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	-This is a group of diseases involving inadequate production of normal Hgb, which decreases RBC production.	-Normally, the parietal cells of the gastric mucosa decrete IF. IF is required for cobalamin (extrinsic factor) absorption. We absorb cobalamin in the distal ileum. Without IF we not not absorb cobalamin. In Pernicious anemia, the gastric mucosa does not excrete IF because of either gastric mucosal atrophy or autoimmune destruction of parietal cells. In the autoimmune processs, antibodies are directed against the gastric parietal cells and or IF itself. Because parietal cells also secrete hydrochloric acid (HCI), in pernicious anemia there is a decrease in HCI in the stomach.	-Folic Acid deficiency can cause megaloblastic anemia. Folic acid is needed for DNA synthesis leading to RBC formation and maturation.
Clinical Manifestations	-Pallor -Glossitis -cheilitis -tachycardia -hypertension -systolic murmurs -intermittent clottication	-The patient thalassemia is often asymptomatic. They have mild to moderate anemia with microcytosis(small	-GI manifestations -sore, red, beefy and shiny tongue -anorexia -nausea and vomiting -abdominal pain	-Esophageal varices -cirrhosis -Stomatitis -cheilosis -dysphagia -flatulence -diarrhea

	-angina -HF -MI -Icteric conjunctiva -retinal hemorrhage -blurred vision -anorexia -hepatomegaly -splenomegaly -problems swallowing -sensitivity to cold -weight loss -lethargy -bone pain -orthopnea -headache -vertigo -irritability -depression -jaundice -itching	cells) and hypochromia (pale cells) -Mild splenomegaly -Bronze skin -Bone marrow Hyperplasia -Pale -Jaundice -hepatomegaly -Cardiomyopathy -endocrine problems -osteoporosis -pulmonary hypertension -thrombosis	-weakness -paresthesia of the feet, hands -reduced vibratory and position senses -ataxia -muscle weakness -impaired cognition	-neurological symptoms as well
Diagnostic Studies	-stool occult blood test -endoscopy -colonoscopy -bone marrow biopsy -hgb -hct -MCV -Reticuloycytes -Serum iron -TIBC -Transferrin -Ferritin Bilirubin -Serum B12 -Folate	-Hgb/Hct -MCV -Reticulocytes -serum iron TIBC -Transferrin -Ferritin -Bilirubin -Serum B12 -Folate	-serum cobalamin levels -upper GI endoscopy And biopsy -Serum Methylmalonic acid -Serum homocysteine -Hgb/Hct -MCV -Reticulocytes -Serum Iron TIBC -Transferrin -Ferritin -Bilirubin -Serum B12 -Folate	-Hgb/Hct -MCV -Reticulocytes -serum iron TIBC -Transferrin -Ferritin -Bilirubin -Serum B12 -Folate
Drug Therapy	-enteric coated or sustained release capsules, which release iron iron farther down in the GI tract, are counterproductive and expensive -Daily dose of 100	-Blood transfusion or exchange transfusion in conjuction with Chelating agents that bind to iron. -oral deferasirox -or deferiprone	-Most patients need parental Vitamin b12 -Intranasal Cyancobalamin	-Folic acid replacement therapy with the usual dosage being 1 to 5mg/day by mouth.

	to 200mg of elemental iron This can be taken in 3 to 4 daily doses with each tablet or capsule containing 60 to 70 mg of iron. -Iron should be taken an hour before meals , when the duodenal mucosa is most acidic. Taking iron with Vitamin C or orange juice enhances iron absorption. Can be taken with meals to reduce GI effects. -Parental Iron in some situations would be indicated for malabsorption or poor adherence to taking iron and can be given IM or IV. Since the IM iron can stain the skin use separate needles for withdrawing the solution and injecting the medication. -Assess the Hgb and RBC count to evaluate the response to therapy. The patient needs to take Iron therapy for 2-3 months after the HGB levels return to normal.	-IV or subcutaneous deferoxamine -Luspa-tercept-aamt -Hematopoietic stem cell transplantation (HSCT)		
Nursing Management	-The main goal is to trat the underlying problem that is causing the iron loss, reduced intake	-One will give blood transfusions along with drug therapy. -Thalasemia minor does not need treatment because the body adapts to	-Assess neurologic problems that are not corrected by replacement therapy -Implement measures to reduce the risk for injury	-Teach the patient to eat foods high in folic acid. -Teach the patient to eat green leafy vegetables, enriched grain products and

	(malnutrition, alcohol use), or poor iron absorption. We also direct out efforts towards replacing the iron. We want to teach the patient which foods are good sources of iron. If nutrition is already good, increasing iron intake through diet may not be enough. The patient may need oral, or occasionally IV iron supplements. If the iron deficiency is from blood los, the patient may need packed RBC infusion.	the reduction of normal Hgb. -One can assist in the patient to get ready for a splenectomy because an enlarged spleen sequesters RBCs the patient may need this.	from the decreased sensitivity to heat and pain -Protect the patient from falling, burning and trauma -the patient may need physical therapy	breakfast cereals, orange juice, peanuts and avocados,

Table 2	**Anemia of Chronic Disease**	**Aplastic Anemia**	**Acute Anemia due to Blood Loss**	**Chronic Anemia due to Blood Loss**
Etiology	-Anemia of chronic disease usually develops after 1 to 2 months of disease activity. Causes include cancer, autoimmune and infectious disorders such as human immunodeficiency virus (HIV), hepatitis, malaria, HF or chronic inflammation. Bleeding episodes can contribute to anemia of chronic disease	-About 70% of aplastic anemias are due to autoimmune activity by autoreactive T lymphocytes. The cytotoxic T cells target and destroy the patient's own hematopoietic stem cells. Other causes include toxic injury to bone marrow stem cells or an inherited stem cell defect.	-Acute blood loss occurs with sudden bleeding, causes of acute blood loss include trauma, surgery complications, ad problems that disrupt vascular integrity.	-The sources of chronic blood loss are similar to those of iron deficiency anemia (bleeding ulcer, hemorrhoids, menstrual and postmenopausal blood loss). The effects of chronic blood loss are usually due to depleted stores so we consider it a iron deficiency iron.
	-Fatigue	-Fatigue	-Vasovagal syncope	-angina

Clinical Manifestations	-Pale skin -Shortness of breath -Headache -Dizziness or lightheadedness -Fast heartbeat -Cold hands and feet -Chest pain -irritability -Brittle nails -Inflammation or soreness of the tongue	-Dyspnea -neutropenia -septic shock -death -bleeding -retinal hemorrhage -blurred vision -anorexia -hepatomegaly -splenomegaly -problems swallowing -sensitivity to cold -weight loss -lethargy -bone pain -orthopnea -headache -vertigo -irritability -depression -jaundice -itching	-increased HR -sight postural hypotension -cold -clammy skin -shock -lactic acidosis -potential death	-HF -MI -Icteric conjunctiva -retinal hemorrhage -blurred vision -anorexia -hepatomegaly -splenomegaly -problems swallowing -sensitivity to cold -weight loss -lethargy -bone pain -orthopnea -headache -vertigo -irritability -depression -jaundice -itching -Pallor -Glossitis -cheilitis -tachycardia -hypertension -systolic murmurs -intermittent clottication
Diagnostic Studies	-CBC -Iron studies (serum iron, ferritin, transferrin saturation) -CRP -ESR	-Hgb -WBC -Platelet values decreased -MCV -Reticulocytes -serum iron TIBC -Transferrin -Ferritin -Bilirubin -Serum B12 -Folate -Bone marrow biopsy	-plasma volume -RBCs -Hgb/Hct	-stool occult blood test -endoscopy -colonoscopy -bone marrow biopsy -hgb -hct -MCV -Reticuloycytes -Serum iron -TIBC -Transferrin -Ferritin Bilirubin -Serum B12 -Folate
Drug Therapy	-Erythropoiesis stimulation agents (ESAs) or iron supplements	Immunosuppressive therapy with antithymocyte globulin	-iron supplements -Blood transfusion -IV Fluids	-Iron supplements

	-Blood transfusions	-cyclosporine -Eltrombopag -high dose cyclophosphamide -alemtuzumab or androgens		
Nursing Management	-Monitor the patients vital signs, hemoglobin levels, and overall physical condition -Educate the patient about anemia and the important of managing underlying chronic diseases. -Encourage diet rich in Iron, Vitamin B12 and folate -Monitor for complications related to anemia.	-Preventing complications from infection and bleeding -Blood transfusions -HSCT graft injection	-replace volume to prevent shock -promoting coagulation to prevent further bleeding and finding the source of the bleeding and stopping the blood loss. -Blood transfusion (Packed RBCs, larger volume whole blood, platelets, and cryoprecipitate) -IV fluids -Provide iron supplements because iron availability affects the marrow production of RBCs. -Post op patient carefully monitor the blood loss from various drainage tubes and dressings and implement appropriate actions.	-Management of chronic blood loss anemia involves identifying the source and stopping the bleeding. The patient may need iron Supplements

Table 3	**Acquired Hemolytic Anemia**	**Hemochromatosis**	**Polycythemia**
Etiology	-Acquired hemolytic anemia results from hemolysis of RBCs from extrinsic factors.	-Hemochromatosis is an iron overload disorder characterized by increased intestinal iron absorption.	-The 2 types of polycythemia are primary polycythemia or polycythemia vera, and secondary polycythemia
Clinical Manifestations	-fatigue -pallor -jaundice -Dark urine -Splenomegaly -shortness of breath -chills -chest pain	-Symptoms do not usually occur until after age 40 in men and after age 50 years in women -fatigue -anthralgia -impotence -abdominal pain	(primary) -splenomegaly -hepatomegaly -enhanced blood viscocity and blood volume and congestion of organs and tissues with blood. (Secondary)

	-fainting -symptoms of heart failure -fever	-weight loss -cirrhosis -excess iron depositis in the liver, pancreas, hearts, joints, and endocrine glands cause diabetes -skin pigment changes -cardiomyopathy -arthritis -testicular atrophy	-Polycythemia-hypoxia -alveolar hypoventilation -tissue hypoxia (overall) -hypertension -headache -vertigo -tinnitus -visual changes -paresthesia -erythromelalgia -angina -HF -intermmitent clottication -stroke -petechiae -bruising -nose bleeding -GI bleeding -hyperuricemia
Diagnostic Studies	-Hgb/Hct -MCV -Reticulocytes -serum iron TIBC -Transferrin -Ferritin -Bilirubin -Serum B12 -Folate	-TIBC -Serum ferritin -MRI -Liver biopsy	-Hgb/Hct -hematocrit -RBC mass -bone marrow -Wbcs -platelet count -leukuocyte alkaline phosphatase -uric acid -combalamine levels
Drug Therapy	-electrolyte replacement -Hydration replacement -corticosteroids -blood products -folate replacement -glucocorticoids -rituximab -monoclonal antibody B cell	-Iron chelating drugs -deferoxamine chelates remove iron via the kidneys -Deferasirox and deriprone	-hydration therapy -aspirin -Myelosuppresive agents such as Hydroxyurea, or busulfan, Ruxolitnib
Nursing Management	-Regularly monitor vital signs -Educate the patient about hemolytic anemia -Nutritional support and encourage a balance diet rich in	-We want to educate on diet changes including avoiding Vitamin C and iron supplements, uncooked seafoods and iron rich foods -we manage problems from organ involvement with the usually treatment for these problems.	-May have to assist or perform phlebotomy -assess intake and output during hydration therapy to avoid fluid overload -give myelosuppressive agents -observe the patient and teach them about drug side

	iron, vitamin B12, and folate. Foods such as red meat, green leafy vegetables, and fortified cereals -Blood transfusions -emotional support		effects -Assess the patient nutritional status. Inadequate food intake can result GI symptoms of fullness, pain and dyspepsia

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.