

HYPOCHROMIC–MICROCYTIC ANEMIA

Samin Alavi.MD

SBMU

1405

MICROCYTIC HYPOCHROMIC ANEMIA

CAUSES

I Teach **A**nemic **L**ittle **C**hildren, **B**ecoming **S**cholars

Iron Deficiency anemia

Thalassemia

Anemia of Chronic disease

Lead poisoning

Copper deficiency

B6 deficiency

Sideroblastic anemia

@VijayPatho

Features of hypochromic anemias

	Ferritin	Serum iron	TIBC	Transferrin saturation	Red cell distribution width	Marrow storage iron
Iron deficiency anemia	Low	Low	High	Low	High	Low
Thalassemias	Normal to high	Normal to high	Low to normal	Normal to high	Normal	Normal to high
Sideroblastic anemias	High	Normal to high	Low to normal	High	High	High
Anemia of chronic disease	Normal to high	Low	Low to normal	Low	Normal	Low to normal



Normal
RBC

Microcytosis (MCV < 80 fL)

Iron
deficiency



MCHC low

Hemoglobinopathies

Thalassemia

Alpha



MCHC normal

Beta



HbC

- HbAC
- HbCC
- HbSC



MCHC elevated

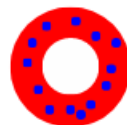
HbE

- HbAE
- HbEE



Inflammation

About 20% of anemia of inflammation
is microcytic



- Sideroblastic anemia (congenital)
- Lead poisoning
- Hyperthyroidism
- Fragmentation syndrome (MAHA)



Horn cell



Helmet cell

(Schistocytes)

Microcytic Hypochromic anemia
MCV <80fl

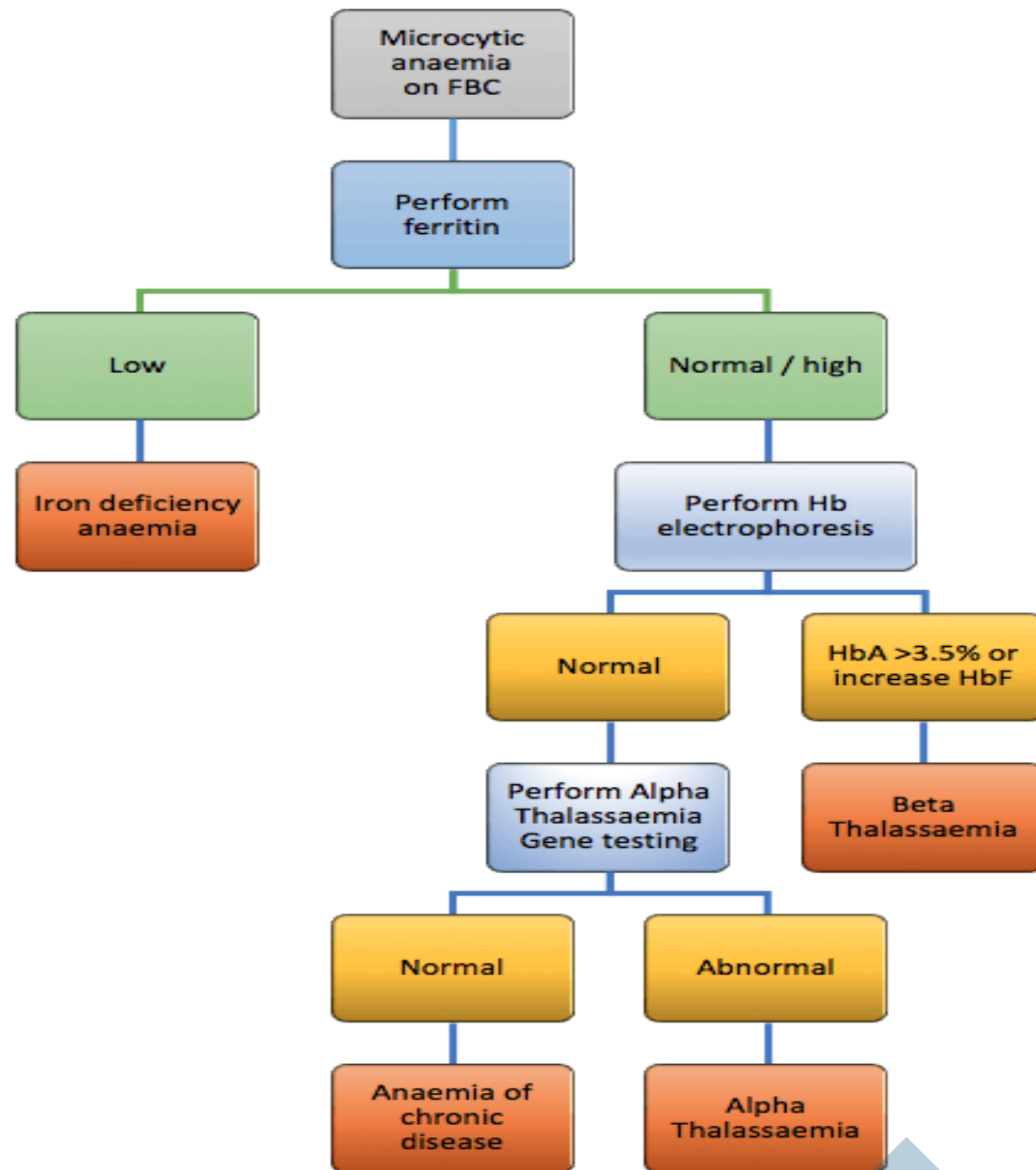
```
graph TD; A["Microcytic Hypochromic anemia<br/>MCV <80fl"] --> B["Decreased serum iron"]; A --> C["Normal or increased serum iron"]; B --> D["1. Iron-deficiency anemia<br/>2. Anemia of chronic diseases"]; C --> E["1. Thalassemia<br/>2. Sideroblastic anemia<br/>3. Hemoglobin E<br/>4. Porphyrins<br/>5. Lead poisoning"];
```

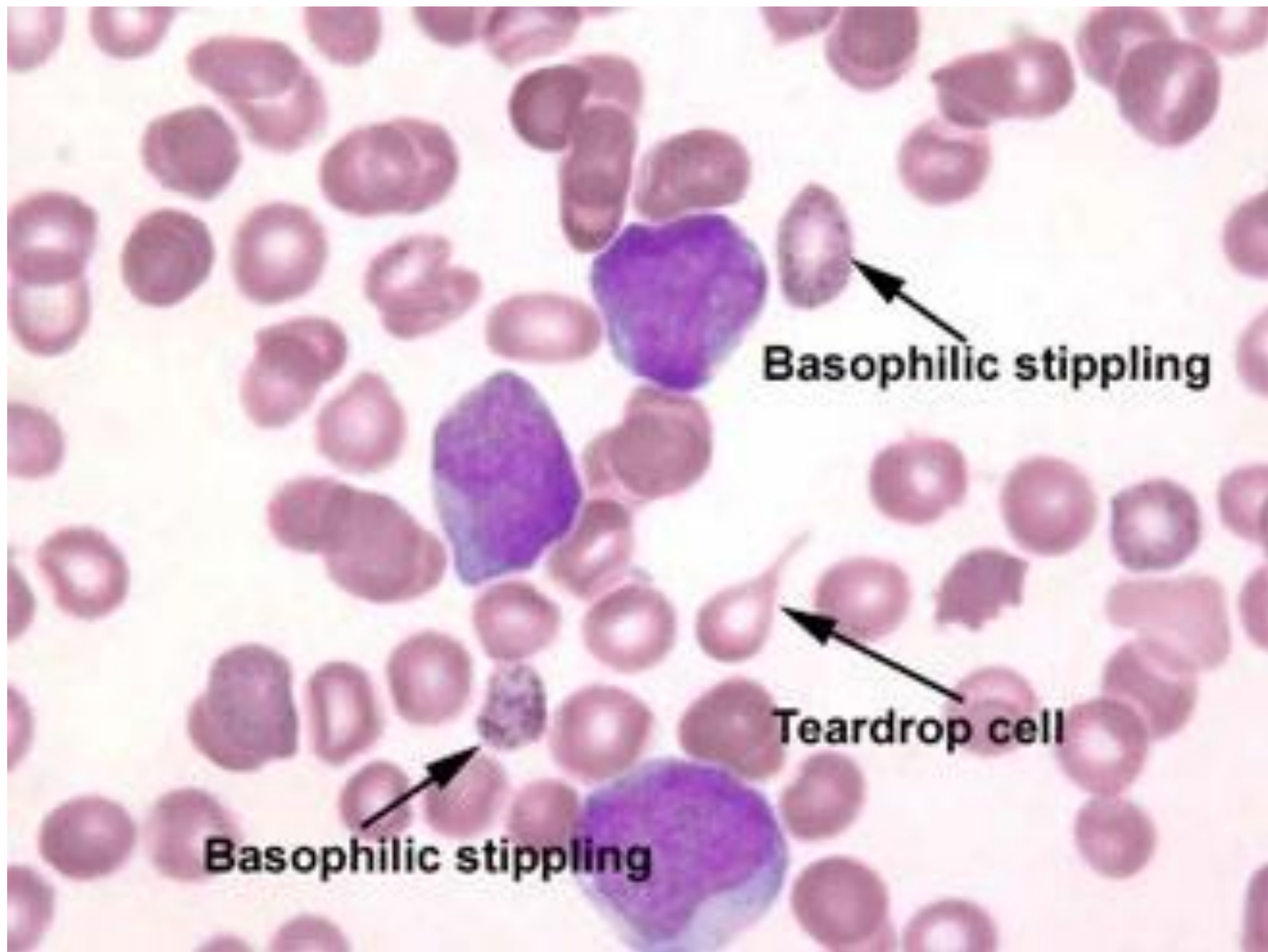
Decreased serum iron

1. Iron-deficiency anemia
2. Anemia of chronic diseases

Normal or increased serum iron

1. Thalassemia
2. Sideroblastic anemia
3. Hemoglobin E
4. Porphyrins
5. Lead poisoning





Which of the following is NOT a typical feature of iron deficiency anemia in children?

A) Pallor

B) Glossitis

C) Jaundice

D) Fatigue

Which test is most useful to confirm iron deficiency anemia?

- A) Serum ferritin
- B) Serum vitamin B12
- C) Coombs test
- D) Bone marrow biopsy

A child with hypochromic microcytic anemia shows a normal serum ferritin level. What is the next best step?

- A) Start iron therapy immediately
- B) Check hemoglobin electrophoresis
- C) Repeat CBC in 6 months
- D) Start vitamin B12 supplementation

**Thalassemia trait can present with hypochromic microcytic anemia.
Which feature helps to differentiate it from iron deficiency anemia?**

- A) High red blood cell count despite anemia
- B) Low reticulocyte count
- C) Presence of hypersegmented neutrophils
- D) Increased serum iron

A 3-year-old boy is brought to the clinic with complaints of fatigue and pallor for the past month. He has a history of a poor diet consisting mainly of cow's milk and limited solid foods. Physical exam shows pale conjunctiva and mild glossitis.

Hemoglobin: 8.2 g/dL , MCV: 65 fL (normal 80-100), MCH: Low, Reticulocyte count: low , Serum ferritin: 8 ng/mL (low)

What is the most likely diagnosis?

- A) Iron deficiency anemia
- B) Thalassemia minor
- C) Lead poisoning
- D) Vitamin B12 deficiency

A 4-year-old child presents with pallor and irritability. The child's diet is balanced, and there is no history of chronic illness. CBC shows microcytic hypochromic anemia. Serum ferritin is normal. Peripheral smear shows target cells.

Which investigation will help confirm the diagnosis?

- A) Serum iron studies
- B) Lead level
- C) Hemoglobin electrophoresis
- D) Bone marrow biopsy

A 2-year-old toddler is brought in with developmental delay, pallor, and pica. Labs show hemoglobin 7.5 g/dL, MCV 60 fL, and low serum ferritin.

What is the first-line treatment?

- A) Intramuscular vitamin B12 injections
- B) Oral iron supplementation
- C) Blood transfusion
- D) Folic acid supplementation

In which of the following conditions is serum ferritin typically elevated despite concurrent hypochromic microcytic anemia?

- A) Iron deficiency anemia
- B) Thalassemia minor
- C) Anemia of chronic disease
- D) Sideroblastic anemia

Which of the following is the primary defect in sideroblastic anemia causing microcytic hypochromic anemia?

- A) Impaired heme synthesis due to defective incorporation of iron into incorporation of iron into protoporphyrin
- B) Decreased globin chain production
- C) Ineffective erythropoiesis due to DNA synthesis defect
- D) Increased hemolysis

Which one of the following laboratory findings helps differentiate between iron deficiency anemia and anemia of chronic disease in children?

- A) Total iron binding capacity (TIBC)
- B) Mean corpuscular volume (MCV)
- C) Reticulocyte count
- D) Peripheral blood smear

A 7-year-old child with hypochromic microcytic anemia has a normal serum iron but low transferrin saturation. Which diagnosis is most likely?

- A) Iron deficiency anemia
- B) Anemia of chronic disease
- C) Thalassemia major
- D) Lead poisoning

Which of the following clinical features is more suggestive of a diagnosis of lead poisoning in a child with hypochromic microcytic anemia?

- A) Glossitis and koilonychia
- B) Basophilic stippling on peripheral smear
- C) Elevated serum ferritin
- D) Increased HbA2 levels

In a child suspected of beta-thalassemia major, which of the following is expected?

- A) Elevated Hb F
- B) Normal Hb A₂ and elevated HbF
- C) Decreased Hb F and elevated Hb A₂
- D) Elevated Hb A with decreased Hb F