Using a coma scale to assess patient consciousness levels

21 June, 2005

Nursing Times. net VOL: 101, ISSUE: 25, PAGE NO: 38

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Assessing a patient's level of consciousness is an essential component of a neurological examination, which is usually performed alongside an assessment of pupil size and reaction, vital signs and focal neurological signs in the limbs. The Glasgow coma scale, developed by Teasdale and Jennett (1974), is the most widely used assessment tool for measuring a patient's level of consciousness. It is the method favoured by The Leeds Teaching Hospitals NHS Trust and this article outlines guidelines the trust has developed in order to standardise its practice and to minimise any possibility of misinterpretation.

Methods of evaluation

The Glasgow coma scale is based on three aspects of a patient's behaviour - eye opening, verbal response and motor response (Table 1). A score is applied to each category and then added up to give an overall value ranging from 3 to 15. As well as calculating a total Glasgow coma score (GCS), a score for each of the three components must be calculated and recorded separately. The original Glasgow coma scale included 14 points (Teasdale and Jennett, 1974). Two years later, its authors introduced a distinction between normal and abnormal flexion, increasing the 'best motor response' item by one point (Teasdale and Jennett, 1976). The extra point was introduced because the significance between flexion and abnormal flexion helped in assessing the patient's prognosis. The Leeds Teaching Hospitals NHS Trust uses the 15-point scale. A recent telephone survey of A&E hospitals revealed that some still use the older 14-point scale (Wiese, 2003). Although neither scale is wrong, it is important that actual clinical response is communicated rather than simply giving a number. This enables nurses to work out the GCS whichever scale has been used.

Patient assessment

The following are important points to note when assessing a patient's level of consciousness using the Glasgow coma scale and calculating a GCS:- The arms give a wider range of responses and, for this reason, are always observed using the Glasgow coma scale. Spinal reflexes may cause the arms or legs to flex briskly in response to pain and must not be interpreted as a response;- Always record the best arm response. If the motor response is different on each side, the better response is used;- Responses must be recorded on the patient observation chart in black ink. Changes in neurologic function, pupil response or GCS must be recorded in relevant nursing documentation including the date, time and signature;- As the GCS is an assessment of consciousness level, it cannot be determined accurately in patients

who are receiving anaesthetic agents. Where anaesthesia is being used, neurological assessment should focus on pupil responses;- Some drugs may affect pupillary reaction and the effects of any prescribed medication must be considered when carrying out a pupil assessment;- A GCS can still be determined in a patient who is sedated, although it must be noted that the score obtained might not be an accurate reflection of what the patient is capable of. In neurosurgical intensive care and high-dependency units, a patient's GCS must be assessed at verbal handover or at the beginning of a shift by both nurses (at the same time) in order to avoid misinterpretation and facilitate continuity;- When a patient with an impaired level of consciousness is transferred to another ward or department, such as recovery or ICU, a GCS must be assessed by both the nurse escorting the patient and the nurse receiving the patient (at the same time) in order to avoid misinterpretation and facilitate continuity of assessment;- Although the Glasgow coma scale should be communicated using its individual components, a score from 3-15 may be used to summarise the scale. A deterioration of one point in the 'motor response' or one point in the 'verbal response' or an overall deterioration of two points is clinically significant and must be reported to medical staff.

Assessing eye-opening response

If a patient's eyes are closed as a result of swelling or because of facial fractures, this is recorded as 'C' on the chart. Eye opening is meaningless in these circumstances. Spontaneous eye opening. It is important to exclude the possibility that a patient is asleep before proceeding to assess eye opening. Spontaneous eye opening is recorded when a patient is observed to be awake with her or his eyes open. This observation is made without any speech or touch. Spontaneous eye opening is allocated a score of four. Eye opening to speech. If there is no spontaneous eye opening, eye opening to speech is recorded when a patient opens her or his eyes to loud, clear commands. Eye opening to speech is allocated a score of three. Eye opening to pain. If there is no eye opening to loud clear commands, eye opening to pain can be assessed. This can be recorded if a patient opens her or his eyes to a painful stimulus - finger tip pressure and supraorbital ridge pressure are the two most commonly used methods. While it could be argued that supraorbital ridge pressure could cause patients to grimace and keep their eyes closed, finger-tip pressure could lead to misinterpretation of the eye opening response due to other complicating factors such as hemiparesis and high spinal cord injury. Also, the response elicited by finger-tip pressure might be misinterpreted as a motor response, particularly when the problems associated with 'localising' and 'withdrawing' to pain are taken into account. Eye opening to pain is allocated a score of two. None. A recording of 'none' should be made when no response to a painful stimulus is observed. A complete lack of eye opening is given a score of one. A patient with flaccid ocular muscles may lie with her or his eyes open all the time. This is not a true arousal response and should be recorded as a 'no eye opening' response and allocated a score of one. Such a response should not be documented as spontaneous eye opening.

Assessing best verbal response

If a patient has an endotracheal tube or tracheostomy tube in situ, this is recorded as 'T' on the chart under 'no response' and allocated a score of one. If a patient is dysphasic, best verbal response cannot be determined with accuracy. This is recorded as a 'D' on the chart under 'no response' and allocated a score of one. Orientated. To be classified as orientated, patients must be able to identify:- Who they are;- Where they are;- The month or year. All three components must be identified correctly for a patient to be classified as orientated. Such a patient is allocated a score of five. Confused. A patient is classified as confused when one or more of the above questions are answered incorrectly. A patient who is confused is allocated a score of four. Inappropriate words. A patient is classified as using inappropriate

words when conversational exchange is absent, that is, she or he tends to use single words more than sentences. Swearing is also common. A patient who is using inappropriate words is allocated a score of three. Incomprehensible sounds. A patient is classified as using incomprehensible sounds when her or his words and speech cannot be identified. A patient may be mumbling, groaning or screaming. A patient who is making incomprehensible sounds is allocated a score of two. None. A recording of 'none' should be made when the patient does not respond verbally to verbal or physical stimuli. A lack of verbal response is allocated a score of one.

Assessing best motor response

Obeying commands. A patient's ability to obey commands is assessed by asking her or him to grip and let go of the assessor's fingers (both sides should be assessed). The patient must grip and ungrip to discount a reflex action. If there is any doubt, the patient should be asked to raise her or his eyebrows. A patient who obeys the commands achieves a score of six. Localising to pain. If the patient is unresponsive to verbal commands she or he should be assessed for response to a painful stimulus. It is important to differentiate between localising to pain and flexion to pain: localising is a purposeful response and an indication of better brain function; flexion is not seen as a purposeful response and may be a reflex action. Supraorbital ridge pressure is considered to be the most reliable and effective technique for distinguishing localising from flexion or abnormal flexion as the observed response to this method is less likely to be misinterpreted. A painful stimulus is applied to the supraorbital ridge to stimulate the supraorbital nerve. In the presence of facial fractures or gross eye swelling, pinching the earlobe is more favourable than applying supraorbital ridge pressure. To be classified as localising to pain, a patient must move her or his hand to the point of stimulation, bringing the hand up beyond the chin and across the midline of the body. A patient who is localising to pain is allocated a score of five. Normal flexion response. In a normal flexion response to pain, no localising to pain is seen. This is recorded when, in response to a painful stimulus, a patient bends her or his arms at the elbow. It is a rapid response (likened to withdrawing from touching something hot) and is associated with abduction of the shoulder. A patient who has a flexion response to pain is allocated a score of four. Abnormal flexion. Abnormal flexion is recorded when, in response to a painful stimulus, the patient's elbow flexes. It is characterised by internal rotation and adduction of the shoulder and flexion of the elbow. It is a much slower response than normal flexion and may be accompanied by spastic wrist flexion. A patient who exhibits abnormal flexion to pain is allocated a score of three. Extension to pain. Extension to pain is recorded when there is no abnormal flexion to painful stimulus. A patient presents with straightening of the elbow joint, adduction and internal rotation of the shoulder and inward rotation and spastic flexion of the wrist. A patient who has extension to pain is allocated a score of two. None. No motor response is recorded when there is no response to a painful stimulus. No motor response is allocated a score of one.

Pupil responses

Focal neurological observations are used to localise cerebral disease to a specific area of the brain. Evidence of focal abnormalities may or may not coexist with evidence of diffuse brain function. Pupil size and reaction to light are important neurological observations. Normal pupils are round and equal in size. The average size is 2-5mm in diameter. A millimetre scale is used to estimate the size of each pupil. The shape of each pupil should be recorded. Abnormal pupil shapes may be described as ovoid, keyhole or irregular. Reaction to light. When light is shone into the eye the pupil should constrict immediately. The withdrawal of the light should produce an immediate and brisk dilation of the pupil. This is called the direct

light reflex. Introducing the light into one pupil should cause a similar constriction to occur simultaneously in the other pupil. When the light is withdrawn from one eye, the opposite pupil should dilate simultaneously. This response is called the consensual light reflex. For the purpose of neurological assessment, the size and reaction of the pupils to bright light should be recorded as follows:- If the pupil reacts briskly to light it is documented as '+';- If the pupil does not react to light it is documented as '-';- If the pupil is sluggish in response when compared with the other pupil it is documented as 'S'.A sluggish pupil may be difficult to distinguish from a fixed pupil and may be an early focal sign of an expanding intracranial lesion and increased intracranial pressure. A sluggish response to light in a previously reacting pupil is therefore a cause for concern and must be reported at once to medical staff. Procedure. For the purpose of neurological assessment the following steps should be followed:- The pupils must be observed simultaneously to determine size and equality;- A bright light should be shone into each eye to gauge how the pupils react and the result recorded. Any external light source should first be eliminated if possible;- Pupil responses must always be monitored and recorded in the records of a sedated patient with neurological injury;- The shape of the pupil should be assessed. An ovoid pupil could be an indication of intracranial hypertension. Points to note. Important points to remember when assessing pupil response are:- Pinpoint non-reactive pupils are seen with opiate overdose and pontine haemorrhage;- The parasympathetic nerve fibres of the third cranial nerve (oculomotor nerve) control constriction of the pupil. Compression of this nerve will result in fixed, dilated pupils;- Antimuscarinic drugs cause the pupils to dilate. For example, atropine sulphate eye drops, one per cent, has a duration of action of 7-12 days after topical application. The effects of intravenous atropine sulphate on the pupil are dose-related. Higher doses further dilate the pupil. Effects reverse when therapy is discontinued (McEvoy, 2004);- Non-reactive pupils may also be caused by local damage;- One dilated or fixed pupil may be an indication of an expanding or developing intracranial lesion, compressing the oculomotor nerve on the same side of the brain as the affected pupil.

Conclusion

The Glasgow coma scale provides a practical means of assessing a patient's level of consciousness, which may then be recorded on an observation chart. However, users of the scale will require training to ensure a consistent approach in order to assess and record changing states of altered consciousness reliably. The Leeds Teaching Hospitals NHS Trust's clinical guidelines provide practitioners with practical guidance on how to carry out and interpret each of the three components of the scale in order to standardise practice. This in turn will minimise errors in communication and misinterpretation of clinical findings.- This article has been double-blind peer-reviewed. For related articles on this subject and links to relevant websites see www.nursingtimes.net