



CO-RELATION OF GCS AND CT SCAN FINDINGS IN CASES OF HEAD INJURY

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ABSTRACT

Background: Traumatic brain injury is very common and are one of the main health problems worldwide, currently with a high and increasing incidence, representing an important cause of mortality among adolescents and young adults. According a report by Ministry of road transport and highways in 2017, In India road traffic accidents led to 3 deaths in every 10 minutes and also according to them a total of 4,64,490 road accidents were reported by states and union territories in 2017 causing 1,47,913 deaths and injuries to 4,70,975 persons.

Objectives: To assess the relationship between computed tomography (CT) scan findings and Glasgow Coma Scale (GCS) score with the purpose of introducing GCS scoring system as an acceptable alternative for CT scan for clinical management of brain injuries in head trauma patients.

Study Type And Design: It was a cross sectional study conducted in the department of surgery Rohilkhand Medical College, Patients with acute cranio-cerebral trauma admitted in RMCH, Bareilly from November 2016 to October 2017 Total Patients Were 62.

Result: Using Pearson Correlation formula having GCS and NCCT head findings as two variables correlation coefficient was $r = +.557$ hence GCS and NCCT head findings are found to be moderately correlated. This study concludes that traumatic brain injury is a potential threat in the society predominantly affecting males (79.03%) of 21-30 yrs. of age (20.97%). Thus, this correlation study concludes GCS as an absolute indicator of severity of injury and NCCT head as a gold standard investigation for early diagnosis and prompt management of moderate and severely classified patients of head injury.

KEYWORDS : Glassgow Coma Scale, Ncct Head.

INTRODUCTION:

Head injuries are any trauma to scalp, skull or brain. These injuries can either be minor bumps in skull or serious brain injuries. These brain injuries contribute to death in most of the trauma fatalities and most commonly occurs in age group of 1-45 years.

The World Health Organization have defined Traumatic Brain Injury as an occurrence of injury to the head (arising from blunt or penetrating trauma or from acceleration-deceleration forces) with at least one of the following:

- Observed or self-reported alteration of consciousness or amnesia due to head trauma,
- Neurologic or neuropsychological or diagnoses of skull fracture or intracranial lesions that can be attributed to the head trauma.¹

It is important to determine the cause, impact and intensity of trauma, presence of any neurological symptoms such as convulsion, loss of consciousness, altered sensorium, vomiting and seizures. The initial assessment of a patient with TBI includes the (GLASSGOW COMA SCALE) GCS, data regarding the accident and CT.²

The use of the Glasgow Coma Score is generalized and a common categorization of head injury severity using the score is described in the Advanced Trauma Life Support® Course Manual.

1. Mild GCS 13-15
2. Moderate GCS 9-12
3. Severe GCS ≤ 8

Ever since the advent of CT scan there has been almost 94% reduction in craniotomies for management of acute head injuries. It is rapid and allows identification of surgically treatable lesions as well as diffuse injury. It is indicated for all patients with severe head injury & indicated in mild/moderate head injury in the presence of neurological signs. Non-contrast CT scan is performed using contiguous 5mm slices for the skull base & 10 mm slices for the rest of the brain. Bone and soft tissue CT windows should be examined and if patient is intubated the upper cervical spine should be included in the scan.³

American Congress of Rehabilitation Medicine has formally defined

mild Traumatic Brain Injury which includes at least one of the following:

- Any period of loss of consciousness;
- Any loss of memory for events immediately before or after the accident;
- Any alteration in mental state at the time of accident (e.g. feeling dazed, disorientated or confused); and
- Focal neurological deficit(s) that may or may not be transient;

But where the severity of the injury does not exceed the following:

- Loss of consciousness of approximately 30 minutes or less;
- After 30 minutes, an initial GCS of 13-15;
- Posttraumatic amnesia of not greater than 24 hours.^{4,5} Focus in this study will be given to understand whether on the basis of GCS, physical examination of the patient and early management can improve the overall outcome of the head injury cases and to study any kind of correlation of GCS and head CT scan. The proposal of this study with a single observer classifying the patients according to the GCS and a single radiologist evaluating the CT images, makes the study more peculiar, as possible interobserver variability in the scoring and images description is taken into consideration.

AIM:

To assess the relationship between computed tomography (CT) scan findings and Glasgow Coma Scale (GCS) score with the purpose of introducing GCS scoring system as an acceptable alternative for CT scan for clinical management of brain injuries in head trauma patients.

OBJECTIVES:

1. To observe the overall outcome of head injuries in relation to early resuscitation and early interventions and their effect on mortality.
2. To observe the outcome of a head injury in relation to conservative management.
3. To observe the outcome of a head injury in relation to surgical management

MATERIALS AND METHOD.

STUDY METHOD AND DESIGN:

It was a cross sectional study conducted in the department of surgery Rohilkhand Medical College, Bareilly, U.P. Patients with acute cranio-cerebral trauma admitted in RMCH, Bareilly from November 2016 to October 2017 were included in the study. All these patients were subjected to CT scan head.

STATISTICAL ANALYSIS:

The data was analyzed and the correlation between CT scan findings and the level of consciousness GCS was evaluated using chi square test. Statistical analysis was done using statistical package for social science version 22. The result of variables was expressed in frequency and percentage. Chi square test and Pearson correlation coefficient formula was used to find association between the two variables.

For the purpose of this study 95% confidence interval was chosen and corresponding p- value less 0.05 was taken statistically significant. corresponding p- value less 0.05 was taken statistically significant.

OBSERVATION AND RESULT:

1. Sex: Out of total no. of cases i.e. 62 which were admitted as cases of head injury

- 13(20.97%) were females.
- 49(79.03%) were male
- Male: Female ratio of incidence of head injury was 8:2.

2. Age: In our study commonest age group in incidence of head injury was observed in 21 to 30 yrs.

3. Socioeconomic status: Majority of these patients belongs to the low economical status.

4. Mode of injury: Out of all the head injury cases in this study in the study time period, it was found that majority of head injuries that occurred were due to Road traffic accidents 66.13%. Next most common cause of head injury was Fall from height 17.74% followed by Physical assault which were 16.13% of total cases taken for this study.

5. Loss of consciousness: History of LOC is of utmost importance because longer history of LOC defines the poor prognosis and sometimes grave outcomes. In our study we found 37% of patients had less than 1 hr of unconsciousness where as 8.06% of these patients had more than 3 hrs of unconsciousness.

6. GCS CORRELATION.

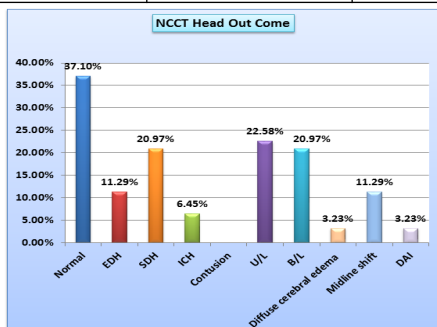
Out of total cases of head injuries in this study it was observed that according to GCS:

- 54.46% of all head injuries were mild.
- 22.58% of all head injuries were moderate.
- 20.97% of all head injuries were severe.

7. Correlation of NCCT and head injury:

TABLE no 1- NCCT Head findings in cases of head injury.

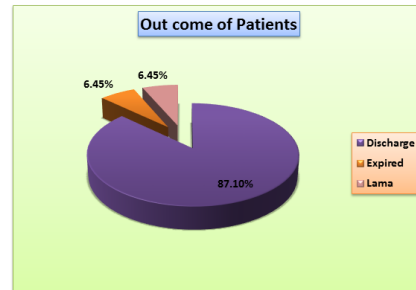
NCCT Head	no of Patients (n=62)	Percentage (%)
Normal	23	37.10%
EDH	7	11.29%
SDH	13	20.97%
ICH	4	6.45%
Contusion		
U/L	14	22.58%
B/L	13	20.97%
Diffuse cerebral edema	2	3.23%
Midline shift	7	11.29%
DAI	2	3.23%



Graph 1 correlation of head injury and NCCT.

8. Outcome of patients.

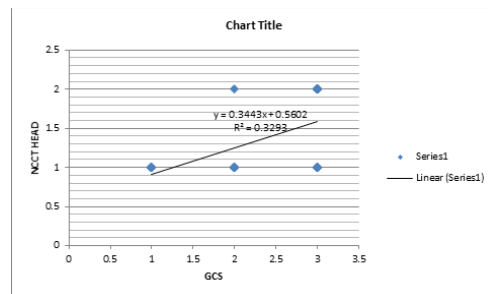
Graph no. 13- Outcome of Patients of head injury.



- 54 cases out of 62 cases of head injury were discharged in satisfactory conditions after management of head injury and were followed up later.
- 4 cases of severe category of head injury got expired during the treatment.
- 4 cases took leave against medical advice (LAMA).

Using Pearson Correlation formula having GCS and NCCT head findings as two variables correlation coefficient was $r = +.557$ hence GCS and ncct head findings are found to be moderately correlated.

Thus, this correlation study concludes GCS as an absolute indicator of severity of injury and NCCT head as a gold standard investigation for early diagnosis and prompt management of moderate and severely classified patients of head injury.



DISCUSSION

Present study was conducted in Rohilkhand medical college and the study found out of total 62 cases of traumatic brain injury 79.03% were males and 20.97% were females. Our study ratio is justified by the fact that in our society, men are the active part and they are more prone to head injury. The study also found that there was a wide range of age groups affected by head injury, but the commonest was the group between 21-30 years (32.26%). Next was age group of 11 to 20 yrs.- 20.97% of total cases were from this age group. It was also observed in the study that age group 31 to 40yrs and 41 to 50yrs had similar incidence of head injury, which corresponds to 12.90% of total cases. Incidence of head injury in age group 1 to 10 yrs. was 11.29% and cases above 50 years of age were only 9.68% of total cases.

Among the total 244 patients, 25% patients had mild, 16% patients had moderate and 59% patients had severe TBI, respectively. The age of patients was significantly associated with the severity of an injury with severe grade, more frequent with increasing age ($P = 0.006$). The mean age of patients with mild, moderate and severe grades of injury were 26, 33 and 35 years, respectively. whereas in our study mean age was 21 to 30.

Farshchian N, Farshchian F, RezaeiM (2012) studied correlation between Glasgow Coma Scale and brain CT-scan findings in traumatic patients and concluded that 385 patients (89.12%) were male. Average age of patients was 25 ± 5 (SD) years. The most common causes of TBI were car accidents (72.9%), violence (20.8%) and fallings (6.27%). 70.13% of patients had mild, 7.8% had moderate and 22% had sever TBI. Of all patients, 79.86% cases had positive brain CT, of which 53.47% had subgaleal hematoma and 28.74% extra-axial hematoma as the most common indications. Findings of this study showed that more than three positive indications including extra-axial, hematoma,

subarachnoid hemorrhage, and hemorrhagic contusion are associated with low GCS scores and moderate or severe TBI. 7

This study found that out of total 62 head injury cases 35 (56.45%) cases were of mild category, 14 (22.58%) cases were of moderate category and 13(20.97%) cases were of severe category. Hryshko FG, Gentry LR, Kalsbeek WD (2014) studied correlation of CT findings with GCS in patient with acute head trauma and concluded that more severe the head injury lesser the GCS score [8].

CONCLUSION:

It was observed that few patients even with mild injury can be subjected to abnormal CT findings. Therefore, careful observation is must for such patients. NCCT head is the gold standard investigation for injuries of moderate severity. Early Operative/conservative management have shown marked improvement in the outcome of patients of moderate severity during the study time. As none was reported as normal head ct in severe GCS category hence not performing a nect head in cases of severe category is a crime. Though mortality rate in this category is much higher than the above two hence only earliest nect head with earliest intervention is the only option to improve the outcome. Therefore, early detection of **SDH, EDH, ICH, CONTUSIONS** by performing ct head became the gold standard management of head trauma, followed by early interventions can prevent the loss of life due to head injury There was significant correlation in GCS Score and History of LOC ($P < 0.001$). Hence it can be concluded that the history of loss of consciousness and GCS assessment can predict the outcome of head injury. This study concluded that a significant P value < 0.001 was found in co-relation between GCS score and Conservative management of head injury cases

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