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# ALCOHOLS TOXICITY

⦿ Osm calculated =

$$2(\text{Na}) + \text{BUN}/2.8 + \text{GLU}/18$$

10 to 15 mOsm/kg H<sub>2</sub>O

⦿ Anion gap =

$$\text{Na} - (\text{Cl} + \text{HCO}_3)$$

15 mEq/l

# Ethanol



- Epidemiology

Most frequently ingested intoxicant

- Pathophysiology

- 6-10mg/kg

CNS& respiratory

Blood level decrease 150-200mg/l hour

# Clinical features

- Serum ethanol level

< 150 mg/dl : Mild

150 - 300 mg/dl : Moderate

300 – 500 mg/dl : Sever

> 500 mg/dl : Coma

# Diagnosis

- ⦿ Clinical presentation
- ⦿ Serum ethanol level
- ⦿ BS & K
- ⦿ Amylase
- ⦿ ABG

# Care & Disposition

- Mainstay of treatment is supportive care
- Iv glucose treated acidosis & siezure
- Thiamine
- Iv fluids
- Dialysis if serum ethanol level  $> 5\text{g/l}$  or  $\text{PH} < 7$
- discharge

# Isopropanol

- ⦿ Solvent
- ⦿ Skin & hair products
- ⦿ Paint thinner
- ⦿ antifreeze

# pathophysiology

Rapidly absorbed

CNS & long lasting are twice as ethanol

- Metabolized to acetone

Acetone metabolized to acetate & formate

- Metabolic acidosis



# Clinical features

- Similarly to that ethanol except

## Duration & CNS depressant effect

- Fruity odor
- Hemorrhagic gastritis
- Upper GI bleeding

# Diagnosis

- Clinical feature & elevated isopropanol level
- Ketonemia and ketonuria without hyperglycemia
- Metabolic acidosis with osmolal gap without anion gap

# Care&Disposition

- General supportive care
- IV fluids & vasopressors
- Hemodialysis

Refractory hypotension& isopropanol  
level>400mg/dl

# Methanol

- ⦿ Solvent in paint products
- ⦿ Windshield wiper fluid
- ⦿ antifreeze

# Pathophysiologi

- Metabolized in the liver

Formaldehyde accumulation in the retina & formic acid results in high anion gap

Methanol results in an elevated osmolal gap

GI mucosal irritant & pancreatitis

# Clinical features

- ⦿ Symptoms appear for 12 to 24 hours after ingestion
- ⦿ Ethanol consumed
- ⦿ Altered mental status
- ⦿ Visual disturbances
- ⦿ GI symptoms
- ⦿ papilledema

# Diagnosis

- Clinical presentation
- Serum methanol level provide definitive diagnosis
- Metabolic acidosis with elevated anion gap and osmolal gap
- leukocytosis

# Care & Disposition

- ⦿ General supportive measures are indicated
- ⦿ Charcoal has no role
- ⦿ NaHco<sub>3</sub>
- ⦿ Diazepam
- ⦿ Prevent formation and removing toxic metabolites
  - Fomepizole
  - Ethanol
  - Dialysis



- Fomepizole 15ml/kg over 30 minutes followed by 10mg/kg every 12 hours
- Ethanol load of 3-4 shots with maintenance of 1-2 shot per hours
- 800mg/kg IV load & 100mg/kg /h

# Ethanol & Fomepizole

- ⦿ Methanol concentration  $> 20$  mg/dl
- ⦿ Documented or Suspected methanol and ethanol ingestion with ethanol level  $< 100$  mg/dl
- ⦿ Coma or altered mental status:  
Unexplained serum osmolar gap  $> 10$  mOsm/l  
  
Unexplained metabolic acidosis and serum ethanol  $< 100$  mg/dl

# Dialysis

- ⦿ Refractory metabolic acidosis  $\text{pH} < 7.25$  with  $\text{AG} > 30 \text{mEq/l}$
- ⦿ Visual abnormality
- ⦿ Renal insufficiency
- ⦿ Deteriorated vital sign
- ⦿ Electrolyte abnormality
- ⦿ Serum methanol  $> 50 \text{mg/dl}$