

ANEMIA

less than normal O₂ carrying capacity

Hx: specific risk factors (risk of bld loss → bld thinners, bruising, menorrhagia), vegan (low iron, B₁₂ def), drug Hx, weight loss (Sx of cancer)

Testing:

CBC w WBC & platelet	
RBC indices	Hct (hematocrit) - % bld made of RBCs MCHC (mean cellular Hb concentration) - Hb lvl in RBC, normochromic or hypochromic MCV (mean cellular vol) - vol of RBC, normocytic, macrocytic, microcytic RDW (RBC distribution width) - degree of variation in RBC size, wide or narrow
reticulocyte count	how well bone marrow compensating
peripheral smear	
serum ferritin	backstock of iron
iron-binding capacity	consistently high in iron-def anemia, how many available spaces does bld have for iron
bone marrow aspiration/biopsy	

IRON DEFICIENCY ANEMIA

most common cause, usually from blood loss, iron metabolism → poorly absorbed (1 in 15 mg, hem-iron (animal product) better absorbed, best absorption w vitamin C in ST), transported by transferrin after absorption, stored as ferritin in LV, bone marrow, SP, amt of circulating ferritin=stored

Etiology

blood loss	men & postmeno → chronic GI occult blding premeno → cumulative menstrual loss chronic intravascular hemolysis (autoimmune, mech HT valve malfxn)
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inc iron req	pregnancy & lactation
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dec iron absorption	gastrectomy, upper small-bowel malabsorption syndromes (celiac)
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S/s: fatigue, loss of stamina, SOB, weakness, dizziness, pallor (pale conjunctiva for more melanin), poss tachycardia

Dx: *discontinue iron supp 48 hrs before testing

CBC & RBC indices	late stages, microcytosis & hypochromia
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Serum Iron	low in iron def, high in hemolytic disorders
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Iron-Building Capacity	increases as levels fall
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Serum Ferritin	first sign of iron deficiency
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Tx: **rule out blding with occult bld test** → oral iron supplementation: liver capsules, floradix (vegetarian), injection if serious (if no response, possible hemorrhage, infxn or cancer)

MEGALOBLASTIC ANEMIAS →

impaired DNA synthesis that make RBCs "look like big babies" - large, immature cells (B₁₂ deficiency & folate deficiency)

PERNICIOUS ANEMIA → B₁₂ deficiency, B₁₂ req for DNA synthesis and maintaining normal neurologic production

Etiology: intrinsic factor deficiency or diet (rare)

Dx: MCV elevated, normal MCHC

S/s: same as iron def + symmetric paresthesias of feet & fingers, spastic ataxia, dementia (neurologic damage is IRREVERSIBLE)

Tx: B₁₂ injection

FOLIC ACID-DEFICIENCY ANEMIA → req for DNA synthesis & RBC maturation

Etiology: dietary lack esp in elderly, alcohol metabolic syndrome, malabsorption (celiac)

S/s: same as pernicious MINUS neuro S/s

ANEMIA OF CHRONIC Dx

chronic inflammation, infxn, cancer

Etiology: sl short RBC survival, impaired erythropoiesis, impaired intracellular iron metabolism

Dx

S/s underlying disorder

CBC & Indices	microcytic or marginal normocytic anemia
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serum iron **decreased**

iron binding capacity **increased**

serum ferritin usually decreased

Tx: tx underlying disorder, recombinant erythropoietin & iron supplementation

LEUKEMIA *liquid tumor*

ACUTE LEUKEMIAS	<i>ALL: most common pediatric cancer (2/3 occur in children) → progn favorable 3-9 y/o, unfavorable in adults, AML: media 31 y/o, long term survival 20-50%</i> Etiology: hematopoietic stem cell is poorly differentiated with abnormal longevity → lymphoid or myeloid S/s: disrupted hematopoiesis (anemia, infection, easy bruising), pallor, fatigue, fever, weight loss, tachycardia, chest Px Dx: CBC & peripheral smear → pancytopenia & peripheral blasts, bone marrow aspiration/biopsy, histochemical studies to distinguish ALL from AML Tx: chemo, cell transplantation, radiation, supportive care (transfusions, hydration, psychological support) Prog: realistic esp in younger, worse in infants/elderly, survival if untreated 3-6 mon
CHRONIC LEUKEMIAS	<i>CLL: most common leukemia in western, increases with age, male sex</i> Etiology: abnormal leukocytes in asymptomatic person, cells better differentiated than in acute → lymphoid or myeloid S/s: insidious onset, fatigue, anorexia, weight loss, dyspnea on exertion, abdom fullness Dx: CBC, peripheral smear, bone marrow asp/biop, immunophenotyping Tx: CLL: NONE until symptoms - cure not possible, CML: imatinib Prog: CLL: 7-10 yrs, CML: 90% w Tx

LYMPHOMA *hard tumor in lymph nodes*

HODGKIN LYMPHOMA	<i>male>female, age:15-40, 50-60, Reed-Sternberg cells (binucleated cells in lymph nodes), come from B-cells, slow progress, more easily treatable</i> Risk Fctrs: immunosuppression, congenital immunodef, autoimmune Dx, env, Epstein-Barr S/s: Painless cervical adenopathy, pruritus, fever, night sweats, unintentional wt loss, splenomegaly, hepatomegaly Dx: lymph node biopsy, chest x-ray, CT chest, abdomen, pelvis, CBC, bone marrow biopsy if bones involved Tx: depends on staging → chemo, radiation, surgery, stem cell transplantation Prog: chemo → 70/80% cure, relapse risk inc w age
NON-HODGKIN LYMPHOMAS	<i>doesn't have Reed-Sternberg cells, collection of different lymph node tumors in bone marrow, SP, LV, GI, not as easily treatable</i> Risk Fctrs: immunodef, immunosup, H pylori, prev Tx for Hodgkin lymphoma Dx: lymph node biopsy Tx: variable depending on cell type Prog: outcomes worse with age

MULTIPLE MYELOMA	<i>tumor in bone, cancer of plasma (B) cells → B-cells make antibodies → too many of monoclonal antibodies (immunoglobulin) usually IgG or IgA → destroys bone tissue, male>female, 65y/o, blacks>whites</i> Risk Fctrs: male, 65+, black S/s: persistent bone Px esp @ night, renal failure, recurring bac infexns, pathologic fractures Dx: Bence Jones proteins found in urine, CBC + peripheral smear - anemia, chem panel - elevated blood protein + hypercalcemia, x-rays - punched out lesions in bone Tx: chemo, corticosteroids, stem cell transpl, Tx of complications Prog: not very good
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