

Hypokalemia

- Serum potassium level less than ($< 3.5 \text{ mmol/l}$)

Causes & Pathophysiology

1) External Balance Shift $\rightarrow$ $\uparrow K^+$ excretion.
diet

1) Low Intake: Anorexia, Specific intake, Fasting.

2) $\uparrow$ Excretion: i) $\uparrow$ Primary aldosteronism (Conn's Syndrome)
by kidney $\downarrow$ $\uparrow$ Aldosterone from Zona glomerulosa

$\downarrow$
Hypokalemia & Hyponatremia -

ii) Diuretics (Loop Diuretics, Thiazide Diuretics).

3) $\uparrow$ GIT loss:-

- Vomiting $\rightarrow$ $\downarrow$ Stomach Acid $\rightarrow$ Metabolic ~~acidosis~~ ^{Alkalosis}

$\downarrow$
 H^+ ion outside cell & K^+ inside

- Diarrhea:

$\downarrow$
Hypokalemia.

$\rightarrow$ Typhoid, IBD, Laxative abuse.

4) $\uparrow$ Sweat in Sun.

2) Internal Balance Shift $\rightarrow K^+$ into cells

① Diabetes mellitus Type I $\rightarrow$ Exogenous insulin overdose

$\downarrow$
 $\uparrow$ Glucose & Potassium by cells

$\downarrow$
Hypokalemia.

② Alkalosis $\rightarrow \downarrow H^+$ in outside cell $\rightarrow$ so H^+/K^+ pump.

$\downarrow$
Compensatory mechanism.

$\uparrow H^+$ outside & $\downarrow K^+$ inside cell.

3) β -adrenergic agonists - by catecholamines - & α -adrenergic antagonists.

Clinical features $\Rightarrow$ $\downarrow$ Resting membrane potential $\Rightarrow$ $\uparrow$ Hyperpolarization.

1) Smooth muscle

$\downarrow$
Constipation
Cramps

2) Skeletal muscle

$\downarrow$
i) Weakness
ii) Cramps
iii) Flaccid paralysis
(Starts from down
- and upwards.

3) ~~Rev~~ Cardiac

$\downarrow$
Arrhythmia
Cardiac arrest

4) Respiratory
 $\Rightarrow$ Depression

Investigation

ECG $\Rightarrow$ $\uparrow$ ST depression, U wave.

- Aldosterone, Glucose.

- Potassium level. Sodium level.

Treatment

- Normalize K^+ levels.

- Potassium Sparing Diuretics.