Hypokalemia

What is Hypokalemia?

- Hypokalemia is when blood's potassium levels are lower than normal level.
- Normal potassium levels are between 3.5 and 5.0 mmol/L (3.5 and 5.0 mEq/L) with levels below 3.5 mmol/L defined as hypokalemia.

- Plasma potassium depends on the balance between intake, excretion and the distribution of potassium across cell membranes.

- Excretion is normally controlled by the kidneys.

- A plasma potassium <2.5mmol/L is an emergency and needs urgent treatment

Causes of Hypokalemia

Increased renal excretion
(Urinary K+ >20 mmol/day)
- Diuretics:
- Thiazides
- Loop diuretics

Increased aldosterone secretion
- Liver failure
- Heart failure
- Nephrotic syndrome
- Cushing's syndrome
- Conn's syndrome
- Adrenocorticotrophic hormone
- (ACTH)-producing tumours

Exogenous mineralocorticoid
- Corticosteroids
- Liquorice (potentiates renal
- actions of cortisol)

Renal disease
- Renal tubular acidosis types 1
- and 2
- Renal tubular damage (diuretic
- phase)
- Acute leukaemia
- Nephrotoxicity:
- Amphotericin
- Aminoglycosides
- Cytotoxic drugs
- Release of urinary tract obstruction
- Bartter's syndrome
- Liddle's syndrome
- Gitelman's syndrome

Reduced intake of K+
- Intravenous fluids without K+
- Dietary deficiency

Redistribution into cells
- β-Adrenergic stimulation
- Acute myocardial infarction
- Beta-agonists,
- e.g., salbutamol,
- fenoterol
- Insulin treatment, e.g. treatment
- of diabetic ketoacidosis
- Correction of megaloblastic
- anaemia, e.g. B12 deficiency
- Alkalosis
- Hypokalaemic periodic paralysis

Gastrointestinal losses
(Urinary K+ <20 mmol/day)
- Vomiting
- Severe diarrhoea
- Purgative abuse
- Villous adenoma
- Ileostomy or ureterosigmoidostomy
- Fistulae
- Ileus/intestinal obstruction

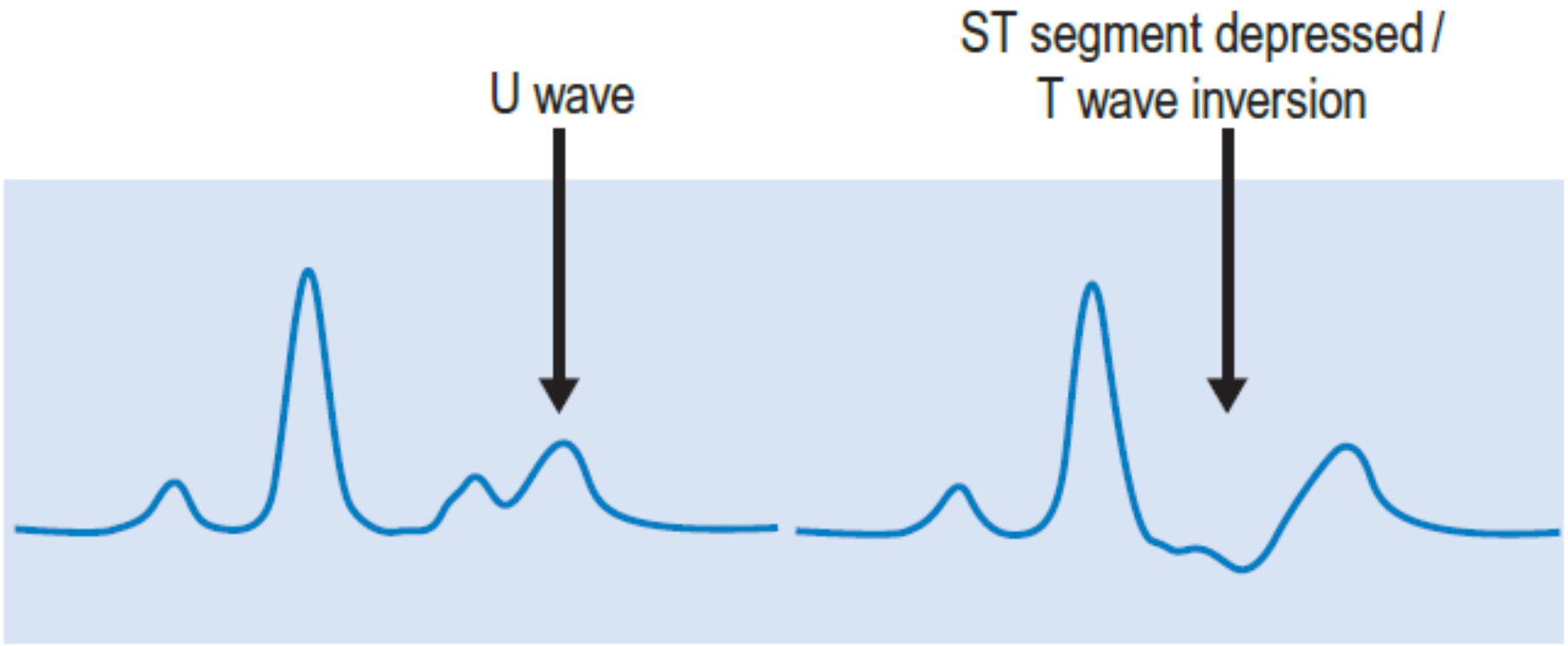
Clinical features

- Usually asymptomatic but severe hypokalemia (<2.5 mmol) causes muscle weakness.
- Hypotonia
- Hyporeflexia
- Cramps
- Tetany
- Palpitations
- Light-headedness (arrhythmias)
- Constipation

ECG Changes in Hypokalemia

- Small or inverted T waves
- Prominent U waves (after T wave)
- Long PR interval
- Depressed ST segments

ECG Changes in Hypokalemia



Risk of tachydysrhythmia and ventricular fibrillation

Management of Hypokalemia

If mild Hypokalemia: (>2.5mmol/L, no symptoms)

Give oral K+ supplement (≥80mmol/24h). Review K+ after 3 days. If taking a thiazide diuretic, and K+ >3.0 consider repeating and/or K+ sparing diuretic.

Management of Hypokalemia

If severe Hypokalemia: (<2.5mmol/L, and/or dangerous symptoms)

Give IV potassium cautiously, not more than 20mmol/h, and not more concentrated than 40mmol/L.

Do not give K+ if oliguric.