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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:** menstruating/pregnant women at higher risk **-malabsorption:** surgical procedure or disease involving duodenum **-blood loss:** GI bleed r/t peptic ulcer, gastritis, esophagitis, diverticula, hemorrhoids, and cancer GU blood loss r/t menstrual bleeding **-hemolysis**	**-abnormal production of hemoglobin which decreases RBC production** **-reduced globulin protein** **-genetic link:** autosomal recessive genetic basis	**-pernicious anemia:** absence of intrinsic factor (IF) which is needed for cobalamin absorption **-IF is not secreted by gastric mucosa:** due to gastric mucosal atrophy or autoimmune process **-impaired absorption of cobalamin in the distal ileum** **-familial predisposition** **-can occur in pts that have had GI surgery, small bowel resection, Crohn's disease, ileitis, celiac disease, diverticula, or chronic atrophic gastritis. Also in pts with excess alcohol or hot tea ingestion, smoking, strict vegetarians, long term users of H2-histamine receptor blockers, and proton pump inhibitors.**	**-chronic alcoholism** **-chronic hemodialysis** **-dietary insufficiency** **-drugs interfering with absorption or use of folic acid:** methotrexate and antiseizure medications such as phenobarbital or phenytoin **-pregnancy** **-malabsorption syndromes:** celiac disease, Crohn's disease, and/or small bowel resection
Clinical Manifestations	**-pallor** **-glossitis (inflammation of tongue)** **-cheilitis (inflammation of the lips)** **-headache** **-paresthesia** **-burning of tongue**	**-microcytosis (small cells)** **-hypochromia (pale cells)** **-splenomegaly** **-bronzed color of skin** **-bone marrow hyperplasia** **-growth slowed**	**-manifestations develop in response to hypoxia** **-GI:** sore, red, beefy, and shiny tongue; anorexia, N/V, and pain **-neuromuscular:** weakness, paresthesia of feet/hands, reduced position senses, ataxia,	**-GI:** stomatitis, cheilosis, dysphagia, flatulence, and diarrhea **-neurologic symptoms when paired with thiamine deficiency:** these deficiencies co-existing is common

	-palpitations **-tachycardia** **-fatigue** **-dyspnea** **-anorexia** **-blurred vision**	**-pallor & other general symptoms of anemia** **-jaundice** **-possible hepatomegaly & cardiomyopathy**	and confusion	**-some symptoms can be attributed to co-existing problems:** cirrhosis and/or esophageal varices
Diagnostic Studies	**-laboratory studies:** Hgb/Hct, MCV, reticulocytes, serum iron, TIBC, transferrin, ferritin, bilirubin, serum B12, and folate **-stool occult blood test** **-endoscopy** **-colonoscopy** **-bone marrow biopsy**	**-laboratory studies:** CBC, Hgb/Hct, MCV, reticulocytes, serum iron, TIBC, transferrin, ferritin, bilirubin, serum B12, and folate	**-laboratory studies:** CBC, Hgb/Hct, MCV, reticulocytes, serum iron, TIBC, transferrin, ferritin, bilirubin, serum B12, and folate **-RBC:** large/abnormal shape **-endoscopy:** biopsy of gastric mucosa **-serum methylmalonic acid (MMA) and homocysteine**	**-laboratory studies:** CBC, Hgb/Hct, MCV, reticulocytes, serum iron, TIBC, transferrin, ferritin, bilirubin, serum B12, and folate
Drug Therapy	**-oral iron:** 150-200mg/day 3-4 doses/day with each tablet containing 50-100mg (ex. 325mg tablet ferrous sulfate containing 65mg iron) take 1 hour before meals with orange juice or vit. C to enhance absorption **-parenteral iron:** used for patients with malabsorption or iron, a need for iron beyond oral limits, or poor medication compliance. Given IM or IV.	**-thalassemia minor does not need treatment the body adapts on its own** **-drug and diet therapies are ineffective for thalassemia major** **-thalassemia major is managed with blood or exchange transfusions in conjunction to chelating agents that bind to iron to prevent iron overloading. Ascorbic acid and zinc supplements may also be given with chelation therapy**	**-parenteral vit. B12:** cyanocobalamin or hydroxocobalamin 1000mcg/day IM for 2 weeks and then weekly until the hemoglobin is normal and then monthly for life **-intranasal cyanocobalamin:** nascobal **-high-dose oral cobalamin and sublingual:** options for pts whose GI absorption is intact	**-replacement therapy:** 1mg/day orally or up to 5mg/day for a pt with malabsorption or chronic alcoholism **-consuming foods high in folic acid:** green leafy vegetables, grain products, orange juice, peanuts, avocados, etc.
Nursing Management	**-promote medication compliance/drug therapy** **-educate on good sources of iron and/or how to correctly take medication** **-monitor labs and**	**-promote transfusion and supplementation compliance** **-educate pt on needed therapy** **-educate on possible need for splenectomy and/or hematopoietic**	**-promote medication regimen compliance** **-educate pt on therapies needed and the need for lifelong treatment** **-monitor labs**	**-promote medication compliance** **-educate on foods high in folic acid** **-monitor labs and evaluate response to treatment**

	evaluate response to therapies **-monitor liver enzymes esp. for pts on lifelong iron supplementation**	**stem cell transplantation (HSCT)** **-monitor hepatic, heart, and lung functioning** **-monitor labs and evaluate response to treatments**	**-monitor for neurological difficulties:** implement safety measures r/t decreased sensitivity to heat and pain **-protect patient from injury r/t neuromuscular complications:** falling, burns, and trauma	

Table 2	**Anemia of Chronic Disease**	**Aplastic Anemia**	**Acute Anemia due to blood loss**	**Chronic Anemia due to blood loss**
Etiology	**-cancer** **-autoimmune and infectious disorders:** HIV, hepatitis, malaria, etc. **-heart failure** **-chronic inflammation**	**-autoimmune activity:** autoreactive T lymphocytes **-toxic injury to bone marrow stem cells** **-inherited stem cell defect**	**-sudden hemorrhage** **-trauma** **-complications of surgery** **-conditions/diseases that disrupt vascular integrity**	**-bleeding ulcer** **-hemorrhoids** **-menstrual bleeding** **-postmenopausal bleeding**
Clinical Manifestations	**-varies depending on cause/pre-existing disease**	**-symptoms arise from suppression of any or all bone marrow elements** **-fatigue** **-dyspnea** **-cardiovascular:** palpitations, tachycardia, angina, HF, MI, etc. **-cerebral:** headache, vertigo, irritability, depression, impaired thought process, etc. **-neutropenia:** infection, septic shock, and death **-thrombocytopenia:** bleeding, petechiae, bruising, nosebleeds, etc.	**-symptoms arise from the bodies attempt to maintain an adequate blood supply and meet O2 requirements** **-syncope** **-hypotension** **-tachycardia** **-decrease CO and central venous pressure** **-air hunger** **-rapid thready pulse** **-cold clammy skin** **-shock, lactic acidosis, and potential death**	**-hypotension** **-palpitations** **-tachycardia** **-syncope** **-fatigue** **-weakness** **-SOB** **-dizziness** **-angina** **-cold hands & feet**
Diagnostic Studies	**Laboratory studies:** high serum ferritin and increased iron stores distinguish it from iron-deficiency anemia. Normal folate and cobalamin serum levels distinguish it	**-Laboratory studies:** Hgb, WBC, and platelet values all decreased. Can also assess iron studies. **-Bone marrow biopsy, aspiration, and pathologic examination:** increased yellow marrow	**-Laboratory studies:** Hgb & Hct	**-identifying the source** **-laboratory studies:** Hgb & Hct

	from megaloblastic anemias.			
Drug Therapy	**-correct the underlying disorder** **-blood transfusions** **-erythropoietin:** used for anemia r/t renal disease and cancer	**-treating causative agent** **-HSCT and immunosuppressive therapy:** antihymocyte globulin (ATG), steroids, and cyclosporine/cyclophosphamide **-eltrombopag:** oral thrombopoietin receptor agonist can be used to increase platelet count	**-IV fluids:** dextran, hetastarch, albumin, and crystalloid electrolyte solutions (LR) **-blood transfusions:** packed RBCs, platelets, plasma, and cryoprecipitate **-supplemental iron:** oral or parenteral	**-dependent on underlying cause** **-IV fluids** **-blood transfusions** **-supplemental iron**
Nursing Management	**-manage therapies being used to treat underlying chronic condition** **-educate and promote compliance of transfusions and therapies** **-monitor labs**	**-prevent infection and hemorrhage** **-educate and promote compliance of therapies and drug regimen** **-monitor labs**	**-monitor blood loss from various drainage tubes and dressings and act when needed** **-appropriately transfuse blood taking all precautions** **-monitor labs** **-manage therapies and provide education**	**-monitor for worsening symptoms** **-appropriately transfuse blood products taking all precautions** **-monitor labs** **-manage therapies and provide education** **-promote compliance of therapies and medications**

Table 3	**Acquired Hemolytic Anemia**	**Hemochromatosis**	**Polycythemia**
Etiology	**-extrinsic factors:** antibodies, infectious agents, toxins, physical destruction, cancer, etc. **-macrophages:** destroy RBCs	**-genetics** **-diseases:** sideroblastic anemia, liver disease, etc. **-chronic blood transfusions**	**Primary polycythemia:** genetic **Secondary polycythemia:** hypoxia, cancer, or benign tumor
Clinical Manifestation	**-palpitations** **-fatigue** **-weakness** **-tachycardia**	**-fatigue** **-arthralgia** **-impotence** **-abdominal pain**	**-hypervolemia** **-hypertension** **-headache** **-vertigo**

s	**-dyspnea** **-pallor** **-hepatomegaly** **-splenomegaly** **-jaundice**	**-weight loss** **-hepatomegaly** **-cirrhosis** **-diabetes** **-skin pigment changes (bronzing)** **-cardiomyopathy** **-arthritis** **-testicular atrophy** **-splenomegaly**	**-dizziness** **-tinnitus** **-visual changes** **-pruritus** **-paresthesia** **-burning/redness of hands and feet** **-angina** **-HF** **-intermittent claudication** **-thrombophlebitis**
Diagnostic Studies	**-Laboratory studies:** Hgb & Hct, bilirubin levels, liver enzymes **-renal function tests**	**-Laboratory studies:** iron levels, liver enzymes, etc.	**-Laboratory studies:** Hgb & Hct, EPO level, WBC, platelets, cobalamin, and uric acid **-bone marrow examination**
Drug Therapy	**-steroids** **-blood transfusions**	**-blood removal:** 500ml each week for 2-3 years then less often **-iron chelating agents:** deferoxamine IV or subcu deferasirox or deferiprone orally **dietary changes:** avoiding vit. C, uncooked seafood, and iron rich foods	**-blood removal:** 300-500ml every few days until Hct is at normal level may be needed every 2-3 months following **-hydration therapy:** to reduce blood viscosity **-myelosuppressive agents:** hydroxyurea, busulfan, and chlorambucil **-low dose aspirin** **-allopurinol:** given to reduce # of acute gouty attacks
Nursing Management	**-manage therapies and drug regimen/promote compliance** **-appropriately transfuse blood utilizing precautions** **-monitor labs**	**-monitor and treat HF, diabetes, and/or liver failure/cirrhosis** **-monitor labs** **-promote medication and therapy compliance and educate**	**-assist with phlebotomy** **-assess fluid status during hydration therapy** **-educate and promote compliance of therapies and medications** **-assess nutritional status** **-educate on prevention of thrombus formation** **-continually assess for complications**