Anemia 1

Friday, October 31, 2014
9:38 AM

Learning Objectives:
- etiology, risk factors, symptoms, & treatment for the following anemias:
  - iron
  - B12
  - folate

ANEMIA - ↓Hb, causing ↓O2 carrying capacity

Causes: not enough RBC
- too little in (malnutrition)
- too much out (blood loss, abnormal Hb)

Diagnosis = CBC (Hb, Crit)

Epidemiology
- old
- female
- blacks
- cancer
- CKD

Erythropoiesis
ERYTHROPOIETIN (EPO) - initiates/stimulates production of RBCs, released by kidneys when ↓tissue O2
- ↑reticulocytes, erythroblasts, Hb

- RBC Production: bone marrow
  - stemcell --> reticulocyte (1 week)
  - reticulocyte --> RBC (24-48 hrs)
- RBC Function: transport O_2
- RBC Destruction: spleen (liver, bone marrow)
  - RBC life = 120 days

General Signs, Symptoms, Findings

Signs	Symptoms	Other Findings
- pale skin, nails, eyes - tachycardia (↑HR) - altered mental status	- fatigue - dizziness - headache - palpitations, chest pain - dyspnea (SOB) - ↓exercise tolerance	- blood loss - malnutrition - alcohol - CKD, cancer, autoimmune, infections

Morphology

MCV	RBC size
Microcytic	small
Normocytic	normal
Macrocytic	large

MCHC	[Hb]
Hypochromic	low
Normochromic	normal

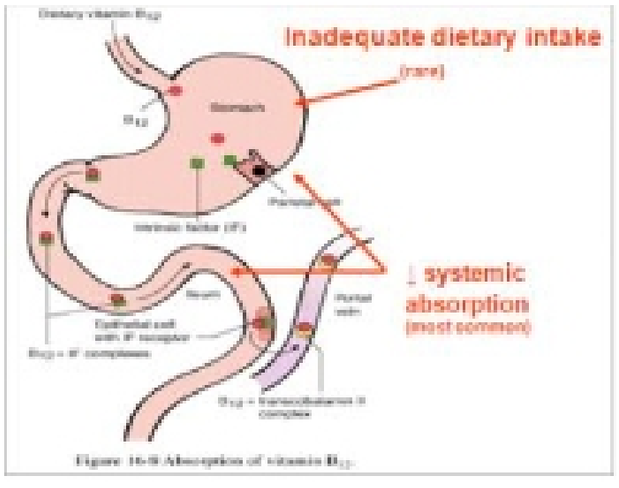
Etiologies

Microcytic (Hypochromic)	Normocytic	Macrocytic (Normochromic)
- Iron	- hemolysis (sickle, G6PD) - blood loss - chronic diseases	- B12 - folate

	Risk Factors	Etiology (Causes)	Signs/Symptoms	Diagnosis	Tx
Iron* (most common)	- <2, >65 - menstruation - pregnancy	- ↓intake - ↓absorption - ↑demand (pregnancy, menstruation) - blood loss		↓: iron, MCV, MCHC, transferrin sat, ferritin ↑: TIBC	- iron - treat underlying cause - improve symptoms & lab findings
B12 (rare)	- vegans - alcoholism	- ↓intake - ↓absorption (IF, parietal cells)*	- neurologic - parasthesias (hands/feet tingling) - vibratory/position sensation loss - spastic ataxia (tense muscles, coordination) - (dementia)	↓: B12 ↑: MCV	- B12 - treat underlying cause - improve symptoms & lab findings - prevention/tx of neurologic effects
Folate (common)	- babies, teens - elderly - pregnancy - alcoholism - poor	- ↓intake - ↓absorption (GI disorders) - ↑demand (pregnancy, growth) - drugs (*methotrexate, trimethoprim*)	- neural tube defects	↓: folate ↑: MCV	- folate - treat underlying cause - improve symptoms & lab findings

B12 - maintenance of nerve function; coenzyme involved in NA synth, promotes RBC development
- PERNICIOUS ANEMIA - autoimmune destruction of parietal cells
  - PARIETAL CELLS - produce IF
    - INTRINSIC FACTOR (IF) - glycoprotein that absorbs B12

FOLATE - coenzyme in AA/protein metabolism, promotes RBC development


Inadequate dietary intake
(rare)
↓ systemic
absorption
(most common)