University of Mosul
Lecture No.:
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Date:
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Lecture title: **ANEMIA**
Lecturer Affiliation: department of pathology and poultary diseases

Summary:.

Anemia is the decrease in number of erythrocytes or hemoglobin concentration in erythrocytes per unit of blood and is characterized by pale mucus membrane, dyspnoea, cardiac hypertrophy and weakness. Anemia is classified according to morphological characteristics of erythrocytes and on the basis of causative factors. Morphologically, anemia is classified as macrocytic, normocytic and microcytic depending on the size of red blood cells and normochromic and hypochromic based on the presence of quantity of hemoglobin in RBC.

Macrocytic anemia is characterized by increased size of RBC and occurs due to acute blood loss or hemolysis resulting in excessive production and availability of immature erythrocytes in blood. Such cells also have reduced amount of hemoglobin and termed as hypochromic. Macrocytic normochromic anemia is increase size of RBC with normal hemoglobin and has been observed in deficiency of folic acid, niacin and vitamin B12

• **Normocytic anemia** are most common in animals occurs due to neoplasia, irradiation and are also known as aplastic anemia as a result of aplasia or agenesis of RBC.

Normocytic normochromic, normal size of RBC with normal hemoglobin anemia occurs as a result of depression of erythrogenesis.

Microcytic anemia is reduction in size of erythrocytes with decreased hemoglobin (Microcytic hypochromic) and occurs in deficiency of iron and pyridoxine or
In anemia, the size of RBC varies markedly with some large .chronic blood loss and some small size and is known as anisocytosis. The presence of abnormal shape (elongated, angular, ovoid, distorted) of RBC is termed as poikilocytosis. In some blood smears, there are nucleated RBC's which are immature due to increased production to meet the demand. Sometimes, the erythrocytes are having minute dark spots known as basophilic stippling which occurs in acute blood loss. Some erythrocytes stain unevenly with some dark and light colour spots and are known as

polychromatophilia which is an indication of active erythrogenesis. The denaturation and precipitation of hemoglobin leads to appearance of purplish granules in RBC near the cytoplasmic membrane which are known as "Heinz bodies". According to etiological factors, the anemia is classified as hemolytic, haemorrhagic or deficiency anemia

HEMOLYTIC ANEMIA

Hemolytic anemia occurs due to excessive lysis of erythrocytes and characterized by icterus, hemoglobinuria, and presence of nucleated erythrocytes in blood and .hemosiderosis in spleen

Etiology • Infections e.g. Anaplasma spp. Babesia spp., Equine infectious anemia virus • Toxins/ poisons e.g. snake venom, chronic lead poisoning. • Immune .mechanisms e.g. autoimmunity against erythrocytes

Macroscopic and microscopic features

• Pale mucous membranes

Icterus • Blood is thin, watery. • Hemoglobinurea • Decreased number of • erythrocytes • Presence of nucleated/ immature RBC in blood • Hemosiderin laden cells in spleen

HEMORRHAGIC ANEMIA

Hemorrhagic anemia occurs due to severe haemorrhage, extravasation of blood and .characterized by pale mucus membrane and hemorrhage in body

Etiology • Infections e.g. Acute septicemic diseases • Toxins/ poisons e.g. Bracken fern poisoning • Parasites e.g. Hemonchus contortus • Deficiency e.g. vitamin C deficiency

Macroscopic and microscopic features • Petechiae or Echymotic hemorrhage • Pale mucous membrane • Hematuria • Hemorrhage in various tissues/ organs • Macrocytic or normocytic characters of RBC • Poikilocytosis • Hyperplasia of bone marrow

DEFICIENCY ANEMIA

Deficiency anemia occurs as a result of deficiency of iron, copper, cobalt and vitamins and characterized by pale mucus membrane, weak and debilitated body .and decreased number of erythrocytes with hypochromasia in blood

Etiology • Deficiency of iron • Deficiency of copper • Deficiency of cobalt • Deficiency of vitamin B12, Pyridoxine, riboflavin and folic acid. • Parasitic infestation may lead to deficiency

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