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 B_{12}) Deficiency**	**Folic Acid Deficiency**
Etiology	Inadequate dietary intake, malabsorption blood loss, or hemolysis	A group of diseases involving inadequate production of normal hemoglobin which decreased RBC production	The gastric mucosa is not secreting IF because of either gastric mucosal atrophy or autoimmune destruction of parietal cells	Folic acid deficiency also causes megaloblastic anemia. Folic acid is needed for DNA synthesis leading to RBC formation and maturation
Clinical Manifestations	No symptoms (Early) Pallor (most common) Glossitis (2^{nd}) Cheilitis Headache, paresthesia and burning sensation of tongue Palpitations, bounding pulse, Fatigue Exertional dyspnea, dyspnea "roaring in the ears"	Minor - Often asymptomatic Mild to moderate anemia with microcytosis and hypochromia, mild splenomegaly, bronzed skin color, bone marrow hyperplasia Major – life threatening. Pale skin color and general symptoms of anemia. Can cause growth and developmental deficits. Jaundice. Pronounced splenomegaly	General manifestations of anemia. GI - Sore, red, beefy and shiny tongue, anorexia, N/V, abdominal pain Neuromuscular – weakness, paresthesia of the feet and hands, reduced vibratory and position senses, ataxia, muscle weakness, and impaired thought processes ranging from confusion to dementia	General manifestations of anemia. GI – stomatitis, cheilosis, dysphasia, flatulence and diarrhea. Thiamine deficiency can cause neurological problems.
Diagnostic Studies	Hgb/Hct, MCV, Reticulocytes, Serum Iron, TIBC, Ferritin, Bilirubin, Serum B12, Folate, Stool occult blood test, history and physical, Endoscopy, colonoscopy, bone marrow biopsy	Hgb/Hct, MCV, Reticulocytes, Serum Iron, TIBC, Ferritin, Bilirubin, Serum B12, Folate	Hgb/Hct, MCV, Reticulocytes, Serum Iron, TIBC, Ferritin, Bilirubin, Serum B12, Folate RBC appear larger and have abnormal shapes Serum anti-IF test Upper GI endoscopy Serum methylmalonic acid Serum homocysteine	Hgb/Hct, MCV, Reticulocytes, Serum Iron, TIBC, Ferritin, Bilirubin, Serum B12, Folate. Serum folate level is low with normal serum cobalamin level
Drug Therapy	PO: Ferrous sulfate or ferrous gluconate IV: iron dextran, sodium ferrous gluconate, iron	Minor - No specific drug therapy Major – blood transfusions or exchange transfusions	Parenteral vitamin B12 or intranasal cyanocobalamin 1000mcg/day of cobalamin IM for 2	Folic Acid replacement therapy 1mg/day PO up to 5mg/day if suffer from chronic alcoholism

	sucrose, Transfusion of packed RBCs	in conjunction with chelating agents PO – deferasirox or deferiprone IV or Subcu – deferoxamine Ascorbic acid taken with chelation Folic acid, zinc supplements	weeks then monthly for life	
Nursing Management	Identification and treatment of underlying cause. Drug therapy Nutritional therapy Transfusion of PRBCs	Monitor hepatic, heart, and lung function	Assess neurologic difficulties. Reduce risk of injury due to reduced sensitivity to heat and pain. Protect pt from falling, burns and trauma.	Teach patients to heat foods high in folic acid (green leafy vegetables, enriched grains, breakfast cereals, 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	Associated with underproduction of RBBs and mild shortening of RBC survival. Develops 1-2 months of disease activity.	Due to autoimmune activity by autoreactive T lymphocytes. The cytotoxic T cells target and destroy the patients own hematopoietic stem cells	A sudden hemorrhage caused by trauma, complications of surgery, and conditions or diseases that disrupt vascular integrity	Depletion of iron stores and considered an iron deficiency anemia. Associated with an underproduction of RBCs and mild shortening of RBC survival
Clinical Manifestations	Chronic diease (HIV, Hep, Cancer, HF) Mild anemia (palpitations, fatigue, exertional dyspnea)	Manifest abruptly or insidiously. General manifestations such as fatigue, dyspnea. Thrombocytopenia. neutropenia	500ml – none or vasovagal syncope 1000ml – no S/S at rest, tachycardia with exercise and slight postural hypotension 1500ml – postural hypotension and tachycardia with exercise 2000ml - BP, central venous pressure, and cardiac output below normal at rest; air hunger; rapid thready pulse and cold, clammy skin 2500ml – shock, lactic acidosis, and potential death	Similar to iron deficiency anemia No symptoms (Early) Pallor (most common) Glossitis (2nd) Cheilitis Headache, paresthesia and burning sensation of tongue Palpitations, bounding pulse, Fatigue Exertional dyspnea, dyspnea “roaring in the ears”
Diagnostic Studies	High serum ferritin and increased iron stores. Normal folate and cobalamin blood levels	Hemoglobin, WBC, and platelet values are decreased. RBC indices are normal. Reticulocyte	RBC, hemoglobin, and hematocrit levels are low	RBC, hemoglobin, and hematocrit

		count is low. Serum iron and total iron-binding may be high. Bone marrow biopsy, aspiration, pathologic examination		
Drug Therapy	Erythropoietin therapy	HSCT and immunosuppressive therapy with antihymocyte globulin, steroids, cyclosporine or cyclophosphamide	IV fluids: dextran, hetastarch, albumin, and LR Packed RBCs, platelets, plasma, and cryoprecipitate. Supplemental iron	Supplemental iron
Nursing Management	Correct the underlying disorder. Blood transfusion if anemia is severe. Erythropoietin therapy r/t renal disease and cancer	Identify and remove causative agent. Prevent infection and hemorrhage	Monitor blood loss from various drainage tube and dressing and implement appropriate actions. Giving blood products	Identifying the source and stopping the bleeding. Supplemental iron may be needed. Replacing blood volume to prevent shock

Table 3	**Acquired Hemolytic Anemia**	**Hemochromatosis**	**Polycythemia**
Etiology	Condition caused by the destruction or hemolysis or RBCs at a rate that exceeds production	Iron overload disorder. May occur with diseases such as sideroblasic anemia. May also be caused by liver disease and the chronic blood transfusions	Polycythemia vera is a chronic myeoproliferative disorder. It involves the RBCs, WBCs and platelets
Clinical Manifestations	General manifestations of anemia. RBCs are normal but external factors are causing damage Antibodies against RBCs, infectious agents and toxins, physical destruction, extracorporeal circulation, disseminated intravascular coagulopathy, HELLP syndrome, prosthetic heart valves, thrombotic	Symptoms develops after age 40 in men 50 in women. Fatigue, arthralgia, impotence, abdominal pain, and weight loss. Live enlargement and eventually cirrhosis. Diabetes, skin pigment changes, cardiomyopathy, arthritis, and testicular atrophy	Headache, vertigo, dizziness, tinnitus and visual changes. Generalized pruritus. Paresthesias and erythromelalgia. Angina, HF, intermittent claudication and thrombophlebitis

	thrombocytopenic purpura, widespread cancer Jaundice Enlarged spleen and liver		
Diagnostic Studies	RBC, WBC, hemoglobin, hematocrit platelets	High serum iron, TIBC, and serum ferritin. Genetic testing. Liver biopsy	High hemoglobin and RBC count with microcytosis, low to normal EPO level, high WBC count, high platelet count, platelet count, high leukocyte alkaline phosphatase, uric acid, colbalamin levels and high histamine levels. Bone marrow examination
Drug Therapy	Iron supplement	Iron chelating agents. Deferoxamine. Deferasirox and deferiprone	Hydroxyurea, busulfan, chlorambucil, aspirin
Nursing Management	Maintain renal function	Education on avoiding vitamin C and iron supplements, undercooked seafood and iron rich foods.	Assess fluid intake and output, assist or perform phlebotomy. Education on side effects of drugs. Assess nutritional status. Active or passive exercises