Neurological Assessment

PACR 2011

Objectives

- Consider History questions that are relevant to the neurological system
- General Introduction to and anatomy of the Central and peripheral nervous systems
- Understand the principles and the clinical application of testing:
  - Higher Cortical Function
  - Cerebellar function
  - Cranial Nerves
  - Peripheral Nervous System

History

- Presenting complaint (OLDCART)
- Witness History
- Past Medical History
- Drug History (incl. allergies)
- Family History
- Social History
- Occupational Hx
- Travel Hx

History taking in neurology

- Headache
- Weakness
- Parasthesia/altered sensation
- Faints/fits/LOC
- Vertigo vs. “dizziness”
- Gait problems
- Visual disturbance
- Deafness
- Speech
- Confusion
- Tremor and involuntary movements
- Personality changes

Nervous System

- Central Nervous System
  Brain and spinal cord
- Peripheral Nervous system
  Peripheral nerves and autonomic nerves

CNS

- Processing centre
- Co-ordinates ‘lower’ functions like respiration rate, temperature, hunger, coordination & balance (unconscious)
- Cerebrum - Higher functions like movement, thinking, emotions
- Upper motor neurons transmit information within the CNS

PNS

- Picks up information from environment (sensory, afferent)
- Transmits it to the CNS
- Carries out the commands of the CNS (motor, efferent)
- Lower motor neurons transmit information outside the CNS
The CNS and testing can be divided into three parts:

- **Cortex** - Higher function testing
- **Cerebellum** - Balance and coordination tests
- **Cranial Nerves** - Facial/neck function.

### Beginning your CNS exam

- **Alert and Orientated?** (Time, Place, Person)
- **AVPU?** (Alert/Verbal/Pain/Unresponsive) remember. ‘P’=GCS 8=Coma/airway trouble!
- **Glasgow Coma Score (GCS)?**

### What is the GCS of these cases?

- 20 year old, alert and talking to you however appears confused at times, unable to follow simple instructions and keeps wandering off.
- 60 year old who has her eyes closed, but wakes when softly spoken to. She is agitated and keeps calling out for her husband. Only appears to be aware of you when you touch her arm, when she pulls away and shouts for help.

### GCS continued.

**Glasgow Coma Scale for Head Injury**

- Eye opening
- Motor response
- Verbal response

<table>
<thead>
<tr>
<th>Eye opening</th>
<th>Motor response</th>
<th>Verbal response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spontaneous</td>
<td>Extremes, $-$</td>
<td>None</td>
</tr>
<tr>
<td>$-$</td>
<td>$-$</td>
<td>Confused</td>
</tr>
<tr>
<td>$-$</td>
<td>$-$</td>
<td>Incomprehensible sounds</td>
</tr>
<tr>
<td>$-$</td>
<td>$-$</td>
<td>None</td>
</tr>
</tbody>
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**Questions and conditions for one point each:**

- 1) age - must be correct
- 2) time, without looking at a timepiece, correct to the nearest hour
- 3) 42, West Street - given as a test of immediate memory and retested at the end
- 4) month - must be exact
- 5) year - exact, except in Jan or Feb when last year is OK
- 6) name of place, or type of place or town (“in hospital” is insufficient (1))
- 7) date of birth - exact
- 8) start of WWI, exact - 1914
- 9) name of the present monarch
- 10) counting backwards from 20 to 0, can prompt to 18 and patient may self-correct or hesitate

### Abreviated Mental test

Check the address.
Mental Health Issues?

- SAD persons score
- Becks Suicide Intent Score
- Edinburgh Risk of Repetition Scale
- Risk Assessment Matrix

- How do you assess MH in your practice?

Specific Higher Function Tests

- Specific ‘higher’ or cerebral function testing ‘Arm drift’ (Pronator drift)
- Ask the patient to close their eyes and outstrecth their arms with palms facing uppermost and fingers extended.
- Then push down the arms
- The arms should come back to original position.

- Point localization – their finger from their nose to your finger which will move position.
- Stereognosis – ability to recognize an object in the hand with eyes closed
- Graphaesthesia – ability to recognize a number drawn on hand with eyes closed
- Sensory inattention – don’t blink when it appears you are going to hit them
- Calculating sums – subtracting 7 from 100 and repeating down

Assessing cortical function: choose one and learn it well

Testing for Cerebellar problems think ‘DANISH’

- D – Dysdiadokokinesis ['poor coordination'] Test rapid alternating movements Finger Romberg’s Test – eyes close – no sway
- A – Ataxia Gait – heel to toe test
- N – Nystagmus Cardinal gaze test (CN testing)
- I – Intention Tremor Finger to Nose test
- S – Slurred Speech
- H – Hypotonia PNS testing

Cranial Nerve testing

<table>
<thead>
<tr>
<th>Cranial Nerves</th>
<th>VII</th>
<th>Facial</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Olfactory</td>
<td>VIII</td>
<td>Vestibulocochlear</td>
</tr>
<tr>
<td>II Optic</td>
<td>IX</td>
<td>Glossoharyngeal</td>
</tr>
<tr>
<td>III Oculomotor</td>
<td>X</td>
<td>Vagus</td>
</tr>
<tr>
<td>IV Trochlear</td>
<td>XI</td>
<td>Accessory</td>
</tr>
<tr>
<td>V Trigeminal</td>
<td>XII</td>
<td>Hypoglossal</td>
</tr>
</tbody>
</table>
Olfactory - I

- Rarely Tested – only if Maxillary facial injury or new ‘anosmia’
- Test with reproducible strong smell. Eg. Coffee

Optic Nerve II

- Fundoscopy
- Pupil Reactions (combination of II and III)
- Peripheral Fields
- Visual Acuity

- Set opthalmoscope to ‘brightest, whitest light’
- Set magnifier to ‘0’ and remove own glasses if needed.
- Find ‘red eye’ reflex
- Move slowly towards patient from 20 degrees in toward nose
- Rt eye to Rt eye/Lt eye to Lt eye

Visual Fields CN II

- Sit/stand opposite-no more than a metre away
- Cover opposite eyes
- Bring in hand slowly from 1,3 and 5 o’clock and then 6, 9 and 11 o’clock.
- Register when the patient sees your hand-it should be the same time as the examiner-discrepancy means moving either closer or further away.

Pupillary reflexes are a combination of the second and third nerves Optic Nerve II and III Occulomotor.
**Optic Nerve II**

- First figure is distance from chart in metres
- Second figure is distance in metres that the normal eye should read the number (less than 6/60 is legally blind!)
- Corrective lenses should be worn.

**CN III**

- Tested by pupil response (periorbital slide)
- Observe for ptosis (innervates eyelid) muscle
- Test by eye movements ('H' test)

**Range of Eye Movement (ROEM)**

III – oculomotor – controls muscles that move the eye except
IV – trochlear – superior oblique mus – looks down and out
VI – abducent – lateral rectus mus – looks laterally

Ask the patient to follow your finger with their eyes
For each eye perform a 'H' figure and make sure that each eye follows all aspects of the shape
Ask the patient if they see "double" anywhere – it’s often a clue as to a muscle problem

**III, IV and VI – Cardinal Gazes**

**Trigeminal CN V**

- Lightly touch each area ensuring you cover each branch!
- Alternate where you touch.
- Ensure patient’s eyes closed.
- Also ask patient to clench teeth to make masseter muscle contract and palpate muscle.
- Corneal reflex is part of CN V but not recommended

**Facial Nerve VII – ‘funny faces’**

Motor function the facial muscles

**Upper Motor Neurone vs Lower Motor Neurone facial nerve.**

Causes of a facial nerve palsy:
- LMN: Bell’s palsy
- Trauma
- Parotid tumour
UMN problem - Facial nerve

- UMN - eg. CVA or tumour “Forehead sparing”

VIII – some times referred to as vestibulocochlear
A simple whisper test will do or clicking fingers
If skilled then can perform Weber and Rinnes tests but generally unnecessary for basic testing

Ask the patient to open their mouth and say AAAAAAGH
Watch that the uvula (and soft palate) move evenly. Also listen to ‘phonation’

Uvula points to the opposite side to the lesion
Ask the patient to stick their tongue straight out
When stuck out it points to the side of the lesion

CN IX Glossopharyngeal & CN X Vagus

CN XI Spinal accessory(shoulders and neck muscles)

• CN XII Hypoglossal

XII – hypoglossal – controls the muscle of the tongue

Questions?
Summary of CNS examination

- Start with general survey and AVPU/GCS
- Test the Cortex
- Test the Cerebellum
- Test Cranial Nerves-find a system and repeat, repeat, repeat.
- Now practice…