Original Article

The Value of Early & Post Resuscitation Glasgow Coma Scale in Prediction of Prognosis of Blunt Trauma Patients: A Pilot Study

Changiz Gholipour¹, Samad Shams Vahdati¹, Ali Irandoust², Mehran Jalilzadeh Binazar¹, Mohammad Oliaei Motlagh²
¹Road Traffic Injury Research Center, Department of Surgery, Tabriz University of Medical Sciences, Tabriz, Iran
²Tabriz University of Medical Sciences, Tabriz, Iran

Correspondence
Samad Shams Vahdati, MD, Associated professor of emergency medicine, Road Traffic Injury Research Center, Tabriz University of medical science, Tabriz/Iran.
Tel:00984133352078; Email:sshamsv@yahoo.com

Abstract

Purpose: To assess the prognosis predictive value of the early and post resuscitation Glasgow Coma Scale (GCS).

Methods: In a retrospective pilot study all blunt trauma patients transported alive to emergency departments (ED) of the two referral hospitals in Tabriz were included. The main variable of interest were age, sex, mechanism of injury, associated injury, Pre- and Post-resuscitation GCS and TRISS scores, and injury outcome were recorded.

Results: 200 patients met our inclusion criteria. The mean GCS was 12.42±2.14 in patients with morbidity, 13.02±2.71 among those discharged in well condition and 6.66±3.65 for those who died in hospital. The mean pre- and post-resuscitation GCS were 11.81 (95% CI: 11.36-12.26) and 13.69 (95% CI: 13.24-14.14) P=0.226. Pearson Correlation Test showed relationship between GCS and TRISS as following: pre-resuscitation GCS and TRISS (P: 0.000 r=0.781), post-resuscitation GCS and TRISS (P< 0.001 r=0.882).

Conclusion: We can consider both pre- and post-resuscitation GCS scores as a good prognosis predictor in blunt trauma patients. The higher the pre- and post-resuscitation GCS scores, the better could be the prognosis.

Keywords: Glasgow Coma Scale, Prognosis Predictor, Resuscitation, Injury Epidemiology

Introduction

Trauma or blunt force injury is any injury occurred due to deliberate or unintentional external factors. Trauma, in addition of imposing both direct and indirect social and economical costs to the society, is recognized as the fourth main cause of human death in the world. In the year of 2000, trauma caused more than 6 million deaths in the world [1, 2]. Since trauma mostly affects youth community, therefore, compared to the other factors, causes more working year loss. Moreover, about 40% of all deaths caused by trauma are preventable with taking preventive measures and establishment of a regional trauma registering systems [3, 4].

Although trauma is well known as the leading cause of death and disability in developed countries, however, little attention has been given to its importance in the developing countries [5]. The situation appears to be worsening and according to the World Health Organization and the forecasts of road accidents in 2020, trauma alone, will be the second leading cause of lost years of life throughout the world [6].

In our country about 15% of deaths in 2000 were caused by trauma [1, 2]. Varieties of criteria are available to evaluate trauma patients such as the Glasgow Coma Scale, which was created in 1974 and was clinically used to assess the rate of alterations in level of consciousness [7]. In developed countries this information is collected based on criteria for trauma and trauma injury severity score (TRISS) [8].

Since 1987, the TRISS criteria have been remained a standard predictor of patients’ outcome [9]. Despite it’s usefulness, involvement of anatomy make it difficult to be truly calculated during initial evaluation [10].

Simplicity of GCS scoring has expanded its use in emergency services for triage and making therapeutic decisions [11-14].
Considering the huge impact of trauma on the human and financial resources, research on trauma undoubtedly is one of today’s man’s practical needs [15].

There are so many controversies about prediction value of GCS in trauma patients.

Our aims of this pilot study are assessment of relation between the Pre and Post resuscitation GCS and outcomes of the patients, response to resuscitation and GCS changes, and correlation between GCS and TRISS.

Method
In a retrospective pilot study all trauma patients transported to Imam Reza and Sina hospital emergency departments (ED) within 6 months (during January, 2014 to July, 2014) were included in the study. Exclusion criteria were as follows: penetrating injuries and death on arrival. Patient demographics (age and sex), mechanism of injury, associated injury, Pre and Post resuscitation GCS and TRISS scores, and patients outcome were all recorded. The patients were resuscitated according to the ATLS guidelines and after 6 hours to fully restore and maintain urine output, Shock index >0.8 and O₂sat> 95%.

Finally all the data was analyzed using SPSS 15.0 program. Descriptive analysis for demographic data and Analysis of variance (ANNOVA) test for independent groups was used to evaluate relationship between Pre & Post resuscitation GCS with patients’ outcome, and relationship between response to resuscitation and GCS changes. Pearson Correlation Test was used to evaluate correlation between GCS and TRISS.

Results
A total of 200 patients met our inclusion. The mean age of trauma patients in this study was 34.17 ± 19.33 years of age, the youngest 3 years and the oldest 89 years old. Most trauma patients aged ranging from 18 to 36.

61 patients (30.5%) were female and 139 (69.5%) were male. Type of trauma was a car accident in 22%, 13% roll-over cars, pedestrian accident 16%, 12.5% roll-over of the motorcycle, a motorcycle and car crash 13% and 23.5% were other accidents such as falling from heights, drowning and street fight. Overall 76.5% of the causes were of accidents involving a car. Mortality occurrences among men were 27 and 2 patients among females.

Of all patients, 118 patients (59%) had some degree of morbidity (transferred to other hospitals for further treatment, broken limbs and disability), 29 patients (14.5%) died and 53 (26.5%) were well discharged from the hospital.

The mean GCS in patients with morbidity was 12.42±2.14, in well-discharged ones was 13.02±2.71 and in patients who died was 6.66±3.65.

The mean Pre-resuscitation GCS was 11.81 (CI: 95, 11.36-12.26) and post resuscitation GCS was 13.69 (CI: 95, 13.24-14.14) (P=0.226).

Pearson Correlation Test showed relationship between GCS and TRISS as following: pre-resuscitation GCS and TRISS (P: 0.000 r=0.781), post-resuscitation GCS and TRISS (P: 0.000 r=0.882).

Discussion
Of 200 trauma patients involvement of 139 men versus 61 women indicated the stronger role of male gender in events such as car accidents, falls from height and the street fights. The mean age of 34.17 ± 19.33 and the most frequent events in a range of 18-36 years demonstrates the impact of traumatic events and it’s consequences on the young population. Car accidents accounted for 76.5% of events that revealed a strong role of road accidents in our country.

A significant and very strong positive relationship between pre-resuscitation GCS and TRISS and post-resuscitation GCS and TRISS indicated that we could use GCS as a prognosis predictor just like TRISS.

A significant relationship between pre-resuscitation GCS and prognosis was obvious. Likewise, there was a significant relationship between post-resuscitation GCS and prognosis. Statistical results also suggest that in patients with morbidity or well discharge ones GCS rates were significantly higher than patients who died. So, the higher the GCS score, the better the prognosis.

There wasn’t a significant GCS difference between well discharge patients and patients with morbidity. Despite an increase in GCS scores in response to resuscitation 11.81 to 13.69, there wasn’t a significant relationship between response to resuscitation and patients’ prognosis.

The study of Chamoun et al with a total of 189 patients (157 male and 32 female patients) and the mean age of 36.5 years (range 13–82 years) was similar to our study [16].

Similarly, in Settervell’s et al. Study, of 277 trauma patients 85% were male and 15% female with a mean age of 37.7 years. 19% of patients in study of Settervell and colleagues died with mean GCS of 4 [17]. In our study, the mean initial GCS of patients who died was 6.66±3.65, indicating a poor prognosis in trauma patients with a lower GCS.

Likewise, Bilgin and colleagues in a study of 296 trauma patients in Turkey, 62.8% were males and 37.2% were female with the average age of 36.6 years. In contrast to our study, most visit were of falls from a height of about 50.8% and accidents by 37.9% in the second place, showing that the traffic control and prevention of traffic accidents in Turkey is better than our country. Seven (2.4%) trauma patients in the study died whose GCS was under 5, which represented a significant correlation between arrival GCS and prognosis in patients [18].

In the study of Davis et al. on the appraised value of the scene GCS compared to ED arrival GCS in patients with moderate to severe brain injury concluded that the estimated value of field GCS is much higher than the GCS at ED arrival and both associated with the outcome. Also they stated that the difference between the field and ED arrival GCS is very valuable in estimating the patient’s outcome [19]. Due to lack of a systematic transport program in our country, patients spend much time in the field of trauma that can lead to a bias in the results. Therefore we decided to use pre and post resuscitation GCS scores.

Unlike our study, Pal et al. concluded that GCS score is valuable for estimation of the outcome only until 6 hours of injury [14]. Different from other studies, Udekwu and his
colleagues denoted that calculated GCS before resuscitation is a poor clinical tool for predicting the prognosis and outcome for patients with head trauma [12].

Conclusion

We can consider both Pre and post resuscitation GCS a predictor of prognosis in blunt trauma patients. The higher pre and post resuscitation GCS score, the better prognosis. Patients that admitted to hospital with lower admission GCS despite rapid diagnostic-therapeutic procedure performed in emergency departments of Imam Reza and Sina hospitals finally are discharged with morbidity and mortality, imposing a huge cost to society.

Using GCS as prognosis predictor can help us to distinguish patients with high probability of mortality. So we can priorities their medication, which can decrease the huge impact of trauma in our society.

Limitations

This study has several weaknesses that should be accounted for. Due to the retrospective nature of the study conclusions related to predictive factors of outcome should be taken with caution. Also, small numbers of participated patients made this study a pilot one, which shows necessity of further studies with large number of participants. Furthermore, several patients were lost to follow-up adding to the limitations of the analysis. Consequently a simple statistical analysis (rather than a detailed one) was performed to determine the main factors that appeared to influence the outcome.

Conflict of interest: The authors have no conflict of interest to declare.

Compliance with Ethical Requirements: This study has been approved by Tabriz University of Medical Sciences’ ethics committee and has been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

References