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DEPARTMENT-PHARMACOLOGY

ASSIGNMENT TITLE-MINERAL METABOLOISM

COURSE CODE-BCH 204

1 .QUESTION-OUTLINE THE TOXICIY VALUES AND DEFICIENCY MANIFESTATIONS OF THE FOLLOWING.

A-POTASSIUM

Toxicity Values- Potassium levels between 5.1mEq/L to 6.0mEq/L reflect mild hyperkalemia. Potassium levels of 6.1mEq/L to 7.0mEq/L are moderate hyperkalemia, and levels above 7mEq/L are severe hyperkalemia. Although the normal range of plasma potassium above 3.5mEq/L to 5.1mEq/L could cause hyperkalemia.

Deficiency Manifestations- 1. Hypokalemia (low intake of potassium)

Potassium supplements are usually the first course of action for levels that are too low. Supplements are mostly effective if your kidneys are in good shape. Severe hypokalemia may require IV treatment, especially if you're experiencing an abnormal heartbeat. Potassium-sparing diuretics can rid the body of excess sodium. This will help normalize electrolyte levels. But, some diuretics and potassium supplements can be harsh on the digestive tract. Only people with normal kidney function can use potassium-sparing diuretics.

2. Hyperkalemia (high intake of potassium)

Mild cases of hyperkalemia can be treated with prescription medications that increase potassium excretion. Other methods include diuretics or an enema. Severe cases may require more complex treatments. Kidney dialysis can remove potassium. This treatment is the preferred for cases of kidney failure. For people with healthy kidneys, a doctor might recommend insulin and glucose. These help to transport potassium from the blood to cells for removal. An albuterol inhaler can also lower dangerously high levels. Calcium gluconate may be used temporarily to stabilize the heart and reduce the risk of serious heart complications from hyperkalemia.

B-CALCIUM

Toxicity Values- Hypercalcemia occurs when serum calcium levels are 10.5 mg/dL (also expressed as 2.63 mmol/L) or greater depending on normative laboratory values. ... Hypercalciuria is present when urinary excretion of calcium exceeds 250 mg/day in women or 275-300 mg/day in men.

Deficiency Manifestations-1. Hypocalcaemia

Hypocalcemia, commonly known as calcium deficiency disease, occurs when calcium levels in the blood are low. A long-term deficiency can lead to dental changes, cataracts, alterations in the brain, and osteoporosis, which causes the bones to become brittle. Complications of hypocalcaemia can be life-threatening, and if the condition goes untreated, it could eventually lead to death.

2. Hypercalciuria

Hypercalciuria can occur, particularly with increased calcium or vitamin D intake. hypercalciuria is present when urinary excretion of calcium exceeds 250 mg/day in women or 275-300 mg/day in men. Often, urinary calcium excretion is expressed as the ratio of calcium to creatinine excreted in 24 hours (milligrams of calcium per milligram of creatinine). Values above 0.3 mg/mg creatinine are considered to be within the hypercalcuric range.

3. Osteopenia and osteoporosis

Calcium deficiency can lead to osteopenia and osteoporosis.

Osteopenia reduces the mineral density of bones, and it can lead to osteoporosis. Osteoporosis makes bones thinner and more susceptible to fractures. It can cause pain, issues with posture, and eventual disability.
While osteopenia is less severe than osteoporosis, both cause diminished bone density and increased risk of breaks and fractures. The bones store calcium well, but they require high levels to stay strong. When overall levels of calcium are low, the body can divert it from the bones, making them brittle and prone to injury. It takes years for bones to lose their density, and a calcium deficiency may take as long to cause serious problems.

4. Dental Problems

When the body lacks calcium, it pulls it from sources such as the teeth. This can lead to dental problems, including weak roots, irritated gums, brittle teeth, and tooth decay. Also, calcium deficiency in infants can delay tooth formation.

5. Muscle problems

Calcium deficiency can lead to extreme tiredness and fatigue.

Muscle aches, cramps, and spasms are the earliest signs of a calcium deficiency. People tend to feel pain in the thighs and arms, particularly the underarms, when walking and otherwise moving. A calcium deficiency can also cause numbness and tingling in the hands, arms, feet, legs, and around the mouth. These sensations may indicate a more severe deficiency.

6. Nail and skin symptoms

Chronic calcium deficiency can affect the skin and nails. The skin may become dry and itchy, and researchers have linked hypocalcaemia to eczema and psoriasis. Eczema is a general term for skin inflammation. Symptoms include itchiness, redness, and skin blisters. Eczema is highly treatable, while psoriasis can be managed, but there is no cure. A calcium deficiency may lead to dry, broken, and brittle nails. It can also contribute to alopecia, a condition that causes hair to fall out in round patches.

7. Painful premenstrual syndrome (PMS)

Low levels of calcium may lead to tooth decay.

Low calcium levels have been linked to severe PMS. Participants in one 2017 study reported improved mood and reduced rates of fluid retention after taking 500 milligrams (mg) of calcium daily for 2 months.

In 2019, authors of a systematic review concluded that low levels of vitamin D and calcium during the second half of the menstrual cycle might contribute to symptoms of PMS. The team proposed using supplements to help relieve symptoms.

C- MAGNESIUM

Toxicity Values-Very large doses of magnesium-containing laxatives and antacids (typically providing more than 5,000 mg/day magnesium) have been associated with magnesium toxicity, including fatal hypomagnesaemia in a 28-month-old boy and an elderly man.

Deficiency Manifestation

Magnesium deficiency and hypomagnesaemia can result from a variety of causes including gastrointestinal and renal losses. Magnesium deficiency can cause a wide variety of features including hypocalcaemia, hypokalemia and cardiac and neurological manifestations. Chronic low magnesium state has been associated with a number of chronic diseases including diabetes, hypertension, coronary heart disease, and osteoporosis. The use of magnesium as a therapeutic agent in asthma, myocardial infarction, and pre-eclampsia is also discussed.

D-CHLORIDE

Toxicity Values- The toxicity of chloride salts depends on the cat ion present; that of chloride itself is unknown. Although excessive intake of drinking-water containing sodium chloride at concentrations
Above 2.5 g/liter has been reported to produce hypertension, this effect is believed to be related to the sodium ion concentration.

Deficiency Manifestations

Hypochloremia

Hypochloremia can also frequently accompany hyponatremia, a low amount of sodium in the blood. Symptoms include:

Fluid loss

Dehydration

Weakness or fatigue

Difficulty breathing

Diarrhea or vomiting, caused by fluid loss

E-IRON

Toxicity values- Toxic effects begin to occur at doses above 10–20 mg/kg of elemental iron. Ingestions of more than 50 mg/kg of elemental iron are associated with severe toxicity. In terms of blood values, iron levels above 350–500 μg/dL are considered toxic, and levels over 1000 μg/dL indicate severe iron poisoning.

Deficiency Manifestation- Anemia occurs when you have a decreased level of hemoglobin in your red blood cells (RBCs). Hemoglobin is the protein in your RBCs that is responsible for carrying oxygen to your tissues. Iron deficiency anemia is the most common type of anemia, and it occurs when your body doesn't have enough of the mineral iron. Your body needs iron to make hemoglobin. When there isn't enough iron in your blood stream, the rest of your body can't get the amount of oxygen it needs.