

OBJECTIVES FOR COMMON CLINICAL PROBLEMS

Anemia

A. KNOWLEDGE: Students should be able to define, describe, and discuss:

1. Classification of anemia based on red cell size:
 - Microcytic:
 - Iron deficiency
 - Thalassemic disorders
 - Sideroblastic anemia
 - Normocytic:
 - Acute blood loss
 - Hemolysis
 - Anemia of chronic disease
 - Chronic renal insufficiency/erythropoietin deficiency
 - Bone marrow suppression (e.g. bone marrow invasion, aplastic anemia)
 - Hypothyroidism
 - Testosterone deficiency
 - Early presentation of microcytic or macrocytic anemia (e.g. early iron deficiency anemia)
 - Combined presentation of microcytic and macrocytic anemias
 - Macrocytic:
 - Ethanol abuse
 - B12 deficiency
 - Folate deficiency
 - Drug-induced
 - Reticulocytosis
 - Liver disease
 - Myelodysplastic syndromes
 - Hypothyroidism

2. Morphological characteristics, pathophysiology, and relative prevalence of each of the causes of anemia
3. The meaning and utility of various components of the hemogram (e.g. hemoglobin, hematocrit, mean corpuscular volume, and random distribution width)
4. The classification of anemia into hypoproliferative and hyperproliferative categories and the utility of the reticulocyte count/index
5. The potential usefulness of the white blood cell count and red blood cell count when attempting to determine the cause of anemia
6. The diagnostic utility of the various tests for iron deficiency (e.g. serum iron, total iron binding capacity, transferrin saturation, ferritin)
7. The genetic basis of some forms of anemia
8. Indications, contraindications, and complications of blood transfusion

B. SKILLS: Students should be able to demonstrate specific skills, including:

1. History-taking skills: Students should be able to obtain, document, and present an age-appropriate medical history, that differentiates among etiologies of disease, including:
 - Constitutional and systemic symptoms (e.g. fatigue, weight loss)
 - History of gastrointestinal bleeding or risk factors for it
 - Abdominal pain
 - Prior history of anemia or other blood diseases
 - Medications
 - Diet
 - Alcohol use
 - Menstrual history
 - Family history of anemia or other blood diseases
2. Physical exam skills: Students should be able to perform a physical exam to establish the diagnosis and severity of disease, including:
 - Pallor (e.g. palms, conjunctiva, nail beds)
 - Mouth (e.g. glossitis, cheilosis)
 - Hyperdynamic precordium, systolic flow murmur
 - Lymph nodes
 - Spleen
 - Obtain stool for occult blood testing
 - Nervous system

3. Differential diagnosis: Students should be able to generate a list of the most important and most common causes of anemia, recognizing specific history, physical exam, and laboratory findings that suggest a specific etiology.
4. Laboratory interpretation: Order and interpret diagnostic and laboratory tests based on the differential diagnosis. These may include:
 - Complete blood count (CBC)
 - Reticulocyte count
 - Iron studies (serum iron, TIBC, ferritin, transferrin, Tsat)
 - Serum B12 and folate
 - Haptoglobin.Lactic dehydrogenase. (LDH)
 - Hemoglobin electrophoresis
 - Blood smear (Manual differential)

Students should be able to define the indications for

- Bone marrow biopsy
5. Management skills: Students should be able to develop an appropriate evaluation and treatment plan for patients that includes:
 - Evaluating for underlying disease processes, given that anemia is not a disease per se, but rather a common finding that requires further delineation in order to identify the underlying cause
 - Prescribing indicated replacement therapy, including iron, vitamin B12, and folic acid