Management of pregnancy and labour with anaemia

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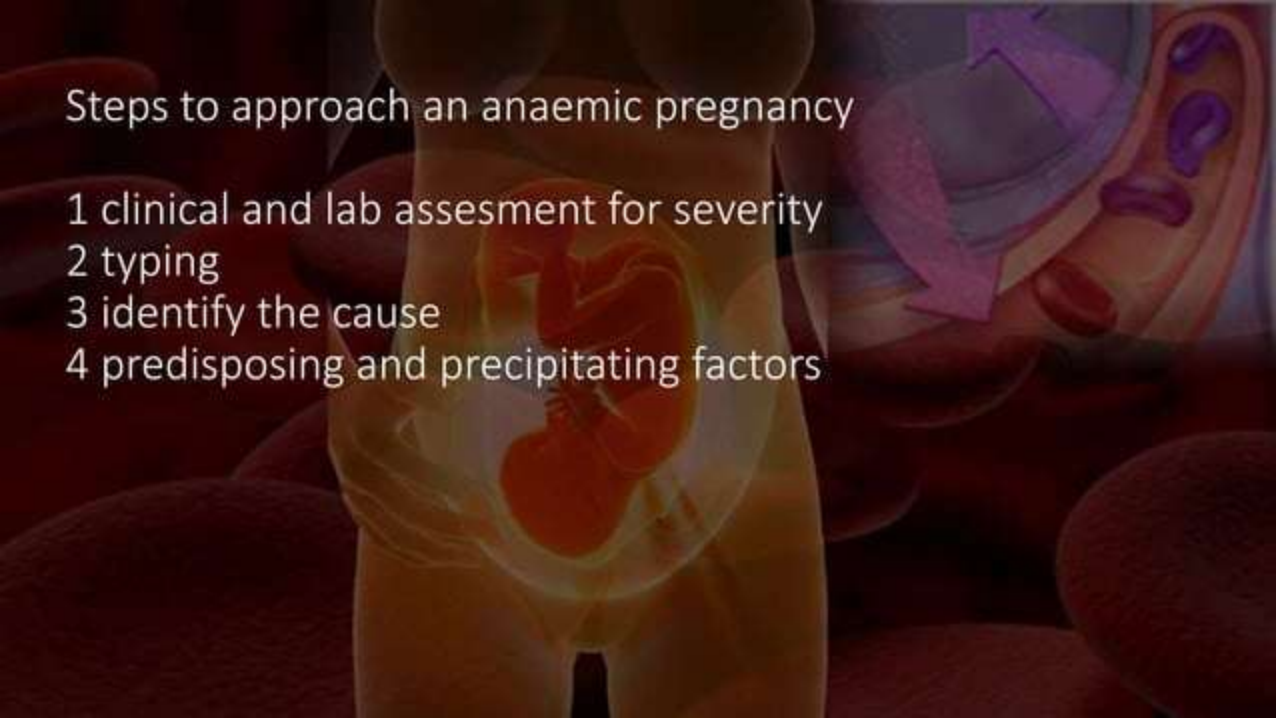
1. Anaemia in pregnant women is defined as haemoglobin concentration below 11 gm/dl(WHO)
2. Cut-off for 1st and 3rd trimester 11gm/dl,2nd trimester below 10.5 gm/dl(CDC)

SEVERITY OF ANAEMIA	WHO (Hb in g/dl)	ICMR (Hb in g/dl)
NORMAL	≥11	≥11
MILD	10-10.9	10.0-10.9
MODERATE	7.0-9.9	7.0-10.0
SEVERE	<7.0	<7.0
VERY SEVERE	_	<4.0



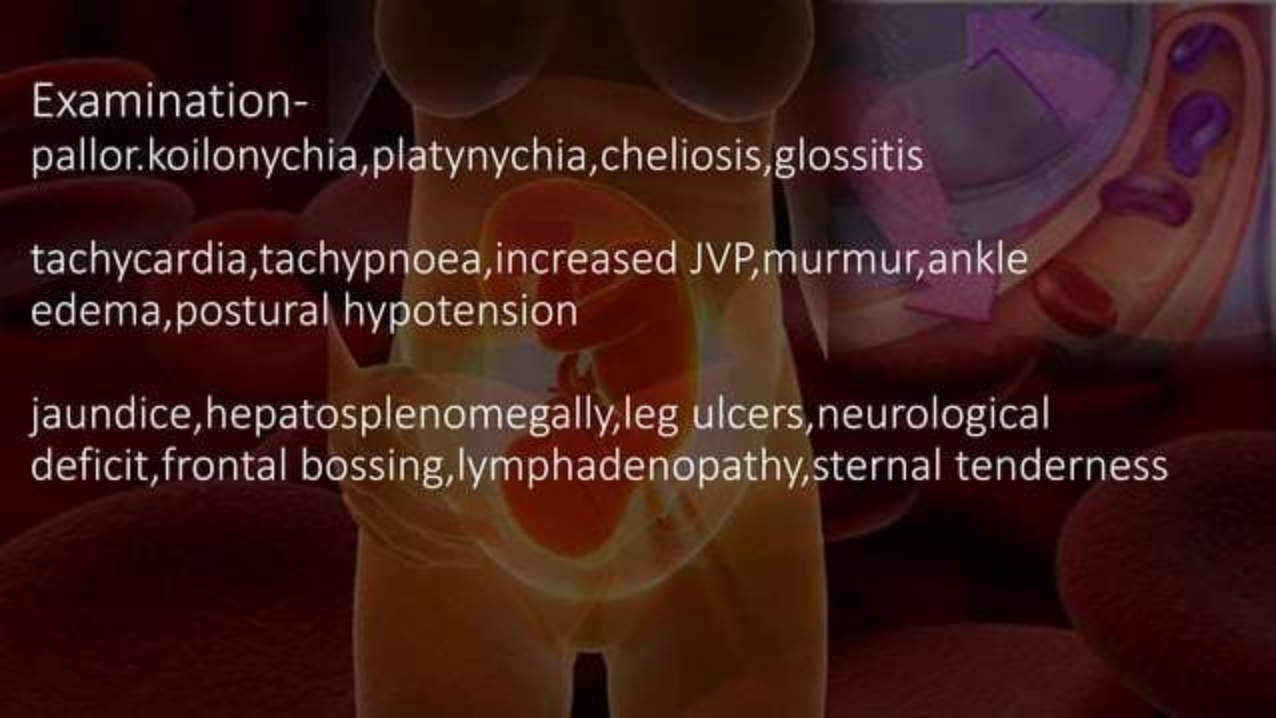
Steps to approach an anaemic pregnancy

1 clinical and lab assesment for severity
2 typing
3 identify the cause
4 predisposing and precipitating factors

Clinical assessment

symptoms and signs- weakness, lightheadedness, headache, loss of appetite, dysphagia, skin changes, nail changes ,ankle swelling, dyspnoea on exertion, palpitations

history-
worm infestation,malabsorption ,excess menstrual loss, bleeding disorder, chronic diseases,infections,bleeding PR or haematuria,bone marrow suppression, endemic areas, genetics, previous history of anemia, blood transfusion, etc.



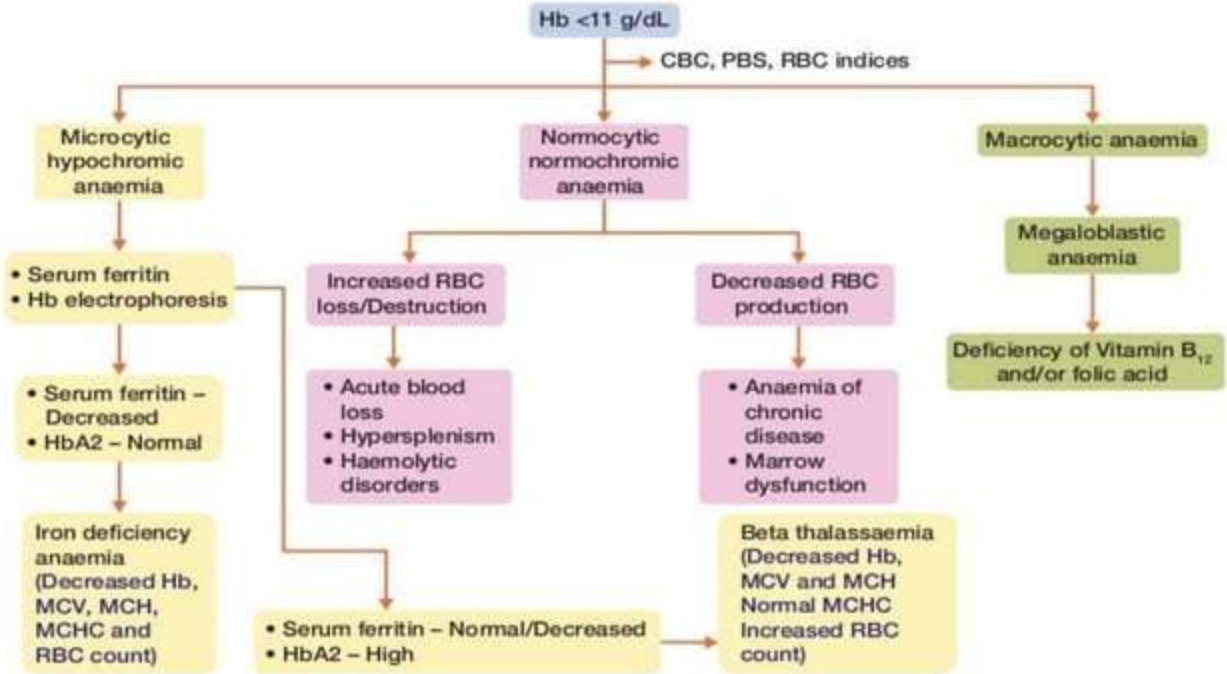
Examination-
pallor.koilonychia,platynychia,cheliosis,glossitis

tachycardia,tachypnoea,increased JVP,murmur,ankle edema,postural hypotension

jaundice,hepatosplenomegally,leg ulcers,neurological deficit,frontal bossing,lymphadenopathy,sternal tenderness

Diagnosis – Baseline/ Presumptive

- Haemoglobin Measurement
- Peripheral blood smear
- Reticulocyte count
- Hematocrit
- Blood indices
  - MCV, MCH, MCHC
- Stool Examination- occult blood,ova ,parasites
- Urine Examination
- Proteins, LFT, RFT


Hb <11 g/dL
CBC, PBS, RBC indices
Microcytic hypochromic anaemia
Normocytic normochromic anaemia
Macrocytic anaemia
• Serum ferritin
• Hb electrophoresis
Increased RBC loss/Destruction
Decreased RBC production
Megaloblastic anaemia
Deficiency of Vitamin B_{12} and/or folic acid
• Serum ferritin – Decreased
• HbA2 – Normal
• Acute blood loss
• Hypersplenism
• Haemolytic disorders
• Anaemia of chronic disease
• Marrow dysfunction
Iron deficiency anaemia (Decreased Hb, MCV, MCH, MCHC and RBC count)
• Serum ferritin – Normal/Decreased
• HbA2 – High
Beta thalassaemia (Decreased Hb, MCV and MCH Normal MCHC Increased RBC count)

	IDA	Anemia of chronic disease	Thalassemia	Sidero-blastic
Severity	Variable	Mild	Mild	Variable
MCV	Decreased	Normal/ decreased	Decreased	Normal/ decreased
S Ferritin	Decreased	Normal/ increased	Normal	Increased
TIBC	Increased	Decreased	Normal	Normal
S Iron	Decreased	Decreased	Normal	Increased
Marrow iron	-	+	+	+

Iron deficiency anemia(IDA)

- MC type of anemia
- Preventable and modifiable anaemia

Diagnosis - Additional

- Serum Fe
- Total iron binding capacity(TIBC)
- Serum Ferritin
- Serum transferrin saturation
- Hb electrophoresis
- Bone marrow examination

Newer investigations

- Soluble Serum transferrin receptors(ELISA)
- Transferrin receptor/ ferritin index
- Reticulocyte indices
  - –automated counting of reticulocytes, count of <26pg/ cell is a strong predictor of IDA
  - –Reticulocyte production index
- Red cell zinc protoporphyrin level(Reserved test)
- Free erythrocyte protoporphyrin

Lab findings in IDA

- Hb < 11 gm/dl(min 4 Hb estimation MOHFW)
- Peripheral smear - microcytic, hypochromic
- MCV and MCHC are low
- Serum iron is low - < 50 µgm/dl (N 60 -175)
- TIBC is increased - > 400 µgm/dl
- Tests of iron stores
  - Serum ferritin is < 100 ngm/dl (1 ng/ml ferritin=8mg of storage iron)
  - Stainable iron in the bone marrow is reduced

- Currently ferritin value is the best confirmatory test for IDA in pregnancy
- Serum iron is done in morning after an overnight fast(due to diurnal variation)
- Hepcidin produced by hepatocytes decreases in IDA.

Marker	Normal value	Stage of iron depletion	Iron-deficient erythropoiesis	Iron deficiency anaemia
Serum ferritin (µg/l)	20–200	<20	<10	<10
Serum iron (µg/dl)	33–150	<115	<60	<40
Total iron binding capacity (µg/dl)	325–400	360	390	410
Transferrin saturation (%)	25–50	<30	<15	<10
RBC morphology	Normal	Normal	Microcytic hypochromic	Microcytic hypochromic
Haemoglobin levels (g/dl)	>11	>11	>11	<11

Prevention

- Dietary advice and modification
- Iron supplementation of adolescent & non pregnant women
- Treatment of hookworm Infestation
- Iron supplementation in pregnant women
- Food fortification
- Antenatal care for early recognition

Management of Anemia

- Oral Iron Therapy
- Prophylactic Iron therapy-30-60mg elemental iron daily with 400 mcg of folic acid(WHO)
- In areas with <20% incidence elemental iron 120mg+2.8mg folate once wkly(WHO)
- Deworming of all anemic patients(albendazole 400 MG IN 2nd trimester)
- Anaemia mukt bharat-50% reduction by 2025
- POSHAN abhiyan-2018-2022,reduce anemia by 3%/yr,60+500 all pregnants from 2nd trimester to 180 days then 180 days postpartum

Iron Requirement in Pregnancy

- 2.5mg /day in early pregnancy
- 5.5mg /day from 20 -32 weeks
- 6 – 8 mg/ day after 32 weeks
- Average 4 mg/ day

Side effects of Oral iron

- Nausea
- Vomiting
- Constipation
- Abdominal cramping
- Diarrhoea

Reasons for Failure to Respond

- Non compliance
- Concomitant folate deficiency
- Continuous loss of blood through hookworm infestation or bleeding haemorrhoids
- Co-existing infection
- Faulty iron absorption
- Inaccurate diagnosis
- Non iron deficiency microcytic anaemia

Parenteral Iron therapy

- Indicated when the pregnant woman is unable to take iron due to side effects or is non compliant
- Its main advantage is certainty of administration
- Rise in hemoglobin is similar to oral iron (upto 1gm per wk)

Precaution

Oral Iron to be suspended 48 hours before parenteral therapy

Preparation & dosage

- *Iron Dextran IM and IV* – high molecular wt stable complexes release iron slowly, can cause anaphylaxis,z track,1.5 mg/kg
- *Iron citrate sorbitol IM* – less stable, rapid release of iron
- *Iron sucrose IV* – intermediate stability, rapid metabolism hence readily available iron. Since they do not form biological polymers, there are no reactions ,200 mg in 100ml NS
- *Iron FCM*-approved in 2nd and 3rd trimester,better safey profile with higher dose availability.1000 mg/250 ml NS
- Others -iron isomaltoside 1000(20 mg/kg),ferumoxytol

Dose calculation

Ganzoni's formula:

Total required iron dose (mg) = 2.4 × (target Hb – actual Hb in g/dl) × *pre-pregnancy weight + replenishment of stores (<35 kg – 15 mg/kg, >35 kg – 500 mg)

*Use ideal body weight if obese before pregnancy.

A **simplified formula**[29] for women weighing >35 kg is as below:

	Total iron dose required	
Hb (g/dl)	Body weight* (35 to ≤70 kg)	Body weight* (≥70 kg)
<10	1500 mg	2000 mg
≥10	1000 mg	1500 mg

Disadvantages

- Pain
- Nausea, vomiting, headache
- Skin discolouration
- Abscess formation
- Fever
- Lymphadenopathy
- Allergic reaction
- Anaphylaxis

Table 7.8 Management of anaemia in pregnancy (MOHFW)

Severity of anaemia	Management
Hb: 10.0–10.9 g/dl (mild anaemia)	• Two tablets of IFA per day (each tablet contains 60 mg elemental iron + 500 µg folic acid) • Parenteral iron therapy (IV iron sucrose or FCM) may be considered if anaemia is diagnosed late in pregnancy or poor compliance expected • When Hb returns to normal level, prophylactic dose of IFA (one tab of IFA daily) can be given • If no improvement after 2 months (<1 g/dl increase in Hb), investigation should be made to find the cause of anaemia; injectable iron therapy may be considered
Hb: 7.0–9.9 g/dl (moderate anaemia)	• Two tablets of IFA per day • IV iron sucrose or FCM to be considered if <1 g/dl increase in Hb in 2 months
Hb: 5.0–6.9 g/dl	• Should be managed at higher centres with IV iron sucrose/FCM • In third trimester, immediate hospitalization needed
Hb: <5.0 g/dl	• Immediate hospitalization needed irrespective of period of gestation

FCM, ferric carboxymaltose; *Hb*, haemoglobin; *IFA*, iron and folic acid; *IV*, intravenous.

Blood Transfusion

- Pregnancy <36 wks-hb<5gm/dl or 5-7 gm/dl
- Pregnancy <36 wks-hb<7gm/dl or <4gm/dl
- Hemorrhage hb <6gm/dl
- Hb<7gm/dl in labour or postpartum
- Associated infections
- Packed cells preferred

Use of Erythropoetin

- Used in severe anemia & renal failure for significant increase in Hb and to avoid blood transfusion
- Gynaecological surgeries - preop use of erythropoietin and Iron Dextran has been shown to avoid the need for blood tranfusion later

Dosage Regimen Erythropoetin

- Inj erythropoetin can be given subcut or iv, 100-150 iu/kg
- On day 1, 3 & 5 along with parenteral iron or day 1, 3 & 5 4000units s/c erythropoetin
- First dose given after subcut sensitivity test
- Adrenaline, hydrocortisone, oxygen to be kept ready
- Produces 3gm% rise in Hb over a 2wk period

Management in Labor

- Make patient comfortable, oxygen
- Sedation and analgesia
- Prevent cardiac failure-give furosemide,avoid ergometrine
- Aim to deliver vaginally, cs only if indicated
- Antibiotics
- Cut short second stage
- Active management of third stage

Megaloblastic anemia

Diagnosis-

- Peripheral smear-hypersegmented neutrophils,oval macrocytes , pancytopenia

- MCV>96 fl, MCH>33pg
- Fasting Serum folate level<3 ng/ml
- Erythrocyte folate activity <150 ng /ml
- Increased serum LDH
- Increased serum homocysteine level

treatment

- 500 microgram of folic acid during antenatal and potpartum along with iron

- In established cases 5mg of folic acid and parenteral iron for acute anaemia in last month of pregnancy
- Response seen as increase in LDH in 3-4 days and retic count in 6-8 days
- Only indication for transfusion is aph or pph

B12 deficiency

- Lab findings same as in folate deficiency
- Vit B12 level < 90 micrograms/l
- Serum homocysteine increased
- Deoxyuridine suppression test differentiates between vitamin b12 and folate deficiency.
- recommended intake-2mcg/day bef pregnancy,3mcg/day in pregnancy
- Without neuro-1000mcg im 3 times wk for 2 wks.maintenance 1000 mcg every 3 months

Management of sickle cell anemia

Prepregnancy counselling-

1. hb electrophoresis
2. Hydroxyurea stopped before 3 months, folic acid 5mg/day, penicillin, inflenza vaccine

Antenatal

1. Joint workout by hematologist and obstetrician
2. Fetal monitoring from 32 wks
3. Low dose aspirin
4. Partner testing
5. Partial RBC exchange or automated erythrocytapheresis

Labour

Hydration, oxygenation above 94% , infection prevention , Elective induction after 38 weeks,

Puerperium

1. LMWH 7days after VD , 6 wks after LSCS
2. POPS,DMPA,LNG IUS – SAFE contraception

- Thalassemia

Preconecption

1. Partner Hb electrophoresis
2. Maternal cardiac,thyroid,glucose level, serum ferritin
3. Desferioxamine to form ferritin level 1000-2000 ng/ml , stopped

during pregnancy

1. ICT
2. CVS 11-13 wks

Puerperium

1. Desferrioxamine restarted within 1wk of puerperium
2. In splenectomised women-OCPs not given as a choice


ANAEMIA- AN
Approach to
Educate,exercise ,eliminate
Mothers with
Iron deficiency and other
Associated factors

Thank
You