



Critique of the Glasgow Coma Scale (GCS)

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Dear Editor,

One of the most critical challenges in patients with consciousness disturbance is determining their outcomes. One of the most important aspects that can evaluate the expected outcomes after nursing interventions is determining the level of consciousness in the ICU patients. Consciousness has two main attributes: Arousal and awareness. Arousal is the ability to experience the periphery and awareness is the ability to understand self-relationship with the world around. Arousal reflects the activity of the reticular activating system and brainstem while awareness indicates the cortex activity. The level of consciousness is evaluated in all patients, except patients who receive sedative or muscle paralyzing agents (1, 2). Different tools have been used to determine the level of consciousness in patients. These include the Ommaya Scale, Glasgow Coma Scale, Comprehensive Level of Consciousness Scale (CLOCS), Rancho Scale, Radar Scale, Scale of Attachment, Glasgow Liege Scale, Coma-Near Coma scale, Clinical Neurological Assessment, and Full Outline of Unresponsiveness (FOUR) score (3, 4). The most famous and valid scale for determining the level of consciousness is the Glasgow Coma Scale (GCS), which was developed in 1974. It includes domains including eye-opening, verbal response, and motor response to verbal and painful stimuli. The score range is between 3 and 15. Score 3 denotes to the lowest level of consciousness indicating severe neuropathic disorder and score 15 indicates complete consciousness and normal response power in the person (5). If a patient demonstrates a meaningful response without provoking the examination, the patient is alert. Hearing stimulus is first used. If the patient does not wake up, a touch stimulus (calm shaking) is used, followed by painful stimuli to receive a response. The central stimuli more represent the brain's function than peripheral stimuli.

The question is whether this criterion is suitable for scientific purposes and from ethical aspects. The limitations of this scale are discussed below.

- Squeezing trapezius muscle or other large muscles may be associated with tissue trauma. On the other hand, the pressure on the upper part of the bone of the eye makes a painful stimulus and one should be careful of any fractures. The use of rubbing sternum is the third method, which may be accompanied by a motor response, but often causes bruising, arising a question that is this a humanistic and moral action?

- In definite nervous disorders such as basicular artery injuries or severe cervical spinal cord injury, the patient may not be able to execute orders at the lower end but is still awake and vigilant.

- A movement response to pain in the lower extremities is often scored as a distraction from the pain or a three-dimensional flexion. In a triple-flexion, a painful stimulus causes ankle, knee, and thigh flexion; in this case, it cannot be differentiated from the distraction from painful stimulus.

- "T" is often used for the verbal score of patients with tracheal tube or tracheostomy. One of the defects in the Glasgow's criterion is the inability to evaluate the verbal response in intubated patients. These patients receive the verbal score of 1. Since the verbal response to these patients cannot be evaluated, the main texts in surgery, neurosurgery, and neurology emphasize 3T to 10T scores in these patients; but at the same time, they suggest that the verbal response be calculated after the intubation. Because no sound is generated by the patient, a mathematical problem occurs: If we give score 1 to verbal response, the minimum and maximum scores of the patient will be 3T and 11T, respectively, and if we want to remove the score of the verb response, they will be 2T and 10T, respectively. Thus, there

is no way to obtain the scores of 3T to 10T, and this problem makes a question for students and even instructors.

- GCS may not be able to detect the exact changes in neurological examinations.

- Abnormal brainstem reflexes change the respiratory patterns, and the need for mechanical ventilation can be a reflection of the intensity of the coma. In addition, the index of brainstem reflex (pupil, cornea, and coughing reflexes) is investigated in the medulla oblongata, pons, and midbrain disorders, and their absence is a criterion for confirming the brain death; but GCS cannot include such clinical implications.

- Scoring on eyes opening in patients with edema and eye trauma is not possible.

However, the comprehensiveness of the Glasgow Coma scale cannot be ruled out in all special departments including the Emergency, CCU, and ICU and the GCS as a standard principle is considered an indicator of traumatic evaluation; On the other hand, it has been ineffective in internal and surgical departments and even may cause inappropriate estimation of severity of the disease. For example, in the case of two patients, one with severe brain damage and GCS = 3 and another with DKA or poisoning and GCS = 3, according to the GCS scores, the outcome is considered the same. This is while in the patient with DKA or poisoning, af-

ter a medical intervention, the GCS will increase in a short time and the patient will return to the pre-existing condition; but the outcome is very different in the case of trauma and brain damage. Therefore, it seems essential for users to consider the limitations of this scale.

Footnotes

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