

## Hyperammonemia

- Serum ammonia level is not required for the diagnosis of hepatic encephalopathy
- Ammonia level can be elevated in several nonhepatic conditions
  - Acute or chronic renal failure
  - GI bleed
  - Shock
  - Urea cycle disorders
  - Infections with urease-producing bacteria such as *Mycoplasma* or *Ureaplasma*
  - *Multiple myeloma*
  - *Intense muscle activity including seizures*
  - *Drugs: valproic acid, narcotics, barbiturates, gabapentin, tacrolimus, cyclosporine, methamphetamine, carbamazepine, and others*
  - Gastric or intestinal bypass surgery
- Lactulose and Rifaximin not useful when the source of increased ammonia production is not the gut

### Acute hyperammonemia

- Acute liver failure
- Systemic opportunistic infections with urease-producing bacteria such as *Mycoplasma* or *Ureaplasma*
  - Metabolize urea as an energy source and produce ammonia
  - Posttransplant period particularly in the lung transplant (usually within the first 2 weeks to 30 days after LT surgery)
  - Tx: doxycycline and a quinolone or macrolide
- Drugs – valproic acid
- Unmasking of partial urea cycle disorders
  - Stress of surgery or infections

### Treatment

- CRRT
- Intermittent HD excellent way to clear ammonia, however, rebound HA often occurs between sessions
- Neuroprotective strategies - promote urea production
  - L-arginine/L-citrulline, L-ornithine/L-aspartate, sodium benzoate, levocarnitine
- Lactulose and Rifaximin
  - Not useful in acute hyperammonemia