Lincoln Memorial University
Caylor School of Nursing
NURS 242/244
Spring 2010

LESSON PLAN: Nursing Strategies: Alterations in Cellular Function
DATES: See syllabus
TIMES: See syllabus
OBJECTIVES: Upon completion of this unit, the student will be able to demonstrate in clinical/campus laboratory setting, in individual and group conferences, and on written materials, the ability to:

1. Define and use the glossary terms as listed in the assigned readings.
2. Using the four adaptive modes of Roy's Adaptation Model (RAM), recognize human adaptive responses to behavior or stimuli when experiencing alterations in cellular function.
3. Compare and contract the various listed types of anemias.
4. Describe nursing and medical management associated with DIC.
5. Identify appropriate nursing interventions associated with blood administration and identify important gerontologic considerations associated with this procedure.
6. Identify environmental and physical factors that affect a person's immune system functioning.
7. Ulitize the RAM nursing process to provide care for adults with impaired immune system functioning
8. Describe the pathophysiology, clinical manifestations and nursing care related to acquired immunodeficiency syndrome (AIDS).
9. Describe the nursing interventions appropriate when caring for elderly patients in relation to skin changes.
10. Utilize the RAM nursing process to provide care for adults with altered integumentary functioning.
11. Describe the pathophysiological changes within the body that accompanies a burn injury.
12. Determine the percent of the body burned by using the Rule of Nines.
13. Identify the nursing interventions appropriate to each of the three stages of burn care.
14. Compare and contrast skin grafts and skin flaps and the nursing interventions appropriate for each.
15. Identify properly the medications on the drug list by generic name, classification, mechanism of action, clinically significant side effects, normal dosage and nursing implications and be able to correctly calculate IV, IM and po dosages.

CLINICAL OBJECTIVES:
1. Assess assigned patients for factors that could affect their immune system functioning.
2. Develop and implement a nursing care plan for the patient with AIDS.
3. Apply legal/ethical principles in the implementation of nursing care to AIDS patients.
4. Assess assigned clinical patients for actual or potential disruption of the integumentary system.
5. Develop and implement a nursing care plan for the patient with disruption of the integumentary system.

TOPICAL OUTLINE:

I. Nursing Strategies R/T Hematologic Problems
- A. Review of Hematologic System – Ch 33
- B. Classification of Anemia– see attached handout
- C. Clotting Defects - Disseminated Intravascular Coagulation

II. Nursing Strategies R/T the Immune System
- A. Overview of the immune system – brief review
- B. Physiology of the immune system
  1. Immune function
     a. Natural immunity
     b. Acquired immunity
  2. Humoral immune response
  3. Cellular immune response
  4. Complement system
  5. Interferons
- C. Assessment of the Immune System
- D. Impaired immune system functioning - Immunodeficiency:
  1. Primary (brief overview)
  2. Secondary
  3. HIV Infection and AIDS

III. Nursing Strategies R/T Altered Integumentary Functioning
- A. Assessment and management of skin/wound care (brief overview)
- C. Dermatologic problems
  1. Viral skin infections - Herpes Simplex
  2. Noninfectious inflammatory dermatoses: psoriasis
  3. Skin cancer
     a. Basal and squamous cell cancer
     b. Malignant melanoma

IV. Nursing strategies R/T burn injury
- A. Classification of Burns
- B. Pathophysiology of burns
- C. Nursing interventions R/T management of patient with burn injury
  1. Immediate/Emergent phase
     a. Emergency management – on the scene care and ER care
     b. Alteration in fluid and electrolyte balance
  2. Intermediate/Acute phase
     a. Nursing strategies R/T complications of this phase
        1. Respiratory system complications
        2. Fluid and electrolyte imbalances
     b. Nursing strategies R.T the burn wound
        1. Prevention of infection
        2. Methods of treating the burn wound
           a. Wound cleaning
           b. Topical antibacterial therapy
           c. Wound dressing (exposure vs. occlusive dressings)

d. Wound debridement
e. Wound grafting

3. Disorders of Healing

c. Nursing strategies R/T pain control
d. Altered nutrition: less than body requirements

3. Rehabilitation phase

REQUIRED READINGS:

Kee, J. L., Hayes, E.R., & McCuistion, L.E. (2009). *Pharmacology: A nursing process approach (Ed 6).* St. Louis: Mosby. Chapters 34, 49 pp. 760-762, 765-767.

Smeltzer, S.C., Bare, B.G., Hinkle, J. L., Cheever, K.H. (2008). *Brunner & Suddarth's textbook of medical-surgical nursing (Ed 11).* Philadelphia: Lippincott Williams & Wilkins. Chapters 33 pp. 1035-1052, 1061-1062, 1093-1098, 1104-1113, 50, 51, 52, 56 pp. 944-1951, 1959-1960, 1965-1971, 1978-1988, 57.

Wissmann, J. (Ed.). *Adult Medical –Surgical Nursing: Content mastery series review module (Ed 7.1).* Kansas City, MO: Assessment Technologies Institute, LLC. Ch 25-26, 107; 113; 115.

MEDICATIONS:

Hematologic Related Medications

ferrous sulfate (Feosol, Iberet)
iron dextran (Infed)
deferoxamine mesylate (Desferal)
anti-thymocyte globulin (ATG, Atgan)
cyclosporine (Sandimmune)
epoetin alfa (Procrit, Epogen)
darbepoetin alfa (Aranesp)

Antivirals

acyclovir (Zovirax)
famciclovir (Famvir)
valacyclovir (Valtrex)

Protease Inhibitors

see table 52-3, pp. 1827-1828

Nucleoside Reverse Transcriptase Inhibitors

see table 52-3, pp. 1827-1828

Non-nucleoside Reverse Transcriptase Inhibitors

see table 52-3, pp. 1827-1828

Fusion Inhibitors

see table 52-3, pp. 1827-1828

Treatment of Psoriasis

see table 56-6, p. 1966

Management of HIV/AIDS complications

TMP-SMZ (Bactrim, Septra)
Pentamidine (Pentacarinat, Pentam 300, NebuPent)
Clarithromycin (Biaxin)
Azithromycin (Zithromax)
Rifabutin (Mycobutin)
Amphotericin B
Flucytosine (5-FC, Ancobon)
Clotrimazole (Mycelex)
Fluconazole (Diflucan)
Nystatin
Ketaconazole (Nizoral)
Megestrol acetate (Magace)
Dronabinol (Marinol)
Ganciclovir (Cytovene, Vitrasert)
Foscarnet (Foscavir)
Octreotide acetate (Sandostatin)
Imipramine (Tofranil)
Desipramine (Norpramin)
Fluoxetine (Prozac)
Methylphenidate (Ritalin)

Burn Wound Topical Agents

See table 57-7, p. 2018

Lincoln Memorial University
Caylor School of Nursing
Altered Cell Unit – Hematology Handout

A. **Review of Hematologic System** - Refer to text Chapter 33, pages 1035-1117.

B. **Classification of Anemias**

1. **Hypoproliferative Anemias**
   a. Iron Deficiency Anemia

Causes:

- Inadequate dietary intake
- Blood loss (menstrual loss, PUD, chronic alcholism)
- Malabsorption of iron by GI tract
- Accelerated growth rate and pregnancy

Symptoms:

- Pallor
- Smooth, sore tongue
- Brittle and rigid nails
- Cheilosis
- Headache
- General malaise, weakness, fatigue
- Pica

Diagnosis:

- Decreased hgb
- Decreased hct
- Decreased MCV (measures size of erythrocytes)
- Decreased serum ferritin = low iron stores
- Elevated TIBC

Treatment:

- Diagnose and treat the underlying cause
- Oral iron therapy - see chart page 1050
  325 mg ferrous sulfate qid for at least 6-12 months. Best absorbed in fasting and acidic state.
  SE= nausea, heartburn, constipation, stained teeth, black stool
- Parenteral iron therapy
  - Iron dextran IM -- administer via deep Z-track technique
  - SE = stained skin, pain at injection site
- IV iron therapy
  - Administer diluted solution slowly over 3-4 hours
  - SE = anaphylaxis, Not to be given to pt. with rheumatoid arthritis because can cause exacerbation of the disease

- Blood transfusion of packed RBC's

b. Anemias in Renal Disease

Cause: Decrease in production of the hormone erythropoietin

Symptoms: Symptoms of anemia usually do not develop until the serum creatinine > 3

Treatment: Epogen or Procrit Sub Q injections 3 times per week, or Aranesp 1 time/week

c. Aplastic Anemia - pancytopenia of varying degrees (mild to severe) --erythrocytes, leukocytes & platelets are quantitatively decreased with no evidence of dysplasia.

Causes:

- Congenital chromosomal alterations
- Acquired due to radiation exposure, chemical exposure (benzene),
- Viral and bacterial infections
- Pesticides - DDT
- Pregnancy
- Most cases are without apparent cause

Symptoms:

- Anemia = fatigue, dyspnea, weakness, pallor
- Neutropenia = infection, fever
- Thrombocytopenia = bleeding, petechiae
- Purpura = bruising
- Retinal Hemorrhage

Diagnosis:

- CBC = pancytopenia
- Bone marrow aspiration = hypoplastic marrow
- Prolonged bleeding time

Treatment:

- Patients <60 years old - treatment of choice = BM or peripheral blood stem cell transplant
- Patients > 60 years old - or who cannot find a bone marrow match, treatment is immunosuppression with ATG and cyclosporine
- Patients are supported with transfusions of packed RBCs and platelets

d. Megaloblastic Anemias

(**Note:** Folic acid deficiency and B12 Deficiency many times occur at the same time.)

1. Folic Acid Deficiency

Causes:

- Poor nutrition
- Small bowel absorption syndromes
- Drugs that interfere with absorption of folic acid i.e., methotrexate and other chemotherapy, oral contraceptives, phenobarbital, dilantin
- Alcohol abuse
- Pregnancy

Symptoms:

- GI= dyspepsia, inflamed tongue
- **NO** neurological symptoms
- Congenital neural tube defect
- Decreased weight and length of infant

Diagnosis:

- Decreased serum folate level

Treatment:

- 1 mg folic acid po daily
- include more green leafy vegetables, liver, meats, fish, whole grain, beans in diet

2. B12 Deficiency (Pernicious anemia)

Causes:

- strict vegetarian
- gastric secretion of intrinsic factor (IF) is defective. (IF is required for vitamin B12 absorption)
- GI mucosal atrophy (Crohn's Disease), gastrectomy or small bowel resection

Symptoms:

- GI = smooth, sore, red tongue
- Diarrhea
- Pale
- Neuromuscular = weakness, paresthesias of feet and hands, ataxia, muscle weakness, memory loss, confusion, depression

Diagnosis:

- Macrocytic erythrocytes
- Intrinsic factor antibody test
- Positive Schilling test

Treatment:

- IM or Sub Q injections of vitamin B12 - daily for 2 wks, weekly until hct is normal, then monthly for life.

2. Blood Loss

a. Acute:

Causes**:**

- Trauma
- Complications of surgery
- Disease that disrupts vascular integrity (i.e., bleeding esophageal varices)

Symptoms:

- Clinical symptoms are more valuable than lab data initially
- Range from mild to severe - tachycardia, postural hypotension, decreased blood pressure at rest, thready pulse, cold, clammy skin, shock, death

Diagnosis:

- Lab data not reflective initially, normal to high Hct/Hgb for 2-3 days, then will decrease

Treatment:

- Replace blood volume with IV fluids, dextran, albumin, crystalloid electrolyte solution
- Identify source of bleeding and control
- Blood transfusions
- Supplemental iron

b. Chronic

Causes:

- Bleeding PUD (peptic ulcer disease)
- Hemorrhoids
- Menstrual blood loss

Treatment:

- Treated as iron-deficient anemia

3. Hemolytic Anemia

Thalassemia

Causes:

- An autosomal recessive genetic disorder that causes defective syntheses of the hemoglobin chain.
- Occurs most commonly in Italians, Greeks (Mediterraneans), southeast Asians, and Africans
- Disease classified into two major gours according to which hemoglobin chain is dimished: alpha (milder forms) or beta

Symptoms:

- Thalassemia minor - usually asymptomatic
- Thalassemia major - jaundice, bone deformitites, splenomegaly, pathologic fractures, general symptoms of anemia

Diagnosis:

- Prenatally by amniocentesis or chorionic villus biopsy
- Family history, DNA sequence defects

Treatment:

- Blood transfusions to keep Hgb level at 10 g/dL
- Treat iron overload from transfusions with deferoxamine mesylate (Desferal) This may be accomplished with a continuous IV or Sub Q pump
- Bone marrow transplant