

ANAEMIA

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Surat

Definition of Anemia

- Decrease in RBC mass
- Deficiency in the oxygen-carrying capacity of the blood due to a diminished erythrocyte mass.
- May be due to:
 - Erythrocyte loss
 - Decreased Erythrocyte production
 - Increased Erythrocyte destruction

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Type of Anaemia

	Men	Women
Normal	14 – 17.5 gm%	12.5 – 15.5 gm %
Mild Anaemia	Up to 11 gm %	
Moderate Anaemia	8 to 11 gm%	
Severe Anaemia	Less than 8 gm%	

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Cause of Anaemia

1. Decrease Production
2. Increase destruction
3. Loss of Blood

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Cause of Decrease Production of RBC

- **Nutritional deficiency**
 - Iron deficiency
 - Folic acid deficiency
 - Vitamin B12 deficiency
- **Genetic defect (defective chain synthesis)**
 - Thalassaemia
 - Sickle Cell anemia
- **Bone Marrow defect**
 - Aplastic anemia
 - Bone marrow depression
 - Myelodysplastic anemia
- **Renal Failure** – Decrease erythropoietin production
- **Inhibition of Heme Synthesis**
 - Lead Poisoning – Petrochemical Occupation
 - Congenital erythropoietic porphyria

Cause of Increase Destruction of RBC

➤ **Intrinsic abnormalities**

- paroxysmal nocturnal hemoglobinuria
- Hereditary spherocytosis
- Hereditary elliptocytosis

➤ **Enzyme deficiencies**

- Pyruvate kinase & hexokinase deficiencies
- G-6-PD deficiency

➤ **Hemoglobinopathies**

- Sickle cell anemia

➤ **Extrinsic (extracorporeal) abnormalities**

- Blood Transfusion reaction
- Erythroblastosis fetalis
- hemolytic disease of the newborn
- Autoimmune hemolytic
- Systemic Lupus Erythematosus
- Chronic lymphocytic leukemia

➤ **Infections**

- Malaria

➤ **Drugs Induce**

- Aspirin
- Quinine

Cause of Increase Loss of RBC (Blood)

- **Polytrauma**
- **Post Major Surgery**
- **Internal Hemorrhage**
 - Haematemesis - Malena
 - Portal Hypertension – Cirrhosis of Liver
 - Peptic ulcer
 - Inflammatory Bowel Disease
 - Haemoptysis
 - Lung malignancy
 - Tuberculosis
 - Haematuria
 - Renal Malignancy
 - Renal Stone
- **Menorrhagia**

CLINICAL FEATURES

- SYMPTOMS

- Fatigue
- Headaches
- Faintness
- Breathlessness
- Angina
- Intermittent claudication
- Palpitation

- SIGNS

- Pallor
- Tachycardia
- Systolic murmur
- Congestive Cardiac failure

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CLINICAL FEATURES

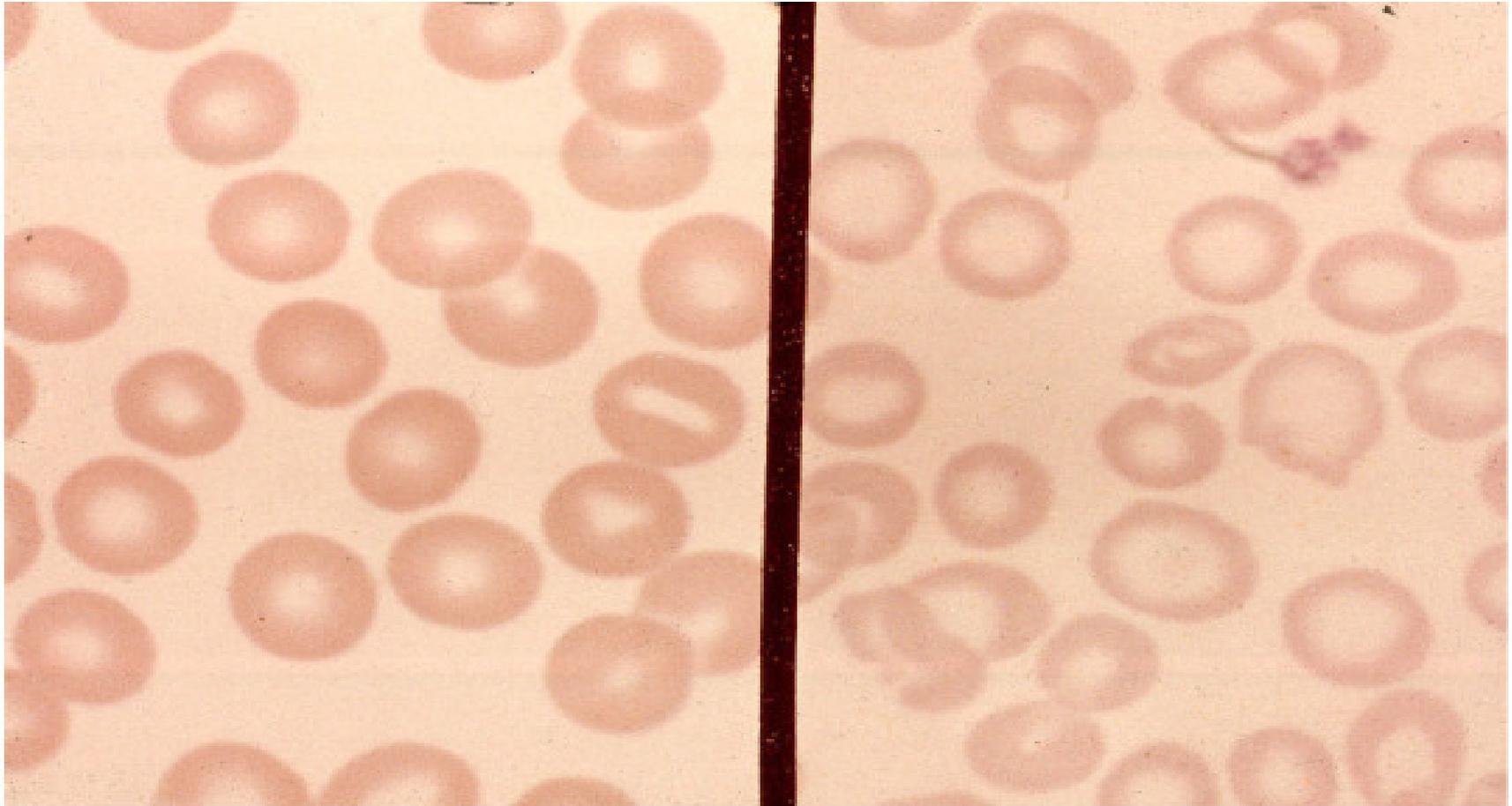
- Specific Signs in Iron deficiency anemia
 - Koilonychia - Spoon nail - (Logitudinal ridge)
 - Brittle nails
 - Atrophy of tongue
 - Angular stomatitis
 - Brittle hair
 - Plummer Wilson Syndrome
 - dysphagia and glossitis

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Iron Deficiency Anemia - koilonychia



Hypochromic Microcytic RBC



Normal red blood cells

Microcytic anemia

CLINICAL FEATURES

- Megaloblastic Anemia
 - Glossitis & Angular stomatitis
 - Neurological changes
 - Polyneuropathy & Paraesthesia
 - Depression /Delusion/Hallucination
- Specific Signs in hemolytic anemia
 - Jaundice
- Specific Signs in sickle cell disease
 - Leg ulcer , Family History , Acute Abdomen & Joint Pain
- Specific Signs in thalassaemia
 - Bone deformities – Thalassaemic face
 - Hepato-Splenomegaly
- Specific Signs in Sideroblastic Anemia
 - Iron can not incorporate to form haemoglobin
 - May be drug induced = Isoniazide , Alcohol , Lead toxicity

EXAMINATION OF ANEMIC PATIENT

- Pallor
- Jaundice
- Glositis/stomatitis
- Shape of skull
- Lymph nodes palpable
- Hepatomegaly
- Splenomegaly
- Leg ulcers

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INVESTIGATIONS

Complete blood count (CBC)

RBC count

Pack Cell Volume (PCV)

Mean corpuscular volume (MCV)

Mean Corpuscular Haemoglobin Concentration (MCHC)

Reticulocyte count

Blast Cell

WBC count

WBC differential Count

Platelet Count

Peripheral smear examination

Investigation For Iron deficiency anemia

- CBC
- Peripheral Smear = Microcytosis, Hypochromia
- Serum Iron
 - Circulatory Iron = Free Iron + Transferrin bound iron
- Serum Transferrin
 - Iron + Apo-transferrin
 - Transport form of Iron bound protein
- Serum Ferritin
 - Iron + Apo-ferritin
 - Store form of Iron bound protein
- TIBC = Total (Transferrin) iron binding capacity
- UIBC= Unsaturated (Transferrin) Iron binding capacity

Specific Investigation for Other Cause of Anaemia

- ✓ Serum Vitamin B12
- ✓ Serum G-6-PD
- ✓ Antinuclear Antibody Test (ANA)
- ✓ Serum Billirubin Level
- ✓ Renal Function Test
- ✓ Stool Examination
- ✓ Urine Examination
- ✓ Ultra-Sonography of Abdomen
- ✓ Gastro-Intestinal Endoscopy
- ✓ X-ray Chest or CT-Scan Chest
- ✓ Bone Marrow Biopsy
- ✓ Haemoglobin electrophoresis
- ✓ HPLC (High Performance Liquide Chromatography)

Treatment of iron Deficiency Anaemia

- Oral Iron Therapy
- Treat the underlying cause
- Prescribe to Mild to Moderate
- Ferrous sulphate 200mg TDS
 - Equivelatent to 60 mg of elemental iron
- Ferrous gluconate 300mg BD
- Iron with Vitamin C increase absorption
- Commonest Side Effect
 - Gastritis
- Total Period
 - 2 months + 4 months (to make iron store) therapy

Treatment of iron Deficiency Anaemia

Parental Iron Therapy if

- Oral Iron intolerance
- Severe mal-absorption syndrome
- Inflammatory Bowel Disease
- Non-compliance
- Iron Dextran or Iron Sorbitol
- Side effect
 - Anaphylactic reaction

Calculation of Iron Requirement

$$= (14 - \text{Patient Hb}) \times \text{Weight(kg)} \times 2.21 + 1000 \text{ mg}$$

[1000 mg for replacement of iron store]