


Neurological Assessment: Looking beyond the Glasgow Coma Scale

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The aim of the workshop is to provide an insight into the process of neurological assessment.

Objectives: The delegates will:

- Identify the differences between consciousness and altered consciousness
- Discuss the relationship of the contents of the skull in relation to intracranial causes of altered consciousness
- Debate the usefulness of the GCS for the critically ill
- Identify other observations which will inform the practitioner regarding the broader neurological status of the patient
- Discuss how the neurologically compromised patient could present when developing RICP

What is consciousness?

“Consciousness is a state of awareness of oneself and the surrounding environment and is particularly dependant on the functioning of the reticular activating system (RAS)”

(HICKEY 2002)



Altered consciousness

“An altered level of consciousness can be defined as either a reduction in alertness or an alteration in behaviour”

(Vander et al, 2000)





Causes of altered consciousness

Can be divided into two main categories;

- **Intra cranial – CNS structural abnormalities**
- **Extra cranial – Metabolic imbalances**



Intra cranial causes of altered consciousness

What are the three components within the skull?

- BRAIN TISSUE (80%)
- BLOOD (10%)
- CEREBRO SPINAL FLUID (10%)



Intra cranial

BRAIN

- Tumours
- Haematomas
- Abscesses
- Contusion
- Oedema

CSF

- Hydrocephalous

BLOOD

- Venous obstruction
- Hypoxia
- Hypercapnia



Compensatory mechanisms

Primary

- Displacement of CSF into the spinal SAS
- Decreased production of CSF
- Increased absorption of CSF

Secondary

- Shunting of venous blood
- Reduction in Cerebral Blood Flow
- Reduction in Cerebral Blood Volume
- Reduction in Cerebral Perfusion Pressure



Autoregulation

Maintains the Cerebral Blood Flow despite fluctuations in blood pressure by regulating vascular resistance. Therefore under normal conditions Cerebral Blood Flow will be maintained at a consistent rate.

Autoregulation becomes non-functional when:

- Diffuse cerebral injury
- Sustained ICP > 30mm Hg
- Mean BP < 60mm Hg (CPP compromised)
- Mean BP > 160mm Hg (CPP compromised)

**Dysfunctional autoregulation & Raised ICP =
Cerebral Ischemia**



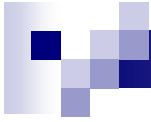
Assessment of conscious level

Glasgow Coma Scale (JENNETT & TEASDALE 1974)

- Assesses conscious level by providing a measurable response to a stimulus

Three responses are assessed;

- Eye opening
- Verbal response
- Motor response



Stimulation continuum

Alert

Unconscious

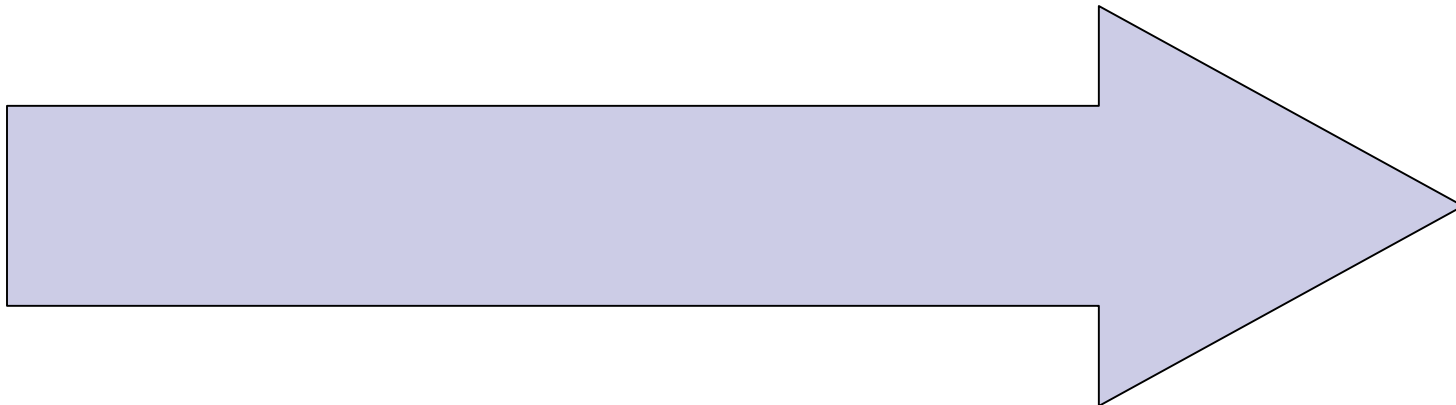
Auditory

Gentle Physical
Stimulus

Painful Physical
Stimulus

Observation

Physical stimulus





Eye opening

Ideally eye opening should be spontaneous or to speech.

What can interfere with eye opening?

- Ptosis
- Peri - orbital oedema

Panda eyes



Best Eye Opening Response

- Spontaneous – 4
- To speech – 3
- To pain – 2
- Nil – 1





Verbal response

Ideally the patient will be orientated to time, place and events.

To get a sensible answer ask a sensible question, in a language commonly understood.

What can interfere with verbal responses?

Expressive and or Receptive dysphasia

Best Verbal Response

- Oriented – 5
- Confused conversation – 4
- Inappropriate words – 3
- Incomprehensible sounds – 2
- Nil - 1





Motor response

Ideally the patient will move all four limbs when Requested – obey commands.

The motor response can indicate how the brain is functioning as a whole.

All limbs are observed, the best response is recorded which is usually the arms

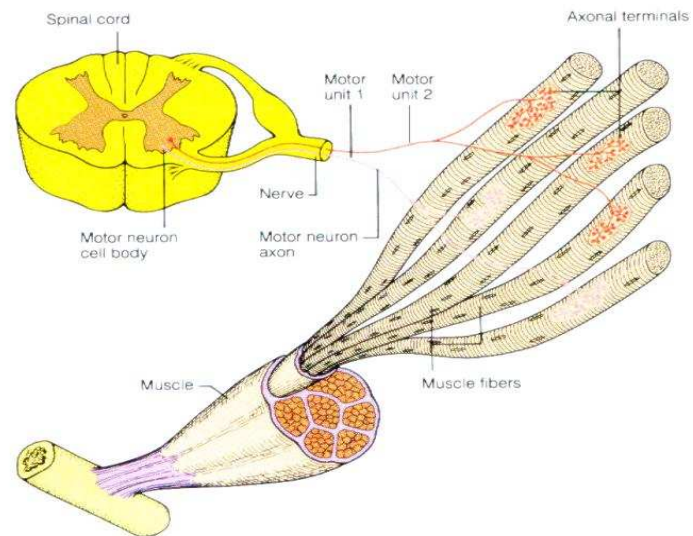
Beware of the grasp reflex, always give two commands.

What can interfere with motor responses ?

Do you know the patients pre admission status ?

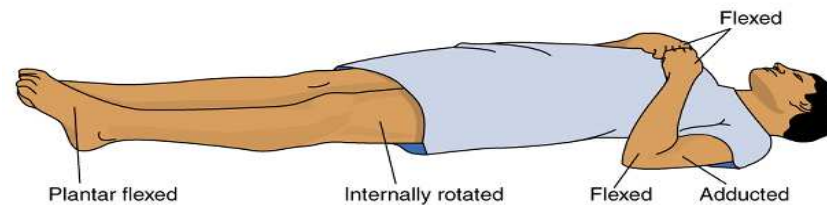
Best Motor Response

- Obeys -6
- Localizes – 5
- Withdraws – 4
- Abnormal flexion – 3
- Extension response – 2
- Nil - 1



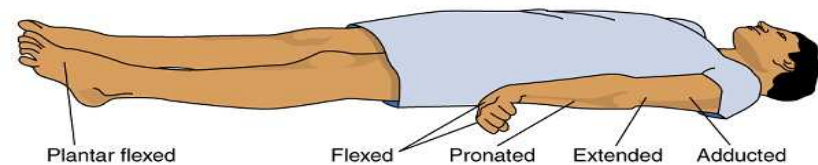
Decorticate Posturing

- Flexed Posturing
 - Flexed arm/elbow
 - Flexed wrists/fingers
 - Adducted arms
 - Legs with internal rotation
 - Foot: Plantar flexed



Decerebrate Posturing -

- Extension posturing
 - Extended arm/elbow
 - Flexed wrist/fingers
 - Adducted arm
 - Pronation of arm
 - Foot: Plantar flexed






What else do you need to assess?

Localising signs

- Pupil response
- Limb power and movement

Clinical signs

- Rise in Blood Pressure associated with Bradicardia
(**Cushings response**)
- Respiratory changes
- Temperature changes



In ITU situations there has to be a greater reliance on the Localising and Clinical signs in the initial management of the patient.


Once the patient is being weaned off the ventilator then the GSC can be used more effectively.

What can be used from the GCS when assessing the ITU patient?

If the patient is sedated or paralysed to facilitate intubation and ventilation then not a great deal!

Pre-ventilation GCS needs to be available for comparison as a base line

Close observation of behaviour patterns when sedation or anaesthetic drugs are being reassessed



Things to consider when conducting a neurological assessment

- **consistency of the observation recording**
- **have faith in yourself**
- **pre admission status of the patient**
 - deafness
 - speech impediments
 - learning disability
 - cultural differences
 - language differences
 - limb weakness
 - unequal pupils
 - non - reactive pupils
 - glass eyes
 - pre existing medical conditions



Painful stimuli

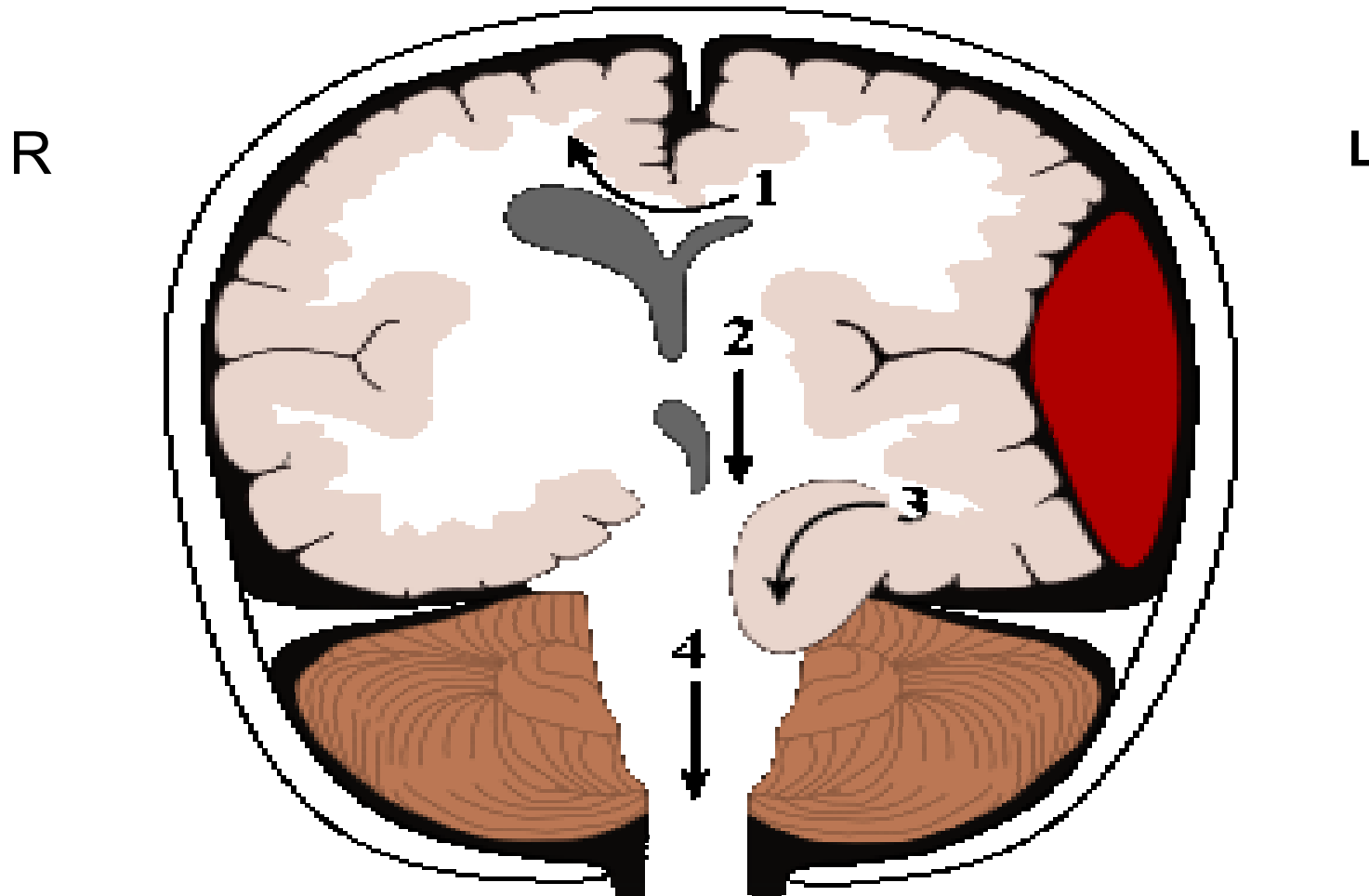
Peripheral

Will tend to give a spinal reflex only

Central

A response to this type of stimulus implies that the neurones within the RAS and connecting neurones are functioning to some extent

Tentorial Herniation





Other assessment tools

The AVPU scale

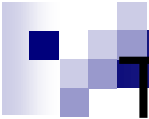
- A –alert
- V –responds to Voice
- P –responds to Pain
- U -unresponsive



Other assessment tools

Encephalopathy Grades

- 0 – normal awareness
- 1 – mood change, confusion
- 11 – drowsiness, inappropriate behaviour
- 111 - stuprose but rousable
- 1V – unrousable to minimal stimuli or no response to noxious stimuli
(decerabrate or decorticate posturing)



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