BLOOD AND LYMPH DISORDERS

Chapter 27

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INTRODUCTION

- Blood- vital to all body functions
- Hematologic system- blood and blood forming organs
- Blood dyscrasias
  - Blood components fail to form correctly
  - Blood values exceed or fail to meet normal standards
- Prenatal development of the hematologic system
  - Plasma and blood cells formed at second week of gestation, primarily in the yolk sac
  - Blood first develops in the liver and then later in the spleen, thymus, lymph system, and bone marrow
  - Blood- formed primarily in the liver until last trimester

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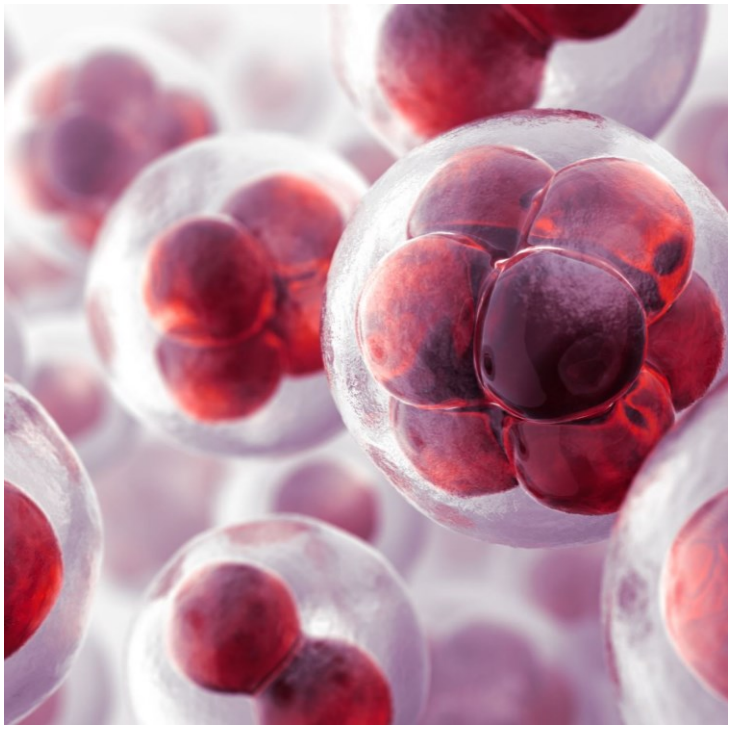
LYMPHATIC SYSTEM

- Drains regions of the body to lymph node
  - Where infectious organisms are destroyed
  - Antibody production is stimulated.
- Lymphadenopathy is an enlargement of lymph nodes.
  - Indicative of infection or disease



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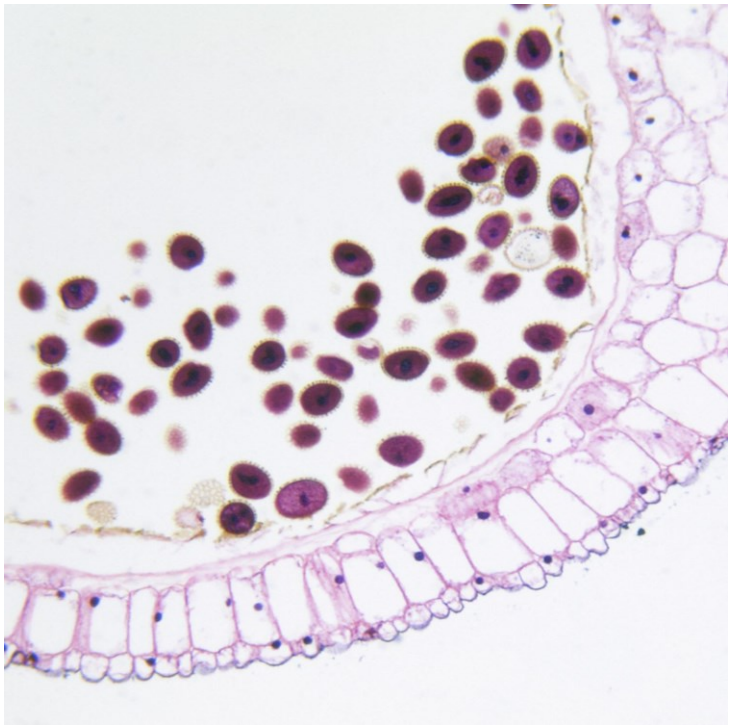
LYMPHATIC SYSTEM

- Spleen is largest organ of the lymphatic system
- One of the main functions is to bring blood into contact with lymphocytes
- Most common pathological condition is enlargement (splenomegaly)
- Enlarges during infections, congenital and acquired hemolytic anemias, and liver malfunction



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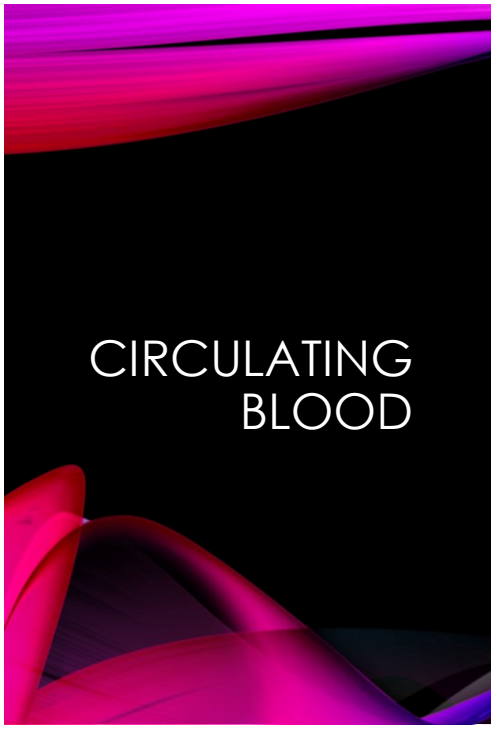

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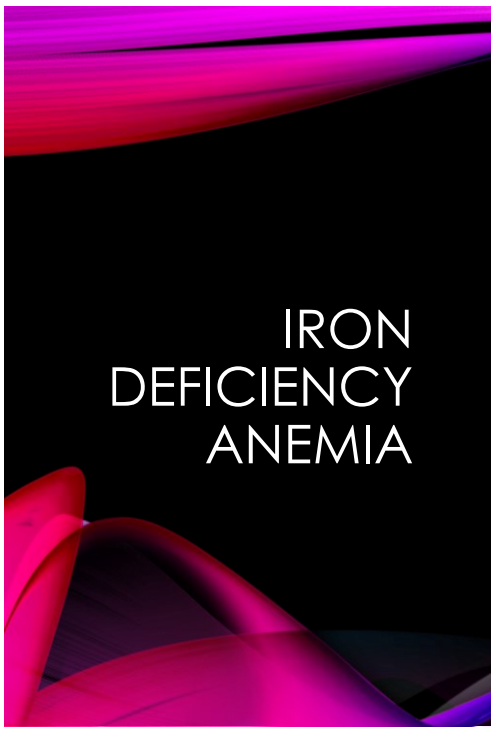
Consists of two portions

Plasma

Formed elements

- Erythrocytes
- Leukocytes (white blood cells [WBCs])
- Thrombocytes (platelets)



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Most common nutritional deficiency of children in the U.S.

Highest incidence during infancy and adolescence

Factors that influence O2 carrying capacity of the blood

- Reduction in the amount and size of RBC's
- Reduction in the amount of hemoglobin

IRON DEFICIENCY ANEMIA

- Manifestations
  - Pallor
  - Irritability
  - Anorexia
  - Decrease in activity
    - Infants may be overweight because of excessive milk consumption.
- Blood tests
  - RBC count
  - Hgb and hematocrit
  - Morphological cell changes
  - Iron concentrations
- Stool may be tested for occult blood.

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COMPLICATIONS AND TREATMENT OF IDA

- Untreated IDA progresses to-
  - Heart muscle becomes too weak to function
  - Possible heart failure
  - Growth retardation
  - Cognitive changes
- Screening blood work recommended from 9 to 24 months of age and earlier for preterm and low birth weight babies
- Ferrous Sulfate
- Vitamin C
- Foods rich in iron
- Imferon

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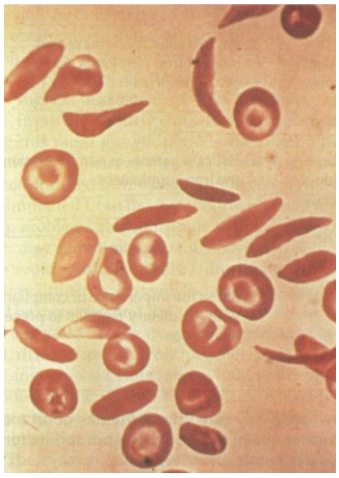
SICKLE CELL DISEASE

- Sickle cell trait (asymptomatic)
  - Blood of the patient contains a mixture of Hgb A and sickle (Hgb S).
  - Proportions of Hgb S are low because the disease is inherited from only one parent.
  - Hgb and RBC counts are normal.



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SICKLE CELL DISEASE

- Sickle cell anemia (more severe)
  - Clinical symptoms do not appear until the last part of the first year of life.
    - May be an unusual swelling of the fingers and toes
    - Symptoms caused by enlarging bone marrow sites that impair circulation to the bone and the abnormal sickle cell shape that causes clumping, obstruction in the vessel, and ischemia to the organ the vessel supplies

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MANIFESTATIONS

Hgb level ranges 6 to 9 g/dL or lower.

- Child is pale, tires easily, and has little appetite.

Sickle cell crises are painful and can be fatal.

- Symptoms: severe abdominal pain, muscle spasms, leg pain, or painful swollen joints may be seen
  - Fever, vomiting, hematuria, convulsions, stiff neck, coma, or paralysis can result.
  - Risk for stroke as a complication of a vaso-occlusive sickle cell crisis

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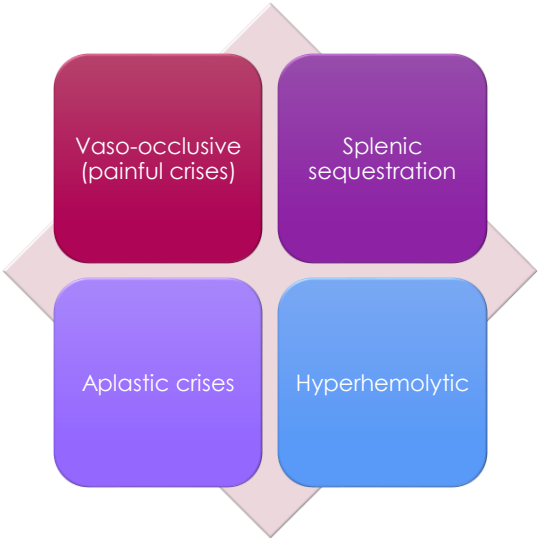
TYPES OF SICKLE CELL CRISIS



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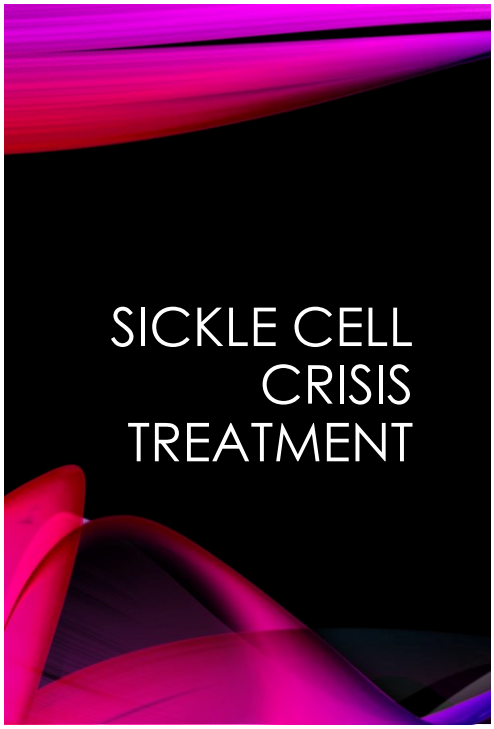

- Oxygen therapy
- Hydration
- Rest
- Protection from infection
- Pain control
- Blood transfusion
- Emotional support
- Bone marrow transplant
- Surgery

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THALASSEMIA

Group of hereditary blood disorders- cannot produce sufficient amount of adult hemoglobin

Blood cells- abnormal size and shape

Blood cells- rapidly destroyed

Chronic anemia

Most common- Polypeptide chain beta-thalassemia

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THALASSEMIA MINOR

- Inherited gene from only one parent
- Mild anemia
- Pale, enlarged spleen
- Needs genetic counseling

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THALASSEMIA MAJOR

- Also called- Cooley's anemia
- Both parents carrier
- More serious form of disease
- Progressive severe anemia within the 2nd 6 months of life
- Symptoms-
  - Pale, hypoxia, poor appetite, fever, jaundice, hepatomegaly, abdominal distention, facial changes, protruding teeth
- Complications
  - Cardiac failure
  - Pathological fractures
- Diagnosis
  - Family history
  - Bone growth studies
  - Blood tests
  - Hemoglobin electrophoresis

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THALASSEMIA MAJOR (CONT.)

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Prognosis

- Poor
- Death due to CHF, severe anemia, or infection

Treatment and Nursing care

- Maintain hemoglobin levels
- Provide for growth and development and normal physical activity
- Prevention and early treatment for infections
- Splenectomy
- Bone marrow transplants
- Iron-chelating agents
- Emotional health of child and parents needs

HEMOPHILIA

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Oldest hereditary disease

More common in men

Transmitted by females on the X chromosome

Blood does not clot properly due to:

- Two common forms
  - Hemophilia A- deficiency in factor VIII
  - Hemophilia B- deficiency in factor IX

HEMOPHILIA (CONT.)

- Manifestations
  - Abnormal bleeding
  - Prolonged clotting time (Partial Thromboplastin Time PTT)
  - Anemia
  - Leukocytosis
  - Moderate increase in platelets in the hemorrhaging child
  - Hematuria
  - Shock
  - Death

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HEMOPHILIA (CONT.)

- Treatment and Nursing care
  - Prevent bleeding- replacing the missing factor
  - DDAVP
  - Parent education
  - Monitor puncture sites
  - Check stool and urine- occult blood
  - Avoid salicylates
  - RICE
  - Medic alert bracelet
  - Carry factor replacement
  - Transfusions

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IDIOPATHIC THROMBOCYTOPENIC PURPURA
ITP

Acquired platelet disorder

Affects the number of platelets or their function

Autoimmune system reaction to a virus

Manifestations

- Bruises easy
- Petechiae and purpura
- Nosebleeds
- Platelet count- below 20,000/mm3
- Hx of viral infection

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ITP TREATMENT AND NURSING CARE

- Treatment and Nursing care
  - Neurologic assessment
  - Avoid drugs- interfere with platelet production (ASA, NSAIDS)
  - Limit activity
  - Observe for s/s of bleeding
  - Packed Red Blood Cell transfusion
  - Administration- prednisone and IV gamma globulin
  - Splenectomy
  - Immunizations

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LEUKEMIA

- Malignant disease of the blood forming organs
- Uncontrolled growth of immature WBC's
  - Blastocysts
  - WBC's 50,000 to 100,000/mm3
  - Cannot fight infection
  - Anemia
  - Bleeding
- Most common childhood cancer
- Most common
  - Acute Lymphoid Leukemia(ALL)
  - Acute Nonlymphoid (myelogenous) Leukemia(AMLL or AML)

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LEUKEMIA (CONT.)

- **Manifestations**
  - Low grade fever
  - Pallor
  - Bruising
  - Leg and joint pain
  - Abdominal pain
  - Anemia secondary to decreased RBC's
  - Petechiae and purpura
  - Skin color changes
  - Anorexia, vomiting, weight loss
  - Dyspnea
  - Hematuria
  - Enlargement of spleen, liver, and lymph glands
  - Enlargement of kidneys and testicles

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LEUKEMIA (CONT.)

- **Diagnosis**
  - Patient history
  - Signs and Symptoms
  - Extensive blood studies-CBC, Liver enzymes, Kidney function
  - Bone marrow aspiration

- **Treatment and Nursing Care**
  - Multi-disciplinary approach
  - Chemotherapy
  - Preventing hemorrhage
  - Monitoring lab values
  - Patient and family education
    - Delay active immunizations during chemotherapy
  - Supportive care
    - Skin
    - Nutrition
    - Preventing infection
- Prognosis- overall cure rate in ALL-80%

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LEUKEMIA (CONT.)

- **Common medications**
  - Prednisone
  - Antibiotics
  - Sedatives
  - Analgesics

- **Common Side Effects of Treatment**
  - Nausea, vomiting, diarrhea
  - Skin rash
  - Hair loss
  - Fever
  - Anemia
  - Bone marrow suppression
  - Peripheral neuropathy
  - Weakness and fatigue

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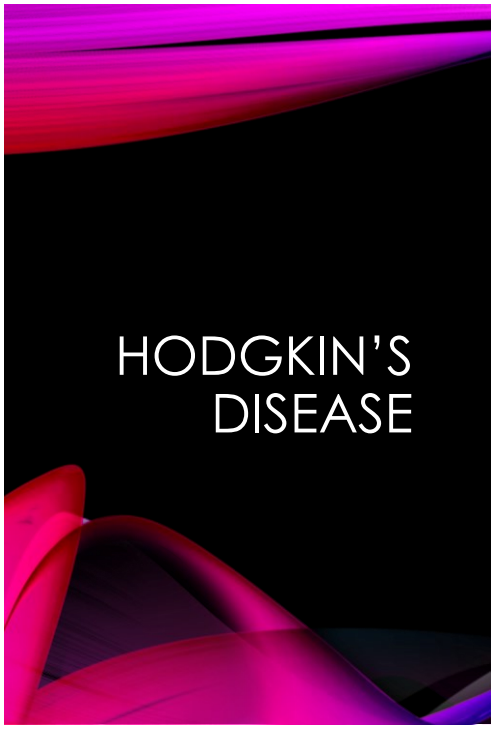

- Malignancy of the lymph system- lymph nodes
- Metastasizes- spleen, liver, bone marrow, lungs
- Reed-Sternberg cells
- Increase incidence in Adolescence and early adulthood
- Twice as common in boys

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HODGKIN'S (CONT.)

- **Manifestations**
  - Painless lump along neck
  - Low grade fever
  - Anorexia
  - Unexplained weight loss
  - Night sweats
  - General malaise
  - Rash and itching
- **Diagnosis**
  - X-ray
  - Body scan
  - Lymphangiogram
  - Biopsy of enlarged lymph node

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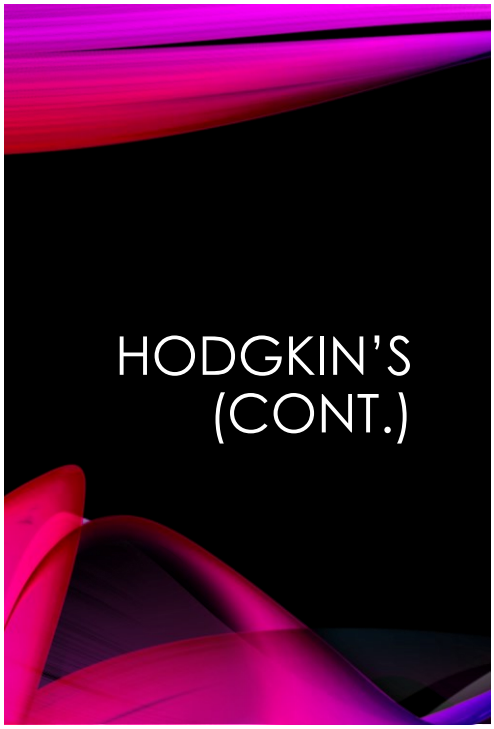

Treatment

- Radiation
- Chemotherapy

Nursing care

- Symptomatic relief of side effects of treatment
- Patient and family education
- Increase risk of infection
- Delay secondary sex characteristic

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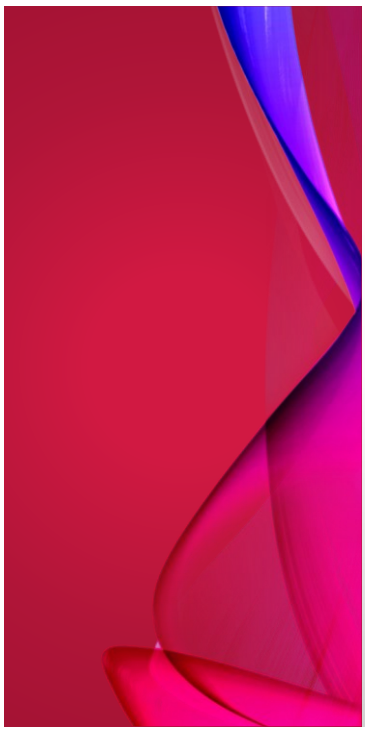

CARE OF THE CHRONICALLY ILL CHILD

- Nursing care
  - Impact on growth and development
  - Developmental disabilities
  - Home care/respite care
  - Avoid overprotection/overrestriction
  - Integrate into the community
  - Self exploration/coping

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CARE OF THE DYING CHILD

- Nursing Care
  - Multidisciplinary approach
  - Nurses role
  - Self exploration
  - Child's reaction to dying

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