University of Mosul
Lecture No.:
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Lecture title:

Disturbances of Mineral Metabolism

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Summary:

1. **Pathologic calcification**
   It is the deposition of calcium salts in tissues other than bone and teeth bone or in soft tissues. The calcium deposit in the form of calcium carbonate or phosphate. Calcification is differing from ossification where the later in the deposition of calcium and phosphorus in bone. The pathologic calcification is divided into dystrophic calcification and metastatic calcification.

A. Dystrophic calcification

It is the deposition of calcium salts in the necrotic or degenerated tissues. Dystrophic calcification has no relation with calcium content of blood.

Pathogenesis In dystrophic calcification, the calcium needs an alkaline media to deposit in it. This media is present in necrotic and degenerated tissues, where the circulation is deficient and the carbon dioxide tension is low (alkaline media. The phosphate and carbonate deposited in the same proportion as is found in bone. B. Metastatic calcification.

B. Metastatic calcification

is the precipitation of calcium salts as a result of high level of plasma calcium without necrosis or degeneration of tissues. It observed in organs secreting acid as stomach, kidneys and lungs.

Pathogenesis and causes Increase plasma calcium level results from:

1. hyperparathyrodism, which lead to resorption of calcium from bone is one of the most important causes of metastatic calcification.

2. Excess vitamin D in diet lead to hypercalcemia and calcification of the wall of arteries and other tissues.

3. Decrease excretion of calcium as in case of renal failure lead to hypercalcemia and calcification.

4. Dystrophic calcification can be observed associated with osteoperosis, osteomalacia and tumor of bone and multiple myeloma.

Macroscopic appearance

If the deposition is enough to observe grossly, the deposit is white or gray granular in appearance. Grating sound and gritty feeling are recorded in cut section.

Microscopic appearance

The calcium carbonate and phosphate are observed as irregular fine granular deposits. The calcium stained purplish to bluish in color with hematoxylin and eosin, depending on the thickness of the particles. Von Kossa stains calcium black.

Significance Calcification is usually permanent but it harmless depending in its location.

2.Gout

It is diseases of purine metabolism where the characteristic lesions are the deposition uric acid and urates, sodium and calcium urates, in the joints, and serous membranes of the internal organs. It is most common in birds and human.

Causes

Uric acid and urates are the end product of purine metabolism. The cause is due to incomplete metabolism of purine derivatives. The defect in metabolism is due to decrease or increase activity of specific enzymes involved in purine metabolism. Moreover, active excretion of uric acid may interfere by chronic nephritis and genetic factors. In birds the causes are due to impaired renal function and excretion of urates, nephrotoxic drugs, nephrogenic viral strain of infectious bronchitis, increase dietary protein and calcium besides vitamin A deficiency