

Intracranial Hematomas In Fatal Closed Head Injury A Postmortem Study

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Abstract

BACKGROUND: Intracranial hematomas is an important cause of death in closed head injury, autopsy findings is the final way to determine the types ,extent& associated findings of these hematomas.

OBJECTIVE: To compare the incidence of brain pathology as a cause of death in patients with isolated head injury and those with multiple organ injuries.

PATIENT & METHODS: One hundred consecutive bodies who were victims of fatal closed head injury(Group A) in the forensic medicine institute from jan.2004 to jan 2007 were included in this study, in addition a control study (Group B) of 100 consecutive victims of closed head & body injury with overt and non overt head injury signs.

RESULTS: Group A (patients with pure head injury signs)

Fifty five out of one hundred (55%) were having ICH , In which SDH (pure or combined) constitutes 35% of all cases.

In addition 45% were having a brain edema &/or herniation.

Group B (patients with multiple organ injury signs)

The majority 49% were having brain ischemia.

CONCLUSION:

1-ICH are important causes of death in fatal closed head injury in which SDH are a majority in these hematomas.

2-As a non hemorrhagic cause brain edema &/or herniation were a major factor.

3-Multiply body injury showed mainly brain ischemia.

Key words: intracranial hematomas, post mortem, closed head injury.

INTRODUCTION

This work is a postmortem examination to the victims of fatal closed head injury in which the main pathology was an intracranial hematomas in the form of a well defined collection of blood as an autopsy findings

A closed head injury can be defined as an injury with an intact inner skull table.⁽¹⁾

An intracranial hematomas can be classified as

1-Membranous which includes :Epidural,Subdural and Subarachnoid hemorrhage

2-Intracerebral which includes: Intraventricular & Intraparenchymal hemorrhage.⁽²⁾

Brain edema can be divided into two categories:

1-Vasogenic which is caused by breakdown of blood brain barrier & increase extracellular water.⁽³⁾

2-Cytotoxic which is caused increasing intracellular osmoles.⁽⁴⁾

Intracranial hematomas and cerebral swelling may cause the following types of herniation;subfalcine,uncal through the tent ,central through foramen magnum.⁽⁵⁾

PATIENTS AND METHODS

This is a descriptive randomized postmortem data analysis for the victims of fatal injury (pure head injury and multiple organ injury) was conducted at the forensic medicine institute/Baghdad from Jan. 2005 to Jan. 2008 during this period 100 cases were included in this study ,male to female ratio 3.5/1.The patients were divided into age groups of the case.

Group A

Includes 100 consecutive victims of fatal closed head injury ,no overt other system injury was found in this group.Cranial vault was removed by a vibrator saw and the brain with the meninges was inspected macroscopically & sliced 1cm thickness in coronal, sagittal, axial section.

Group B

Includes 100 consecutive victims of fatal multiple organ injuries who were associated with closed head injury.The same method of examination applied to head and whole body.

RESULTS

of group A

Table 1: Age & Gender distribution

Age	No./%	Female No./%	Male No./%
2-10	5	1	4
10-20	11	2	9
20-30	29	9	20
30-40	31	6	25
40-50	11	2	9
50-60	8	2	6
60-67	5	1	4
Total	100	23(23%)	77(77%)

Age extremes; 2,67 years with a medium of 33 years, the peak incidence in the third&fourth decades.

Male to female ratio 3.5-1 , total male 77(77%) total female 23(23%).

Table 2: Intracranial hematomas incidence in fatal closed head injury (group A)

Autopsy	Autopsy	Autopsy
EDH	8	8%
SDH (3 Bilateral)	33	33%
multiple brain contusions	8	8%
SAH	10	10%
IVH (with or without hydrocephalous)	6	6%
Intraparenchymal hematoma	6	6%
Pure brain edema and herniation (DAI)	20	20%
Autolysed brain	6	6%
brain stem contusion	3	3%
Total	100	100%

*table 2 revealed that most of the autopsies had intracranial hematoma of different types as the most frequent cause of death in comparison with other brain pathologies in pure head injured patients.(63%) versus (37%) respectively of which SDH comprises the highest incidence among other source of intracranial bleeding

Table 3: showing cause of injury in group A , 51 out of 100(51%) were caused by ballistic injury

Cause of injury	No.	%
Fall	12	12
RTA	11	11
Assault	26	26
Ballistic injury	51	51

table 3 is the base for the causes of fatal head injury were ballistic injuries comprises the highest frequency.

Table 4: Types of herniation in group A , 24out of 100 (24%) were herniated in which 13out of 24(54%) were uncal type

Types of herniation	No.	% of the total herniated
Uncal	13	54%
Central	6	25%
Subfalcine	3	12%
Tonsilar	2	8%
Total	24	100%

table 4 shows the types of herniation as cause of death in 24 patients with pure fatal head injury. Uncal herniation presents the highest frequency by 54%. While table 5 describes the distribution of multiple fatal organ injuries in age subgroups of decades.

Table 5: group B patients ages

Age	SDH	All cases
2-10	4(80%)	5
10-20	6(54%)	11
20-30	4(14%)	29
30-40	4(13%)	31
40-50	5(45%)	11
50-60	7(88%)	8
60-67	5(100%)	5
Total	35(35%)	100

table 6 shows the autopsy findings in group B patients were brain ischemia with frequency of 49% **stands out** as the most frequent cause of death in this group.

Table 6: Autopsy findings in fatal multiple organ injury (group B)

Autopsy	No.	%
Brain ischemia	49	49
Insignificant membranous hematomas (less than 1cm thickness)	19	19
Brain edema&/or herniation	20	20
Autolysed brain	12	12

DISCUSSION

our study revealed that with regard to the age ,the peak incidence of fatal head injury caused mostly by intra cranial hematoma occurred in the third&fourth decades and that goes with M L Babu, ⁽⁶⁾ who found that the third decades in the most common one for the occurrence of fatal traumatic ICH . Male to female ratio of 3.5/1 was described before.⁽⁷⁾ **with regard to our findings concerning** Intracranial hematomas incidence in fatal closed head injury (group A),Itis clear that ICH constitutes 63 out of 100(63%) of autopsy finding of which SDH with or without heniation constitutes 33 out of the 63 ICH(52.4%)of all ICH. In agreement with Harvey S Levin,⁽⁸⁾ who found that ICH in severe head injury can be up to 88% also In agreement with Fisher B,⁽⁹⁾ Marshal,⁽¹⁰⁾ Zwieneburg-LeeM,⁽¹¹⁾ Arvind Kumer,⁽¹²⁾ who found that SDH constitute up to 50-60% of acute traumatic ICH (fatal). Also goes with Luke Aldo, ⁽⁷⁾ who found that SDH share one third of severe fatal head injury. all these results could be explained when we conjoined them to the causes of the head injury in this group.while in group B brain ischemia was the most common cause of death and may be related to associated injury of major organs that play role in well blood ,oxygen and nutrients supply to the brain (secondary impact injury)

Conclusion

in pure head injured patients primary impact injury in the form of ICH is the most significant cause of death while in patient with multiple fatal organ injuries secondary impact injury stands out as the major constitute of death.

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