Glasgow Coma Scale

Emergency In-Service Lecture

GLASGOW COMA SCALE

Acta Neurochirurgica 34, 45—55 (1976)

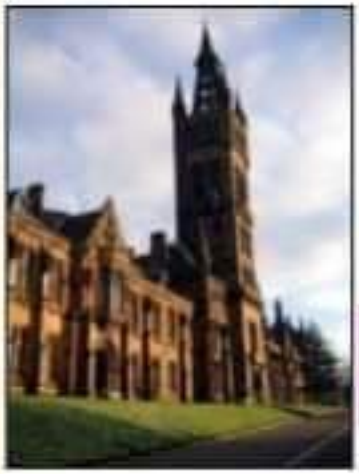
Department of Neurosurgery, Institute of Neurological Sciences, Glasgow, Scotland

Assessment and Prognosis of Coma After Head Injury

By

G. Teasdale and B. Jennett

Graham M. Teasdale



Graham M. Teasdale was Professor and Head of the Department of Neurosurgery, University of Glasgow (1981 to 2003).

What were the main factors in the design of the scale?

The approach should be **simple and practicable**, useable in a wide range of hospitals by staff **without special training**.

GLASGOW COMA SCALE

The Glasgow Coma Scale (GCS) was developed to assess the **level of neurologic injury**, and includes assessments of **movement, speech**, and **eye opening**

This avoids the need to make arbitrary distinctions between consciousness and different levels of coma

Brain injury is often classified as
Severe (GCS ≤ 8),
Moderate (GCS 9–12),
Mild (GCS ≥ 13)

Quick neurologic assessment for
- **Prognosis**
- Victim's ability to **maintain patent airway** on own

Table Glasgow coma scale.

Eye opening	
Spontaneous	4
To loud voice	3
To pain	2
None	1
Verbal response	
Oriented	5
Confused, disoriented	4
Inappropriate word	3
Incomprehensible sounds	2
None	1
Best motor response	
Obeys	6
Localizes	5
Withdraws (flexion)	4
Abnormal flexion posturing	3
Extension posturing	2
None	1

GLASGOW COMA SCALE

The Glasgow Coma Scale has proved a **practical** and **consistent** means of monitoring the state of head injured patients.

In the acute stage, **changes in conscious** level provide the best **indication** of the development of **complications** such as intracranial haematoma whilst the **depth of coma** and its **duration** indicate the degree of **ultimate recovery** which can be expected.

GCS does **not** entail assumptions of specific underlying **anatomical lesions** or **physiological mechanisms**

GCS: CONSISTENCY

Inter-observer consistency has been examined by many investigators and has been shown to be **robust** in a wide, relevant range of circumstances including emergency departments, intensive care units and in pre-hospital care.

However, consistency **cannot be assumed** and **should be confirmed** and enhanced by training and communication between staff.

GCS: HOW SOON ?

In the **acute stage**, the **sooner** an observation is made, the more useful it is as a guide to **predict the ultimate outcome**.

In the acute state where patient's state of consciousness is influenced by remedial disorders – for example hypoxia or hypotension, prognosis have been based upon an **assessment after sufficient time has passed**

Post resuscitation GCS

Post resuscitation GCS usually assess **after 6 hours**, in a well resuscitated patient.

GCS: HOW OFTEN ?

- The shorter the time between an **injury** or other event and the **assessment**, the more the **security about the stability** of a patient's condition.

- Observations at **frequent intervals** are appropriate for example **every few minutes** and at **least several times within an hour**.

- As time passes the frequency can be reduced, and related to whether or not there are reasons for considering the patient needs continuing observation and care.

GCS: HOW MUCH CHANGE MATTER ?

- Questions are asked about the **extent of change** that should take place in order **to trigger action**.
- It may determine transfer to another unit e.g. from a general to a specialist neurosurgical department.
- Again, hard and fast rules are not appropriate.

The general guidance is that it depends upon where the patient is showing **change from** and the **extent of the change**

- Generally significant changes when **total score reduces by 2 points** or **motor response reduces by single point**

There is a greater degree of consistency in the assessment of the motor component of the scale than the verbal and eye features

GCS: RELATIONSHIP BETWEEN THE SCALE AND THE SCORE?

The **total or sum score** (coma score) was initially used as a way of **summarizing** information, in order to make it easier to present group data.
However, the **resulting score** proved a useful and powerful summary of the extent of brain dysfunction and showed a strong relationship with prognosis

When describing an individual patient, especially when communicating with colleagues, it is always preferable to refer to the **responses observed** and **not** to rely upon communication through the **intermediary of numbers** or a **total score**.

GCS: RELATIONSHIP BETWEEN THE SCALE AND THE SCORE?

A major limitation of the total score is the **difficulty to translate the score** into a clear picture of the **patient's actual condition**.
This is particularly a risk in telephone exchanges.

The lowest score is not 0, nor even, 1 but 3

GCS: IS THE TOTAL SCORE 14 OR 15?

It is a result of the differences in the approaches to assessment of **flexion motor responses**

In the **simpler system**, recommended for routine use in patient monitoring, **no attempt is made to distinguish between normal and abnormal flexion**.
This results in a system summing to a total of 14

Distinction between normal and abnormal flexion important in assessing the **significant deterioration from normal to abnormal brain responses** – Important **prognostic factor**

CHILDREN COMA SCALE

Child's Nerv Syst (1988) 4:34–40

GNS
© Springer-Verlag 1988

Head injuries in children under 36 months of age *

Demography and outcome

Yoon S. Hahn, Chiehong Chyung, Martha J. Barthel, Julian Bailes, Ann M. Flannery and David G. McLone

Division of Pediatric Neurosurgery, Children's Memorial Hospital, Northwestern University Medical School, 2300 Children's Plaza, Chicago, IL 60614, USA

The Glasgow Coma Scale (GCS) as an objective assessment of neurological function, is of Limited usefulness in **children under 3 years of age**

One of the components of the Glasgow coma scale is the **best verbal response which cannot be assessed** in nonverbal small children

A modification of the original Glasgow coma scale was created for children too young to talk

PAEDIATRIC COMA SCALE

Table 1. Glascow Coma Scale Modified For Pediatric Patients[59]

Eye Opening Response	< 1 year
4	Spontaneous
3	To shout
2	To pain
1	None
Verbal Response	**0 to 2 years**
5	Babbles, coos appropriately
4	Cries but is inconsolable
3	Persistent crying or screaming in pain
2	Grunts or moans to pain
1	None
Motor Response	**< 1 year**
6	Spontaneous
5	Localizes pain
4	Withdraws to pain
3	Abnormal flexion to pain (decerebrate)
2	Abnormal extension to pain (decorticate)
1	None

Table 4. Pediatric Glasgow Coma Scale For Nonverbal Children.

Eye Opening	
Spontaneous	4
To speech	3
To pain	2
No response	1
Verbal Response	
Coos, babbles	5
Irritable cry	4
Cries to pain	3
Moans to pain	2
No response	1
Motor Response	
Follows commands	6
Localizes pain	5
Withdraws to pain	4
Decorticate flexion	3
Decerebrate extension	2
No response	1

Simpson and Reilly (1982)

CHILD'S GLASGOW COMA SCALE

Table Child's Glasgow Coma scale (BPNA revised 2001) : Always the score is the best response

	> 5 years	< 5 years
Eye		
E4	Spontaneous	
E3	To voice	
E2	To pain	
E1	None	
C	Eyes closed (by swelling or bandage)	
Verbal		
V5	Orientated (in person or place or address)	Alerts, babbles, coos, words or sentences to usual ability (normal)
V4	Confused	Less than usual ability, irritable cry
V3	Inappropriate words	Cries to pain
V2	Incomprehensible sounds	Moans to pain
V1	No response to pain	
T	Intubated	
Motor (arms)		
M6	Obeys commands	Normal spontaneous movements
M5	Localises to supraorbital pain (>9 months of age; thumb beneath medial end eyebrow) or withdraws to touch	
M4	Withdraws from nailbed pain (pressing hard on flat nail surface with the barrel of a pencil)	
M3	Flexion to supraorbital pain (decorticate)	
M2	Extension to supraorbital pain (decerebration)	
M1	No response to supraorbital pain (flaccid)	

British Pediatric Neurology Association

CONCLUSIONS

Although initially described four decades ago, the Glasgow approaches to assessment of initial severity and outcome of brain damage have weathered the test of time.

It remains the standard for acute assessment

Alternatives to and adaptations of the Glasgow Scales have been described. Some of these have clear advantages, for example in relation to children.

GLASGOW SCORE

Score Range

- Extubated: 3 – 15
- Intubated: 3 – 11T

Clinical Presentation

- Normal: GCS =15
- Comatose: GCS ≤ 8
- Dead: GCS = 3

Grading Of Head Injury

- Minor: GCS ≥13
- Moderate: GCS 9 -12
- Severe: GCS ≤ 8

Example report

GCS 9 = E2 V4 M3 at 07:35

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