Unit 7: Hematology
Chapter 33 & 34
ONLINE CONTENT (2H)

Complete the worksheet and submit in the Unit 7: Hematology dropbox by March 17, 2025 at 0800. Please be sure to bring a copy to class on March 17, 2025.

Table 1	**Iron Deficiency Anemia**	**Thalassemia**	**Cobalamin (Vitamin B_{12}) Deficiency**	**Folic Acid Deficiency**
Etiology	Iron deficiency anemia may develop from inadequate diet intake, malabsorption, blood loss, or hemolysis.	Thalassemia is a group of disorders causing reduced or absent globin protein production, leading to decreased RBC production and hemolysis.	Intrinsic factor (IF) is needed for cobalamin absorption in the distal ileum. Without IF, cobalamin is not absorbed. Can result from GI surgery, Crohn's disease, celiac disease, chronic gastritis, alcohol, hot tea, smoking, certain medications, or a strict vegetarian diet.	Folic acid is needed for DNA synthesis leading to RBC formation and maturation. Folic acid deficiency can result from chronic alcohol use, hemodialysis, poor diet certain drugs and malabsorption conditions like celiac disease, Crohn's disease, or small bowel resection.
Clinical Manifestations	↑ HR, ↑ pulse pressure, systolic murmurs, intermittent claudication, angina, HF, MI, Icteric conjunctiva and sclera, retinal hemorrhage, blurred vision	Often asymptomatic. might have mild to moderate anemia with microcytosis (small cells) and hypochromia (pale cells), mild splenomegaly, bronzed skin color, and bone marrow hyperplasia.	Hypoxia, Sore, red, beefy, and shiny tongue, anorexia, nausea, vomiting, abdominal pain, weakness, paresthesia of feet and hands, reduced vibratory and position senses, ataxia, muscle weakness, and impaired cognition. (may take several months or years for symptoms to show)	The manifestations of folic acid deficiency are like cobalamin deficiency. It develops insidiously. Symptoms may be attributed to other coexisting problems
Diagnostic Studies	History and physical assessment Labs: • Hgb/Hct: ↓ • MCV: ↓ • Reticulocytes ↓ or ↑ • Serum Iron: ↓ • TIBC: ↑ • Transferrin: N or ↓ • Ferritin: ↓ • Bilirubin: N or ↓	History and physical assessment Labs: • Hgb/Hct: ↓ • MCV: N or ↓ • Reticulocytes: Serum Iron: ↑ • TIBC: ↓ • Transferrin: ↓ • Ferritin: N or ↑ • Bilirubin: N or ↑ • Folate: ↓	History and physical assessment Labs: • Hgb/Hct: ↓ • MCV: ↑ • Reticulocytes: N or ↓ • Serum Iron: N or ↑ • Transferrin: Slight ↑ • Ferritin: ↑ • Bilirubin: N or slight ↑ • Serum B12: ↓ Upper GI endoscopy and biopsy	History and physical assessment Labs: • Hgb/Hct: ↓ • MCV: ↑ • Reticulocytes: N or ↓ • Serum Iron: N or ↑ • Transferrin: Slight ↑ • Ferritin: ↑ • Bilirubin: N or slight ↑ • Folate: ↓
Drug Therapy	Some IV and IM iron preparations have a risk for an allergic reaction, so monitor the patient accordingly. Oral iron should be taken 1 hour before meals.	Transfusions are generally given when the Hgb drops to less than 7 g/dL (100 g/L). Drugs used include oral deferasirox or deferiprone or IV or	Parenteral vitamin B12 (cyanocobalamin, hydroxocobalamin) or intranasal cyanocobalamin. 1000 mcg/day of cobalamin IM for 2 weeks, then	We treat folic acid deficiency with replacement therapy. The usual dosage is 1 to 5 mg/day by mouth. The duration of treatment depends on the reason for

	Vitamin C (ascorbic acid) enhances iron absorption.	subcutaneous deferoxamine. Luspatercept-aamt may be given subcutaneously every 21 days.	weekly until the Hgb is normal, and then monthly for life.	the deficiency.
Nursing Management	Treat the underlying problem that is causing iron loss first. (Malnutrition, alcohol use. Teach the patient which foods are good sources of iron. Give oral, or occasionally, IV iron supplements if needed. Give packed RBC transfusion if needed.	Thalassemia minor does not need treatment because the body adapts to the reduction of normal Hgb. In older adults, we need to give and manage blood transfusions or exchange transfusions in conjunction with chelating agents that bind to iron. therapy.	Assess for neurologic problems that are not corrected by replacement therapy. Implement measures to reduce the risk for injury from the decreased sensitivity to heat and pain. Protect the patient from falling, burns, and trauma	Teach the patient to eat foods high in folic acid (Meat, eggs, enriched grain products, milk and dairy foods, fish).

Table 2	**Anemia of Chronic Disease**	**Aplastic Anemia**	**Acute Anemia due to Blood Loss**	**Chronic Anemia due to Blood Loss**
Etiology	Results from reduced RBC production and a shorter RBC lifespan. It is usually mild but can worsen if the underlying condition is untreated. Traps iron in storage, reducing its availability for RBC production. Caused by cancer, autoimmune and infectious disorders HIV, hepatitis, HF, or chronic inflammation. Bleeding episodes can contribute to anemia of chronic disease.	Autoreactive T lymphocytes attack and destroy the patient's hematopoietic stem cells. Cytotoxic T cells specifically target these stem cells, leading to their destruction. Caused by toxins, drugs, immune suppression of stem cells by autoreactive T lymphocytes, stem cell defects, radiation, toxic injury to bone marrow stem cells and viral and bacterial infections	Sudden bleeding. Causes are trauma, surgery complications, and problems that disrupt vascular integrity.	The sources of chronic blood loss are bleeding ulcer, hemorrhoids, menstrual and postmenopausal blood loss. The effects of chronic blood loss are usually due to depleted iron stores. We consider it an iron deficiency anemia. Management of chronic blood loss anemia involves identifying the source and stopping the bleeding. The patient may need iron supplements.
Clinical Manifestations	General symptoms like fatigue, weakness, pallor, shortness of breath, dizziness and lightheadedness	Fatigue, dyspnea, neutropenia, thrombocytopenia can lead to bleeding (petechiae, bruising, nosebleeds).	10% blood loss = None or rare vasovagal syncope. 20% blood loss = No detectable signs or symptoms at rest. ↑ HR with exercise and slight postural hypotension 30% blood loss = Normal supine BP and pulse at rest. Postural hypotension and ↑ HR with exercise 40% blood loss = BP, central venous pressure, and cardiac output below normal at rest; air hunger; rapid, thready pulse and cold, clammy	(Similar to anemia of chronic disease) General symptoms like fatigue, weakness, pallor, shortness of breath, dizziness and lightheadedness

			skin 50% blood loss = Shock, lactic acidosis, and potential death	
Diagnostic Studies	History and physical assessment Labs: • Hgb/Hct: ↓ • MCV: ↓ • Reticulocytes N or ↓ • Serum Iron: ↓ • TIBC: ↓ • Transferrin: N or ↓ • Ferritin: N or ↑	History and physical assessment Labs: • Hgb/Hct: ↓ • MCV: N or slight ↑ • Reticulocytes: ↓ • Serum Iron: N or ↑ • TIBC: N or ↑ Bone marrow biopsy, aspiration, and pathologic examination	History and physical assessment Labs: • Hgb/Hct: ↓ • MCV: N or ↓ • Reticulocytes: N or ↑	History and physical assessment Labs: • Hgb/Hct: ↓ • MCV: ↓ • Reticulocytes: N or ↑ • Serum Iron: ↓ • TIBC: ↓ • Transferrin: ↓ • Bilirubin: N or ↓
Drug Therapy	Blood transfusions may be needed. They are not recommended for long-term treatment. EPO therapy is used for anemia from renal disease.	Hematopoietic Stem Cell Transplantation (HSCT). Immunosuppressive therapy (antithymocyte globulin and cyclosporine). An oral thrombopoietin receptor agonist to increase platelet counts (Eltrombopag).	Blood transfusions (packed RBCs), whole blood, platelets and plasma. IV fluids for emergencies are volume replacement fluids (e0.9% NaCl, lactated Ringer) or colloids that pull fluids back in.	Iron supplements
Nursing Management	Monitor labs regularly. Evaluate for signs of worsening anemia. Assess underlying chronic conditions contributing to anemia.	Identify and remove the causative agent. Provide supportive care. Prevent complications from infection and bleeding.	Assess the patient for pain. Assess for numbness and pain in lower extremities. Monitor for signs of shock. Replace blood volume to prevent shock. Promote coagulation to prevent further bleeding. Find the source of the bleeding and stop the blood loss.	Identifying the source and stopping the bleeding Assess for pain Monitor the patient

Table 3	**Acquired Hemolytic Anemia**	**Hemochromatosis**	**Polycythemia**
Etiology	RBCs themselves are normal, but external factors are causing destruction. Macrophages in the spleen, liver, and bone marrow, break down RBCs that are aged, defective, or damaged.	Iron overload disorder is caused by excessive iron absorption in the intestines, often due to a genetic defect. It can also occur in conditions like sideroblastic anemia, liver disease, and with chronic blood transfusions.	Production and increased numbers of RBCs. RBCs can be so great that blood circulation is impaired because of the increased blood viscosity and volume of it.
Clinical Manifestations	Fatigue, sensitivity to cold, weight loss, lethargy, jaundice, spleen and liver enlargement	Early Symptoms (usually after age 40 in men and 50 in women) = Fatigue, joint pain, abdominal pain, weight loss. Later Symptoms = Liver enlargement and cirrhosis, skin pigmentation changes (bronzing),	Headache, vertigo, dizziness, tinnitus, visual changes, generalized itching, paresthesia, painful burning and redness of the hands and feet, may have angina, HF, intermittent claudication, and thrombophlebitis

		cardiomyopathy, arthritis, testicular atrophy	
Diagnostic Studies	History and physical assessment Labs: • Hgb/Hct: ↓ • MCV: N or ↑ • Reticulocytes: ↑ • Serum Iron: N or ↑ • TIBC: N or ↓ • Ferritin: N or ↑ • Bilirubin: ↑	History and physical assessment Labs: • Serum Iron: ↑ • TIBC: ↑ • Ferritin: N or ↑ Testing for known genetic MRI Liver biopsy	History and physical assessment Labs: • Hgb/Hct: ↑↑ • RBC: ↑ • WBC: ↑ • Platelets: ↑ Bone marrow examination
Drug Therapy	Corticosteroids, immunosuppressants, IVIG, Epoetin Alfa	Iron-chelating drugs (deferoxamine IV or subcutaneously, deferasirox and deferiprone orally).	Hydroxyurea, Busulfan, Ruxolitinib
Nursing Management	Maintain/monitor renal function. Control BP, give fluids if needed, take accurate I's and O's	Minimize any symptoms the patient may have. Remove excess iron. Educate on diet changes include avoiding vitamin C and iron supplements, uncooked seafood, and iron-rich foods.	Reduce blood volume and viscosity and bone marrow activity. Education on the need for phlebotomy every 2 to 3 months. Assess intake and output during hydration therapy to avoid fluid overload and nutrition status.

In order to receive full credit (2H class time) for this assignment, it must be completed in its entirety by the due date/time assigned. Any assignment not completed in its entirety by the due date and time will result in missed class time and must be completed by the end of the semester to pass the course.