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	May develop from inadequate diet intake, malabsorption, blood loss, or hemolysis	Inadequate production of normal Hgb, which decreases RBC production due to an absent or reduced globulin protein.	Lack of intrinsic factor being produced causes a malabsorption of cobalamin which causes pernicious anemia	Folic acid is needed for DNA synthesis leading to RBC formation and maturation. Can by inhibited by chronic alcohol use, chronic dialysis, diet deficiency, increased requirement, malabsorption syndromes.
Clinical Manifestations	Pallor is the most common finding. Glossitis- inflammation of the tongue. Cheilitis- inflammation of the lips Headache, paresthesia, burning sensation of the tongue	Often asymptomatic. Mild to moderate anemia with microcytosis and hypochromia, mild splenomegaly, bronzed skin color, and bone marrow hyperplasia. Can cause growth and developmental deficits.	Tissue hypoxia, GI manifestations such as sore, red, beefy, and shiny tongue, anorexia, nausea, vomiting and abdominal pain. Neuromuscular manifestations include weakness, paresthesia of the feet and hands, reduce vibratory and position senses, ataxia, muscle weakness, and impaired cognition	Similar to cobalamin deficiency. Can be attributed to other coexisting problems. GI problems include stomatitis, cheilosis, dysphagia, flatulence, and diarrhea. Thiamine deficiency is also often related to folic acid deficiency which can cause neurologic symptoms.
Diagnostic Studies	Hgb and HCT- Low MCV- Low Serum Iron- low Ferritin- Low Stool occult blood test Endoscopy and colonoscopy Bone Marrow Biopsy (last resort)	Hbg and HCT- Low Reticulocytes- High Serum Iron- High TIBC- Low Transferrin- Low Bilirubin- High Folate- Low	Hgb/HCT- Low MCV- High Reticulocytes- Norm or L Serum Iron- Norm or L Transferrin- High Ferritin- High Bilirubin- Norm or High Serum B12- Low	Hgb/HCT- Low MCV- high Reticulocytes- Norm or low Serum Iron- Norm or high Transferrin- high Ferritin- high Bilirubin- Norm or high Folate- Low

Drug Therapy	Enteric coated or sustained-release capsules. Daily dose 100-200 mg of elemental iron. Can be in 3 or 4 doses of 60-70 mg. Taking with vitamin C or OJ can enhance absorption. GI side effects: heartburn, constipation, diarrhea, Black stools Stay upright for 30 minutes	Oral deferasirox or deferiprone IV or SubQ deferoxamine New therapy-luspatercept-aamt (subQ) which improves Hgb levels and reduces transfusion need. Blocks inhibitors of late-stage RBC production.	Parenteral vitamin B12 (cyancobalamin) or intranasal cyanocobalamin 1000 mcg/day of cyancobalamin for two weeks, by weekly until hgb is normal, then monthly for life	Usual dose for replacement therapy is 1-5 mg/day by mouth. Duration depends on reason for deficiency.
Nursing Management	Treat underlying problem. Teach pt of iron replacing meals Oral or IV iron replacement	Blood transfusions or exchange transfusions with chelating agents. Monitor liver, heart, and lung function and provide treatment as needed.	Assess for neurological problems that are not corrected by replacement therapy Implement measures to reduce injury from the decreased sensitivity to heat and pain.	Teach patient to eat foods high in folic acid.

Table 2	**Anemia of Chronic Disease**	**Aplastic Anemia**	**Acute Anemia due to Blood Loss**	**Chronic Anemia due to Blood Loss**
Etiology	Usually occurs 1 to 2 months of disease activity. Different diseases include HIV, hepatitis, malaria. Associated with underproduction of RBCs and mild shortening of RBC survival.	Due to autoimmune activity by autoreactive T lymphocytes. Cytotoxic T cells target and destroy the patient's own hematopoietic stem cells.	Sudden bleeding due to trauma, surgery complications, and problems that disrupt vascular integrity.	Chronic blood loss causes depletion in iron stores. Management involves identifying cause and stopping it.
Clinical Manifestations	Limited available RBCs, reduced RBC lifespan.	Symptoms can manifest abruptly or slowly. General manifestations include anemia, fatigue, and dyspnea, as well as cardiovascular and cerebral responses. Neutropenia makes patients susceptible for infection.	Symptoms are based around how much blood is lost. Some symptoms include increased heart rate, hypotension, decreased cardiac output, air hunger, shock, lactic acidosis, and potential death	Will have the same symptoms as iron deficiency anemia. Pallor is the most common finding. Glossitis-inflammation of the tongue. Cheilitis-inflammation of the lips Headache, paresthesia,

		Thrombocytopenia can lead to bleeding		burning sensation of the tongue
Diagnostic Studies	Hgb/HCT- low MCV- Norm or low Reticulocytes- Norm or Low Serum Iron- Low TIBC- Low Transferrin- Norm or low Ferritin- Norm or high	Hgb- low WBC- low Platelet values- low Other RBC tests are typically normal. Reticulocytes- low Serum Iron- high Total iron-binding capacity- high Bone marrow biopsy, aspiration and pathologic examination	Laboratory data does not reflect the RBC loss. Values may seem normal or high for 2-3 days. Once plasma volume is replaced, RBC mass will be less concentrated. Then RBC, hgb, and HCT will be low.	Hgb/HCT- low MCV- low Reticulocytes- Norm or low Serum iron- low TIBC- low Bilirubin- norm or low
Drug Therapy	Best tx is to correct underlying problems. EPO therapy is used in renal disease and cancer. Increases risk of thromboembolism and death	Immunosuppressive therapy with antihymocyte globulin and cyclosporine. Eltrombopag- an oral thrombopoietin receptor agonist and can increase platelet counts. High-dose cyclophosphamide, alemtuzumab or androgens may be helpful in select patients	IV fluids to replace volume loss. Whole blood, platelets, plasma, and cryoprecipitate may be given to replace blood loss. EPO and iron supplements may take 2-5 days to reflect in body.	Iron supplements- similar to iron deficiency anemia
Nursing Management	Correct underlying problems. Educate on ways to increase health.	Identify and remove causative agents when possible and provide supportive care until the pancytopenia resolves. Prevent complications from infection and bleeding.	Replace blood volume to prevent shock. Promote coagulation to prevent further volume loss, find source of bleeding and stop it.	Identify source of bleeding and stop the bleeding.

Table 3	**Acquired Hemolytic Anemia**	**Hemochromatosis**	**Polycythemia**
Etiology	RBCs are normal but external factors are causing damage. Macrophages in the spleen, liver, and bone marrow are destroying RBCs that are old, moderately defective, or moderately damaged.	An overload of iron characterized by increased intestinal iron absorption. Genetic defect is the most common cause.	Primary- a chronic myeloproliferative disorder. Causes increased RBC, WBC and platelet production. Secondary- caused by chronic hypoxia.

Clinical Manifestations	Jaundice, spleen and liver may be enlarged from hyperactivity	Fatigue, arthralgia, impotence, abdominal pain, weight loss, liver enlargement, cirrhosis. Can cause diabetes, skin pigmentation, cardiomyopathy, arthritis, testicular atrophy	Headache, vertigo, dizziness, tinnitus, visual changes, itching, paresthesia, angina, HF, intermittent claudication and thrombophlebitis.
Diagnostic Studies	Hgb/HCT- low MCV- norm or high Reticulocytes- high Serum Iron- Norm or high TIBC- norm or low Ferritin- Norm or high Bilirubin- high	Serum Iron- high TIBC- high Serum ferritin- high Genetic testing to detect mutation MRI Liver biopsy to quantify iron amount	Hgb/HCT- high RBC Mass- High Bone marrow examination EPO levels- low WBC- low
Drug Therapy	No medication therapy given. Corticosteroids given to help suppress immune system.	Goal- remove excess iron from the body. Iron-chelating drugs may be used. IV or subQ deferoxamine.	Ruxolitinib inhibits expression of JAK2 mutation Hydroxyurea or busulfan- myelosuppressive agents
Nursing Management	Maintain renal function. When RBCs are hemolyzed, Hgb is release and is filtered by the kidneys. Can cause obstruction of renal tubules	Manage problems from organ involvement. Early treatment can prevent complications.	Treatment to reduce blood volume and viscosity and bone marrow activity. 300-500 ml of blood will be removed. Assess intake and output during hydration therapy Teach about side effects Assess nutrition status Assess for complications

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.