

# Depressed Consciousness and Coma

Summary from Rosen's Chapter 16 By Richard B. Moleno

## Epidemiology

- Manifests as a wide spectrum of disease, i.e. sleepiness to decreased alertness to frank coma.
- Can be categorized into metabolic/systemic, structural, and psychogenic causes.
- Most cases caused by metabolic/systemic, followed by structural and then psychogenic causes.

## Pathophysiology

- Consciousness controlled by the ascending reticular activating system (ARAS), the neuroanatomical structure responsible for arousal and cortical activation. ARAS is located in the dorsal part of the brainstem.
- Structures are vulnerable to metabolic derangements, toxins, and mechanical injury. Depressed consciousness due to cerebral cortex injury is usually due to both hemispheres being affected.
- This contrasts injury to the brainstem, which must be totally intact for arousal to be unaffected.
- ARAS becomes impaired → cerebral cortex cannot be aroused → depressed consciousness/coma occurs.

## Differential Diagnosis

- Very Broad DDX
- Critical Dxs
  - Hemorrhage
  - Meningitis/Encephalitis/Septic Shock
  - Hypoglycemia
  - Toxic
    - CO, Cyanide, Heroin, other drugs
  - Cerebral Edema
  - Heat Stroke/Hypothermia
  - Anaphylaxis
  - PE
  - Cardiovascular causes
    - MI, Dissection, Tamponade, Shock
  - Acute hydrocephalus
  - Venous Sinus Thrombosis
  - CNS vasculitis
  - Brain abscess
  - Hyperglycemia (DKA)
  - Nutrition def (thiamine)
  - Electrolyte abnormalities (Na, Ca, hyperammonemia)
  - Myxedema coma
  - Uremia, Thyrotoxicosis
- Emergent Dxs
  - Subdural/Epidural hematomas (really anything that occupies space)
  - Nonemergent Dxs
    - Concussion or contusion
    - Marijuana, LSD, Mushrooms, NSAIDs

- Very unusual for ischemic stroke to cause depressed consciousness.
- Pay special attention to elderly patients, susceptible to alterations in medication dosages and drug-drug interactions and infections.

## Signs and Symptoms

- Patients often found down, important to rely on family, friends, prehospital personnel for history and information.
- Pay special attention to the rate of symptom onset (rapid onset usually indicates structural causes whereas slow onset favors a metabolic cause), hx of trauma, exposure to drugs or toxins, new

## Work-up

- Guided by the physical exam
- After vitals, it is important to do a thorough neurological examination, looking for clues that would suggest structural lesions.
- Dolls eye reflex and cold water calorics can provide information about brainstem function.
- Bedside glucose must be done, as well as serum electrolytes, CBC, CMP, ABG, urinalysis including urine tox screen. Also can do lumbar function for CSF analysis, thyroid studies and ammonia level. Get coags before any invasive procedure.
- Imaging is important as well if you suspect trauma or structural lesions. Consider noncontrast head CT to visualize blood (initial imaging of choice), MRI to evaluate masses or edema, CT angiography for obstruction or shunt malfunction. Also get a CXR, Perform an EKG.

## Empiric Management

- ABCs initially. GCS < 8 u must intubate (unless cause is easily reversible, i.e. hypoglycemia, opioids).
- Coma cocktail includes dextrose, naloxone, and thiamine can quickly reverse hypoglycemia, opioid overdose and thiamine deficiency. Avoid giving glucose before thiamine, as thiamine is a cofactor for glucose metabolism and can worsen or precipitate Wernicke encephalopathy.
- If cause is suspected to be infectious, empirical administration of broad spectrum Abx should be started as soon as possible.
- Clear signs of impending herniation → stat neurosurgery consult, initiate measures to decrease ICP → elevate head of bed, start mannitol, increase RR to achieve a pCO<sub>2</sub> ~35.

## Disposition

- Pts with structural lesions on imaging require immediate neurosurgical consultation and will frequently require surgical intervention.
- Vast majority of pts with depressed consciousness or coma require admission to the hospital for further tx and workup.
- Pts who have returned to their baseline mental status following correction of hypoglycemia or opioid overdose may be discharged from the ED following a period of observation.
- Pts with depressed consciousness secondary to alcohol or recreational drug intoxication may be discharged once clinically sober.

\*Please see figure 16-3 for algorithm for diagnostic approach to altered mental status and coma.