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Glasgow Coma Scale

Introduction: The Glasgow Coma Scale (GCS) estimates coma severity based on eye, verbal, and motor criteria.

Points & Pearls

- The Glasgow Coma Scale (GCS) allows providers in multiple settings and with varying levels of training to communicate succinctly about a patient’s mental status.
- The GCS has been shown to have statistical correlation with a broad array of adverse neurologic outcomes, including brain injury, need for neurosurgery, and mortality.
- The GCS score has been incorporated into numerous guidelines and assessment scores (eg, Advanced Cardiac Life Support, Advanced Trauma Life Support, Acute Physiology and Chronic Health Evaluation I-III, the Trauma and Injury Severity Score, and the World Federation of Neurologic Surgeons Subarachnoid Hemorrhage Grading Scale)

Points to keep in mind:

- Correlation with outcome and severity is most accurate when applied to an individual patient over time; the patient’s trend is important.
- A GCS score of 8 should not be used in isolation to determine whether or not to intubate a patient, but does suggest a level of obtundation that should be evaluated carefully.
- Reproducibility of the GCS score can be low; if individual institutions have concerns about

agreement between providers, training and education are available online from the GCS creators at www.glasgowcomascale.org.

- Simpler scores that have been shown to perform as well as the GCS in the prehospital and emergency department setting (for initial evaluation); these are often contracted versions of the GCS itself. For example, the Simplified Motor Score (SMS) uses the motor portion of the GCS only. THE SMS and other contracted scores are less well studied than the GCS for outcomes like long-term mortality, and the GCS has been studied as trended over time, while the SMS has not.

Critical Actions

Although it has been adopted widely and in a variety of settings, the GCS score is not intended for quantitative use. Clinical management decisions should not be based solely on the GCS score in the acute setting.

Evidence Appraisal

The Modified Glasgow Coma Scale (the 15-point scale that has been widely adopted, including by the **original** unit in Glasgow, as opposed to the 14-point **original** GCS Scale score) was developed to be used in a repeated manner in the inpatient setting to assess and communicate changes in mental status and to measure the duration of coma (Teasdale 1974).

In the acute care setting, the GCS has been shown to have highly variable reproducibility and inter-rater reliability (ie, 56% among neurosurgeons in 1 study, 38% among emergency department

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Why to Use

The Glasgow Coma Scale (GCS) is an adopted standard for mental status assessment in the acutely ill trauma and nontrauma patient and assists with predictions of neurological outcomes (complications, impaired recovery) and mortality.

When to Use

- The GCS is designed for use in serial assessments of patients with coma from either medical or surgical causes and is widely applicable.
- The GCS is commonly used in the prehospital and acute care setting as well as over a patient's hospital course to evaluate for mental status assessment in both traumatic and nontraumatic presentations.

Next Steps

- The GCS can indicate the level of critical illness.
- Trauma patients presenting with a GCS score < 15 warrant close attention and reassessment.
- A declining GCS score is concerning in any setting, and should prompt airway assessment and possible intervention.
- Conversely, a GCS score of 15 should not be taken as an indication that a patient (trauma or medical) is not critically ill. Decisions about the aggressiveness of management and treatment plans should be made based on clinical presentation and context, and should not be overridden in any way by the GCS score.
- Clinical management decisions should not be based solely on the GCS score in the acute setting.
- If a trauma patient has a GCS score < 8 and there is clinical concern that the patient is unable to protect his/her airway or there is an expected worsening clinical course based on exam or imaging findings, then intubation can be considered.
- In any patient, a rapidly declining or waxing and waning GCS score is concerning and intubation should be considered in the context of the patient's overall clinical picture.

physicians in another). In its most common usage, the 3 sections of the scale are often combined to provide a summary of severity. The authors themselves have explicitly objected to the score being used in this way, and analysis has shown that patients with the same total score can have huge variations in outcomes, specifically mortality. A GCS score of 4 predicts a mortality rate of 48% if calculated 1 + 1 + 2 for eye, verbal, and motor components, and a mortality rate of 27% if calculated 1 + 2 + 1, but a mortality rate of only 19% if calculated 2 + 1 + 1 (Healey 2014).

In summary, the Modified Glasgow Coma Scale provides an almost universally accepted method of assessing patients with acute brain damage. Summation of its components into a single overall score results in information loss and provides only a rough guide to severity. In some circumstances, such as early triage of severe injuries, assessment of only a contracted version of the motor component of the scale, as in the SMS, can perform as well as the GCS and is significantly less complicated. However, the SMS may be less informative in patients with lesser injuries.

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Calculator Creator

Sir Graham Teasdale, MBBS, FRCP

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