Poisoning

Poisoning

Definition:

- Poisoning refers to the harmful effects that occur when a toxic substance is ingested, inhaled, injected, or absorbed through the skin, disrupting normal physiological functions and potentially leading to morbidity or death.

Types of Poisoning

1. Organophosphate Poisoning

- **Source:** Insecticides, pesticides (e.g., malathion, parathion)
- **Mechanism:** Inhibits acetylcholinesterase → Accumulation of acetylcholine
- **Clinical Manifestations:**
  - **Muscarinic:** Salivation, Lacrimation, Urination, Diarrhea, GI cramps, Emesis (SLUDGE)
  - **Nicotinic:** Muscle twitching, weakness, paralysis
  - **CNS:** Anxiety, confusion, convulsions, coma
  - Miosis (constricted pupils), bradycardia, bronchorrhea
- **Antidotes:**
  - Atropine: Muscarinic receptor blocker
  - Pralidoxime (2-PAM): Reactivates acetylcholinesterase
  - Supportive care: Airway protection, oxygen, fluids

2. Acetaminophen (Paracetamol) Poisoning

- **Source:** Overdose of Tylenol or similar products
- **Mechanism:** Excess NAPQI depletes glutathione → Liver damage
- **Clinical Manifestations:**
  - **Initial (0–24 hrs):** Nausea, vomiting, anorexia
  - **24–72 hrs:** Right upper quadrant pain, elevated liver enzymes
  - **Severe:** Hepatic failure, encephalopathy, death
- **Antidotes:**
  - N-acetylcysteine (NAC): Replenishes glutathione

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- Activated charcoal (if early ingestion)

3. Carbon Monoxide (CO) Poisoning

- **Source:** Combustion fumes (car exhaust, heaters)
- **Mechanism:** CO binds to hemoglobin → Reduces oxygen delivery
- **Clinical Manifestations:**
  - Headache, dizziness
  - Cherry-red skin (rare)
  - Confusion, tachycardia, hypotension
  - Seizures, coma, death
- **Antidotes:**
  - 100% Oxygen via non-rebreather mask
  - Hyperbaric oxygen therapy (severe cases)

4. Cyanide Poisoning

- **Source:** Smoke inhalation, industrial exposure, ingestion of cyanogenic compounds (e.g., apricot seeds)
- **Mechanism:** Inhibits cytochrome oxidase → Cellular hypoxia
- **Clinical Manifestations:**
  - Rapid dyspnea, confusion, seizures
  - Hypotension, metabolic acidosis
  - “Bitter almond” breath (not always detectable)
- **Antidotes:**
  - Hydroxocobalamin (preferred)
  - Sodium thiosulfate
  - Amyl nitrite/sodium nitrite (induces methemoglobinemia)

5. Methanol & Ethylene Glycol Poisoning

- **Sources:**
  - Methanol: Industrial solvents, windshield wiper fluid
  - Ethylene glycol: Antifreeze
- **Mechanism:** Metabolized to toxic compounds (formic acid in methanol, oxalic acid in ethylene glycol)

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- **Clinical Manifestations:**
  - CNS depression
  - **Methanol:** Visual disturbances (“snowfield vision”)
  - **Ethylene Glycol:** Renal failure
  - Metabolic acidosis (high anion gap)
- **Antidotes:**
  - Fomepizole (alcohol dehydrogenase inhibitor)
  - Ethanol (if fomepizole unavailable)
  - Hemodialysis (severe toxicity)
  - Bicarbonate (for acidosis)

6. Iron Poisoning

- **Source:** Accidental ingestion of iron tablets (common in children)
- **Mechanism:** Direct GI corrosive effect & mitochondrial toxicity
- **Clinical Manifestations:**
  - GI symptoms: Vomiting, diarrhea, GI bleeding
  - Latent phase
  - Systemic toxicity: Metabolic acidosis, hepatic failure, shock
  - Late complications: GI scarring, obstruction
- **Antidote:**
  - Deferoxamine (chelates iron; excreted in orange-red urine)
  - Supportive care

7. Opioid Poisoning

- **Source:** Morphine, heroin, oxycodone, fentanyl
- **Mechanism:** Mu-opioid receptor activation → CNS & respiratory depression
- **Clinical Manifestations:**
  - Pinpoint pupils (miosis)
  - Respiratory depression
  - Coma
  - Bradycardia, hypotension
- **Antidote:**

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- Naloxone (opioid receptor antagonist; repeat as needed)
- Supportive care

8. Benzodiazepine Overdose

- **Source:** Diazepam, lorazepam, alprazolam
- **Mechanism:** Enhances GABA activity → CNS depression
- **Clinical Manifestations:**
  - Drowsiness, slurred speech
  - Ataxia, confusion
  - Respiratory depression (rare when taken alone)
- **Antidote:**
  - Flumazenil (GABA receptor antagonist; use cautiously in chronic users due to seizure risk)

9. Salicylate (Aspirin) Poisoning

- **Source:** Aspirin overdose
- **Mechanism:** Uncouples oxidative phosphorylation → Stimulates respiratory center
- **Clinical Manifestations:**
  - Tinnitus
  - Hyperventilation → Respiratory alkalosis
  - Metabolic acidosis
  - Fever, confusion, coma
- **Antidote/Treatment:**
  - Activated charcoal (early ingestion)
  - Sodium bicarbonate (urinary alkalinization)
  - Hemodialysis (severe cases)

10. Heavy Metal Poisoning

- **Sources:** Industrial exposure, contaminated water, paint, batteries
  - **Examples:** Lead, arsenic, mercury
- **Clinical Manifestations:**
  - **Lead:** Anemia, cognitive deficits, abdominal pain, neuropathy
  - **Arsenic:** GI symptoms, garlic breath, QT prolongation

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