11.3: Acid-Base Disorders due to Drugs and Toxins

Classification by Mechanism

Drug-induced acid-base disorders:

1. **Metabolic acidosis induced by large acid loads**
   - from exogenous sources (e.g. NH₄Cl, or toxin ingestion)
   - from endogenous acid production (e.g. generation of ketoacids or lactic acids by alcohol or phenformin)
   - from base loss (e.g. laxative abuse).

2. **Renal tubular acidosis**

3. **Metabolic alkalosis** resulting from exogenous bicarbonate loads or effective extracellular fluid contraction, potassium depletion plus hyperaldosteronism

4. **Respiratory acidosis** from drug-induced respiratory depression or neuromuscular impairment

5. **Respiratory alkalosis** from drug-induced hyperventilation

Some Drugs & Toxins which have been involved in various Acid-Base Disorders
Respiratory Acidosis

- CNS depressants
- Narcotics
- Muscle Relaxants

High Anion Gap Metabolic Acidosis

- Methanol
- Ethylene glycol (due glycolic acid)
- Salicylates
- Paraldehyde
- Phenformin & metformin (lactic acidosis)
- Sodium nitroprusside (lactic acidosis due cyanide)

Renal Tubular Acidosis

- Amphotericin B
- Acetazolamide
- Toluene
- Lithium
- Cyclamate
- Analgesics
- Carbonic Anhydrase Inhibitors (eg acetazolamide)
- Lead
- NSAIDs
- Outdated tetracycline
- Pentamidine in AIDS patients

Other causes of Hyperchlaemiac Metabolic Acidosis

- Potassium-sparing diuretics
- Acidifying infusions (eg HCl, NH₄Cl, lysine-HCl & arginine-HCl infusions)
- CaCl₂ ingestion (loss of HCO₃⁻ due to precipitation of carbonate)

Respiratory Alkalosis

- Salicylates
- Propanidid
Metabolic Alkalosis

- Emetics
- Diuretics