

Unit 7: Hematology
Chapter 29 & 30
ONLINE CONTENT (1.5 H)

Complete the worksheet and submit in the Unit 7: Hematology dropbox by March 20, 2023 at 0800. Please be sure to bring a copy to class on March 20, 2023.

Table 1	Iron Deficiency Anemia	Thalassemia	Cobalamin (Vitamin B₁₂) Deficiency	Folic Acid Deficiency
Etiology	Inadequate dietary intake, malabsorption, blood loss, or hemolysis Iron absorption occurs in the duodenum and can happen if surgery on GI tract.	Group of diseases involving inadequate production of normal hemoglobin, which decreases RBC production. Autosomal recessive genetic basis	Pernicious anemia Caused by an absence of intrinsic factor. A disease of insidious onset. It begins in middle age or later. Northern European ancestry and blacks is most common. GI surgery	Folic acid is needed for DNA synthesis leading to RBC formation and maturation.
Clinical Manifestations	Early-no symptoms Chronic- pale skin, tachycardia, headache, fever, unsteady gait, ataxia, lethargy, And postural hypotension	Minor- asymptomatic Major- Life-threatening: physical and mental slowness Pale and other anemia symptoms Happens by age 2: growth and development deficits, jaundice, splenomegaly, hepatomegaly and cardiomyopathy	Develop from tissue hypoxia. Sore, red, beefy, and shiny tongue Anorexia, nausea, vomiting, and abdominal pain. Weakness, paresthesia, vibratory and position senses, ataxia, muscle weakness, and impaired thought process (confusion to dementia)	Develops insidiously. GI problems: stomatitis, cheilosis, dysphagia, flatulence and diarrhea. Neurological problems
Diagnostic Studies	Hgb/hct MCV, Reticulocytes, Serum Iron, TIBC, Transferrin, Ferritin, Bilirubin, Serum B12, and Folate Endoscopy, colonoscopy, bone marrow biopsy	Iron studies, Blood work, ECG Hgb/hct MCV, Reticulocytes, Serum Iron, TIBC, Transferrin, Ferritin, Bilirubin, Serum B12, and Folate Endoscopy, colonoscopy, bone marrow	Hgb/hct MCV, Reticulocytes, Serum Iron, TIBC, Transferrin, Ferritin, Bilirubin, Serum B12, and Folate Endoscopy, colonoscopy, bone marrow biopsy Serum folate MMA	Serum Folate level will be low. Normal serum cobalamin level Hgb/hct MCV, Reticulocytes, Serum Iron, TIBC, Transferrin, Ferritin, Bilirubin, Serum B12, and Folate

		biopsy	Serum homocysteine	
Drug Therapy	Oral Iron IM Or IV Iron dextran, sodium ferrous gluconate, and iron sucrose	Blood transfusions or exchange transfusions Oral deferasirox or deferiprone or IV deferoxamine	Parenteral vitamin B12 or intranasal cyanocobalamin is needed. Cobalamin IM for 2 weeks High-dose oral cobalamin	Replacement therapy: 1mg/day by mouth May be up to 5mg/day if malabsorption or alcoholism.
Nursing Management	Treat underlying issue Replacing iron Teach about iron rich foods: dark green leafy vegetables, beans, chicken. Iron supplements	Patients may need a splenectomy. Hepatic, heart, and lung function are monitored and treated as needed. Hematopoietic stem cell transplantation may be needed.	Assess for neurological difficulties that are not fully corrected by replacement therapy. Reduce the risk of injury from decreased sensitivity to heat and cold. Protect from fall, burns and trauma, Physical therapy may be needed	Teach the patient to eat foods high in folic acid: green leafy vegetables, enriched grain products, orange juice, peanuts, avocado

Table 2	Anemia of Chronic Disease	Aplastic Anemia	Acute Anemia due to blood loss	Chronic Anemia due to blood loss
Etiology	Anemia of inflammation-caused by cancer, autoimmune and infectious disorders Underproduction of RBC's and mild shortening of RBC survival	Patients have peripheral blood pancytopenia (decrease of all blood cell types- RBS, WBC, and platelets) and hypocellular bone marrow. 70% of aplastic anemias are due to autoimmune activity by autoreactive T lymphocytes.	Sudden hemorrhage and caused by acute blood loss from trauma, complications of surgery, and conditions or diseases that disrupt vascular integrity.	Sources: bleeding ulcer, hemorrhoids, and menstrual and post menstrual blood loss
Clinical Manifestations	Causes an increase and retention of iron within macrophages. Cytokine dysregulation may be the cause in elderly.	Abruptly-over days or weeks to months. Fatigue, dyspnea, cardiovascular and cerebral responses. Neutropenia, bleeding, nosebleeds.	Hypovolemic shock Fatigue, pale, cool skin, Tachycardia, Postural hypotension Shock, lactic acidosis, and potential death	Fatigue, weakness, pale skin, irregular heartbeats SOB Chest pain Cold hands and feet Dizziness
				CBC

Diagnostic Studies	High serum ferritin and increased iron stores Normal folate and cobalamin blood levels distinguish it from megaloblastic anemias from folate and cobalamin deficiencies.	Decreased marrow elements, hemoglobin, WBC, and platelet values. The Reticulocyte count is low. Assess various iron studies and bone marrow studies. Bone marrow biopsy Aspiration Pathologic examination	Low RBC, Hgb, and Hct levels Values may seem normal or high for 2 to 3 days with sudden blood loss.	Hgb Hct Blood transfusions
Drug Therapy	Correct the underlying disorder. Blood transfusion may be needed. Erythropoietin therapy is used in renal disease.	HSCT and immunosuppressive therapy with steroids, and cyclosporine Eltrombopag increases platelet count.	IV fluids Blood transfusions Iron Packed RBC's Platelets	Supplemental iron Blood transfusions IV fluids Packed RBC's
Nursing Management	Obtain 12 lead ECG. Ins and outs Monitor labs. Educate on nutrition. Neurological status	Supportive care Correct underlying disorder. Monitor labs. Educate on nutrition.	Replace blood volume. Check lab values. Provide supplemental iron. Give blood products. Vital signs Neurological checks.	Identify the source and stop it from bleeding. Provide supplemental iron. Teach about nutrition. Teach about iron supplements. Vital signs

Table 3	Acquired Hemolytic Anemia	Hemochromatosis	Polycythemia
Etiology	Results from destruction or hemolysis of RBC's at a rate that exceeds production. Extrinsic and Intrinsic factors Hemodialysis	Iron overload disorder Genetic link or liver disease as well as from chronic blood transfusions.	Production and presence of increased numbers of RBC's The increase in RBC's can be so great that blood circulation is impaired because of increased viscosity and volume. Primary and Secondary

	Physical destruction of RBC's results from extreme force on cells		
Clinical Manifestations	Jaundice, Large spleen and liver, fatigue, pale skin, tachycardia, dark urine, heart murmur, weakness, and confusion	Symptoms do not develop until after age 40 years in men and after 50 years in women. Fatigue, arthralgia, impotence, abdominal pain, and weight loss. Iron accumulates in liver and causes liver enlargement and cirrhosis	Headache, blurred vision, dizziness, fatigue, hypertension, vertigo, tinnitus, and visual changes. Generalized Pruritus Thrombophlebitis Leukemia Thrombosis
Diagnostic Studies	Hgb/hct MCV, Reticulocytes, Serum Iron, TIBC, Transferrin, Ferritin, Bilirubin, Serum B12, and Folate	Lab work shows high serum iron, TIBC, and serum ferritin. Testing for known genetic mutations confirms diagnosis. Liver biopsy can quantify the amount of iron and damage.	High hemoglobin and RBC count with microcytosis Normal to low EPO Level (Secondary has high levels) High WBC count with basophilia and neutrophilia. High platelet count and platelet dysfunction High leukocyte alkaline phosphatase, uric acid, and cobalamin levels and high histamine levels Bone marrow examination in polycythemia vera shows hypercellularity of RBC, WBCs, and platelets.
Drug Therapy	Blood transfusions Corticosteroids Rituximab Surgery to remove spleen. Immunosuppressive therapy	Remove excess iron from the body. Remove 500 mL of blood each week for 2 to 3 years. Iron chelating agents Deferoxamine IV or Sub q Deferasirox and deferiprone are oral agents	Reduce blood volume and viscosity and bone marrow activity. Phlebotomy is the mainstay of treatment. Remove 300-500 mL of blood. Myelosuppressive agents may be given. Ruxolitinib Low-dose aspirin. Allopurinol-no gouty attacks
Nursing Management	Vital signs Drug therapy Blood transfusions Diet rich in iron Iron supplements	Avoid Vitamin C Avoid iron supplements, uncooked seafood, and iron-rich foods. Educate on foods. Liver cirrhosis and HF symptoms	Perform Phlebotomy Assess fluid intake and output. Avoid fluid overload. Observe patient while on myelosuppressive Teach patient about side

			effects of this drug.
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