Pancytopenia and Aplastic anaemia

Dr. Md. Sadequel Islam Talukder
MBBS; M Phil (Path); MACP (USA)
1 July 2016

Pancytopenia

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

Classification of Pancytopenia:

- **Due to production failure**
  - Aplastic anaemia
  - Cytotoxic drugs
  - Leukaemia and myelodysplastic syndrome
  - Myelofibrosis
  - Radiation
  - Space occupying lesions
    - Secondary metastatic deposits of malignant neoplasm
    - Granulomatous diseases
    - Storage diseases
  - Megaloblastic anaemia

- **Due to Increased peripheral utilization or destruction**:
  - Disseminated intravascular coagulation (DIC)
  - Septicaemia
  - Systemic lupus erythematosus (SLE)
  - Paroxysmal noctural haemoglobinuria (PNH)
  - Hyperslenism

Characteristics of hyperslenism:

- Slenomegaly
- 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 hyperslenism:**
- 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 particle.
- 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.