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

Complete the worksheet and submit in the Unit 7: Hematology dropbox by March 18, 2024 at 0800. Please be sure to bring a copy to class on March 18, 2024.

Table 1	**Iron Deficiency Anemia**	**Thalassemia**	**Cobalamin (Vitamin B_{12}) Deficiency**	**Folic Acid Deficiency**
Etiology	Iron deficiency anemia is caused by inadequate diet intake, malabsorption, blood loss, or hemolysis.	Thalassemia is a group of diseases that causes inadequate production of normal Hgb, which decreases RBC production.	Pernicious anemia prevents the gastric mucosa from secreting IF because of either gastric mucosal atrophy or autoimmune destruction of parietal cells.	• Chronic alcohol use • Chronic hemodialysis • Diet deficiency (e.g., leafy green vegetables, citrus fruits) • Drugs interfering with absorption or use of folic acid (e.g., metformin phenytoin) • Increased requirement • Malabsorption syndromes
Clinical Manifestations	• May be asymptomatic in early stages. • Pallor • Glossitis (tongue inflammation • Cheilitis (lip inflammation) • Headache • Paresthesia • Burning of the tongue	• **Thalassemia minor:** microcytosis (small cells), hypochromia (pale cells, mild splenomegaly, bronzed skin, bone marrow hyperplasia. • **Thalassemia major:** pallor, general anemia symptoms, jaundice, pronounced splenomegaly, hepatomegaly, cardiomyopathy	• Sore, red, beefy, shiny tongue • Anorexia • N/V • Abdominal pain • Weakness • paresthesia of the feet and hands • reduced vibratory and position senses. • ataxia • muscle weakness • impaired cognition.	• Stomatitis • Cheilosis • Dysphagia • Flatulence • Diarrhea • Neurologic problems
Diagnostic Studies	• Decreased Hgb/Hct • Decreased MCV • Normal or slight increase or decrease in	• Decreased Hgb/Hct • Decreased or normal MCV • Increased reticulocytes. • Increased serum iron	• Decreased Hgb/Hct • Increased MCV • Normal or decreased reticulocytes. • Normal or	• Decreased Hgb/Hct • Increased MCV • Normal or decreased reticulocytes.

	reticulocytes. • Decreased serum iron. • Increased TIBC • Normal or decreased transferrin • Decreased ferritin. • Increased bilirubin. • Decreased folate. • Stool- occult blood test (hidden blood loss) • Colonoscopy or endoscopy (GI bleed) • Bone marrow biopsy (if other tests are inconclusive)	• Decreased TIBC • Decreased transferrin. • Normal or increased ferritin • Increased bilirubin • Decreased folate.	increased serum iron • Increased transferrin • Increased ferritin • Normal or slightly increased bilirubin • decreased serum B12.	• Normal or increased serum iron • slightly increased transferrin • Increased ferritin • Normal or slightly increased bilirubin • Decreased folate
Drug Therapy	Iron supplements.	• blood transfusions or exchange transfusions in conjunction with chelating agents that bind to iron. • Deferasirox • Deferiprone • deferoxamine • luspatercept-aamt	• parenteral vitamin B12 • intranasal cyanocobalamin	• Folic acid supplements
Nursing Management	• Treat the underlying cause. • Educate on good dietary sources of iron. • If the dietary intake is already adequate, introduce iron supplements.	• Monitor liver, heart, and lung function and provide treatment as needed.	• Assess for neurologic problems. • Reduce risk for injury from decreased sensitivity to heat and pain. • Protect the patient from falls, burns, and trauma. • Physical therapy	• Replacement therapy • Educate on increasing foods rich in folic acid.

Table 2	**Anemia of Chronic Disease**	**Aplastic Anemia**	**Acute Anemia due to Blood Loss**	**Chronic Anemia due to Blood Loss**
Etiology	• Develops after 1-2 months of disease activity. • Cancer • Autoimmune disorders • HF • Chronic inflammation	• autoimmune activity by autoreactive T lymphocytes. • cytotoxic T cells target and destroy the patient's own hematopoietic stem cells. • toxic injury to bone marrow stem cells • inherited stem cell defect	RBCs are lost through acute blood loss caused by trauma, surgery complications, or problems that disrupt vascular integrity.	Anemia caused by chronic sources of blood loss such as bleeding ulcers, hemorrhoids, menstrual blood loss, and postmenopausal blood loss.
Clinical Manifestations	• Fatigue • Pallor • Lightheadedness • SOB • Tachycardia • Irritability • Chest pain	• General s/s of anemia • Fatigue • Dyspnea • Palpitations • Headache • Vertigo • Irritability • Depression • Impaired thought processes	• **500 mL:** no s/s or vasovagal syncope • **1000 mL:** no s/s at rest, increased HR with slight postural hypotension • **1500 mL:** Normal supine BP and pulse at rest, postural hypotension, and increased HR with exercise. • **2000 mL:** BP, central venous pressure, and cardiac output below normal at rest, air hunger, rapid, thready pulse, and cold, clammy	• Brittle nails • Desire to eat ice. • Lightheadedness upon standing up. • Pallor • SOB at rest or on exertion • Glossitis • Mouth ulcers.

			skin. • **2500 mL:** shock, lactic acidosis, potential death	
Diagnostic Studies	• Decreased Hgb/Hct • Decreased or normal MCV • Normal or decreased reticulocytes • Decreased serum iron. • Decreased TIBC. • Normal or decreased transferrin • Normal or increased ferritin	• Decreased Hgb/Hct • Normal or slightly increased MCV • Decreased reticulocytes. • Normal or increased serum iron • Normal or increased TIBC	• Levels may appear normal or high for 2-3 days. • Once plasma volume increases, the RBC count, Hgb, and Hct become low.	• Decreased RBC count. • Decreased Hgb/Hct • Increased plasma.
Drug Therapy	• Blood transfusions • EPO therapy • Cancer treatments	• Cyclosporine • Anti-thymocyte globulin	• Packed RBCs • Whole blood • Platelets • Plasma products • Cryoprecipitate • 0.9% NS • Lactated ringers • Colloids (dextran, hetastarch, albumin) • Iron supplements	• Iron supplements
Nursing Management	Treat underlying cause.	• Prevent infection and bleeding. • Turn/ reposition every 2 hours. • Prevent falls	• Replace blood to prevent shock. • Promote coagulation to prevent further bleeding. • Find the source of the bleeding and stop further	• Identify the source of bleeding. • Stop further bleeding. • Administer iron supplements.

			bleeding	

Table 3	**Acquired Hemolytic Anemia**	**Hemochromatosis**	**Polycythemia**
Etiology	Results from the hemolysis of extrinsic factors such as physical destruction, antibody reactions, and infectious agents and toxins.	Iron overload disorder characterized by increased intestinal iron absorption often caused by genetic defects, sideroblastic anemia, liver disease, and chronic blood transfusions.	• **Primary-** increased production of RBCs, WBCs, and platelets. This leads to increased blood viscosity, blood volume and congestion of organs and tissues with blood. • **Secondary-** hypoxia stimulates the kidneys to make EPO, which stimulates RBC production.
Clinical Manifestations	• Weakness • Pallor • Dark-colored urine • Fever • Activity intolerance • Heart murmur • Jaundice	• **Early symptoms:** fatigue, arthralgia, impotence, abdominal pain, and weight loss. • **Late symptoms:** hepatomegaly, cirrhosis, diabetes, skin pigment bronzing, heart problems, arthritis, and testicular atrophy	• Headache • Dizziness • Vertigo • Tinnitus • Vision changes • Generalized itching. • Paresthesia • Erythromelalgia • Angina • HF • Intermittent claudication • Thrombophlebitis
Diagnostic Studies	• Decreased Hgb/Hct • Normal or increased MCV • Increased reticulocytes. • Normal or increased serum iron • Normal or decreased TIBC • Normal or increased ferritin • Increased bilirubin	• Increased serum iron • Increased TIBC • Increased ferritin • MRI- shows liver and cardiac iron. • Liver biopsy- quantify the amount of iron and establish the degree of organ damage	• Increased Hgb/Hct • Increased RBC mass • Bone marrow exam- shows the hypercellularity of RBCs, WBCs, and platelets. • Presence of JAK2, V617F, or JAK2 exon mutation • Increased platelet count/platelet dysfunction • Low EPO level • Increased WBC w/ basophilia and neutrophilia • Normal or increased leukocyte alkaline phosphatase, • Normal or increased uric acid. • Normal or increased cobalamin levels.

Drug Therapy	• Folate replacement • Glucocorticoids • Rituximab • immunosuppressants	• iron- chelating drugs such as… • deferoxamine • deferasirox • deferiprone	• hydroxyurea • busulfan • Ruxolitinib • α-Interferon • pegylated IFN alfa-2a
Nursing Management	General supportive care until the causative agent can be eliminated or made less injurious to RBCs.	• Remove excess iron from the body. • Treat symptoms	• Assist with/perform phlebotomy. • Assess I/O measurements during hydration therapy. • Administer myelosuppressive agents. • Educate about drug side effects. • Assess 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.