Assessing the relationship between GCS scores and survival of TBI patients: joint modeling of longitudinal measurements and time to incident

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Background: Traumatic brain injury (TBI) is an important public health problem throughout the world.

Objective: This study assesses repeated Glasgow Coma Scale (GCS) scores to predict the severity of TBI and survival of the patients.

Methods: A sample of 239 patients who were hospitalized with traumatic brain injury was selected by random sampling from ICU wards at Shahid Beheshti Hospital in Kashan City from September 2006 to September 2010. The level of consciousness was evaluated using GCS at admission, 6 hours after admission in the ICU, and at the time of discharge from the hospital. Glasgow Outcome Score (GOS) are used to classify global outcomes for TBI survivors. A joint modeling approach was utilized for data analysis using R software.

Results: Mortality risks were significantly higher in older patients (HR = 1.018; P = 0.010). In addition, the results indicated a significant linear increasing trend in GCS values over time (HR = 1.78; P = 0.003). A higher age was also associated with lower GCS values over time (P < 0.001). The severity of TBI decreases with increasing GCS values (P < 0.001).

Conclusion: In general, our findings support the usage of the repeated GCS in predicting and use of repeated GCS in predicting the severity of TBI in survivors.

Keywords: Traumatic brain injuries, Glasgow Coma Scale, Glasgow outcome score, joint model.