

Outcome of Head Injury Patients Based on Computed Tomography (CT) Scan Findings in a Tertiary Care Hospital:- A Cross-sectional Study

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ABSTRACT

Introduction: The major cause of head injury is trauma due to Road Traffic Accidents (RTA). Evaluation of all patients by Computed Tomography (CT) scan improved the diagnosis and tracing the exact location of injury or its after-effect.

Material and Methods: The present study was conducted in emergency department of Rohilkhand Medical College and Hospital (RMCH), Bareilly, UP from January 2014 to December 2015 to evaluate the outcome of the patients admitted because of head injury on the basis of CT scan.

Results: Out of total 452 head injury patients admitted, maximum 39.8% were belonged to the age group of 21-40 years. Maximum 75.9% of the head injury patients were admitted because of cerebral edema, followed by skull fracture (63.3%) and Intra-Cerebral Haematoma (46%). Survival rate observed maximum in Epidural haematoma (80.9%), followed by Pneumocranium (73.7%) and skull fracture (71.7%). Minimum survival rate was observed in Intra-ventricular Haemorrhage (21.7%).

Conclusion: CT scan findings are found to be helpful in detection and precise location of the parenchymal damage of the brain and helpful to evaluate the outcome.

Keywords: Head injury; Road Traffic injuries; Computed Tomography; Survival.

INTRODUCTION

Road Traffic Accidents (RTA) is the Major and leading cause of head injury in teenagers and young adults.¹ Head injury is observed to be the immediate cause of deaths in 25% of acute trauma victims. RTA contributes more than 50% of head injuries and its one of the leading cause of death due to brain injuries.^{2,3} An increasing health problem globally and especially in South-East Asia is Road traffic injury.⁴ Majority of severely injured patients survives with severe disability and few of them spend their rest of life in vegetative state. Computed Tomography (CT) scan found to be very helpful to diagnose patient suffering from head trauma due to its accuracy, reliability, safety and wide availability.⁵ A variety of mechanisms like motor vehicle accidents, falls from heights, assaults and struck of pedestrians by motor vehicles results in closed head injuries. The traumatic brain injures commonly occurs in the presence of additional injuries of other major organ systems but it can also occur alone.⁶

The single largest cause of morbidity and mortality in patients who reach the hospital alive is complications from closed head injuries; it is also applicable to children. Although the mechanisms vary, head injuries are the major cause of mor-

bidity and mortality in childhood trauma victims, accounting for an annual mortality rate of 1 per 1000 in this age group.⁷ Immediate start of therapeutic management of brain injury on the basis of correct diagnosis is found to be helpful in increasing the survival of head injury patients.

The present study was conducted to assess different type of brain injuries following the head trauma and assess the survival rate in different type of brain injuries.

MATERIAL AND METHODS

The present cross-sectional study was conducted in emergency department of Rohilkhand Medical College and Hospital (RMCH), Bareilly, Uttar Pradesh, from January 2014 to December 2015, after taking approval from, the Institutional Ethical committee. 452 head injury patients who were brought to the emergency department, during a period of 2 year, were included in this study, to assess different type of brain injuries following the head trauma and assess the survival rate in different type of brain injuries.

Inclusion criteria

1. Head trauma patients admitted at emergency department, who was conscious and cooperative.
2. Head trauma patients admitted at emergency department, who were unconscious and had cooperative attendants.

Exclusion criteria

1. Patient or attendants non co-operative.
2. Brought dead patients.

Interview schedule: Data was collected on daily basis from emergency department, using a pre-tested semi-structured interview schedule. Data were collected everyday by the candidate either in the casualty or in the wards of RMCH. Where condition of victims was not suitable for the inter-

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view, the relatives or attendants were interviewed. Purpose of the study was explained to each respondent. Nature of brain injury and survival rate was assessed on the basis of reports of CT scan and final outcome of the patients.

RESULTS

The present cross-sectional study was conducted in emergency department of Rohilkhand Medical College and Hospital (RMCH), from January 2014 to December 2015. A total of 452 head injury patient satisfying the inclusion and exclusion criteria were included the study.

As shown in Table-1, out of total 452 head patients, maximum 39.8% belonged to age group 21-40 years, followed by 29.9% from age group of less than 20 years. And only 2% of head injury patients were in age group 60 years and above. Out of total 452, patients of head injury 375 (83%) were males and 77 (17%) were females. Male: Female ratio observed was approximately 5:1.

As per the findings of CT scan, maximum 75.9% head injury patients had cerebral edema, skull fracture was observed in 67.3% patients followed by Intra-Cerebral Haematoma

(46%) and Epidural Haematoma in 30.1% and Intra-ventricular haemorrhage was observed in only 5.1 % cases of head injury(shown in Table 2).

As shown in Table 3, survival rate observed maximum in patients of Epidural haematoma (80.9%), out of total 136 patients having CT findings of Epidural haematoma only 26 (19.1%) expired. Survival rate was minimum in Intra-ventricular Haemorrhage (21.7%) followed by Subarachnoid haematoma (25.6 %).

DISCUSSION

Radiological evaluation of head injuries had undergone dramatic changes since the advent of CT scan, which found to be very helpful in diagnosis and treatment of patients with head injury.

In present study, the maximum 39.8% of patients admitted with head injury belonged to the age group of 21-40 years and 29.9% were less than 20 years. Out of 452 cases of head injury 375 (83%) were males while 77 (17%) were females, with male: female ratio of approximately 5:1. Similar finding were observed by Gupta et al⁸, Bharti et al⁹, Yattoo GH et al¹⁰, Khan MK et al¹¹, Adam M Net al¹², and Malhotra et al.¹³ The main reason for it may be that this age group maximally involved in driving, thus they are more susceptible for the head trauma.

In the present study, on the basis of CT scan report, Cerebral edema was found in 75.9% head injury patients, followed by Skull fracture (67.3%), Intra-cerebral haematoma (46%), Epidural haematoma (30.1%), Subarachnoid haematoma (22.6%), Subdural haematoma (13.7%), Pneumocranium (8.4%) and Intra-ventricular haemorrhage in only 5.1% of head injury patients. Similar observations were reported by Yattoo GH et al¹⁰, Stein SC et al.¹⁴ While Gupta P K et al⁸ observed Cerebral edema in 63.4% head injury patients, followed by Skull fracture (62%), Intra-cerebral haematoma (46.3%), Epidural haematoma (30.4%), Subarachnoid haematoma (28.8%), Subdural haematoma (19.4%), Pneumocranium (12%) and Intra-ventricular haemorrhage in 10.7%.

In present study mortality of patients of head injury observed maximum in Intra-ventricular haemorrhage (78.3%), followed by Subdural haematoma (77.4%) and Subarachnoid haematoma (74.4%), it was observed minimum in Epidural haematoma (19.1%). Mortality observed in Cerebral edema, Skull fractures, Intra-cerebral haematoma and Pneumocranium

Age in Years	Male (%)	Female (%)	Total No. of patients	Percentage
≤20	116(85.93)	19(14.07)	135	29.9
21-40	143 (79.44)	37 (20.56)	180	39.8
41-60	108(84.4)	20 (15.6)	128	28.3
> 60	8(88.9)	1 (11.1)	9	2.0
Total	375(83.0%)	77(17.0%)	452	100

Male: Female= 5:1

Table-1: Age distribution of patients

CT Findings	No. of patients*	Percentage
Cerebral edema	343	75.9
Skull fracture	304	67.3
Intra- cerebral Hematoma	208	46.0
Epidural hematoma	136	30.1
Subarachnoid hematoma	102	22.6
Subdural Hematoma	62	13.7
Pneumocranium	38	8.4
Intra-ventricular Hemorrhage	23	5.1

*Multiple responses

Table-2: Distribution of patients according to CT scan findings

CT Findings	No. of patients*	Survived (%)	Expired (%)
Cerebral edema	343	178 (51.9)	165 (48.1)
Skull fracture	304	218 (71.7)	86 (28.3)
Intra- cerebral Hematoma	208	102 (49.0)	106 (51.0)
Epidural hematoma	136	110 (80.9)	26 (19.1)
Subarachnoid hematoma	102	26 (25.6)	76 (74.4)
Subdural Hematoma	62	14(22.6)	48 (77.4)
Pneumocranium	38	28 (73.7)	10 (26.3)
Intra-ventricular Hemorrhage	23	5 (21.7)	18 (78.3)

*Multiple responses

Table-3: Distribution of head patients according to CT scan findings and its outcome

um was 48.1%, 28.3%, 51% and 26.3% respectively. Similar observation were made by Gupta P K et al⁸, they reported maximum 79% deaths in Subarachnoid haematoma and 78% and 75.7% deaths in Intra-ventricular and Subdural haematoma respectively. Mortality observed by them was, minimum in Pneumocranium (10.9%) and was 24% in Epidural haematoma.

CONCLUSION

CT scan findings are found to be helpful in detection and precise location of the parenchymal damage of the brain and helpful to evaluate the outcome. CT scan with evidence of parenchymal damage is predictive of poor functional outcome; other factors associated with poor outcome are intracranial haemorrhage or haematoma and age.

Early detection of level of injury were helpful in early start of management and surgical intervention, which found to be very helpful in improvement of outcome in head injury patients,

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