

Haematology Lecture Notes on Pancytopenia and Aplastic anaemia

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Pancytopenia:

- Pancytopenia refers to reduction of all three cellular elements of blood, which is characterized by anaemia, leucopenia and thrombocytopenia.

Classification of Pancytopenia:

A. Due to production failure

- a. Aplastic anaemia
- b. Cytotoxic drugs
- c. Leukaemia and myelodysplastic syndrome
- d. Myelofibrosis
- e. Radiation
- f. Space occupying lesions
 - i. Secondary metastatic deposits of malignant neoplasm
 - ii. Granulomatous diseases
 - iii. Storage diseases
- g. Megaloblastic anaemia

B. Increased peripheral utilization or destruction:

- a. Disseminated intravascular coagulation (DIC)
- b. Septicaemia
- c. Systemic lupus erythematosus (SLE)
- d. Paroxysmal nocturnal haemoglobinuria (PNH)
- e. Hypersplenism

Characteristics of hypersplenism:

- Splenomegaly
- Reduction of cellular elements of blood e.g. monocytopenia, bicytopenia or pancytopenia.
- Hyperplasia of bone marrow corresponding with cytopenias.
- Correction of cytopenias by splenectomy.

Common Causes of hypersplenism;

- Kala-azar
- Malaria
- Chronic haemolytic anaemia
- CLL, CML, Myelofibrosis and lymphoma.

Bone marrow failure

- Bone marrow failure refers to cytopenias in peripheral blood due to failure of marrow precursor cells to produce mature blood cells.
- Types;
 - Aplastic anaemia – due to failure of pluripotent stem cells.
 - Single cell cytopenia – due to failure of committed stem cells.

Aplastic Anaemia

- Aplastic anaemia is a disorder of unknown aetiology characterized by anaemia, leucopenia and thrombocytopenia resulting from aplasia of the bone marrow.
- The fundamental pathological feature is a reduction in the amount of haemopoietic tissue, causing inability to produce normal numbers of mature cells for discharge into the blood stream.

Types of aplastic anaemia:

- Idiopathic
- Secondary
 - Drug idiosyncrasy
 - Chemical exposure
 - Infective hepatitis
- Constitutional

Blood picture:

- Anaemia
 - Usually normochromic and normocytic.
 - Minor to moderate degree macrocytosis
- Leucopenia – commonly seen.
- Thrombocytopenia.
- ESR usually elevated, sometimes high.
- Haemoglobin level often as low as 7 Gm/dl
- Anisocytosis is common.
- Poikilocytosis can occur.
- MCV can be elevated.
- Percentage of reticulocyte may be subnormal, normal or slightly increased.
- Absolute reticulocyte count is subnormal.
- Typical relative lymphocytosis.
- Red cell and white cell precursors are almost never present in the blood and their presence suggests an alternative cause of pancytopenia such as leukaemia, myelofibrosis or bone marrow infiltration.
- Serum iron level is usually elevated.

Bone marrow picture:

- In most cases hypocellular marrow picture.
- There may be dry tap or blood tap during bone marrow aspiration.
- Fat cells are increased.
- Erythropoiesis and leucopoiesis are equally reduced.
- Erythropoiesis is normoblastic.
- Plasma cells, reticulum cells and lymphocytes are relatively prominent.
- Megakaryocytes are commonly reduced in number.
- Iron content is usually normal or increased.

Courses and prognosis:

- Aplastic anaemia is a serious disorder, which frequently terminate in death within six months.
- Mortality rate is 50% to 80% in first year after presentation.
- Death occurs due to bleeding and/or infection.
- Outcome is difficult to predict.