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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	Inadequate dietary intake Malabsorption Blood loss Hemolysis	Genetic disorder leading to the production of abnormal hemoglobin.	Inadequate intake, malabsorption (e.g., pernicious anemia), or certain medications.	Poor diet, certain medications, malabsorption syndromes, increased demand (e.g., pregnancy).
Clinical Manifestations	Fatigue, weakness, pallor, shortness of breath, and, in severe cases, angina or heart palpitations.	Depending on severity - mild anemia with minimal symptoms to severe anemia with growth delays, bone deformities, and fatigue.	Fatigue, weakness, constipation, loss of appetite, weight loss, numbness and tingling in the hands and feet, difficulty maintaining balance.	Fatigue, weakness, palpitations, shortness of breath, open sores on the tongue and inside the mouth, changes in the color of the skin, hair, or fingernails.
Diagnostic Studies	Low hemoglobin and hematocrit levels, low serum iron, low ferritin, high total iron-binding capacity (TIBC).	Hemoglobin electrophoresis to identify abnormal hemoglobin types, complete blood count (CBC) to check for anemia.	Low serum B12 levels, elevated methylmalonic acid, and homocysteine levels, complete blood count (CBC) may show megaloblastic anemia.	Low serum folate levels, high homocysteine levels, megaloblastic anemia on CBC.
Drug Therapy	Oral iron supplements	Blood transfusions for severe cases,	Vitamin B12 injections initially,	Oral folic acid supplements

	(e.g., ferrous sulfate), intravenous iron for those who cannot tolerate oral iron.	iron chelation therapy to remove excess iron from blood transfusions, folic acid supplements.	followed by high-dose oral B12 or nasal B12 supplementation.	
Nursing Management	Education on dietary iron intake, monitoring for therapeutic response and side effects of iron supplementation, and counseling on compliance with therapy.	Monitoring transfusion and chelation therapy, educating about genetic counseling, and managing complications of iron overload.	Education on B12 supplementation, dietary advice, monitoring for response to therapy, and managing symptoms of neuropathy.	Dietary education on folate-rich foods, monitoring for therapeutic response, counseling on compliance with folic acid supplementation, especially important in pregnant women to prevent fetal neural tube defects.

Table 2	**Anemia of Chronic Disease**	**Aplastic Anemia**	**Acute Anemia due to Blood Loss**	**Chronic Anemia due to Blood Loss**
Etiology	associated with chronic infections, autoimmune diseases, cancer, and chronic kidney disease. The inflammation involved in these conditions leads to decreased RBC production and reduced lifespan of RBCs.	Results from damage to the bone marrow, leading to pancytopenia. Can be idiopathic, autoimmune, or caused by exposure to toxins, radiation, or certain medications.	Sudden blood loss due to surgery, trauma, or a bleeding disorder.	Slow, persistent blood loss from sources such as gastrointestinal ulcers, hemorrhoids, menstrual or uterine bleeding, and cancer.

Clinical Manifestations	Often mild, including fatigue and pallor; symptoms of the underlying disease may be more prominent.	Fatigue, pallor, shortness of breath, increased susceptibility to infections, and bleeding tendencies due to thrombocytopenia.	Rapid heart rate, low blood pressure, dizziness, fatigue, and loss of consciousness in severe cases.	Symptoms may be mild and develop gradually, including fatigue, weakness, and pallor.
Diagnostic Studies	Normocytic, normochromic anemia; low serum iron and total iron-binding capacity (TIBC); normal or increased ferritin levels.	Bone marrow biopsy showing hypocellular marrow without abnormal cells, pancytopenia on complete blood count.	Decreased hemoglobin and hematocrit levels; reticulocyte count may initially be normal but will increase as a compensatory response.	Iron deficiency indicated by low serum iron, ferritin, and transferrin saturation; high total iron-binding capacity (TIBC).
Drug Therapy	Treatment focuses on the underlying disease; erythropoiesis-stimulating agents may be used in some cases, especially in chronic kidney disease.	Immunosuppressive therapy, bone marrow stimulants, and bone marrow transplantation in severe cases.	Blood transfusions to restore blood volume and oxygen-carrying capacity, iron supplements to replenish stores.	Iron supplementation, either orally or intravenously, and treatment of the underlying cause of bleeding.
	Monitor blood	Monitor vital	Blood	Monitor blood

Nursing Management	counts, manage symptoms, and educate the patient about the disease process and treatment of the underlying condition.	signs and hemoglobin levels, manage symptoms of shock if present, and provide post-transfusion care.	transfusions to restore blood volume and oxygen-carrying capacity, iron supplements to replenish stores.	counts and iron levels, educate on iron supplementation and dietary sources of iron, manage symptoms, and address the underlying cause of bleeding.

Table 3	**Acquired Hemolytic Anemia**	**Hemochromatosis**	**Polycythemia**
Etiology	Immune-mediated processes (autoimmune hemolytic anemia) Infections (e.g., malaria) Medications (e.g., penicillin, quinine) Mechanical causes (artificial heart valves) Toxins and venoms Underlying systemic diseases (e.g., lupus)	Genetic mutations (HFE gene most commonly) Secondary to other diseases (e.g., chronic transfusion therapy)	Primary polycythemia (Polycythemia Vera): A clonal hematopoietic stem cell disorder Secondary polycythemia: Due to hypoxia, smoking, tumors producing erythropoietin, or chronic carbon monoxide exposure
Clinical Manifestations	Fatigue and weakness Jaundice (yellowing of the skin and eyes) Dark urine (due to hemoglobinuria) Splenomegaly (enlarged spleen) Increased heart rate Shortness of breath	Arthralgia (joint pain) Fatigue Hepatomegaly (enlarged liver) Diabetes mellitus Skin bronzing or hyperpigmentation Cardiac arrhythmias	Headaches and dizziness Pruritus (especially after a hot bath) Erythromelalgia (burning pain in hands or feet with redness) Splenomegaly Hypertension Thrombosis
Diagnostic Studies	Complete blood count (CBC) Peripheral smear (spherocytes, schistocytes)	Serum transferrin saturation Serum ferritin levels Genetic testing for HFE mutations Liver biopsy (if indicated)	Elevated red blood cell mass JAK2 mutation testing (for Polycythemia Vera) Erythropoietin levels (low

	Direct antiglobulin test (DAT, Coombs test) Lactate dehydrogenase (LDH) Haptoglobin levels Bilirubin levels	MRI of the liver (for iron quantification)	in Polycythemia Vera, high in secondary) Bone marrow biopsy
Drug Therapy	Corticosteroids (first-line for autoimmune causes) Immunosuppressive agents (for refractory cases) Intravenous immunoglobulin (IVIG) Rituximab (anti-CD20 monoclonal antibody)	Phlebotomy (primary treatment) Iron chelation (for those unable to undergo phlebotomy) Treatment of associated conditions (e.g., diabetes, liver disease)	Phlebotomy (to reduce hematocrit) Hydroxyurea (to reduce blood cell production) Interferon-alpha (for patients intolerant to hydroxyurea) Aspirin (to reduce thrombotic events)
Nursing Management	Monitoring vital signs and hemoglobin levels Assessing for signs of increased hemolysis or anemia Providing support during transfusions Educating about the importance of medication adherence Monitoring for side effects of drug therapy	Educating about the genetic nature of the disease Scheduling and monitoring phlebotomy sessions Assessing for complications of iron overload Dietary counseling to avoid excess iron intake	Monitoring for symptoms of hyperviscosity Educating about the importance of regular phlebotomy Assessing for signs of thrombosis Monitoring for side effects of cytoreductive therapy

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.