PROBLEMS OF THE HEMATOLOGICAL SYSTEM

UNIT

5

OBJECTIVES

- Review A & P of Hematological system
- Outline focused exam
- Differentiate and start to evaluate diagnostic exams used to assess problems of the hematological system
- Identify diversity concerns for patients at risk for: Anemia, Leukemia, Lymphoma, & Lymphedema
- Differentiate clinical manifestations of various anemia's and leukemia's and those affected by the disease
- Relate the clinical manifestations of acute and chronic anemia, identifying diagnostic data related to both of the disease processes
- Design a nutritional plan for patients with any of the following disorders: Anemia, Leukemia, Lymphoma, and Lymphedema
- Summarize pharmacological agents used in treatment of hematological disorders such as Anemia, Leukemia, Lymphoma, and Lymphedema
- Apply critical thinking skills and analyze nursing interventions when providing pain medications to clients with the following disorders Anemia, Leukemia, Lymphoma, and Lymphedema
- Utilize selected terms associated with hematological system
- Analyze surgical and non surgical interventions for the following disorders Anemia, Leukemia, Lymphoma, and Lymphedema
- Relate etiology, epidemiology, pathophysiology, clinical manifestations nursing diagnosis, implementation/interventions and medical management indicated for the following disorders Anemia, Leukemia, Lymphoma, and Lymphedema
- Point out important information needed when communicating to the physician or nurse regarding the client with the following disorders , Anemia, Leukemia, Lymphoma, and Lymphedema
- Utilize nursing interventions in preventing Anemia, Leukemia, Lymphoma and Lymphedema
- Select nursing interventions that will prevent complications associated with Anemia, Leukemia, Lymphoma and Lymphedema
- Identify teaching principals and needs of the adult geriatric client, as a participant in the care with Apply critical thinking skills and analyze nursing interventions when providing pain medications to clients with the following disorders Anemia, Leukemia,

90 min 19 objectives 4.73 min per objective. Not a chance ..Review of A and P is independent

Anatomy and Physiology

- Bone Marrow
- Blood components
- Accessory organs or Hematopoiesis
- Homeostasis and blood clotting
- Hematologic changes with aging
- Anticoagulants, Fibrinolytics and Platelet Inhibitors

– Chapter 33 Lemone and Burke

Focused Health History

- **Family and Genetic History**
- **Personal History**
- **Diet History**
- **Socioeconomic Status**
- **Current health problems**

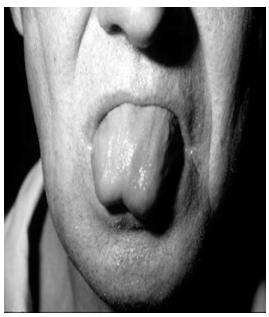
Physical Assessment

- **Skin**
- **Head and Neck**
- **Respiratory**
- **Cardiovascular**
- **Renal and Urinary**
- **Musculoskeletal**
- **Abdominal**
- **Central Nervous system**

Skin

- **Color**
- **Bleeding / Bruising**
- **Turgor**
- **Swelling**
  - **Lymphangitis**
  - **Lymphedema**
  - **Edema**

Head and Neck



- **Pallor or ulcerations**
- **Tongue**
- **Lymph nodes**

Cardiovascular Assesssment

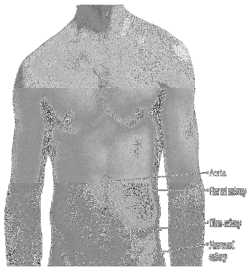
- **Heaves**
- **Distended neck veins**
- **Edema**
- **Signs of phlebitis**
- **Murmurs**
- **Gallops**
- **Irregular rhythms**
- **Abnormal Blood pressure**

Artery and Vein

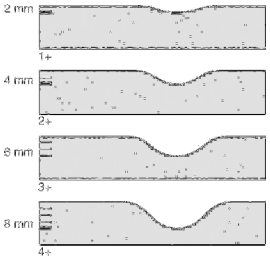
- Assessment to include
  - Symmetry
  - Rate
  - Rhythm
  - Volume
  - Amplitude
- Scale:
  - 0 = Absent
  - 1+ = Diminished
  - 2+ = Normal
  - 3+ = Increased
  - 4+ = Bounding

Abdominal Aorta Assessment

- Assess aorta
  - Aneurysm
  - Stenosis
  - Occlussion



Edema

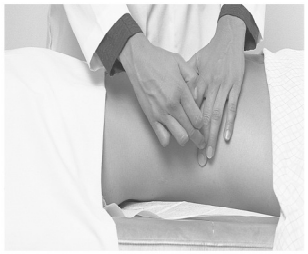


Abdominal Assessment

- The spleen is normally not palpable

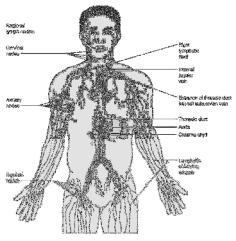
Liver:

- Normally the liver is palpable 4 to 5 cm below the right costal margin



Lymph Node Assessment

- Nodes should not enlarged (greater than 1 cm) or painful



Respiratory Assessment

- Rate
- Depth
- Activity Tolerance
- Sleep behaviors

Renal and Urinary Assessment

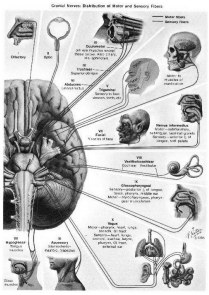
- Urine color
  - Overt blood
  - Occult blood
- Protein

Musculoskeletal Assessment

- Tenderness
- Joint mobility
  - Swelling
  - Pain

Central Nervous System

- Cranial Nerves
- Neurologic function
- Fever
- Chills
- Night sweats



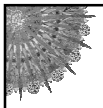
Hematologic Laboratory Assessment

Complete blood count
Reticulocyte Count
Hemoglobin Electrophoresis
Leukocyte Alkaline Phosphatase
Coombs Test
Serum Ferritin, Transferrin and Total Iron Binding Capacity
PT/INR/PTT

Radiographic Assessments

- Radioactive Isotope Imaging
- Bone Marrow Aspiration and Biopsy

Anemia



Anemia

- Anemia
- Iron Deficiency Anemia
- Vitamin B12 Deficiency Anemia
- Folic Acid Deficiency Anemia
- Sickle Cell Anemia
- Thalassemia
- Acquired Hemolytic Anemia

Anemia

- **The reduction in either the number of red blood cells, the amount of hemoglobin, or the hematocrit**
- **Clinical sign (not a specific disease); a manifestation of several abnormal conditions**

Iron Deficiency Anemia

- This common type of anemia can result from blood loss, poor intestinal absorption, or inadequate diet.
- Evaluate adult clients for abnormal bleeding.
- Supplemental iron is the treatment.

Vitamin B_{12} Deficiency Anemia

- Anemia is caused by inhibiting folic acid transport and reducing DNA synthesis in precursor cells.
- Vitamin B_{12} deficiency is a result of poor intake of foods containing vitamin B_{12}.

(Continued)

Vitamin B_{12} Deficiency Anemia *(Continued)*

- **Pernicious anemia is anemia caused by failure to absorb vitamin B_{12} and lack of intrinsic factor; clients often exhibit paresthesia.**

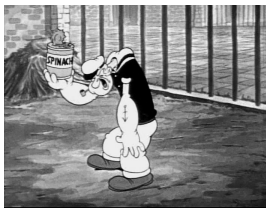
Folic Acid Deficiency Anemia

- **Can cause megaloblastic anemia**
- **Manifestations similar to those of vitamin B_{12} deficiency, but nervous system functions remain normal**

(Continued)

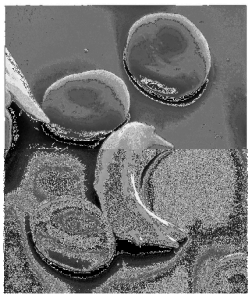
Folic Acid Deficiency Anemia *(Continued)*

- **Caused by:**
  - **Poor nutrition and chronic alcohol abuse**
  - **Malabsorption syndromes, such as Crohn's disease**
  - **Drugs, including anticonvulsants and oral contraceptives, that slow or prevent absorption of folic acid**



Sickle Cell Anemia

- Blood smear containing normal red blood cells and sickle cells.



Thalassemia

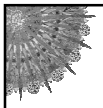
- Major and Minor
- Inherited disorder of Hgb synthesis
- Most common in People of Mediterranean descent

Acquired Hemolytic Anemia

- Mechanical trauma
- Autoimmune disorders
- Bacterial or Protozoal infections
- Immune system mediated responses
- Drugs – Toxins- Chenical Agents- Venoms

Glucose-6-Phosphate Dehydrogenase (G6PD) Deficiency Anemia

- **Most common type of congenital hemolytic anemia**
- **Hydration**
- **Screening for this deficiency necessary before donating blood, because cells deficient in G6PD can be hazardous**



Nursing Implications

- Anemia
  - Medications
    - Iron replacement therapy for iron deficiency anemia
    - Parenteral vitamin B12 for vitamin B12 deficiency anemia
    - Folic acid supplementation
    - Hydroxyurea for sickle cell anemia
  - Treatments
    - Blood transfusion
  - Nursing diagnoses
    - Activity intolerance
    - Impaired oral mucous membranes
    - Risk for decreased cardiac output
    - Self-care deficit

Leukemia

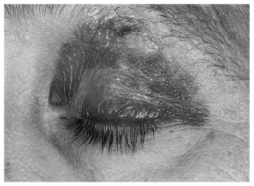
Leukemia

- **Acute or chronic**
- **Classified by cell type and acuity**
  - **Acute lymphoblatic leukemia**
  - **Chronic lymphocytic leukemia**
  - **Acute myeloid leukemia**
  - **Chronic myeloid leukemia**

Clinical Manifestations

- **Integument**
- **Intestinal manifestations**
- **Renal**
- **Cardiovascular**
- **Respiratory**
- **Central nervous system**
- **Musculoskeletal**

- Increased bleeding due to thrombocytopenia
  - bruising,
  - petechiae
  - bleeding gums and
  - bleeding within specific tissues



Laboratory Assessment

- Decreased hemoglobin and hematocrit levels
- Low platelet count
- Abnormal white blood cell count, may be low, normal or elevated, but is usually quite high
- Poorer prognosis: client with high white blood cell count at diagnosis

(Continued)

Laboratory Assessment *(Continued)*

- Definitive test: examination of cells obtained from bone marrow aspiration and biopsy

Risk for Infections

- Infection is a major cause of death in the client with leukemia, and sepsis is a common complication.
  - Autocontamination
  - Cross-contamination

Drug Therapy for Acute Leukemia

- Induction therapy
- Consolidation therapy
- Maintenance therapy
- New drug therapies
- Drug therapy for infection

Infection Protection

- Frequent handwashing
- Private room
- HEPA filtration or laminar airflow system
- Mask for visitor with upper respiratory infection

(Continued)

Infection Protection *(Continued)*

- "Minimal bacteria diet" without uncooked foods
- Monitoring of daily laboratory results
- Assessment of vital signs
- Skin care, respiratory care

Bone Marrow Transplantation

- Standard treatment for leukemia
- Purges present marrow of the leukemic cells
- After conditioning, new, healthy marrow given to the client toward a cure
- Sources of stem cells
- Conditioning regimen
- Transplantation

Risk for Injury

- Nadir: period of greatest bone marrow suppression
- Bleeding precautions
- Fatigue
- Interventions:
  - Diet therapy
  - Blood replacement therapy
  - Drug therapy
  - Energy conservation

Case study

- Mr McCann, an 80 year old Caucasian male
- Hx of frequent sinus infections
- Current condition Cholecystitis, leukocytosis
- Socio – retired firefighter with 2 grown children

Work up/Treatment

- On arrival to the ED his temperature is 103 degrees F
- WBC count on admission is 35,900
- A gallbladder UTZ revealed a stone with sludge present.
- Levofloxacin and Flagyl were ordered IV

Day 4

- WBC remains elevated - 25,900
- No lymphadenopathy or spleenomegaly
- Negative Hepatitis Negative mononucleosis screen
- Urine analysis defines no abnormality
- A Lap choley is recommended

Day 11

- WBC 30,500
- Referral to an oncologist
- Diagnosis

- Prioritize three nursing diagnosis appropriate for Mr McCann at this stage of his cronic illness

- Identify three components of a teaching plan to educate ways to reduce his of infection

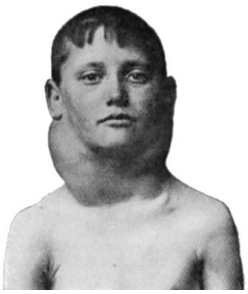
- Identify at least five nursing interventions to address coping needs and include at least one community resource

Lymphoma

Hodgkin's Lymphoma

- **Cancer that starts in a single lymph node or a single chain of nodes**
- **Large, painless lymph node usually in the neck; fever, malaise, night sweats**
- **Marker: Reed-Sternberg cell**
- **One of the most curable cancers**
- **Treatment: external radiation alone or with combination chemotherapy**

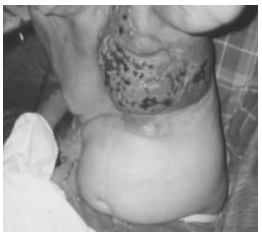
Hodgkin's Lymphoma

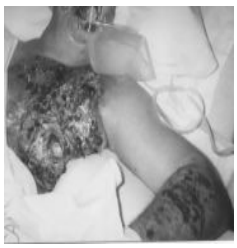


Non-Hodgkin's Lymphoma

- **All lymphoid cancers that do not have the Reed-Sternberg cell**
- **More than 12 types of non-Hodgkin's lymphoma**
- **Low-grade – slow progress; less responsive to treatment; cures are rare**
- **Treatment: radiation therapy and multiagent chemotherapy, or single-agent therapy with fludarabine**

B Cell Non Hodgkin's Lymphoma

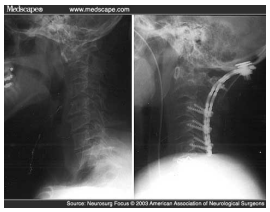




Multiple Myeloma

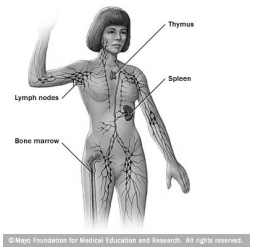
- **White blood cell cancer that involves a more mature lymphocyte than either leukemia or lymphoma**
- **Uncommon cancer**
- **Manifestations: fatigue, easy bruising, bone pain, fractures, hypertension, increased infection, hypercalcemia, and fluid imbalance**
- **Treatment: chemotherapy**

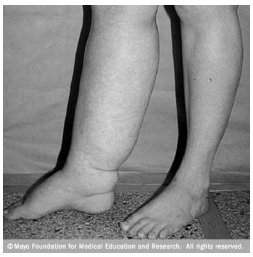
Visual of Multiple Myeloma



- Plain lateral *(left)* pre- and postoperative *(right)* x-ray films obtained in a patient with multiple myeloma. The preoperative study demonstrates pathological dens fracture with C1-2 subluxation, and the postoperative study reveals reduction of deformity and posterior occipitocervical hardware

Lymphedema





Lymphedema

- Inability to drain lymph fluid from the arm or legs
  - Primary – occurs on its own
  - Secondary caused by another disease process
    - Milroy disease
    - Meige disease
    - Late onset