Glasgow Coma Scale (GCS)

- Golden hour management in the patient with intraparenchymal cerebral hemorrhage: an Italian intersociety document
- Regional variation in traumatic brain injury patterns, management and mortality: a nationwide Swedish cohort study
- Starting with the End in Mind: Recommendations to Optimize Implementation of a Novel TBI Classification from the 2024 NINDS TBI Classification and Nomenclature Workshop's Knowledge to Practice Working Group
- Evaluating the Machine Learning Models in Predicting Intensive Care Unit Discharge for Neurosurgical Patients Undergoing Craniotomy: A Big Data Analysis
- Incidence, Risk Factors, Microbiology and Outcomes of VAP at an NCU in India: A Prospective Observational Study
- Feasibility of transcription factor EB as a serological metric of poor prognosis following moderate-severe traumatic brain injury: A prospective cohort study
- Factors affecting outcomes following mini-craniotomy evacuation of primary chronic subdural hematoma: a single center retrospective study
- Comparative Effectiveness of Midazolam-Based Sedation on the Need for Intracranial Pressure Lowering Therapies in Traumatic Brain Injury

Glasgow Coma Scale use became more widespread in 1980 when the first edition of the Advanced Trauma and Life Support recommended its use in all trauma patients. Additionally, the World Federation of Neurosurgical Societies (WFNS) used it in its scale for grading patients with subarachnoid hemorrhage in 1988. The Glasgow Coma Scale has since been incorporated into numerous clinical guidelines and scoring systems for victims of trauma or critical illness. This includes patients of all ages, including preverbal children. Additionally, the Glasgow Coma Scale is used in more than 75 countries [1)].

The scale was published in 1974 by Graham Teasdale and Bryan J. Jennett, professors of neurosurgery at the University of Glasgow's Institute of Neurological Sciences at the city's Southern General Hospital [2)].

GCS is used as part of several ICU scoring systems, including APACHE II, SAPS II, and SOFA, to assess the status of the central nervous system. A similar scale, the Rancho Los Amigos Scale is used to assess the recovery of traumatic brain injury patients.

Assessment of a patient's clinical condition, and how it may change, is a cornerstone of care for people with head injury and for those with other kinds of acute brain damage. The Glasgow Coma Scale (GCS) is widely used for this purpose, reflecting its utility in observing a patient's responsiveness, or so-called "consciousness level," and communicating this finding clearly and consistently [3) 4) 5)].

The Glasgow Coma Scale is used to assess 3 aspects of a patient's responsiveness (eye, verbal, and motor responses). Each of these aspects contains information about prognosis [6) 7)].

Soon after the Glasgow Coma Scale was described, the findings of the 3 components were combined in a summary total score, derived from the simple addition of a notation assigned to each of its components [8)].

The GCS score is widely used as an index of "overall" brain damage, which is the most important

feature in distinguishing head injuries of differing severities and in monitoring patient progress and estimating prognosis [9) 10)].

In accord with this, focal indices, such as brainstem features, were not incorporated into the scale and were intended to be assessed separately [11)].

Nevertheless, some clinicians have held the view that more complex scores, which would include extra physiological features, would nevertheless be useful [12) 13) 14)].

The GCS score, together with information about pupil reaction, conveys to the physician most of the clinical predictive information in head-injured patients [15) 16) 17)].

Reliability of the GCS is influenced by multiple factors and as such is context dependent [18)].

Eye response (E)

There are four grades starting with the most severe:

No eye opening

Eye opening in response to pain stimulus. (a peripheral pain stimulus, such as squeezing the lunula area of the patient's fingernail is more effective than a central stimulus such as a trapezius squeeze, due to a grimacing effect).

Eye opening to speech. (Not to be confused with the awakening of a sleeping person; such patients receive a score of 4, not 3.)

Eyes opening spontaneously

Verbal response (V)

There are five grades starting with the most severe:

No verbal response

Incomprehensible sounds. (Moaning but no words.)

Inappropriate words. (Random or exclamatory articulated speech, but no conversational exchange. Speaks words but no sentences.)

Confused. (The patient responds to questions coherently but there is some disorientation and confusion.)

Oriented. (Patient responds coherently and appropriately to questions such as the patient’s name and age, where they are and why, the year, month, etc.)

Motor response (M)

There are six grades:

No motor response

Decerebrate posturing accentuated by pain (extensor response: adduction of arm, internal rotation of shoulder, pronation of forearm and extension at elbow, flexion of wrist and fingers, leg extension, plantarflexion of foot)

Decorticate posturing accentuated by pain (flexor response: internal rotation of shoulder, flexion of forearm and wrist with clenched fist, leg extension, plantarflexion of foot)

Withdrawal from pain (Absence of abnormal posturing; unable to lift hand past chin with supra-orbital pain but does pull away when nailbed is pinched)

Localizes to pain (Purposeful movements towards painful stimuli; e.g., brings hand up beyond chin when supra-orbital pressure applied.)

Obeys commands (The patient does simple things as asked.)

GMS score alone and GCS do not differ in identifying children with serious TBI. Eliminating the eye and verbal components of GCS does not adversely affect the accuracy of this tool to identify children at risk for serious TBI [19].

Because the motor component of the GCS contains virtually all the information of the GCS itself, can be measured in intubated patients, and is much better behaved statistically than the GCS, Healey et al. believe that the motor component of the GCS should replace the GCS in outcome prediction models. Because the m component is nonlinear in the log odds of survival, however, it should be mathematically transformed before its inclusion in broader outcome prediction models [20].

Limitations

Although GCS is of great descriptive value and is one of the strongest predictors of outcome in TBI, early structural pathological abnormalities detected by computerized tomography (CT) may be of similar predictive value [21] [22] [23].

Furthermore, GCS is subject to error resulting from, for instance, alcohol intoxication, sedation and intubation, and inter-rater variability [24] [25].

Strategies for reporting the GCS varied greatly and 35% of participants limited the reporting to a summary score. Moreover, different approaches were used when one of the components could not be assessed. Overall, the surveys have identified a general lack of standardization in assessment and reporting of the GCS. The results illustrate the need for continued education to improve reliability of assessments through guidance to a standard approach [26].

Glasgow Coma Scale Pupils Score

Glasgow Coma Scale Pupils Score.

Paediatric Glasgow Coma Scale

Pediatric Glasgow Coma Scale

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