PHYSIOLOGY OF IRON DEFICIENCY ANAEMIA IN PREGNANCY

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CONCEPT OF PHYSIOLOGICAL ANAEMIA

• The main causes of physiological anaemia during pregnancy are:
  1. Disproportionate increase in the plasma volume, RBC volume and Hb mass.
  2. Increased demand for iron.
• The anaemia is normocytic, normochromic type.
<table>
<thead>
<tr>
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<th><strong>NON- PREGNANT WOMAN</strong></th>
<th><strong>SECOND HALF OF PREGNANCY</strong></th>
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<tbody>
<tr>
<td>Haemoglobin (Hb)</td>
<td>14.8 g/dL</td>
<td>11-14 g/dL</td>
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<tr>
<td>Red blood cells (RBC) count</td>
<td>5 million/ cu.mm</td>
<td>4-4.5 million/ cu.mm</td>
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<tr>
<td>Packed cell volume (PCV)</td>
<td>39-42 %</td>
<td>32-36 %</td>
</tr>
<tr>
<td>Serum Iron</td>
<td>60-120 µg/dL</td>
<td>65-75µg/dL</td>
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<tr>
<td>Total Iron Binding Capacity (TIBC)</td>
<td>300-350 µg/dL</td>
<td>350-400µg/dL</td>
</tr>
<tr>
<td>Serum ferritin</td>
<td>20-30 mg/L</td>
<td>15mg/L</td>
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Criteria of physiological anaemia

The lower limit of physiological anaemia during the second half of pregnancy should fulfill the following haematological values:

- Hb – 10 g%
- RBC count – 3.2 million/ cu.mm
- PCV – 32%
- Peripheral smear – normal RBC with central pallor.
ERYTHROPOIESIS
Requirements for normal erythropoiesis.

- **Minerals**:  
  i. Iron  
  ii. Cobalt and copper

- **Vitamins**: Vit B12, Folic acid and Vit C.

- **Proteins**.

- **Erythropoietin**.
CAUSES OF INCREASED PREVALENCE OF ANAEMIA IN TROPICS

• Iron deficiency anaemia is most prevalent in the tropics amongst women of child bearing age, especially in the underprivileged sector.

• There is increase in the daily requirement of iron.
Causes for increased daily requirement are:

• Before pregnancy:
  1. Faulty dietary habits – intake of diet rich in carbohydrate. (Phosphates and phytates)
  2. Faulty absorption – prevalence of intestinal infections, hypochlorohydria etc.
  3. Increased iron loss –
     a. Increased loss in sweat.
     b. Repeated pregnancies in short intervals.
     c. Excessive blood loss during menstruation.
     d. Hook worm infestation.
     e. Chronic malaria.
     f. Bleeding piles or dysentery.
• **During pregnancy:**

1. Increased demands of iron.
2. Diminished intake of iron – low socio-economic group, faulty diet, loss of appetite, vomitings.
4. Disturbed metabolism – presence of infection.
5. Pre-pregnant health status – pre-existing anaemic state.
6. Excess demand –
   a. Multiple pregnancies.
   b. Rapidly recurring pregnancy.
   c. Young age of pregnant lady.
IRON DEFICIENCY ANAEMIA

NORMAL IRON METABOLISM
Pathophysiology

Stage 1 is characterized by decreased bone marrow iron stores; Hb and serum iron remain normal, but serum ferritin level falls. There is compensatory increase in iron absorption and increase in TIBC (transferrin level).

Stage 2, Erythropoiesis is impaired. Although TIBC increases, the serum iron level decreases; transferrin saturation decreases.

Stage 3, anemia with normal-appearing RBCs and indices develops.

Stage 4, microcytosis and then hypochromia develop.

Stage 5, iron deficiency affects tissues, resulting in symptoms and signs.
Clinical features

• Symptoms:
  1. Lassitude and feeling of weakness.
  2. Easy fatigability, dyspnoea on exertion.
  3. Anorexia, indigestion, palpitations.

• Signs:
  1. Pallor of varying degrees, koilonychia, atrophic glossitis, angular stomatitis.
  2. Edema of leg if associated pre-eclampsia present.
  3. Soft systolic murmur due to physiological mitral incompetence.
PALLOR IN PALMS

CONJUNCTIVAL PALLOR
KOILONYCHIA

ANGULAR STOMATITIS

ATROPHIC GLOSSITIS
THANK YOU