Clinical approach and revision

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Anemia: A thorough history and physical

Some important questions to obtain in a history:

- Obvious bleeding- per rectum or heavy menstrual bleeding, black tarry stools, hemorrhoids
- Thorough dietary history
- Consumption of nonfood substances
- Bulky or fatty stools with foul odor to suggest malabsorption
- Thorough surgical history, with a concentration on abdominal and gastric surgeries
- Family history of hemoglobinopathies, cancer, bleeding disorders
- Careful attention to the medications taken daily

Symptoms of anemia

Classically depends on the rate of blood loss. Symptoms usually include the following:

- Weakness
- Tiredness
- Lethargy
- Restless legs
- Shortness of breath, especially on exertion.. near syncope
- Chest pain and reduced exercise tolerance- with more severe anemia
- Pica- desire to eat unusual and nondietary substances
- **Mild anemia may otherwise be asymptomatic**

Signs of anemia

- Cool skin
- Tachypnea
- Hypotension (orthostatic)
- Pallor of the conjunctiva
- Jaundice- elevated bilirubin is seen in several hemoglobinopathies, liver diseases and other forms of hemolysis
- Lymphadenopathy: suggestive of lymphoma or leukemia.
- Glossitis (inflammation of the tongue) and cheilitis (swollen patches on the corners of the mouth): iron/folate deficiency, alcoholism, pernicious anemia

Microcytic anemia (MCV (<80 fl)

- ***1st: R/O iron def. anemia***
- Best: Low serum ferritin, high RDW, may be reactive thrombocytosis

Vs Thalassemia?

Usually, RDW normal

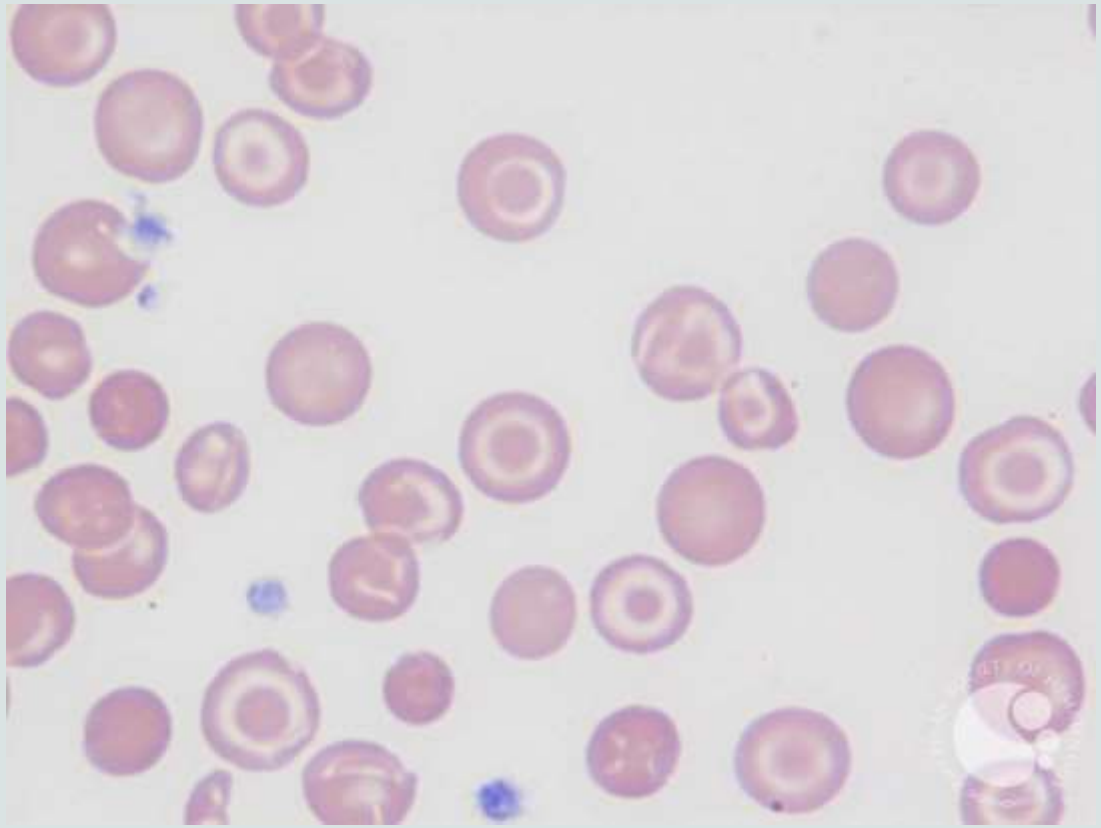
High RBC count

Polychromasia (increased reticulocytes)

Target cells.

Usually its preexisting; the patient always had thalassemia

Hb electrophoresis



thalassemias; hemoglobinopathies; obstructive jaundice; asplenia

ACD/ACI

Anemia of chronic disease is usually normocytic but can be microcytic in few cases.

Sideroblastic anemia is a rare disorder that is characterized by increased RDW, dimorphic red blood cells, and bone marrow ring sideroblasts.

Item	ACD	IDA
Fe	Low	Low
TIBC	Normal or low	High
Transferrin saturation (Fe/TIBC)	Low	Much lower
Ferritin	High	Low

Fe = serum iron; TIBC = total iron-binding capacity.

DOI: 10.1016/S1991-

Normocytic anemia (MCV (80-100fl)

- Nutritional..

  both iron and vitamin B12/folate deficiencies are possible causes?

Anemia of Renal Insufficiency.—Anemia of renal insufficiency is associated with an unremarkable peripheral blood smear and low-normal EPO.

Anemia of chronic disease.

Normocytic anemia:
Hemolytic Anemia

Laboratory evidence:

- *increased LDH (lactate dehydrogenase): cellular destruction.*
- *increased indirect bilirubin: hemoglobin catabolism*
- *decreased haptoglobin: clears free hemoglobin.*
- *Reticulocytosis: bone marrow regenerative effort*

extravascular vs intravascular hemolysis

Test	Intravascular	Extravascular
Reticulocyte count	Increased	Increased
LDH	Increased	Increased
Indirect bilirubin	Normal/ sometimes increased	Increased
Haptoglobin	Decreased	Decreased
Urinary Hemosiderin	Present	Absent

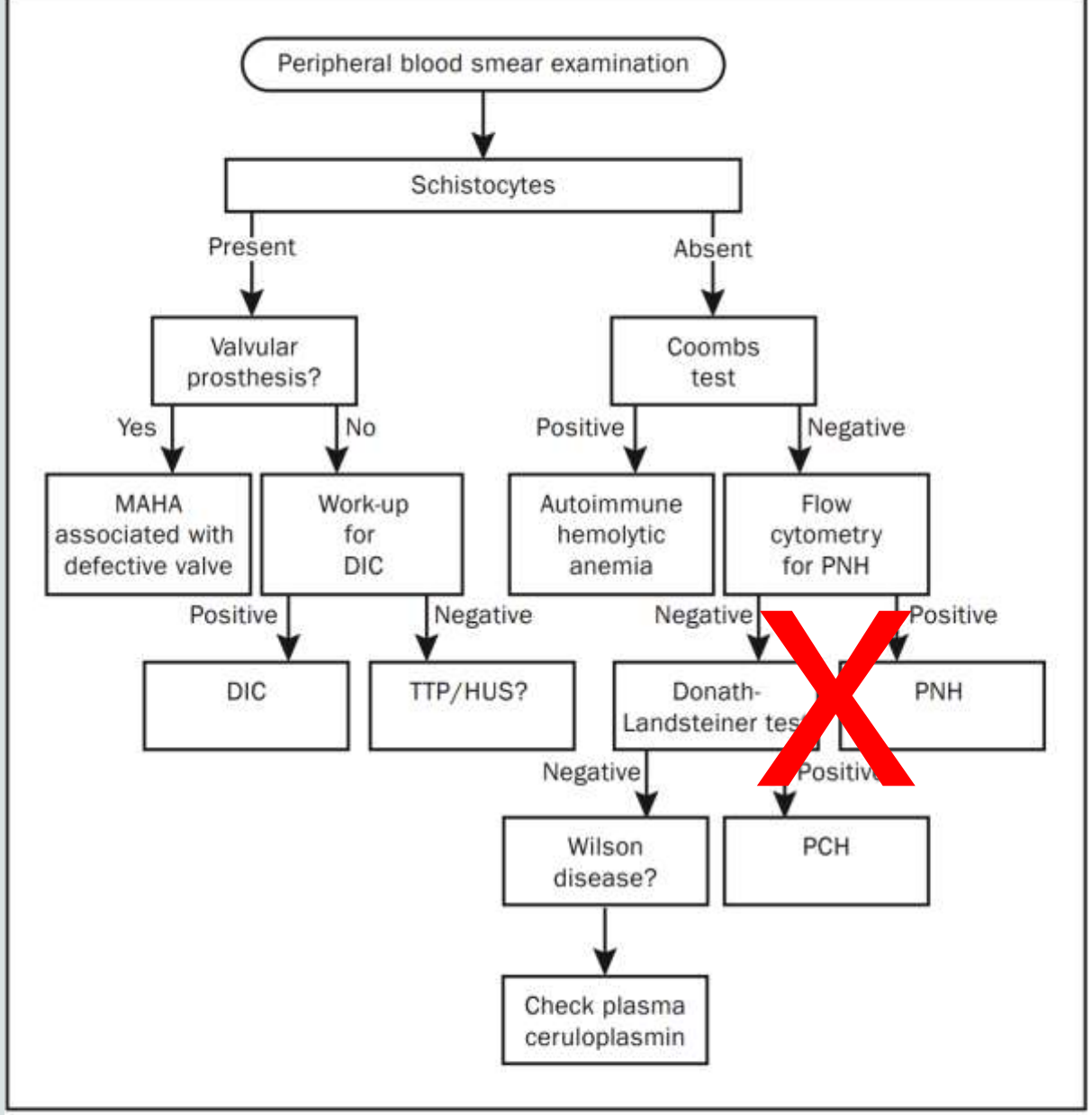


Figure 1. Evaluation of intravascular hemolysis. DIC = disseminated intravascular coagulation; HUS = hemolytic uremic syndrome; MAHA = microangiopathic hemolytic anemia; PCH = paroxysmal cold hemoglobinuria; PNH = paroxysmal nocturnal hemoglobinuria; TTP = thrombotic thrombocytopenic purpura.

Mayo Clin Proc. 2003;78:1274-1280

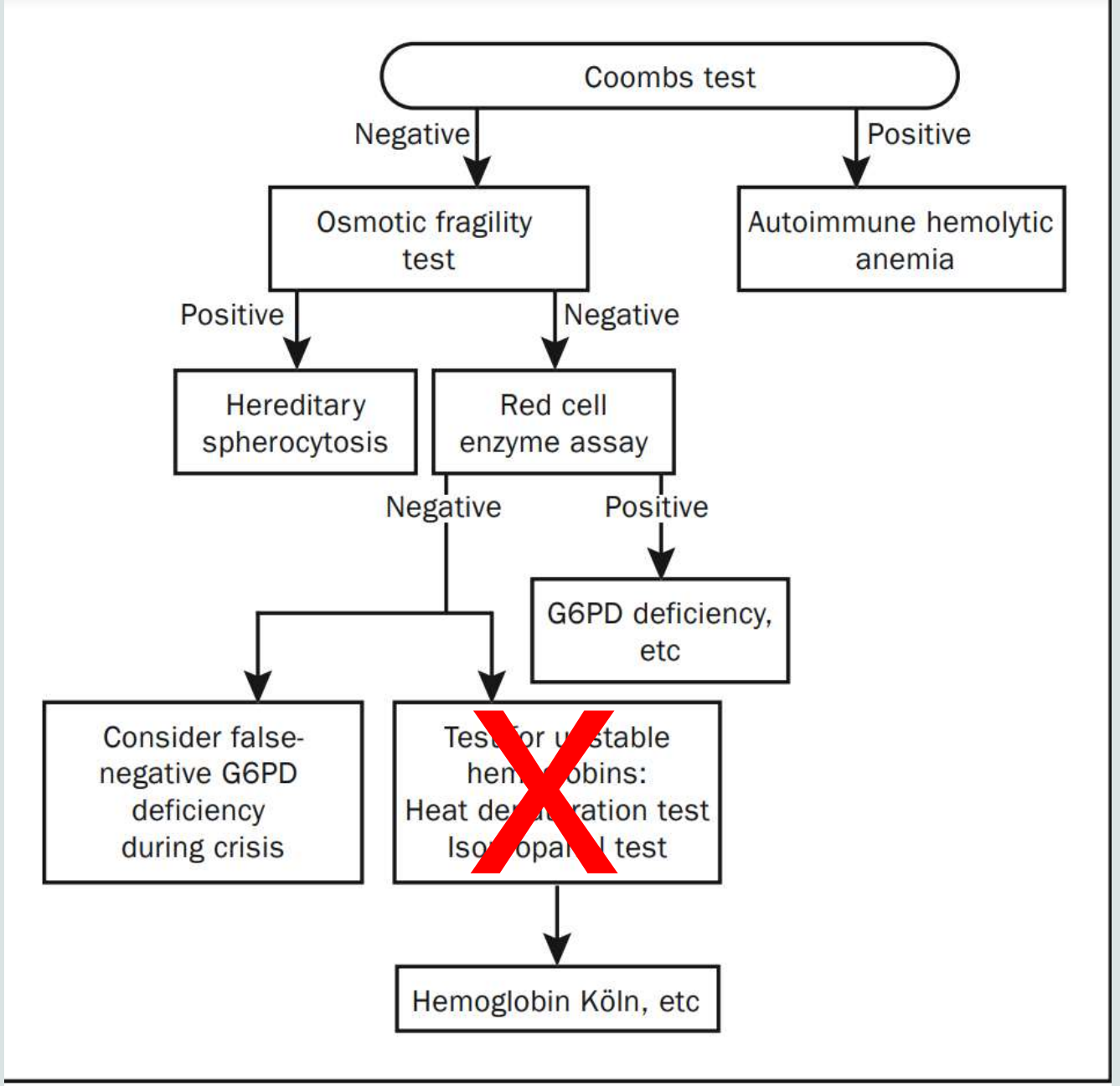


Figure 2. Evaluation of extravascular hemolysis. G6PD = glucose-6-phosphate dehydrogenase.

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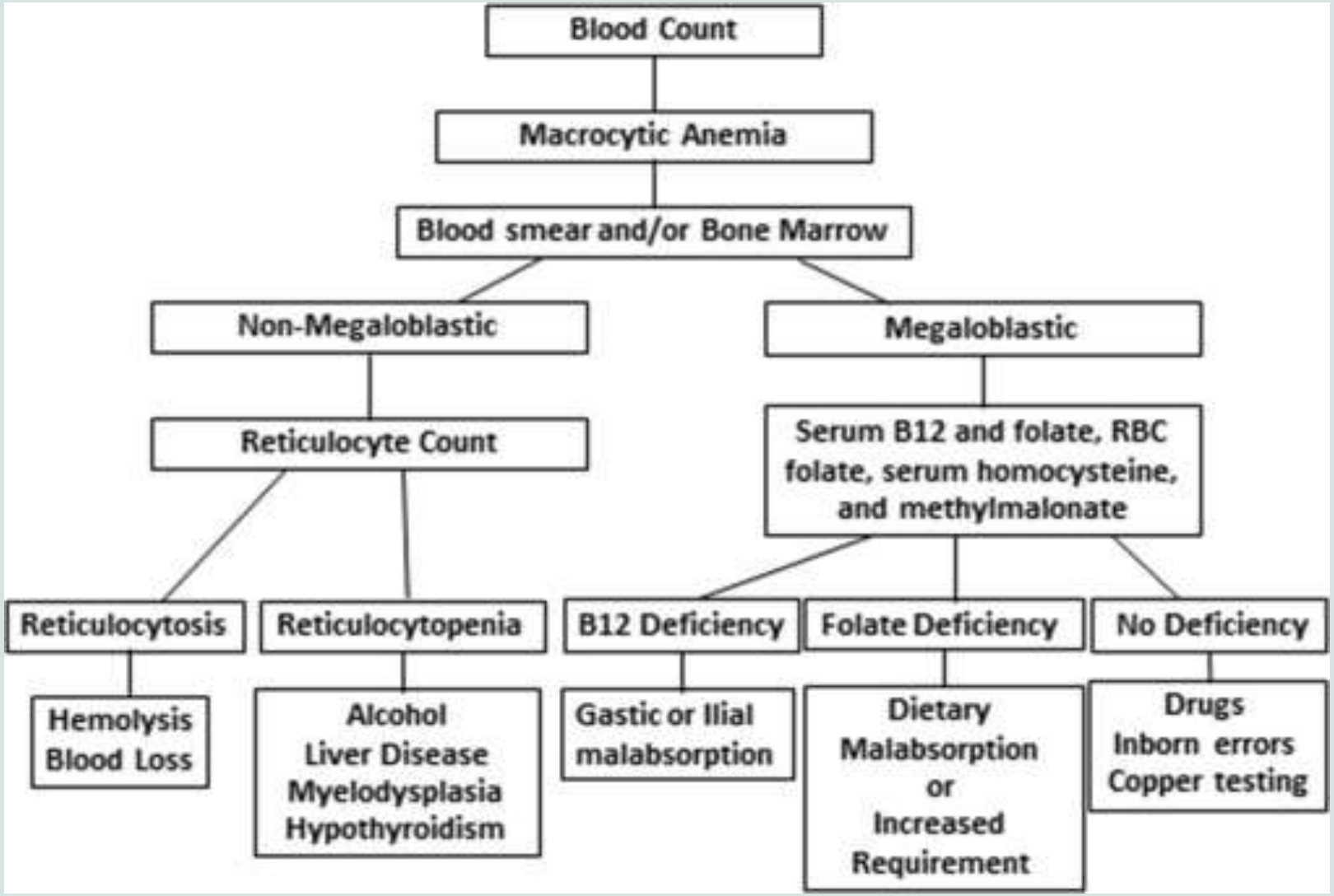
Macrocytic anemia (MCV >100 fl)



https://doi.org/10.1053/j.seminhematol.2015.06.00

Thank you

Gaucher disease

- Gaucher disease (GD) is an autosomal recessive lysosomal storage disorder caused by mutation of the *GBA1* gene that codes for glucocerebrosidase (GCase).
- One of the most common lysosomal storage disorders
- Impaired enzymatic activity leads to accumulation of Gaucher cells in reticuloendothelial system (liver, spleen, bone marrow), which leads to hepatosplenomegaly and bone marrow infiltration with cytopenia and bone pain