Approach to ANAEMIA

By
Dr NAJAF MASOOD
Objectives

- What is anaemia
- Causes
- How to proceed for anaemic pt
- Iron deficiency anaemia
Definition

- A hemoglobin level or red blood cell volume below the normal range for the age and sex.
## Normal Range:

<table>
<thead>
<tr>
<th>Age</th>
<th>Hemoglobin (g/dl)</th>
<th>Hematocrit (%)</th>
<th>MCV (fl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cord blood</td>
<td>13.7-20.1</td>
<td>44-55</td>
<td>100</td>
</tr>
<tr>
<td>2 weeks</td>
<td>13.0-20.0</td>
<td>42-66</td>
<td>-</td>
</tr>
<tr>
<td>3 months</td>
<td>9.5-14.5</td>
<td>31-41</td>
<td>-</td>
</tr>
<tr>
<td>6 months-6 years</td>
<td>10.5-14.0</td>
<td>33-42</td>
<td>70-74</td>
</tr>
<tr>
<td>7-12 years</td>
<td>11.0-16.0</td>
<td>34-40</td>
<td>76-80</td>
</tr>
</tbody>
</table>
Causes

- **Deficient hemopoietic factors:**
  - Iron deficiency
  - Folate deficiency
  - Vitamin B 12 deficiency
Disorder of hemoglobin synthesis

- Thalassemia
- Sickle cell anaemia
Hemolysis

- Red cell enzyme deficiency
  - G6PD
  - Pyruvate kinase deficiency
- Red cell membrane defect
  - Hereditary Spherocytosis
- Autoimmune hemolytic anaemia
Blood loss

- **Gastrointestinal**
  - Meckles diverticulum
  - Cows milk protein allergy

- **Parasites**
  - Hook worms

- **Bleeding disorders**
  - Haemophilia
  - Von willibrands disease
Bone marrow Failure

- Aplastic Anaemia
  - Fanconi Anaemia
- Red cell anaemia
  - Diamond Blackfan
  - Transient erythroblastopenia of childhood
Infection/Inflammation/Chronic illness

- Malabsorption syndrome
  - Coeliac disease

- Chronic inflammatory disorder
  - JRA

- Organ failure
  - Renal failure

- Malignant disease

- Lead poisoning
Approach to anaemic pt

☐ History
  ■ Ask for sign & symptoms
  ■ Pertinent question about cause

☐ Non specific
  ■ Lethargy,
    headache, breathlessness, palpitation

☐ Specific
  ■ Jaundice, diarrhea, bone deformity
Specific
- Fever, bleeding, pica, drug

Nutritional history

Family history

Drug history
- Signs
  - Pallor
  - Koilonychia
  - Jaundice
  - Thalassemic fascies
  - Hepatosplenomegaly
  - Signs of CCF
  - Cardiomegaly
Complete blood picture

- Spherocytes
  - Hereditary spherocytosis
  - Autoimmune hemolytic Anaemia
  - Wilson’s disease

- Sickle form
  - Sickle cell disease

- Target cell
  - Hemoglobin SC disease
- Nucleated RBC
  - Beta Thalassemia
- Microangiopathy
  - Hemolytic Uremic Syndrome
- Bite cell/ blister cell
  - G6PD deficiency
- Raised Retic count
  - Hemolysis
  - Blood loss
- Low Retic count
- Assess for RBC size
Microcytic Anaemia

- Iron deficiency
- Beta Thalassemia
- Hemoglobin E disease
- Lead poisoning
Macrocytic

- Folate deficiency
- Vitamin B12 deficiency
- Inborn error of metabolism
- Diamond Blackfan Anaemia
- Congenital dyserythropoietic Anaemia
Normocytic normochromic

- Anaemia of Chronic disease
- Renal failure
- Transient erythroblastopenia of childhood
- Anaemia associated with hypothyroidism
Iron deficiency anaemia

- Anaemia resulting from lack of sufficient iron for synthesis of hemoglobin
- Most common hematologic disease
- Newborn baby.....0.5 gm
- Adult ...............5.0 gm
- 0.8 gm iron must be absorbed
- Absorption of dietary iron is 10%
- DRA is 8-10 gm
- Bioavailability of iron in breast milk is 2-3 times better than cow’s milk
- Must add iron containing cereals after 4 months of age
- External blood loss
Etiology

- Low birth weight
- Perinatal hemorrhage
- Dietary
- Occult bleeding
- Parasitic infestation
- Pulmonary hemosidrosis
- Cow’s milk protein allergy
Incidence

- Rare before 6 month oef age
- Peak age is 9-24 months
Clinical manifestations

- Pallor
- Pagophagia
- Irritability
- Anorexia
- Poor attention span
- Memory loss
Laboratory Findings

- Bone marrow hemosiderin levels
- Serum ferritin
- Serum iron
- Serum iron binding capacity
- Transferrin saturation
- Reduce MCH & MCV
- Deformed RBCs
- Raised RDW
- Normal WBCs count
- Thrombocytosis
Hypercellular bone marrow with erythroid hyperplasia

Normoblasts have scanty, fragmented cytoplasm with poor hemoglobination

Stool for occult blood
Differential diagnosis

- Beta Thalassemia
- Hemoglobinopathies
- Lead poisoning
Treatment

- 4-6mg/kg/day of elemental iron
- Dietary education
  - 500ml of milk
  - Leafy vegetables
  - Meat
  - Iron fortified formula / cereals
Response to treatment

- Within 12-24 hrs
  - Subjective improvement
- 36-48 hrs
  - Erythroid hyperplasia
- 48-72 hrs
  - Reticulocytosis
- 4-30 days
  - Increase in Hb levels
- 1-3 months
  - Repletion of stores
Blood transfusion

- Hb level less than 4 gm%
- Frank CCF
Summary

- Is anaemia associated with other hematological abnormalities?
- Is there associated reticulocytosis?
- Review of peripheral smear?
- Is it associated with reduced retic count?
- Microcytic, macrocytic & normocytic anaemia?
Thankyou