NURS 821 Advanced Pathophysiology

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Lecture 5 Alterations in Blood Formation and Hemostasis

Alterations in Blood Formation and Hemostasis

Part 2 Alterations in Red Blood Cell Production

Increased RBC Production

Polycythemias

Polycythemia Effects

- Too many cells result in:
  - Increased blood volume
  - Increased blood viscosity

Clinical manifestations?

Polycythemia

- Definition-many cells
- Types:
  - Relative
  - Absolute
    - Primary
    - Secondary

Decreased Circulating RBCs-anemia

Anemia Definitions

- Decreased numbers of circulating RBCs
- Decreased volume of packed RBCs to normal
- Decreased hemoglobin concentration

Anemia Classification

- Etiology
- Morphology
  - Size (-cytic)-normo-, micro-, macro-
  - Color (-chromic)-normo-, hypo-

Compensatory Mechanisms and Clinical Manifestations

- Decreased Hgb leads to decreased O_2 carrying capacity of blood
  - What compensatory mechanisms would the body employ?
  - What clinical manifestations would result?

Anemia Associated with Excess RBC Loss

- Acute loss-normochromic normocytic
  - Clinical conditions
  - Manifestations
- Chronic loss-hypochromic, normocytic
  - Clinical conditions
  - Manifestations

Anemia of Chronic Disease: Etiology

- Bone marrow depression
- Nutrient deficiencies
- Toxic environment
- Mechanical stress

- Conditions associated with secondary anemia:
  - TB
  - Lung abscess
  - Hepatic or renal failure
  - Bacterial endocarditis
  - Viral hepatitis
  - Some endocrine disorders

Anemias Caused by Decreased RBC Production

Pernicious (Addison's) Anemia

- Definition-megaloblastic anemia with anisocytosis and poikilocytosis
- Incidence-over age 60 of Northern European descent-Great Lakes region
- Etiology-IF dericiency; autoimmune or autosomal dominant

Pernicious Anemia (cont'd)

- Pathophysiology
  - Vit. B12 deficiency results in failure of nuclear maturation of all cells, especially rapidly proliferating cells
- Clinical manifestations-anemia, neurological, GI

Folic Acid Deficiency Anemia

- Definition-slowly progressive megaloblastic anemia
- Classification-macrocytic, normochromic
- Etiology
  - Populations at risk-
    - Pregnant women-decreased leads to birth defects
    - Infants
    - malnourished
- Clinical manifestations

Iron Deficiency Anemia

- Classification-microcytic hypochromic anemia
- Incidence and populations at risk
- Etiology
  - Deficient dietary intake
  - Malabsorption syndromes
  - Chronic blood loss
- Pathophysiology
- Clinical manifestations

Aplastic (pancytopenia) Anemia

- Classification-normocytic, normochromic
- Etiology-
  - Primary
  - Secondary-radiation, infection, chemicals, drugs, leukemia or lymphoma
- Pathophysiology-stem cell destruction in bone marrow
- Clinical manifestations