

# Neurological Examination in the ER

1369-1374

# ***Organization***

- Mental Status testing
- Higher cerebral function
- Cranial Nerves
- Sensory examination
- Motor system
- Reflexes
- Cerebellar testing
- Gait and station

# Mental status testing

## Basic

- Assess thought disorders or abnormal thought content such as hallucinations, mood, insight
- Sensorium is a term used for the appropriate awareness and perception of consciousness
- Attention (by digit repetition) and memory assessment
  - Long term and short term memory
    - Long term: recall events from months or yrs ago
    - Short term: recall events of the day or 3 object recall at 5 minutes

## Advanced

- Use the mini mental status exam

# Higher Cerebral Functions

- Tests the cerebral cortex
- Language is controlled in the dominant hemisphere
  - Most are left hemisphere dominant
  - Therefore a large cortical stroke in the dominant hemisphere will affect language function
- Dysarthria vs Dysphasia
  - Dysarthria is a mechanical disorder resulting from weakness or uncoordination of facial or oral musculature
    - Motor systems problem (cortical, subcortical, brainstem, CN or cerebellar)
  - Dysphasia is a problem of language resulting from cortical or subcortical damage
    - The part of the brain concerned with comprehension, processing or producing language is impaired.

# Higher Cerebral Functions (continued)

- Basic
  - Comprehension; ask pts to id common objects (watch, pen)
    - If unable denotes a “dominant hemisphere problem”
  - Apraxia is the inability to perform a willed task (ex. If ask the pt to do something with the object)
  - Nonfluent motor aphasia (expressive aphasia) is Broca aphasia
    - Speech is halting and slow with stops b/w words
  - Fluent aphasia (auditory or receptive aphasia) sentences may have normal grammatical structure with normal rhythm, but incorrect words may be substituted within sentences that may be sound-alike words or similar yet incorrect meanings.
  - Global or mixed aphasia is combo of both and is most commonly seen.
- Advanced
  - Mental status and Cognitive function
    - Have the pt repeat “no ifs ands or buts” to determine some types of fluent aphasia
    - Pts aphasic in speaking may also be aphasic in writing. (ex. Draw circle and place number on it as if placing on clock)

# Cranial Nerves

- Basic
  - CN I olfactory (not usually assessed)
  - CN II optic: optic nerve head visible with ophthalmoscope for abnormalities
    - Visual acuity test and direct and indirect (consensual) pupillary responses. This is a reflex arc which the afferent limb is CN II and brainstem and the efferent limb is CN III which controls pupilloconstrictors
      - Bright light shown in one eye should cause a brisk constriction of equal magnitude in both eyes. Dilation of the pupil may indicate dysfunction of that eye, this is referred to as an afferent pupillary defect.

# Cranial Nerves (basic continued)

- CN III, IV, VI: extraocular eye movements
  - Trace object through a full “H” pattern
  - Abnormalities of CN III: dilated pupil with globe deviated downward and outward
    - The dilated pupil is due to the efferent limb of the reflex arc that CN III controls.
  - CN VI controls lateral rectus muscles so abnormalities will present with inability to abduct the eye.
  - CN IV: hard to detect. Controls the superior oblique which elevates the eye but you will only see a subtle loss of this ability.
- CN V has motor and sensory functions
  - Motor component: Muscles of mastication
    - Look for masseter bulk
  - Sensory: supplies cornea; the corneal reflex is a reflex arc of CN V to VII.
- CN VII supplies the muscles for facial movement
- CN VIII has auditory and vestibular afferent components
- CN IX and X observe pharyngeal musculature
- CN XI shoulder shrug
- CN XII Lingual movement (have pt stick tongue out and observe for asymmetry of motion)

# Cranial Nerves (advanced)

- Advanced
  - Anisocoria
  - A peripheral lesion of CN VII will cause complete facial paralysis on the same side as the lesion.
  - A cortical lesion (often stroke) results in weakness of the lower and mid face, with preservation of the motor function in the upper face (“Central Seventh pater”) because of bilateral cortical upper motor neuron innervation of the forehead musculature present in most patients.
- Special Circumstances: IN comatose pt, unilaterally dilated pupil that is unreactive or reacts sluggishly to light may represent III nerve dysfunction or paresis from impingement of the oculomotor nerve at the tentorium; this finding is consistent with the uncal herniation syndrome.



# Sensory Examination

- Basic
  - Light touch, pinprick, position, vibration and temperature sense (usually touch or pinprick if normal is enough)
  - If abnormal position testing is best used for the detection of the peripheral neuropathy or if posterior column spinal cord disease is suspected.
- Advanced
  - Dermatomes Figure 226-1
- Special Circumstances
  - In cervical spinal cord injuries or compression, an apparent demarcation often appears to be just above the nipples.
  - With suspected spinal cord injuries, test perineum sensation
    - The demonstration of a preserved island of sensation around the perineum may be the only sign of an incomplete spinal cord injury, which has a different prognosis than a complete spinal cord injury.

# Motor system

- Basic
  - Muscle tone: 1. normal 2. decreased 3. increased
    - To assess axial and truncal tone, stand behind the pt, grasping the shoulders, and gently moving the shoulders forward and then back. A pt with normal tone will offer little resistance to repeated motions, and some spontaneous swinging of the arms will be noted.
    - Parkinsons pts with increased axial tone may turn en bloc without the arm swing
  - Pronator drift (pt stands with arms outstretched with palms upward and observe for an inward or downward drift)
- Advanced
  - A formal rating of muscle strength
    - 5 normal strength
    - 4 some weakness with some ability to contract the muscle against resistance
    - 3 able to demonstrate full motion against gravity
    - 2 active movement of muscle with gravity that is eliminated with repositioning
    - 1 means minimal flicker of contractions
    - 0 represents complete paresis
    - Table 226-1 pg 1373 (muscle innervation)
- Special Circumstances
  - Probable neurogenic bladder: pts with incontinence and low back pain

# Reflexes

- Most useful to weight evidence collected in other parts of the H&P.
- Basic
  - Graded from 1-4.
  - Zero is the absence of reflexes
  - 2-3 being normal
  - 4 represents hyperactive
  - Asymmetry of UE and LE or left vs right may represent CNS or PNS abnormalities
  - Babinskis Response
    - A toe that moves upward in response to noxious stimulation applied to the lateral plantar or lateral aspect of the foot
    - In Adults, the toe should move downward to the plantar surface to be considered normal.
- Advanced
  - Clonus
    - Rhythmic oscillation of a body part, typically the ankle, elicited by a brisk stretch.
      - May be increased muscle tone, hyperactive muscle stretch reflexes
      - May be seen in conditions of metabolic disturbance and primary neurologic dysfunction
- Special Circumstances
  - It is thought that diseases that affect the upper motor neurons result in hyperactive reflexes, Babinskis response, clonus. Processes injuring the lower motor neurons, their axons, peripheral nerve roots, peripheral nerves or the muscles may result in hypoactive reflexes
  - However, in spinal cord injuries and strokes, reflexes may take several hours or even days to become hyperactive, so the absence of these signs is not valuable in excluding acute spinal cord injury

# Cerebellar Testing

- Concerned with involuntary actions of the CNS
  - Smooth muscle movements
  - Aids in coordination
- Basic
  - Rapid alternating movements
    - (hand slapping test: rapidly pronating and supinating forearms and slapping of the thigh)
    - With a normal exam, you should see symmetry
- Advanced
  - Eye movements should be tested.
    - Abnormalities suggest cerebellar dysfunction if the eyes don't move smoothly while watching a slow moving object
  - Finger to Nose testing
  - Nystagmus (rapid involuntary movements of the eyes that may be present with primary or straight-ahead gaze or provoked by looking at the extremes of gaze) may represent cerebellar problems

# Gait and Station

- Basic
  - Observation of the pt walking
  - The posture of the pt while stationary defines their station
- Special circumstances
  - Cerebellar hemorrhage may affect gait