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**DEPARTMENT: ANATOMY**

**COURSE CODE: BCH 204**

**OUTLINE THE TOXICITY VALUES AND DEFICIENCY MANIFESTATIONS OF THE FOLLOWING MINERALS**

**A. POTASSIUM**

**B. CALCIUM**

**C. MAGNESSIUM**

**D. CHLORIDE**

**E. IRON**

**POTASSIUM**

Hypokalemia is a low level of potassium (K+) in the blood serum.Mild low potassium does not typically cause symptoms. Symptoms may include feeling tired, leg cramps, weakness, and constipation. Low potassium also increases the risk of an abnormal heart rhythm, which is often too slow and can cause cardiac arrest.

Causes of hypokalemia include vomiting, diarrhea, medications like furosemide and steroids, dialysis, diabetes insipidus, hyperaldosteronism, hypomagnesemia, and not enough intake in the diet. 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. It is classified as severe when levels are less than 2.5 mmol/L. Low levels may also be suspected based on an electrocardiogram (ECG). Hyperkalemia is a high level of potassium in the blood serum.

Normal potassium levels are between 3.5 and 5.0 mmol/L with levels below 3.5 mmol/L (less than 3.5 mEq/L) defined as hypokalemia.

**CALCIUM**

Hypocalcaemia is low calcium levels in the blood serum. The normal range is 2.1–2.6 mmol/L (8.8–10.7 mg/dl, 4.3–5.2 mEq/L) with levels less than 2.1 mmol/l defined as hypocalcemia. Mildly low levels that develop slowly often have no symptoms.Otherwise symptoms may include numbness, muscle spasms, seizures, confusion, or cardiac arrest.

Common causes include hypoparathyroidism and vitamin D deficiency. Others causes include kidney failure, pancreatitis, calcium channel blocker overdose, rhabdomyolysis, tumor lysis syndrome, and medications such as bisphosphonates. Diagnosis should generally be confirmed with a corrected calcium or ionized calcium level.Specific changes may be seen on an electrocardiogram (ECG).

**MAGNESIUM**

Magnesium deficiency is an electrolyte disturbance in which there is a low level of magnesium in the body. It can result in multiple symptoms. Symptoms include tremor, poor coordination, muscle spasms, loss of appetite, personality changes, and nystagmus. Complications may include seizures or cardiac arrest such as from torsade de pointes.Those with low magnesium often have low potassium.

Causes include low dietary intake, alcoholism, diarrhea, increased urinary loss, poor absorption from the intestines, and diabetes mellitus.A number of medications may also cause low magnesium, including proton pump inhibitors (PPIs) and furosemide. The diagnosis is typically based on finding low blood magnesium levels (hypomagnesemia). Normal magnesium levels are between 0.6-1.1 mmol/L (1.46–2.68 mg/dL) with levels less than 0.6 mmol/L (1.46 mg/dL) defining hypomagnesemia.

Treatment is with magnesium either by mouth or intravenously. For those with severe symptoms, intravenous magnesium sulfate may be used.Associated low potassium or low calcium should also be treated. The condition is relatively common among people in hospital.

**CHLORIDE**

Hypochloremia is an electrolyte disturbance in which there is an abnormally low level of the chloride ion in the blood. The normal serum range for chloride is 97 to 107 mEq/L.

It rarely occurs in the absence of other abnormalities. It is sometimes associated with hypoventilation. It can be associated with chronic respiratory acidosis. If it occurs together with metabolic alkalosis (decreased blood acidity) it is often due to vomiting. It is usually the result of hyponatremia or elevated bicarbonate concentration. It occurs in cystic fibrosis.

**IRON**

Anemia is a decrease in the total amount of red blood cells (RBCs) or hemoglobin in the blood, or a lowered ability of the blood to carry oxygen.When anemia comes on slowly, the symptoms are often vague and may include feeling tired, weakness, shortness of breath, and a poor ability to exercise. When the anemia comes on quickly, symptoms may include confusion, feeling like one is going to pass out, loss of consciousness, and increased thirst.Anemia must be significant before a person becomes noticeably pale.

Anemia can be caused by blood loss, decreased red blood cell production, and increased red blood cell breakdown. Causes of blood loss include trauma and gastrointestinal bleeding.Causes of decreased production include iron deficiency, vitamin B12 deficiency, thalassemia, and a number of neoplasms of the bone marrow. Causes of increased breakdown include genetic conditions such as sickle cell anemia, infections such as malaria, and certain autoimmune diseases. Anemia can also be classified based on the size of the red blood cells and amount of hemoglobin in each cell. If the cells are small, it is called microcytic anemia; if they are large, it is called macrocytic anemia; and if they are normal sized, it is called normocytic anemia. The diagnosis of anemia in men is based on a hemoglobin of less than 130 to 140 g/L (13 to 14 g/dL); in women, it is less than 120 to 130 g/L (12 to 13 g/dL).