Closed head injury (Adult) Clinical pathway

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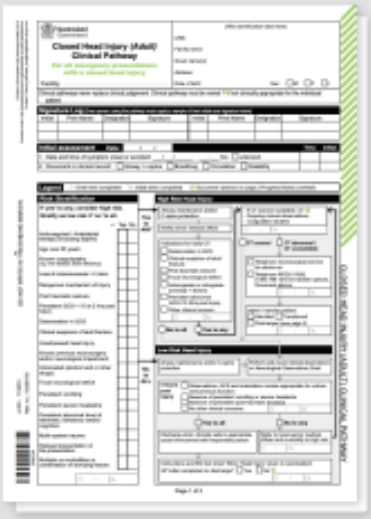

Statewide Neurological Assessment (Adult)

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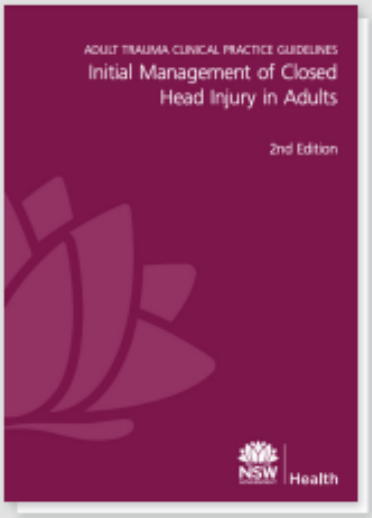
Adult Trauma Clinical Practice Guidelines Initial Management of Closed Head Injury in Adults 2nd Ed.

https://www.aci.health.nsw.gov.au/__data/assets/pdf_file/0003/195150/Closed_Head_Injury_CPG_2nd_Ed_Full_document.pdf



Advantages and disadvantages of the GCS

Advantages

- The most widely recognised of all conscious level scoring systems in the world.
- Reproduceable by well-trained staff.
- Easy to perform with minimal training.
- GCS has “face validity” (i.e. it looks like it should work).
- It has prognostic value: the motor score particularly has a significant impact on the prognosis.
- The motor score findings (2,3,4) have specific pathophysiological correlations.
- It is used to categorise traumatic brain injury into mild, moderate and severe.
- It is used to determine the need for a pressure monitor in a patient with traumatic brain injury in the absence of any CT abnormalities (at a GCS of 8, you’d want an pressure monitor).
- It can be used to indicate a depth of coma at which one’s airway reflexes are likely to become unreliable.
- It has been incorporated into the APACHE-II scoring system.

Disadvantages

- Apart from being confused by the presence of drugs, the GCS has a few important problems.
- When first designed in 1974, it was never meant as an assessment tool for trauma. Teasdale and Jennett even said so themselves.
- It is unreliable in patients in the middle range of 9-12.
- People don’t know how to use it. Only 15% of military physicians were able to calculate it correctly.
- Even when calculated correctly, it has high inter-observer variability: even trained emergency staff get a different score on the same patient in 38% of cases. 6-17% of scores were 2 or more points apart.
- Its inter-observer variability means we should always report the exact findings rather than the number which the patient has scored.
- It is inadequate to assess higher cortical functions, and there may be a lot of variability at the upper range of the score. The delirious person scoring 14 could have a massively impaired cognition, or a mild confusion.
- It is inadequate to assess brainstem reflexes.
    - Therefore, it cannot be used as a trigger for intubation (GCS of 8).
- The eye score is unreliable if the eyes are damaged. Alternatively, it is possible to score an E4 even if one is braindead, provided one’s eyes are open. Intelligence in interpretation is called for, and perhaps because of this the GCS is not ideal as a screening tool among partially trained staff.
- The total score is meaningless.
    - The components are more important individually.
- Depending on the individual component score, the prognosis may be very different for patients with the same total score.
- It is affected by drugs and alcohol.
    - However, it is still used in assessing drug overdose patients.
- It is affected by language barriers.
- Intubation makes a mockery of its verbal component.
- It needs to be modified for use in young children.

Glasgow Coma Scale vs Score

http://www.glasgowcomascale.org/faq/

Scale versus score

The core concept in the Scale is that the patient's eye, verbal and motor responses are described in simple, objective terms in order to convey a clear unambiguous picture of their condition.[1] The allocation of numbers to the steps in the three responses (e.g. E=3, V=4, M=5) was introduced later to facilitate entry of clinical findings into a databank.

The Glasgow Coma Scale Score is produced by adding the numeric values of the three responses into a sum or composite total (e.g. E3, V4, M5 = Score 12).[2] The lowest Score possible is 3, indicating deep coma, and the highest Score is 15, indicating normal consciousness. The other 11 Scores can reflect 118 different combinations of the three responses. Not all of these are clinically realistic.

Although the Score was initially developed to summarise information about patient groups, it became widely used in clinical practice as a 'shorthand' way of communicating the severity of a patient's condition. A widely used classification system stratifies the early severity of head injury into mild (sum score 13–15), moderate (sum score 9–12) and severe (sum score < 8).

Relation between the scale and the score

The contribution of the components of the Scale to the sum score depends on the severity of the patients' condition.[3] In mild head injury the motor score has reached its maximum 'ceiling' effect and changes in the Score result only from changes in verbal or eye responses; in moderate head injury the motor score has a stable value and in severe head injury changes in the sum Score reflect changes only in the motor score.

The findings in each component of the scale and of the sum score both relate to prognosis. Studies of a very large database of 54040 patients[3] showed definitively that taking account of the findings from the components separately yields more information than using only the sum Score. Furthermore, the importance of the components varies according to the sum score, the motor component contributing most information in severe injury, the eye and verbal in mild and moderate injuries.

These findings underline the importance of assessing a patient's impaired consciousness by the three separate clinical responses.

Clinical uses of the Score

The score is commonly used in the construction of clinical guidelines as produced by the Brain Trauma Foundation (severe TBI guidelines)[4], the American College of Surgeons and Centers for Disease for control and prevention (National Trauma Triage Protocol)[5] and the National Institute of Clinical Excellence (Head injury: assessment and early management NICE guideline)[6] for decisions such as transport to a hospital, the need for a head CT, admission to the hospital, intubation, cervical immobilisation, undertaking surgery, and providing air transport.

The Score is included in many clinical stratification and severity prediction scores, such as Acute Physiology and Chronic Health Evaluation (APACHE) II[7], Revised Trauma Score (RTS).[8]
It is a required component of the NIH Common Data Elements for studies of head injury.[9]

Recently the GCS Score and a pupil reactivity score have been combined into a new GCS-P score, with extended information about brainstem dysfunction (More information).[10]

Recommended practice in the use of the scale and score

The Score has limitations. It provides a less complete description of the patient than separate description of the three component responses of the scale. Also, the Score contains less prognostic information.[3] Therefore, in clinical practice the three responses of the Scale should always be described rather than the sum Score alone.

In a minority of patients one or other of the components cannot be tested, usually the verbal response. In clinical monitoring this can be denoted by recording N T. This should not be translated into a value of 1 or zero in calculating a sum score. Methods for estimating the verbal response from the combined information from motor and eye responses have been described.[11]

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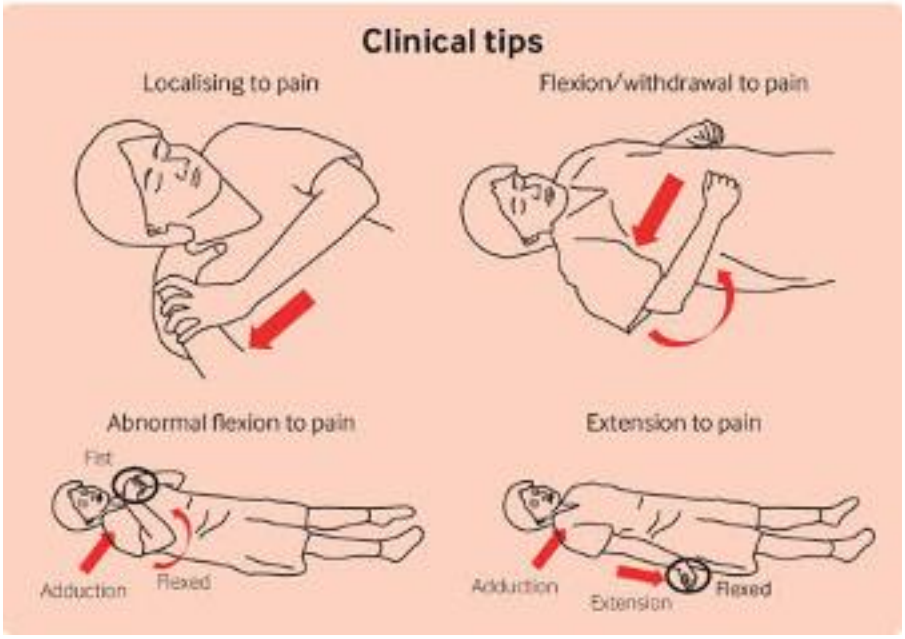
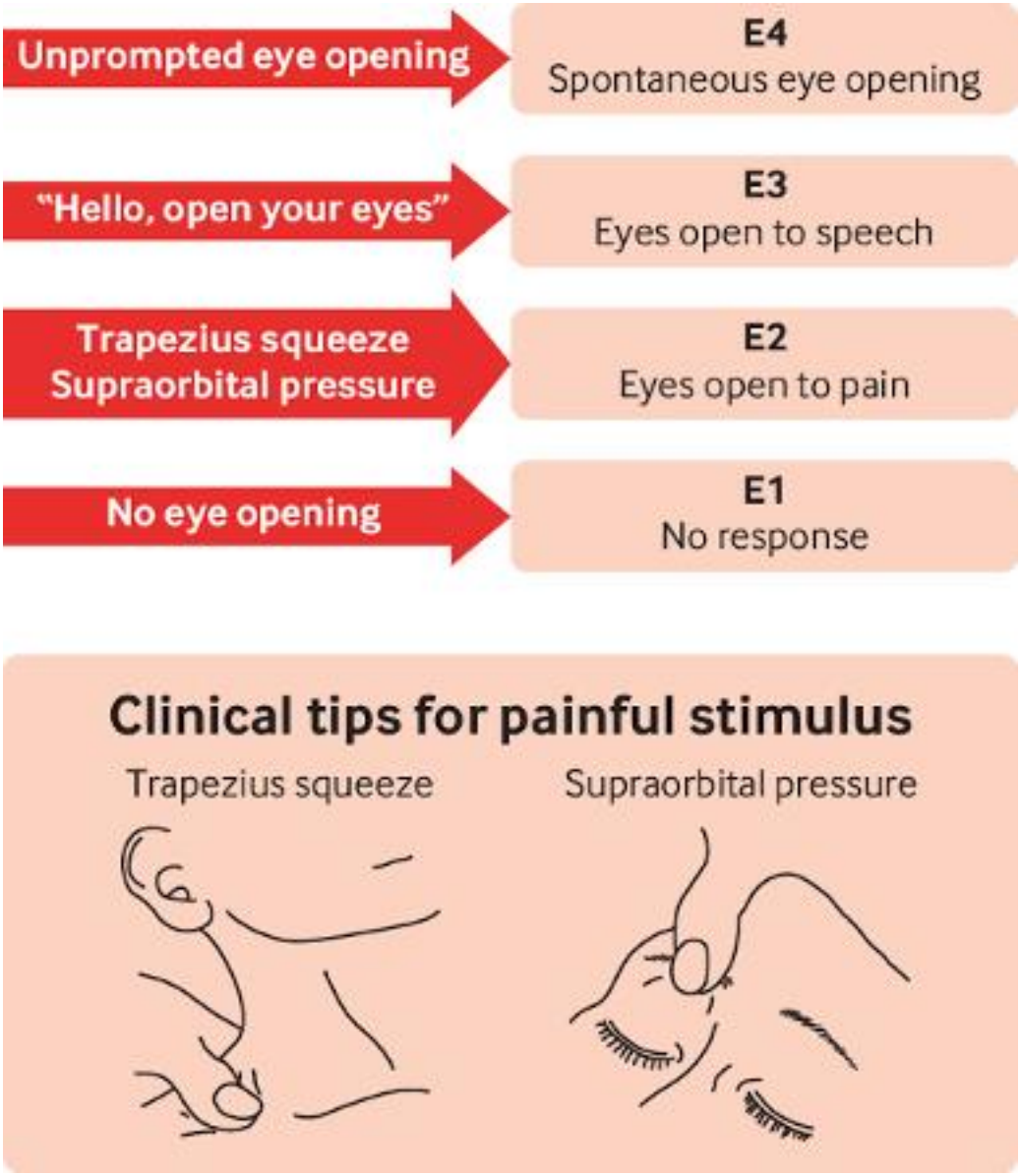
GCS assessment



GCS assessment



GCS assessment

Behaviour	Response	S
Eye opening response	Eyes open spontaneously	4
	Eyes open to verbal command, speech or shout	3
	Eyes open to pain (not applied to face)	2
	No eye opening	1
Best verbal response	Oriented	5
	Confused conversation, but able to answer questions	4
	Inappropriate responses, words discernible	3
	Incomprehensible sounds or speech	2
	No verbal response	1
Best motor response	Obeys commands for movement	6
	Purposeful movement to painful stimulus	5
	Withdraws from pain	4
	Abnormal (spastic) flexion, decorticate posture	3
	Extensor (rigid) response, decerebrate posture	2
	No motor response	1
Total score	Best reponse	15
	Comatose patient	8 or less
	Totally unresponsive	3

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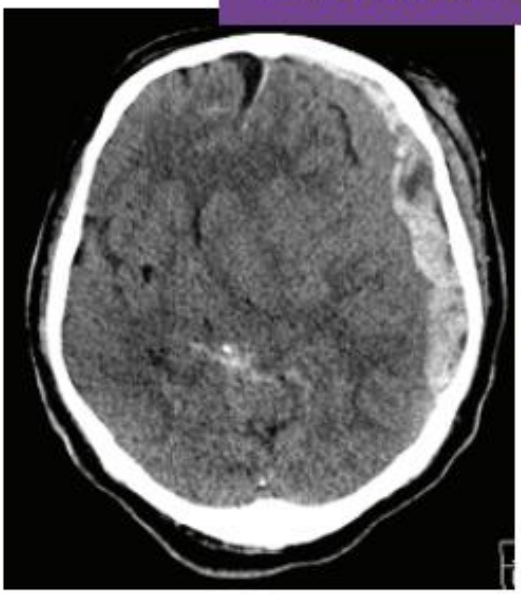
TRAUMATIC BRAIN INJURY

Clinical and radiological features of closed head injury

Subdural haemorrhage



Clinical features

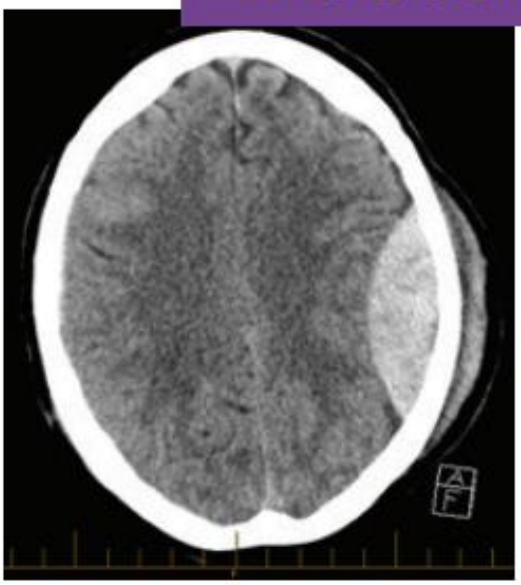
- Associated with trauma - younger patients high velocity, older patients low velocity.
- Confusion/vague neurological symptoms.
- Slower development of symptoms.
- History of anticoagulation use.

Radiological features

- Crescent shaped peripheral collection.
- Not limited by sutures.
- Fills dural reflections (falx cerebri/tentorium).
- Density can be varied (anticoagulants, acute bleed, mixed with CSF).

https://radiopaedia.org/articles/subdural-haemorrhage-summary

Extradural haemorrhage



Clinical features

- Associated with high energy trauma - younger patients.
- Arterial bleed - middle meningeal artery.
- Headache.
- Localising signs.
- Rapid loss of consciousness.

Radiological features

- Associated skull fracture.
- Hyperdense biconvex extra-axial collection.
- Lens (lentiform) or egg-shaped collection.
- Clearly demarcated area between brain and skull.

https://radiopaedia.org/articles/extradural-haemorrhage-summary