K. et al^[11] (2000) had also got similar results as that of the study.

The prevalence of male victims in 21 – 40 years of age group are more active, mobile and sole bread earners of the family and, most commonly engaged in outdoor activities, thus increasing their chances of meeting traffic accidents and falls, leading to death. This sex and age wise variation can be explained that in a state like Orissa where the society is conservative at large, thereby prevents the females to get out and involve in litigation, for which males are more exposed to litigation and thus it is the young adult males of 21 – 40 years age present highest incidence

Taking sex incidence into consideration [vide table no – 3] it has been observed that most of the ICH cases are males i.e. 78.57% in comparison to females 21.42%. This figure is almost similar to that of head injuries of sex incidence as observed in [Table No–1] where male to female ratio is 78.26% to 21.73%. This indicates both the males and females are almost equally vulnerable to intracranial haemorrhage in head injuries.

Considering the type of ICH in relation to age groups in [Table no 4], it was found that maximum number of cases were in the age group 21 – 30 followed by 31 – 40 years. People in two extremes

of life i.e. in between 0 – 10 and more than 70 years were least affected

It is apparent from [Table no –5] that majority of male victims were dying from ICH in comparison to females, which is almost parallel with sex wise incidence of head injuries at large. Here also large number of victims belongs to 21 – 30 years of age group and least in first decade and after 70 years of age.

CONCLUSION

This study was based on analysis of 207 cases of death due to Head injuries, out of total no 1077 medico legal autopsies conducted in the Department of Forensic Medicine and Toxicology, M.K.C.G. Medical College, Berhampur for a period of two years from January 2004 to December 2005. ICH was detected in 182 cases, i.e. 87.92% of Head injuries. Most of the victims belong to the male population (78.26%) and of within 21 to 40 years (49.27%) age group. The youngest child was a female child of 3 years, whereas the eldest one was a male of 79 years. RTA was found to be the most common cause of Head injuries revealing ICH (51.68%) whereas hard and blunt instrument was used to cause ICH in the most of the assault related Head injuries. There found no direct relationship between traumatic ICH and sex of the deceased, male (88.27%) and female (86.66%). However, all the victims of 0-10 years (8 cases) and above 60 years (26 cases) had revealed some types of ICH. Although RTA is the commonest cause of Head Injury, ICH is seen more in falling from height (93.75%) in comparison to RTA (86.91%).

Basing on the result of this study the author desires to suggest the following:

1. The autopsy surgeons are advised to open the cranial cavity in every case and to inspect the intracranial structures in detail, as there are possibilities of occurrence of ICH without any visible injury to the scalp or skull. They can avoid future allegations and counter allegations.
2. Whenever a dead body was received for medico legal post-mortem examination with alleged history of trauma to the head, the autopsy surgeon when fails to find any injury on the head (either extracranial or intracranial) or any other lesion in any organ of the body for giving a concluding opinion as to the cause of death, he is advised to search for the patriarchal type of ICH in the selected sites (substances of White matter, Basal ganglia, Brain stem and Corpus callosum) of the brain and to preserve tissue from the suspected areas
3. For histological examination and corroboration.

4. As EDH and SDH are more common entity in all types of head trauma either alone or in combination with injury to other intracranial structures and since the complications arising out of most of the intracranial haemorrhages (rising intracranial pressure) are present table, the clinicians (Surgeons) should take utmost care in making an early diagnosis of such haemorrhages and to take immediate measures to save the life of the patients. Delay in diagnosis and subsequent intervention may be too late to save the life of the patients. Therefore, in all cases of head injuries with or without gross damage to the brain tissue the first and foremost duty of the clinicians is to exclude any type of coexisting ICH to prevent subsequent epiphenomena (second accident).

However, as the present study was conducted over a limited number of cases for a short duration (2 years) an intensive study is suggested on a large scale to highlight guidelines that are more specific for the autopsy surgeon and the clinicians.

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