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STUDY OF INTRACRANIAL HAEMORRAGES IN MEDICO LEGAL AUTOPSIES

Forensic Medicine

KEYWORDS: Intracranial haemorrhage, Traumatic, road traffic accidents, fracture.

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ABSTRACT

Intracranial haemorrhage is one of the major causes of death encountered during medico legal autopsy. The most common cause of head trauma is Road traffic accidents and among all the lesion of the brain, intracranial haemorrhage is a very common finding observed. This retrospective study being carried out in the department of Forensic Medicine, Gauhati Medical College and Hospital with a view to bring out the various factors in intracranial haemorrhages. In our present study intracranial haemorrhages were present in all the cases which are the main clause of the study.

INTRODUCTION: Intracranial haemorrhage is one of the major causes of death encountered during medico legal autopsy. A considerable number of cases die because of intracranial haemorrhage of various causes that includes- Spontaneous or non-traumatic and traumatic. The nature of trauma may be accidental, homicidal and suicidal. Among these, accidental can be said to be the most common but it must be realized that the gap between the incidence of homicide and accidental trauma has been narrowed down to a large extent in our present day civilization. Recent year have seen the increase in frequency and seriousness of intracranial haemorrhage following head injury, with vehicular accident being the major provider for such cases. Intracranial haemorrhage affects 2.5 per 10,000 people each year.[3] Worst statistics are found in some developing countries where the fatal accident rate per car on the road may be over 100 times that of developed country (A Keith Manth 1978).[12] Among all the lesion of the brain, intracranial haemorrhage is a very common finding observed.

According to the World Health Organization (WHO), deaths related to the head, whether traumatic or non-traumatic, represent about 17% depending on global studies from different countries; in the United States of America (USA) Cerebrovascular diseases represent the third cause of death.[6]

This retrospective study has been undertaken with a view to bring out the various factors in intracranial haemorrhage. The subject has been also chosen to provide an in-depth knowledge about their types, distribution, survival time following trauma, other associated injury, socio- economic status and causes of death. So, this study is aimed at evaluating the case and circumstances of intracranial haemorrhage and to formulate measures to prevent the loss of valuable human life.

MATERIAL AND METHODS: The study was conducted on bodies coming for medico-legal post-mortem examination to mortuary of department of Forensic Medicine, Gauhati Medical College and Hospital during the period of 1st July 2005 to 31st June, 2006. During the span of this study a total of 1923 medico-legal autopsies were performed in this department and out of which 110 cases were selected for the current study. After obtaining the necessary and relevant information about the victim, a thorough and complete autopsy was performed on the dead body, recording the finding on the proforma.

OBSERVATIONS AND RESULTS: A total of 1923 medico-legal autopsies were performed in the Department of Forensic Medicine, Gauhati Medical College, Guwahati during the one year period from 1st July 2005 to 31st June 2006 of this, total numbers of cases having intracranial haemorrhage was 383 constituting 19.97% of the total number of cases. Observations have been made on 110 cases having intracranial haemorrhge in association with injuries on others part of the body. The autopsy has been performed in the mortuary of the department.

Detailed study has been made on the 110 cases and results of observations have been charted out after analysis on the basis of the autopsy finding, etiological and environmental factors and other relevant data collected.

In this present study, the age of the victims varied from 4 ½ to 72 years. The peak incidence was observed in the age group of 21-30 years comprising 33 (30%) cases, which is followed by 20 (18.18%) cases, belonged to the age group of 31-40 years and only 1(0.91%) case in 71-80 years age group.

In this current study males comprised a majority and constituted 96 (87.27%) compared to female who were only 14 (12.73%). The male to female ratio in the study is 6.9:1.

We found in this study that 37(33.64%) victims were businessman, 28 (25.45%) victims were service holder and only 1(0.91%) victim was not engaged in any occupation as the victim was 4 ½ years child and occupation of 2 (1.82%) victims were not known.

The various incidence of intracranial haemorrhge in our study, we found that out of total 110 cases vehicular accidents were responsible for 91(82.73%) cases followed by fall from height for 11(10%) cases and natural cause for 2 (1.82%) cases.

In our present study, we found that out of total 110 cases, 108(98.18%) cases were traumatic and 2(1.82%) cases were natural. Out of 110 cases, 104(94.55%) cases were accidental, 4 (3.63%) cases were homicidal and 2 (1.82%) cases were natural death.

In our current study, we found 55 victims had facial injuries, 106 (96.36%) victims had scalp injuries and 78 cases presented with fracture of the skull. Out of the fractures, the most common fracture was fissured fracture of the vault of the skull with 52(66.67%) cases.

In this present study, intracranial haemorrhage was present in all the cases which are the main clause of the study. Most of the cases presented with subdural haemorrhage in 74(67.28%) cases, 19(17.28%) cases presented with both subdural and subarachnoid haemorrhage and only 1(0.90%) case shows both subarachnoid and intracerebral haemorrhage.

Out of the total 53(48.18%) cases of brain injury encountered in the course of the present study, contusions were the commonest injury present in 23(45.40%) cases, followed by lacerated injury in 10(18.26%) cases. The combination of contusion and laceration consist of 20 (37.74%) cases. Associated injuries in other parts of the body presented in 108 cases. In this current study histo-pathological examination was carried out in 10 cases and slides were made from tissue preserved from brain matter and the meanings which shows intracranial haemorrhages, contusion and laceration at places.

In this present study, survival of a victim after sustaining injury varied from 1 hour to about 11 days. Maximum 25(22.73%) victims survived up to 1-3 days, followed by 20(18.18%) victims survived in 2-4 hours and only 3(2.73%) cases survived for more than one week. In our study, we found that 68(61.82%) victims died within 24 hours, which shows that the first 24 hours of the accident is the most crucial period for management.

In this study, 103(93.64%) cases died due to coma which corresponds to the nature of injuries being studied in this work and 7(6.36%) cases died due to shock and haemorrhage and these were the cases associated with fatal injuries in various parts of the body.

DISCUSSION: A total of 1923 medico-legal autopsies were performed in the Department of Forensic medicine, Gauhati Medical College, Guwahati during the one year period from 1st July 2005 to 31st June 2006 of this, total numbers of cases having intracranial haemorrhage was 383 constituting 19.97% of the total number of cases.

Table-1: Age distribution of the cases.

Group	Age group(in Years)	No. of cases	%
1	0-10	5	4.55
2	11-20	17	15.45
3	21-30	33	30.00
4	31-40	20	18.18
5	41-50	19	17.27
6	51-60	12	10.91
7	61-70	3	2.73
8	71-80	1	0.91
	Total	110	100

In this present study, the peak incidence was observed in the age group of 21-30 years comprising 33(30%) cases and only 1(0.91%) case in 71-80 years age group. Our findings are consistent with the study conducted by Salgado M.S.L. et al, Momochand A and Fimate L, Kumar A et al, Mautaz A et al and Pillay V.V. where the commonest age group to be 21-30 years.[19,13,9,14,16] The present study is variance with the finding of Basu R. et al and R. Ravikumar where maximum involvement in the age group 26-40 years and third decades respectively.[2,17]

In this current study male comprised a majority and constituted 96(87.27%) compared to female who were only 14(12.73%). The male to female ratio in the study is 6.9:1. Similarly, our findings found agreement observed by Mautaz A et al, Momochand A and Fimate L, Salgado MSL et al, Santhiyasekharan BWC et al, Basu R et al and Pillay VV.[14,13,19,20,2,16] The reason for the male majority in this study that male are commonly busy with outdoor activities, travelling between the home and place of work to earn bread for the family, while females remain mainly indoors at the home involved in household work and thereby males are more exposed to trauma especially traffic incident which have been found to be the predominant source of trauma in this study.

We found in this study that 37(33.64%) victims were businessmen, followed 28(25.45%) victims were service holder and only 1(0.91%) victim was not engaged in any occupation as the victim was 4 ½ years child and occupation of 2 (1.82%) victims were not known. Businessmen have to use any kinds of transport even at odd hours in connection with their business and hence they are more exposed to trauma.

Table-2: Incidence of Intracranial Haemorrhage.

Type of Event	No. of Cases	%
Motor Vehicle accident	91	82.73
Homicide	4	3.63
Knocked down or run over by Train	2	1.82
Fall from height	11	10.00
Natural	2	1.82
Total	110	100

In our present study, we found that out of total 110 cases vehicular accidents were responsible for 91(82.73%) cases, followed by fall from height for 11(10%) cases and only 2(1.82%) cases were due to natural cause. Our findings are similar with the study conducted by Liko O et al, Mautaz A et al and Aggarwal G et al but differ from those observed by Freytag E.[10,14,1,8] The high rate of vehicular incidents observed is due to the ever increasing number of motor vehicle in and around Guwahati. The public as well as the drivers are ignorant about the traffic rules and this has resulted in the ever increasing number of traffic incidents.

In our study, we found that out of 110 cases, 108 cases were traumatic and 2 cases were natural. Our findings found consistent with the findings of Mautaz A et al.[14] The commonest nature of death was accidental which comprising of 104(94.55%), followed by homicidal with 4 cases and only 2 cases were natural. Our findings are similar with the study of Mautaz A et al and Aggarwal G et al with 89% deaths due to accidental.[14,1]

Injuries in this present study were grouped under head injuries and associated injuries, with the presence of intracranial haemorrhage being mandatory in all cases. Out of the total 110 cases of intracranial haemorrhage in this present study, associated injuries were observed in almost all the different parts of the body in varying numbers. The study conducted by Aggarwal G et al found that associated injuries were present in 83% of the cases on the body.[1] These findings are slightly similar to our present study.

In our present study, 106(96.36%) victims had scalp injuries and 4(3.64%) cases with no scalp injury at all. The commonest type of injury was contusions which were present in 80(72.72%) cases. Tyagi AK et al reported that scalp injuries to be present in 76% of the cases.[22] Their findings are slightly similar to our study. Our findings are also consistent with the study of Chandra J et al where the commonest scalp injuries were contusions followed by laceration.[4]

In our current study we found that the skull is fractured in 78(70.9%) cases. Out of the fractures, the most common fracture was fissured fracture in 52(66.67%) cases, followed by depressed comminuted fractures in 22(28.21%) cases. The findings of Manish A et al, Mukesh K Goyal et al, Momochand A et al, Roja Rupani et al and Aggarwal G et al found similar to our present study.[11,15,13,18,1.]

Table-3: Types of Intracranial Haemorrhages

Type of Haemorrhage	No. of Cases	%
Extradural Haemorrhage(EDH)	4	3.64
Subdural Haemorrhage(SDH)	74	67.28
Subarachnoid Haemorrhage(SAH)	0	0
Intracerebral only	1	0.90
EDH+SDH	11	10.00
EDH+SAH	0	0
SDH+SAH	19	17.28
SAH+Intracerebral	1	0.90
Total	110	100

In this present study, intracranial haemorrhage was present in all the cases, which is the main clause of the study. In the course of the study, Subdural haemorrhage found in 104(94.54%) cases, out of which 74(67.27%) cases found alone, followed by combination of subdural and subarachnoid haemorrhages in 19(17.27%) cases and intracerebral haemorrhge found only in 2(1.81%) cases. Our study found consistent with the findings of Freytag, Christopher C. Baker et al, R. Ravikumar, Tyagi AK et al and Liko O et al.[8,5,17,22,10] While the study conducted by Fimate L Mautaz A et al and Chandra J. et al found variance with our current study.[7,14,4.]

Out of the total 53 (48.18%) cases of brain injury encountered in the course of the present study, contusions were the commonest injury present in 33(62.26%) cases, followed by lacerated injury in 20(37.74%) cases. The combination of contusions and laceration

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consist of 20(37.74%) cases. The findings of Tyagi AK et al are almost similar to our present study.[22]

In the present study, survival of a victim after sustaining injury varied from 1.10 hours to about 11days, 5(4.55%) victims died within 1-2 hours, 68(61.82%) victims died within 24 hours which shows that the first 24 hours of the accident is the most crucial period for the management and only 3(2.73%) cases survived for more than one weeks. Our present study found variance with the study conducted by Fimate L et al, Sevitt Simon, Chandra J. et al and Tyagi AK et al.[7,21,4,22.] The period of survival has not shown on increase despite the advancement of medical facilities, due to waste of time during the time of incidence and bringing of the victim to casualty. Also with the increase in the average speed of traffic movement, the severity of head injuries is more.

In this present study, 103(93.64%) cases died due to coma which corresponds to the nature of injuries being studied in this work and 7(6.36%) cases died due to haemorrhage and shock with associated fatal injuries in different parts of the body. The findings of Tyagi AK et al and Salgado MSL et al are similar to our present study.[22,19.]

In this current study histo-pathological examination was carried out in 10 cases and slides were made which showed intracranial haemorrhage, contusions, laceration at places.

CONCLUSION: The stress and strains of a modern life takes its own toll in the form of such accidents. Man himself is capable of averting many of the accidents by proper exercise of sanity and self-control. It needs proper education right from the school days about traffic rules and regulations. Improved road conditions as well as proper planning by the concerned authorities will help in further reducing the number of accidents. Moreover, interdepartmental coordination between the different agencies of the government is an utmost necessity. It is well said that this is the 'only epidemic problems which need no vaccination'. Beside the need of setting up of trauma centers at various places, the importance of first aid medical care, prompt ambulance services and provision of immediate treatment at a well equipped hospital with life support techniques will probably save the life of many of the victims of intracranial haemorrhage. Non govt. organizations and an active co-operation of the public will only help in reducing the number of such tragic happening in the future.

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References:

1. Aggarwal G, Aggarwal NK, Verma SK: A profile of head injury (an autopsy study) a personal communication of Avinash in his PG Thesis.
2. Basu R, Nandy A, Mukhopadhyay BB and Majumder BC: Some host factors and seasonal variation in the fatal road traffic accident occurring in old Coroners Calcutta-A Scientific paper in the XIV Annual Conference of the Indian Association of Forensic Medicine, 1992.
3. Caceres JA, Goldstein, JN (August 2012) "intracranial haemorrhage", Emergency Medicine Clinics of North America, 30(3): 77194. Doi: 10, 1016/j.emc.2012.06.003,PMC 3443867, PMID 22974648.
4. Chandra J., Dogra TD., Dikshit PC: Pattern of Cranio-intracranial injuries in fatal road traffic accidents in Delhi, 1966-67, Medical Science & Law 1979; 19(3) 186-190.
5. Christopher C. Baker, Louis Oppenheimer, Boyed Stephens, Frank Lewis and Donald D. Trunkey: Epidemiology of trauma death. The American Journal of Surgery 140: 144-150, 1986.
6. Di Maio VI, Di Maio D. Forensic Pathology .2nd Edition .Boca Raton, FI: CRC Press; 2001, Chapter 6.
7. Fimate L, Chandra S, Dikshit PC: Survival time in relation to consciousness and severity of head injury. Journal of Forensic Medicine & Toxicology 1992, 8:15-19.
8. Freytag E: Autopsy findings in head injuries from blunt forces. Arch of Path. 75:74, 1963.
9. Kumar A, Lalwani S, Agarwal D, Rauti R, Dogra TD: Fatal Road Traffic Accidents and their relationship with head injuries, An Epidemical Survey of 5years; Indian Journal of neurotrauma 2008, 5(2): p 63-67.
10. Liko O, Chalau P, Rosenfeld JV and Watters DA: Head injuries in Papua New Guinea, PNG Medical Journals, 1996; 39(2), 100-104.
11. Manish A, Jyothi NS, Gurudatta SP, Vijayakumar BJ: Fatal head injuries in Road Traffic Accidents in and around Davangeri: A prospective study. Indian Journal of Forensic Medicine and Pathology 2013; 5(2): 61-65.
12. Mant AK: The chapter "Injuries and deaths in motor vehicle accidents" in The Pathology of Violent Injury, Edited by JK Mason, 1978, First edition (pp 1-18)
13. Momochand A and Fimate L: Pattern of Skull Fracture in Road Traffic Accidents, Journal of Medical Society, RMC, 1988.
14. Muataz A, Al-Qazzaz, Mohammad abdul-mohsin Jabor: Medico-legal study of Intracranial causes of death. Egyptian Journal of forensic Sciences. Dec 2014, Vol.4(4): 116-123, doi: 10,1016
15. Mukesh K Goyal, Rajesh Verma, Shiv R Kocher,Shrikant S Asawa: Correlation of CT scan with post mortem findings of Acute Head Trauma cases at SMS Hospital, Jaipur. JIAFM 2010; 32(3); 208-211.
16. Pillay V V: Indian Academy of Forensic Medicine, Scientific article of XIV Annual Conference 1992, Jan 4th - 11th.
17. R. Ravikumar: Patterns of Head injuries in Road Traffic Accidents Involving Two wheelers. An Autopsy study. Journal of Indian Academy of Forensic Medicine.Vol.35, No.4 Oct-Dec 2013: 349-352.
18. Roja Rupani, Anoop Verma, Shiuli Rathore: Patterns of Skull fractures in cases of Head injury by blunt force. JIAFM Vol.35, No.4 Oct-Dec 2013: 336-338.
19. Salgado MSL & Colombage SM: Analysis of fatalities in road accidents. Forensic Science International 1988, 36:91-96.
20. Santhiyasekharan BWC: Study of the injured and the injury pattern in road traffic Accidents. Indian Journal of Forensic Science 1991; 5:63-68.
21. Sevitt Simon: Fatal Road Accidents: British Journal of Surgery, 1969, vol.55 No.7: 481-505.
22. Tyagi AK, Sharma GK,Kumar B: Cranio-Cerebral damage by blunt force impact. Journal of Indian Academy of Forensic Medicine 1986, 1: 24-39.