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Outcome Predictors of Glasgow Coma Scale Score in Patients with Severe Traumatic Brain Injury

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Abstract: Background: - The "Glasgow Coma Scale" is routinely used to assess responsiveness and guide early care for individuals with head injury or severe brain impairment. Severely impaired patients may need MRI, hospitalization for observation, or discharge, which is determined based on Glasgow Coma Scale assessments.
Purpose: - The study's objective is to evaluate that Glasgow coma scale scores are outcome
Methods: - A retrospective study was conducted on 30 patients who visited the outpatient department of Teerthanker Mahaveer Hospital & Research Center, Moradabad. Only TBI patients with a GCS score of 5-8 were included. Patient demographics, physical exams, doctor assessments, medicinal interventions, and health status evaluations were recorded. The study analyzed the correlation between each variable and the GCS score to determine their relationship.
Results: - In total, there were 30 patients; 26 male and 4 female patients, ranging in age from 15 to 45year, were represented. The study has shown that there is a statistically important connection between the GCS and Hematoma and edema (P=.041), Surgery (P=.038), Intubation (P=.043), Hospital rehabilitation (P=.047), Resuscitation (P=.0412), and Epileptic seizures during a stay in hospital (P=.045). However, it is important to note that correlation does not imply causation, and other investigation is necessary to recognize the nature and direction of these relationships.
Conclusion: - The study concluded that GCS can be used as an effective outcome predictor for patients with plain "traumatic brain injury".
Keywords: GCS (Glasgow Coma Scale), TBI Traumatic Brain Injury), Consciousness.

I. INTRODUCTION

"Traumatic brain injury" (TBI), the primary risk factor of incapacity, mortality, & morbidity universally, is responsible for a significant portion of total traumatic mortalities within the US. TBIs are thought to cause 1.5 million deaths annually, whereas hundreds of millions additional require emergency care [1,2]. The percentages of negative outcomes (vegetative state, mortality, and physical damage) following TBI might be higher than 20.3% [3]; however, these rates vary with the cruelty and devices of things like the TBI.

The "Glasgow Coma Scale" (GCS) were industrialized to classify brain injured people based on their level of awareness. In a multicenter investigation of individuals with simple brain injury, this scale was formed mostly to simplify the evaluation &arranging of the grade of brain dysfunction as well as its outcomes [4]. A popular and well-known prognostic predictor for both non-traumatic & traumatic altered consciousness levels is the GCS. It evaluates patients with TBI who exhibit the greatest ocular, motor, & vocal responses [5].

The "Glasgow Coma Scale" is comprised of 3 subscales: "best eye reaction" (E), "best motor response" (M), and "best verbal response" (V) (M). "Glasgow Coma Scale" responses were "graded" on a scale from 0 (no response) to 6, with 0 being no response and 5 being a response similar to opening one's eyes [6,7].Since three is the lowest and 15 is the most, this same total"Coma Score" varies from 3 to 15.

The total of each element's scores makes up the final result. [8,9] In order to assess responsiveness & guide early care for individuals who have experienced a head injury or another sort of severe brain impairment, using Glasgow Coma Scale was routinely utilised.

For individuals that are even more badly impacted, immediate treatment decisions are taken, including such securing their airway and using triage to identify individuals who need to be transported [10,11]. Less severely impaired patients must choose whether they require MRI, should indeed be hospitalized for observation, or they ought to be discharged. Frequent Glasgow Coma Scale assessments are necessary to monitor a patient's overall development and guide therapy adjustments [12].

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II. MATERIALS AND METHODS

A. *Study Design*

The patients who visited our outpatient department of Teerthanker Mahaveer Hospital & Research Center, Moradabad.The study considered were the subject of a retrospective analysis.30 respondents was enrolled in the trial.The patient's demographics, usual physical examinations, the doctor's assessment of the patient's consciousness level, and medicinal interventions were all documented. The patient's state of health was evaluated by an experienced attending physician. GCS assessed the patients' initial consequences. Only TBI patients who had a GCS of 5-8 on field assessment were included. Each case received effective interventions in accordance with the emergency care policy, and the interventions were documented. The study correlated with GCS score of each patient with each variable and found out how much a particular variable is correlating with the GCS score.

B. *Inclusion and Exclusion Criteria*

Included are patients who visited our hospital's outpatient department, adhere to the study protocol, & offer their informed consent. Those who consent to take part in the research voluntarily do so. Individuals with GCS scores of 5-8 and between the ages of 15 and 45 were accepted into the research. of the 30 patients who were a part of the trial overall.

The study did not include patients that failed to adhere to the study protocol, did not complete it, or did not give their consent. The individuals who have been identified confirmed died with in field were left out because of the absence of precise info concerning the cause of death.

C. *Statistical Analysis*

The data were examined using the quantitative application SPSS 25 (Statistical Package with in Social Sciences) (SPSS Inc., Chicago, IL, USA). Descriptive statistics have been collected by them. The significance of the connection between the variables has been examined using Spearman's correlation coefficient (r).The t-test for independent samples was used.Values of p less than 0.05 were considered statistically significant.

D. *Ethical Approval*

The patients' permission has been obtained. The hospital's ethics board has given its clearance of approval to the study's.

III. RESULTS

The medical and socioeconomic details of the study participants are shown in Table 1. With in study, there are 13.3% women and 86.7% men. Vehicle accidents account for 66.7% of the traumatic brain injury causes, 26.7% due to falls and the least is due to gunshots. The major consequence of TBI is contusion of the brain (66.7), then cerebral edema and skull fracture account for 60%. Thirteen percent of patients tested positive for alcohol, eighty-seven percent required intubation, forty percent had multiple injuries, and forty percent were operated on. Patients were given liquids at a rate of 86.7%, while anesthetics and sedatives were used in the treatment of 76.7%. In-hospital pneumonia affected 46.7% of patients (Table 1).

Table 1: patient clinical as well as demographic characteristics

Characteristics	Number	%
Gender		
Female	4	13.3
Male	26	86.7
Etiology of severe TBI		
Fall	8	26.7
Traffic accident	20	66.7
Consequences of severe TBI		

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Subdural hematoma	7	23.3
Cerebral edema	18	60
Subarachnoidal bleeding	15	50
Contusion of brain	20	66.7
fracture of basis	3	10
fracture of skull	15	50
Epidural hematoma	2	6.7
Injury of skin	6	20
Surgery	5	40
Alcohol present in blood	4	13.3
Intubation	10	86.7
Hospital rehabilitation	9	30
Resuscitation	1	3.3
Epileptic seizures during a stay in hospital	5	16.7
Polytrauma	7	
Drugs during hospitals stay or resuscitation		
Analgesics	12	40
Liquids	26	86.7
Relaxants	13	43.3
Anesthetics, sedatives	23	76.7
Antiemetics	1	3.3

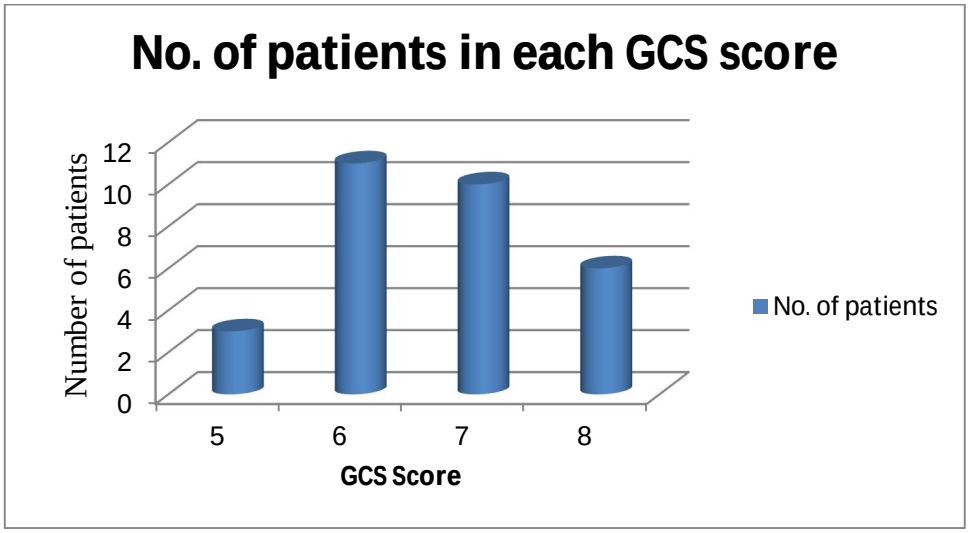


Figure 1: Number of patients in each GCS scores

Table 2 displays the results of a linear regression analysis that examines the relationship between the "Glasgow Coma Scale" (GCS) and various independent variables. The GCS is the main variable and is considered the dependent variable in this analysis. The p-value for each independent variable is also provided, indicating the statistical significance of the relationship between that independent variable and the GCS.The table shows that there are six independent variables that have a statistically significant relationship with the GCS, as indicated by their p-values being less than 0.05. These variables are Hematoma and edema, Surgery, Intubation, Hospital rehabilitation, Resuscitation, and Epileptic seizures during a stay in hospital.

When there is no strong connection between both the variables that are dependent and independent, the p-value represents the likelihood of finding a result as severe as that found in the information. Wherever the p-value is less than 0.05, then the observed link is significantly more likely to have occurred due to chance than to the actual existence of the relationship being tested.Therefore, the study has shown that there is a statistically important connection between the GCS and Hematoma and edema (P=.041), Surgery (P=.038), Intubation (P=.043), Hospital rehabilitation (P=.047), Resuscitation (P=.0412), and Epileptic seizures during a stay in hospital (P=.045). However, it is important to note that correlation does not imply causation, and more research is required to understand the nature and direction of these relationships.

Table 2: Linear regression between GCS and other variables

Main variable	Independent Variable	P-Value
GCS	Age	0.0644
	Hematoma and edema	0.041
	Surgery	0.038
	Intubation	0.043
	Hospital rehabilitation	0.047
	Resuscitation	0.0412
	Epileptic seizures during a stay in hospital	0.045

IV. DISCUSSION

Because to the high death and morbidity rates among survivors, "traumatic brain injury" is a important public health problem. Individuals who suffered serious "traumatic brain injury" were the subject of retrospective cohort research. We documented the attending doctor's assessment of the patient's level of awareness, as well as the patient's demographics, regular physical examinations, and medicinal processes. They used the "Glasgow Coma Scale" as well as the Expanded Glasgow Outcome Scale. The study found that using the standardised inpatient protocol on evaluation, intervention, including outcome tracking will enhance the excellence of behavior for people with severe "traumatic brain injuries" and make it easier for trauma centres to compare their practices [13].

In a pre hospital context, scores mostly on Glasgow Coma Scale (GCS) were regularly used to regulator a patient's level of awareness. Although its predictive value is not completely understood, the field vs. entrance GCS has a massive influence on the use of several prognosis rating systems, including the Trauma Score and the Injuries Severity Score, and also triage and therapeutic possibilities.

The study examines the predictive value of fields GCS (fGCS) as well as arrival GCS (aGCS). The results of the study show that the levels for fGCS as well as aGCS are both closely related to the outcome of TBI. From the field till arrival, a change in GCS is highly prognostic. Even in seriously damaged TBI patients having prehospital intubation, It appears that using field data for TRISS computations is a reasonable methodological approach [14].

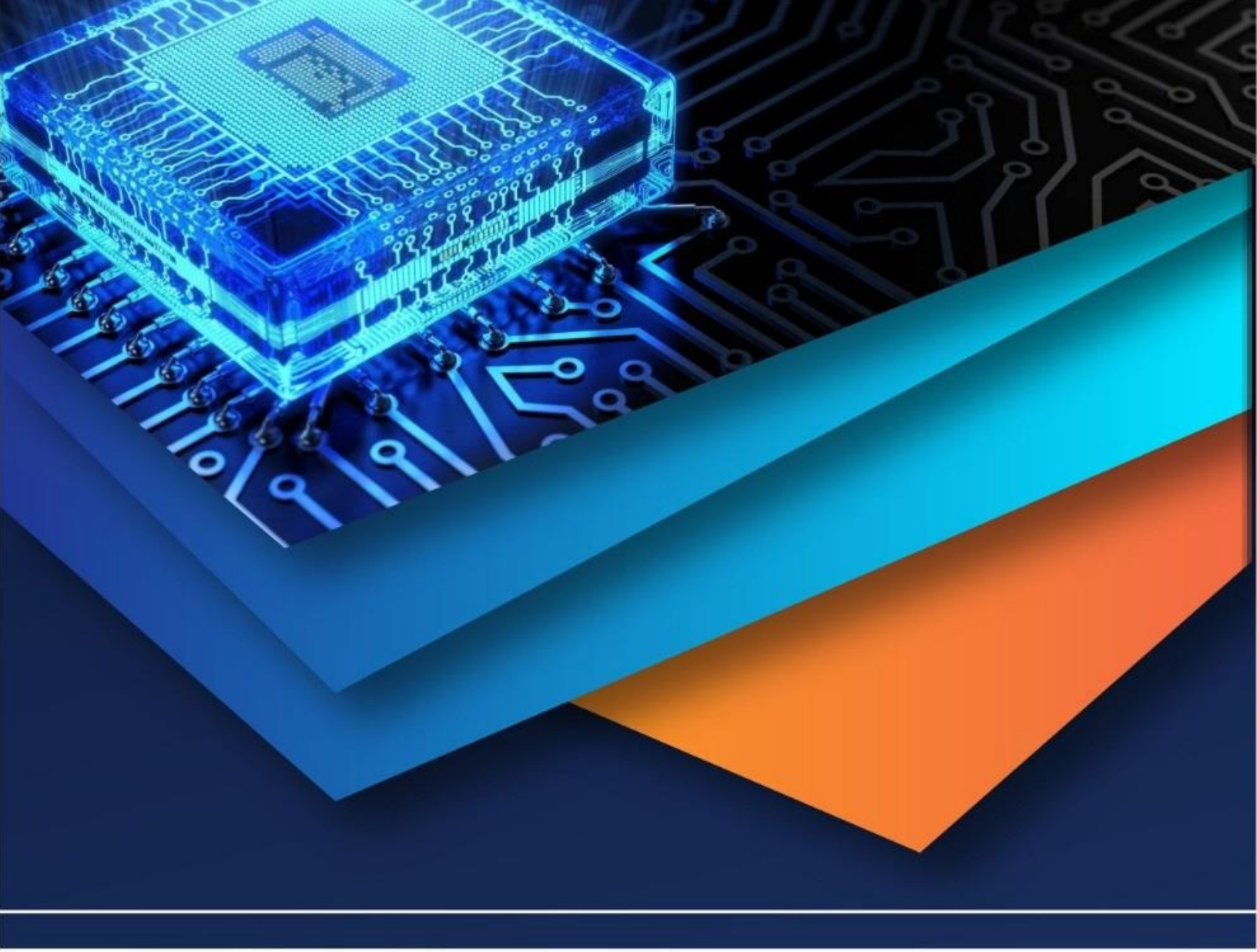
For the treatment of severe traumatic brain damage, early intubation is the norm (TBI). Aeromedical teams along with certain paramedic organisations use rapid sequencing intubation (RSI), which makes intubation easier after TBI. The "Glasgow Coma Scale" (GCS) score is frequently utilized as a diagnostic instrument. To investigate the connection between paramedic GCS and results for individuals with TBI who are obtaining RSI before they get to the hospital, emergency services systematically way included adult major trauma patients with GCS 3–8, which included those who were assumed to have head trauma. In the end, it seems like emergency responders do a good job of figuring out GCS value systems before emergency medicine RSI. Despite the fact that paramedic GCS as well as prognosis are correlated, using this statistic to predict injury severity, airway-related problems, ICU stay duration, and survival rate is difficult [15].

V. CONCLUSION

The study concluded that Glasgow Coma Scale can be used as an effective outcome for patients with "Traumatic brain injury". A sizable proportion of all traumatic losses are caused by "Traumatic brain injury" (TBI), this similar global most public cause for incapacity, humanity, with illness. This Glasgow Coma Scale (GCS) were created to categories brain-damaged individuals according to their level of consciousness. Following falls, automobile accidents are the main cause of TBI .The main consequence of TBI is brain contusion. An understanding of the complexity of interventions which improve long-term outcomes after severe TBI is provided through a decision. This could act as that of the basis for the development of a uniform monitoring, intervention, including outcome-tracking procedure for inpatients. Such a strategy would improve care for patients with severe TBI by encouraging benchmarking between trauma centers and making future comparisons more informative.

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