Chapter 9
Blood and nutrition

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1 Anaemias

1.1 Iron-deficiency anaemias

Iron deficiency should only be treated in the presence of a demonstrable iron-deficiency state.

1.1.1 Oral iron

Choice of preparation is decided by the incidence of side-effects and cost. The oral dose of elemental iron for iron-deficiency anaemia should be 100 to 200 mg daily. Haemoglobin regeneration rate is little affected by the type of salt used. Rise in haemoglobin concentration takes about 3-4 weeks, treatment should be continued for a further 3 months to replenish the iron stores. Gastrointestinal disturbances are common; can be reduced if tablets taken with food.

1.1.2 Parenteral iron

Reserved for use when oral therapy is unsuccessful because the patient cannot tolerate oral iron, or there is continuing blood loss, or in malabsorption. Parenteral iron does not produce a faster haemoglobin response than oral iron.

Serious hypersensitivity reactions

Incidents of anaphylaxis have been reported. In the event of a reaction, treatment should be stopped immediately.

The risk of hypersensitivity is increased in patients with known allergies, immune or inflammatory conditions, or those with a history of severe asthma, eczema, or other atopic allergy; in these patients, intravenous iron should only be used if the benefits outweigh the risks.

Intravenous iron should be avoided in the first trimester of pregnancy and used in the second or third trimesters only if the benefit outweighs the potential risks for both mother and foetus.

1.2 Megaloblastic anaemia

Most megaloblastic anaemias result from a lack of either vitamin B12 or folate; lack of gastric intrinsic factor resulting from an autoimmune gastritis causes malabsorption of vitamin B12. Hydroxocobalamin is the choice for therapy; it is retained in the body longer than cyanocobalamin and thus requires fewer dosing intervals - up to 3 months.

2 Fluid and electrolyte imbalances

(see ProPharmace guide 'Laboratory Test Results')

2.1 Calcium imbalance

Hyper (bone pain, stones, psychiatric issues)
cincalcet
Hypo (convulsions, arrhythmias, numbness)
calcium salts

2.2 Magnesium imbalance

Hypo (arrhythmias, hypokalaemia, hypocalcaemia)
magnesium slats

2.3 Phosphate imbalance

Hyper (ectopic calcification, hyperparathyroidism)
aluminium hydroxide, Phosex, sevlamer
Hypo (weak muscles, mental issues, blood disorder)
phosphate salts

2.4 Potassium imbalance

Hyper: IV soluble insulin with glucose, plus nebulised salbutamol; calcium gluconate for cardioprotection

Hypo: Potassium overdose can be fatal. Ready-mixed infusion solutions containing potassium should be used where possible. Potassium chloride solution for infusion must be given by slow intravenous infusion, under ECG control, ensuring adequate urine flow and with careful monitoring of electrolytes.

Rapid infusion can be toxic to the heart and cardiac arrhythmias may occur. Manufacturer recommendation is that the infusion rate should not exceed 20 mmol potassium per hour. A higher concentration and higher infusion rate may be given in severe potassium depletion under specialist supervision.

2.5 Drugs that cause electrolyte imbalance

2.5.1 Hyperkalaemia

Symptoms
Fatigue, numbness, tingling, nausea or vomiting, trouble breathing, chest pain, irregular heart beat

Causative drugs
ACE inhibitors; potassium supplements; NSAIDs; heparins; spironolactone; amiloride

Treatment
IV soluble insulin with glucose, plus nebulised salbutamol; calcium gluconate for cardioprotection

2.5.2 Hypokalaemia

Symptoms
constipation, irregular heartbeat, fatigue, muscle damage, muscle spasms, tingling, numbness

Causative drugs
Diuretics; beta-2 agonists, insulin; corticosteroids

Treatment
Gradual replacement with potassium chloride; rapid infusion can be cardiotoxic and cause arrhythmias

2.5.3 Hypernatremia

Symptoms
dehydration, thirst, osmotic damage of cells (confusion, muscle twitching or spasms, seizures)

Causative drugs
Corticosteroids; IV abx with sodium; oral contraceptive; sodium bicarbonate

Treatment
Correction of the relative water deficit. If IV, administered via dextrose or saline infusion. Rapid correction can lead to cerebral oedema.

2.5.4 Hyponatraemia

Symptoms
nausea and vomiting, headache, confusion, fatigue, loss of appetite, irritability, osmotic damage of cells (confusion, muscle twitching or spasms, seizures)

Causative drugs
Anti-depressants; desmopressin; carbamazepine; diuretics; lithium

Treatment
Hypovolemia: IV saline
Euvolemic: fluid restriction & remove stimuli for ADH
Hypervolemic: address underlying heart or liver failure

3 Vitamin deficiency

(see propharmace guide 'Vitamins and Minerals Guide')

3.1 Pyridoxine (vitamin B6)

Prolonged use of pyridoxine in a dose of 10 mg daily is considered safe but the long-term use of pyridoxine in a dose of 200 mg or more daily has been associated with neuropathy.

3.2 IV Thiamine (vitamin B1)

Rare risk of potentially serious allergic adverse reactions, the CHM has recommended that:

- This should not prevent the use of parenteral thiamine in patients where this route of administration is required, particularly in patients at risk of Wernicke-Korsakoff syndrome where treatment with thiamine is essential;
- Intravenous administration should be by infusion over 30 minutes;
- Facilities for treating anaphylaxis (including resuscitation facilities) should be available when parenteral thiamine is administered