Stupor, Coma, Delirium, dementia and Brain death

Neurology Didactic Session 2
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Coma

- Severe depression of consciousness
- No meaningful response to external stimuli
- Reactions are mediated by reflexes such as:
  - Decorticate or decerebrate posturing
  - Oculocephalic reflexes
  - Cranial nerve reflexes (pupillary, pharyngeal)
- Coma is NOT the same as brain death!
Stupor

- Depressed level of consciousness
- Some meaningful interaction
  - Withdrawal from noxious stimuli
  - Resisting examination
- There is a gray area between stupor and coma but the approach to diagnosis and treatment is similar
Delirium

- Agitated behavior
- Excessive response to external stimuli
- Hardly ever due to primary CNS dysfunction
Dementia

- Clear sensorium
- NEVER acute in onset
- Person often appears normal in casual interactions
- Only diagnose when these entities have been excluded:
  - Depression (also known as pseudodementia)
  - Hypothyroidism (test with TSH)
  - B12 deficiency
- Medications slow progression but do not reverse the disorder
# Comparisons

<table>
<thead>
<tr>
<th></th>
<th>Clear sensorium?</th>
<th>Behavioral manifestations</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>STUPOR</td>
<td>NO</td>
<td>Minimal reaction to external stimuli</td>
<td>Address underlying cause</td>
</tr>
<tr>
<td>COMA</td>
<td>NO</td>
<td>Reflex reactions to external stimuli</td>
<td>Address underlying cause</td>
</tr>
<tr>
<td>DELIRIUM</td>
<td>NO</td>
<td>Exaggerated reactions to external stimuli</td>
<td>Address underlying cause</td>
</tr>
<tr>
<td>DEMENTIA</td>
<td>YES</td>
<td>Interactions are generally appropriate</td>
<td>Medicines to slow progression</td>
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</table>
“Acute change in mental status”

- Is there a focal neurological deficit?
  - If not—the brain is hardly ever the problem
  - The brain is being affected by a toxic-metabolic process
- Focal neurological deficit
  - Brain dysfunction is the likely cause
  - Acute onset is V-E-T and possibly emergent:
    - Vascular includes stroke, TIA and migraine
    - Electrical includes seizures and arrhythmias
    - Traumatic should be apparent in the history
Non-focal examination
Acute change in mental status

- Primary brain disease is hardly ever the cause
  - First organ affected
  - Last to recover
- Usual causes
  - Organ dysfunction (liver, kidneys, heart, lungs)
  - Infections
  - Medications
- Recovery time prolonged in those with brain dysfunction at baseline (e.g. demented or cognitively impaired persons)
Brain death determination in adults [Step 1]

- **PERFORM NEUROLOGICAL EXAM**
  - No brain death unless ALL these reflexes are absent
    - No pupillary response
    - No corneal reflex
    - No oculocephalic reflexes (“Doll’s eyes”)
    - No pharyngeal reflex (gag reflex)
    - No spontaneous respirations
  - Presence of any of these = NO BRAIN DEATH

- Insure that the patient is not obtunded due to:
  - Drugs (e.g. opioids, benzodiazepines, anesthetics)
  - Core temperature > 32 Celsius (92 Fahrenheit)
  - Hypoperfusion
Brain death determination in adults [Step 2]-Organ donor?

- If organ donor-time is of the essence
  - Confirm brain death with an ancillary test
  - Acceptable ancillary tests [ONLY 1 required]:
    - EEG
    - Somatosensory Evoked Potentials
    - Apnea test with apneic oxygen
    - Brain flow studies
  - If ancillary test confirmatory– harvest organs
- If NOT an organ donor:
  - Wait 6 hours and repeat neurological examination
  - ALL brainstem reflexes still absent – patient is dead
Myths regarding brain death

- Requires a neurologist or neurosurgeon
  - FALSE—any licensed physician may do this
- Confirmatory test must always be performed
  - FALSE—this is only required to expedite organ donation
- Hypothermic people can be declared “brain dead”
  - FALSE—“You are not dead until you are warm and dead.”
- Brain death is a neurological emergency
  - FALSE—no neurologist is required
Summary for change in mental status

- EXAMINE THE PATIENT!
  - Focal deficit - Blame the brain
  - No focal deficit - NOT the brain

- No focal deficit
  - Toxic metabolic encephalopathy most common
  - If you think that an LP might be needed - IT IS!

- Brain death
  - Exclude drugs and hypothermia
  - Insure that ALL brainstem reflexes are absent
  - Confirmatory test only for organ donation
  - Repeat exam in 6 hours - no change = brain death