

# A Retrospective Comparison of CT scan Findings and Autopsy Findings in Fatal Head Injury Cases

## Keywords

Head injury; Autopsy findings; CT scan report

## Abstract

A head injury is any injury that results in trauma to the skull or brain. The terms traumatic brain injury and head injury are often used interchangeably in the medical literature. All fatal head injury cases subjected for medico-legal autopsy to the Dept of Forensic Medicine, Adichunchanagiri Institute of Medical Sciences, where prior CT Head scan was taken during hospitalization. In the present study, the vulnerable age group was those in the 21-30 years (18 cases) followed by age group of < 20 years (8 cases). In the present study, 26 cases were due to RTA injury and remaining 4 cases were due to fall and assault respectively. In the present study, Of the 30 cases, scalp injuries were noted in 22 cases at autopsy where as CT reported scalp injury in only 28 cases. Of the 30 cases, in 28 cases skull fractures were observed at autopsy but in 30 cases the same was commented upon in the CT scan. It was observed that combination of CT scan findings and autopsy findings is a useful tool for the diagnosis of various kinds of lesions of head injury and thus helps in formulating better policies.

## Introduction

A head injury is any injury that results in trauma to the skull or brain. The terms traumatic brain injury and head injury are often used interchangeably in the medical literature [1]. Because head injuries cover such a broad scope of injuries, there are many causes-including accidents, falls, physical assault, or traffic accidents-that can cause head injuries.

The number of new cases is 1.7 million in the United States each year, with about 3% of these incidents leading to death. Adults have head injuries more frequently than any age group resulting from falls, motor vehicle crashes, colliding or being struck by an object, or assaults. Children, however, may experience head injuries from accidental falls or intentional causes (such as being struck or shaken) leading to hospitalization.

A non-contrast CT of the head should be performed immediately in all those who have suffered a moderate or severe head injury. A CT is an imaging technique that allows physicians to see inside the head without surgery in order to determine if there is internal bleeding or swelling in the brain [2]. Computed Tomography (CT) has become the diagnostic modality of choice for head trauma due to its accuracy, reliability, safety, and wide availability. The changes in microcirculation, impaired auto-regulation, cerebral edema, and axonal injury start as soon as head injury occurs and manifest as clinical, biochemical, and radiological changes [3].

Autopsy is the final procedure of choice for finding out the exact

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## Research Article



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cause of death. In head injuries, diagnosis by clinical and radiological assessment may not reveal the full extent of injuries. In patients who succumb to their illness, autopsy may detect the lacunae in clinical diagnosis and investigation. These autopsy findings are a valuable source of information. This is a unique opportunity to identify the exact cause of death. It may be possible to modify the protocol for care of neurotrauma patients in the prehospital and emergency hospital setting following this study. That is the main purpose of this study.

## Objectives

Comparison of autopsy findings with CT scan findings in fatal head injury cases.

## Methodology

### Source of data

All fatal head injury cases subjected for medico-legal autopsy to the Dept of Forensic Medicine, Adichunchanagiri Institute of Medical Sciences, where prior CT Head scan was taken during hospitalization.

**Study period:** January to December 2018

### Method of collection of data

All fatal cases of head injury subjected for post mortem examination where ante mortem CT scan reports were available were taken up for study. Post mortem examination of each case was carried out as per the standard procedure mentioned in the "Autopsy diagnosis and technique". Further a comparative evaluation of post mortem findings of the head injuries with that of the CT scan report were analyzed.

### Inclusion criteria

Fatal head injury cases with ante mortem CT Head scan reports were included in the study.

### Exclusion criteria

Cases where surgical intervention had led to a gross discrepancy

**Table 1:** Age and Sex distribution of the cases.

Sl. NO.	Age Group	No. Of Cases	Male	Female	Total
1	<20 Years	08	06	02	08
2	21-30 Years	18	12	06	18
3	31-40 Years	07	04	03	07
4	41-50 Years	07	05	02	07

The vulnerable age group was those in the 21-30 years (18 cases) followed by age group of < 20 years (8 cases).

**Table 2:** Etiology of head injury.

Etiology	Number of Cases
RTA	22
Fall from Height	04
Assault	04
Total	30

26 cases were due to RTA injury and remaining 4 cases were due to fall and assault respectively.

**Table 3:** Comparison of scalp injury as in Autopsy and CT scan.

Number of cases	Scalp injury detected at autopsy	Scalp injury detected in CT scan report
30	22	28

Of the 30 cases, scalp injuries were noted in 22 cases at autopsy where as CT reported scalp injury in only 28 cases.

**Table 4:** Comparison of Skull fractures as in Autopsy and CT scan.

Number of cases	Skull fractures detected at autopsy	Skull fractures detected in CT scan report
30	28	30

Of the 30 cases, in 28 cases skull fractures were observed at autopsy but in 30 cases the same was commented upon in the CT scan.

between the CT scan findings and autopsy findings were excluded.

## Results

(Table 1) The vulnerable age group was those in the 21-30 years (18 cases) followed by age group of < 20 years (8 cases).

(Table 2) 26 cases were due to RTA injury and remaining 4 cases were due to fall and assault respectively.

(Table 3) Of the 30 cases, scalp injuries were noted in 22 cases at autopsy where as CT reported scalp injury in only 28 cases.

(Table 4) Of the 30 cases, in 28 cases skull fractures were observed at autopsy but in 30 cases the same was commented upon in the CT scan.

## Discussion

In the present study, the vulnerable age group was those in the 21-30 years (18 cases) followed by age group of < 20 years (8 cases).

According to a study by Mukesh K Goyal, Rajesh Verma, Shiv R Kochar, Shrikant S Asawa where the maximum number of cases i.e. 56 cases (40%) belonged to the age group 21-40 years, followed by below 10-year age group which were 30 cases (30.4%). Main cause of injury was Traffic accident (62%). Among males it is 66% and in females it is 33%. Leading cause of injury among females was fall from height. Males 122 (87.1%) outnumbered females 18 (12.8%) [4].

Kelly C. Bordignon, Walter Oleschko Arruda observed in their

study that highest frequency of Head Trauma occurred in the 21-30 years (25.1%) age group, followed by the age groups 11-20 (21.6%) and 31-40 (17.5%) One thousand three hundred and six (67.3%) patients were male and 654 (32.7%) were female (sex ratio M: F=2:1) [5]. In the present study, 26 cases were due to RTA injury and remaining 4 cases were due to fall and assault respectively.

Observation was made by G Gururaj, Sastry Kolluri where RTA constituted 62%, fall constituted 22% and assault constituted 10% [6].

In the present study, Of the 30 cases, scalp injuries were noted in 22 cases at autopsy where as CT reported scalp injury in only 28 cases. Of the 30 cases, in 28 cases skull fractures were observed at autopsy but in 30 cases the same was commented upon in the CT scan.

In a study done by Mohammad Zafar Equabal, Shameem Jahan Rizvi, Munawwar Husain, V.K Srivastava, Scalp swelling or haematoma was observed in 86.3% of the cases and the CT scan concurred in all cases. It was also the most common CT finding [7].

Sharma R, Murari A in their study observed that amongst skull fractures, 76.3% of them was diagnosed in both CT scan and Autopsy; whereas 23.7% of them remained undiagnosed by CT scan [8].

P. Srinivasa Reddy, B. Manjunatha, B.M. Balaraj observed skull fracture in 48% of the cases at autopsy whereas the same was observed in only 38 % of the cases in the CT scan [9].

Arvind Kumar et al in their study observed that 69.63 % cases of head injury had skull fractures [10].

## Conclusion

It was observed that combination of CT scan findings and autopsy findings is a useful tool for the diagnosis of various kinds of lesions of head injury and thus helps in formulating better policies.

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