Optimizing care of anaemic women through pregnancy at institutional level

Jan Swasthya Sahyog
For the group #1

• 22 year old primigravida Rani comes to you for her first routine ANC check up at 30 weeks of pregnancy.
• A routine Hb sent along with other ANC tests comes out to be 5.2 gm/dL.
Questions to the group

1) What history would you now like to ASK in light of this?
2) What would you like to SEE in her physical examination?
3) What tests would you ADVISE?
What would you like to ASK in history?
History targeted at...

• Needs supplementation only
  – Dietary, socio-economic
  – H/O iron folic acid consumption
  – Multiple frequent pregnancies
  – Adolescent pregnancy
• Needs additional treatment
  – PV bleeding
  – Hookworm infestation, bleeding piles
  – H/s/o sickle cell disease
  – Asymptomatic malaria
  – Infections specially UTI
• How the symptoms are affecting the patient
  – h/s/o heart failure
    (dyspnea, orthopnea, cough)
What would you like to **SEE** in her physical examination?
Vitals...always

- PR
- BP: How her heart is coping
- RR
- Temperature: - infections right now
• Pallor- grade of pallor
• Platynychia
• Oedema
• Jaundice
• JVP, S3
• Splenomegaly, hepatomegaly
• Auscultate chest for crepitations – pulmonary oedema
Pointer to iron deficiency anaemia
• What tests would you ADVISE?
At sub-centre/PHC -

- RDT (Malaria)
- Sickle cell (solubility test)
At CHC

- RDT (Malaria)
- Sickling preparation
Her RDT and sickling preparation are negative

How would you manage this lady?
Trial of iron therapy - at all levels

- Established approach to the diagnosis of iron deficiency.
- Increase of at least 1g/dl in hemoglobin after 1 month of supplementation is indicative of iron deficiency. (WHO)
- Normally iron increases by 0.5 to 1 gram per week.
Follow up

• Can be tried safely only if follow up assured.
• Counselling plus health provider visits
• Tab Albendazole 400 mg 1\textsuperscript{st} dose in 2\textsuperscript{nd} trimester – as endemic area (WHO)
• Would you give her blood?
Blood - antepartum

Low Hb

<34 weeks

Hb <5 g/dL

5-7 g/dL – in presence of impending CHF

>34 weeks

Hb <7 g/dL

Severe anemia with decompensation
Additionally

- If the patient becomes hemodynamically unstable due to ongoing hemorrhage.
- Remember – Hb *does not reflect* acute blood loss
Blood - intrapartum

- Hb < 7 g/dL
- Medical history or symptoms based
Blood - post partum

• Any anemia with signs of hemodynamic instability
• Any active significant bleed
• Hb < 7gm/dL - depends on medical history or symptoms
SKILL STATION - 1
Rapid diagnostic kit - malaria
For the group #2

• Rani comes back you at 1 month. Her haemoglobin is 5 gm/dL.

What is your next step in management?
• What would you ASK Rani?
• Compliance
• Side effects
• Ongoing blood loss
• Hemolysis
• Infections
Rani says that she has not missed any dose of therapy

How would you check compliance?
Remember 50% of anaemia in pregnancy is **NOT** iron deficiency anaemia
• What would you next ADVISE?
• Blood transfusion
Administration of blood

- Verify indication
- Check for cross matching and typing
- Obtain and record baseline vital signs
- Practice strict asepsis
• Blood at room temperature
• Identify patient
• Use needle gauge 20/18
• Transfuse over 4 hours.
• Remain at bedside for 15 - 30 minutes
• Monitor vital signs.
• Check the following:
  – Serial number
  – Blood component
  – Blood type
  – Rh factor
  – Expiration date
  – Screening test (VDRL, HBsAg, malarial smear)
• Do not mix medications with blood transfusion.
• Never administer IV fluids with dextrose. - can cause hemolysis.
• Observe for complications.
Preventing reactions....

• Verifying patient
• Inspecting blood product for abnormality
• Beginning transfusion slowly.
• Observing patient particularly during first 15 minutes.
• Transfusing blood within 4 hours
• Changing blood tubing every 4 hours
• Donor screening
• Room temperature blood
On detecting any signs of reaction…

• Stop transfusion immediately
• Disconnect transfusion; keep the IV
• Send blood bag/tubing for repeat typing and culture.
• Perform hemoglobin, culture, and retyping.
For specific reaction....

• Allergic reaction - antihistamines, steroids, epinephrine.
• Hemolytic reaction - treat hypotension, DIC, and renal failure.
• Febrile, nonhemolytic reactions - symptomatic
• Septicemia - antibiotics, increased hydration, steroids and vasopressors.
• If itching/rash are the only sign, transfusion can continue at a slower rate.
• For circulatory overload - patient upright, diuretics and oxygen.
What investigations would you now ADVISE?
At CHC level

- HB, TLC, DLC, Platelets
- MCV
- Sickle preparation/ solubility test (if not done)
- P/S for MP (if available)
- Peripheral smear for RBC morphology (if available)
If cell counter available..

- Red cell distribution width
- RBC count (millions/uL)
Ferritin - let’s discuss

• Fairly sensitive and specific
• How feasible is this at your centre?
• 50% of anaemia is **NOT** iron deficiency
• We may be harming women
  – predisposing to sepsis.
  – Missing other important work up
Low Hemoglobin

- Low TC and platelets
  - Needs evaluation for pancytopenia
    - Increased destruction/hyperproliferation
    - Reduced production/marrow suppression
- Normal TC and platelets
  - Proceed based on MCV
• Further work up requires MCV
• If CHC does not have the coulter tests - samples for further analysis at DH must be collected and blood must be given PRIOR to referral.
• Referral includes a possibility that the patient gets lost to follow up.
## Anaemia classification based on MCV

<table>
<thead>
<tr>
<th>Microcytic (&lt;80)</th>
<th>Normocytic (80-100)</th>
<th>Macrocytic (&gt;100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron deficiency</td>
<td>Early iron def.</td>
<td>Vitamin B12 def.</td>
</tr>
<tr>
<td>Thalassemia</td>
<td>Acute blood loss</td>
<td>Folic acid def.</td>
</tr>
<tr>
<td>Anaemia of chronic disease</td>
<td>Sickle cell disease</td>
<td>Liver disease</td>
</tr>
<tr>
<td>Sideroblastic</td>
<td>Anaemia of chronic disease</td>
<td>Alcohol use</td>
</tr>
<tr>
<td>Lead poisoning</td>
<td>Bone marrow disease</td>
<td>Myelodysplastic syndromes</td>
</tr>
<tr>
<td>Copper deficiency</td>
<td>CRF</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hypothyroidism</td>
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</tbody>
</table>
• If her platelets are 2.5 lakhs and MCV is 50
In a microcytic anaemia (MCV < 80)

- Iron deficiency (high RDW)
- b-thalassemia minor (low RDW)
- Sideroblastic (High RDW, ringed sideroblasts)
Red cell distribution width - 11.5 to 14.5
To differentiate anaemia and thalassemia

• Mentzer’s index- MCV (in fL)/ RBC count (millions per Ul)
• If < 13 suggestive of b - thalassemia
• If > 13 Iron deficiency (Implies that the RBC count and size are both low)
• If her platelets are 2.5 lakhs and MCV is 85
Normocytic normochromic

- Marrow damage
- Infiltration
- Aplasia

- Reduced stimulation
  - AOCD
  - Metabolic
  - Renal

- Iron deficiency

- Hemolysis
• Check creatinine
• Total bilirubin / Direct
• LDH, reticulocytes (if available)
• Rule out chronic infections
• Check for symptoms of hypothyroidism
• If her platelets are 2.5 lakhs and MCV is 114
Macrocytic

- Folate/B12 deficiency
- Drug toxicity
- Refractory anaemia
• B 12 + folate supplementation - especially malnourished women
• Inj. Vitamin B12 - 1000 mcg once a week upto correction then once a month.
• Folic acid 5 mcg once a month.
• B12 levels not very useful.
• As you did not have the required blood tests available at your centre you sent Rani’s blood to the CHC for further testing while continuing her on Iron therapy.
• Your health worker notices that Rani dislikes taking the tablets as she feels nauseous.
• What would you now ADVISE?
Parenteral iron therapy

• Can be given as first line therapy in moderate to severe anaemia **ONLY** if proven iron deficiency anaemia.

• Consider for first line if (Madhya Pradesh)
  – You have availability of parenteral therapy.
  – Your centre consistently has low follow up rates.

• Make decision based on your centre’s experience
? Sepsis risk

• May be better to not give injectable iron unless clear failure of oral iron.
• Concerns for sepsis in malaria high region.
IV iron infusion therapy

- Unable to tolerate oral iron
- Non-compliant/likely poor follow up
- Need rapid restoration of iron stores
To keep ready - emergency tray

- Inj Chlorpheniramine maleate - 5
- Inj Dexamethasone - 5
- Inj Hydrocortisone succinate - 3
- Inj Adrenanline - 10
- Inj. Furesemide - 5
- Inj. Dopamine - 3
- Inj. Sodium bicarbonate – 3
Administration of iron

• IV iron sucrose
• 5 ml ampoules with 100 mg iron
• Hb of 7- 8.9 – 200 mg per dose 2-3 doses alternate days
• Hb of 5- 6.9 – 200 mg per dose 4-5 doses alternate days
• Micropore – 2
• IV sets – 3
• IV fluids, RL, DNS, NS- 3 each
• Syringes - 2 ml, 5 ml, 20 ml – 5 each
• Scissors - 1
• Oxygen cylinder with accessories – 1
To administer..

• 20/18 gauge canula
• Micropore
• IV fluid – NS 100 ml
• Iron sucrose 2 vials (each with 100 mg)
Method

• Check vitals and keep emergency tray ready
• Dilute 2 vials in 100 ml NS
• Infuse over 15-20 minutes – alternate days
• Stop oral iron 48 hrs prior
• Discard unused solution
Contraindications to i.v iron

• History of anaphylactic reactions to iron
• First trimester of pregnancy
• Chronic liver disease and active infection (acute or chronic)
• Oral iron should be stopped at least 24 hours prior to therapy to avoid toxic reaction
Possible side effects

- Anaphylactic reactions (*very rare; 3.3/million/year*)
- Local reactions
- Hypotension
- Musculoskeletal pain
- Nausea
- Vomiting
- Diarrhoea
• Abdominal pain
• Pruritis
• Raised liver enzymes
• Injection site pain.
SKILL STATION - 2
In groups of 4

23 year old G2 P1 at 27 weeks pregnancy with intolerance to oral iron is being given a intravenous iron at your centre. You receive an alert that the patient seems uncomfortable.
Expected steps

• Stop infusion
• Vital signs - told to be PR -90, BP- 120/80, RR- 14, SpO2- 98 %, afebrile.
• Assess patient - local reaction as in picture
Arm with iv line
Expected steps

• Assess anaphylaxis
  – airway - ok
  – bronchospasm - none
  – circulatory status - BP - normal
  – GI symptoms - none

• Antihistamine, steroid, fluids - as assessment shows no anaphylaxis

• Monitor closely.

• Keep adrenaline loaded but not administer
For the group # 3

• A pregnant woman presents to you at 37 weeks of pregnancy with pallor and complaints of severe fatigue.

What would you like to ASK this lady?
• Dyspnea on exertion
• Orthopnea, PND
• Pedal oedema
• Headache/blurring of vision/altered mental status
• ANC checks- specifically
  – Iron/ folic acid consumption
  – BP checks
• Blood loss – per vaginum, per rectum or otherwise
• H/s/o sickle cell disease.
What signs would you LOOK for?
Vitals...always

• PR – Heart failure, shock
• BP – high for severe pre-eclampsia, low for active bleeding
• Temperature – infection, precipitating sickling crisis
• RR – pulmonary oedema, shock

Additionally SpO2 - sickle chest, pulmonary oedema
• Pallor
• Oedema
• Raised JVP
• Palpate precordium for thrills
• S3 - failure, murmurs (RHD)
• Bi basal crepitations
• Jaundice
• Spleen
What are the first 2 tests you would ADVISE?
• Hb
• Blood group and cross-match
• Her Hb comes out to be 3 gm/dL.

• How would you manage this lady?
• Blood transfusion on priority
• Manage hemodynamic status intra and immediate post partum.
• Blood transfusion arrangement to be immediate regardless of patient ability to replace with donors.
For the group # 4

• 26 year old G2P1 presents at 32 weeks of pregnancy. On a first look she looks pale and has mild jaundice.

• What additional history would you ASK in this patient?
• History of high BP (95%)
• Pedal oedema that does not subside with rest.
• H/O fevers
• H/O jaundice, blood transfusions, sibling deaths
• H/O bone or limb pains or chest pain episodes since childhood.
• What specific things would you **SEE** in examination?
Vitals ... always

- PR – with anemia and acute blood loss
- BP – high for severe pre-eclampsia, low for active bleeding
- Temperature – infection, precipitating sickling
- RR – pulmonary oedema, shock, acidosis

Additionally SpO2 - sickle chest, pulmonary oedema
• Pallor - grade of pallor
• Jaundice – grade of jaundice
• Pedal oedema
• Spleen
• Altered mental status
• She has pedal oedema, is severely icteric and pale

• What are your 3 first differentials?
• HELLP
• Sickle cell disease
• Acute fatty liver of pregnancy
• Fulminant hepatitis
• Other causes of hemolysis - TTP, ITP, HUS
• Flare of systemic lupus erythematosis
• Cholecystitis
• Anti-phospholipid antibody syndrome
On examination

- PR 130/min
- BP-140/98
- Afebrile
- RR – 38/min
- GCS – 14/15
• Severely pale
• Mildly icteric
• Pedal oedema present  B/L up to knees
• Abdomen non trender. No hepatosplenomegaly.
• No purpurae/petechiae/ecchymosis
• No eschar
• What tests would you ADVISE?
• Hb, TLC,DLC (infection may be missed on history/exam)
• Platelets
• T.bil/Direct
• Creatinine
• Urine for albuminuria
• SGOT/SGPT
• RDT (malaria)
Her reports are..

- Hb - 6
- Platelets - 43,000
- T.bil/Direct - 3.0/1.0
- Creatinine - 0.9
- Urine for albuminuria – 3+
- SGPT - 200
• How do you now proceed?
• HELLP syndrome.
  – Hemolysis (elevated bilirubin, P/S if available)
  – Elevated liver enzymes
  – Low platelets (<100,000)
At all levels of care

- C,A,B
- Pulse oximeter
- 2 wide bore i.v lines
- Foley’s catheter- urine output monitoring
- Control hypertension – Labetalol, Nifedepine SR
- MgSO4 (if severe PIH) - per Pritchard’s regimen
- Fluids
At all levels of care - MgSO4

- Loading dose - Inj MgSO4 4 gm iv over 10-15 mins. plus 5 gm deep im. each buttock
- Maintenance – 5 gms in alternate buttocks every 4 hrs with monitoring
Monitoring specifically

• BP’s - anti hypertensive as needed
• Sensorium - prognostication
• Urine output - magnesium safety, guide fluid management
• Knee jerks - magnesium toxicity
• Respiratory rate - magnesium toxicity
• Watch for pulmonary oedema
• GRBS - as is usual in altered mental status
At CHC/DH

• Steroids - for mother and baby (as less than 34 weeks)
• Platelets - transfusion prior to delivery (target 50,000)
• DELIVER
• NO role for expectant management
Skill station 3 - interpreting blood reports

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value 1</th>
<th>Value 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC %</td>
<td>71.1</td>
<td>H 8.5 H</td>
</tr>
<tr>
<td>LY %</td>
<td>15.9</td>
<td>L 1.9</td>
</tr>
<tr>
<td>MO %</td>
<td>3.3</td>
<td>0.5</td>
</tr>
<tr>
<td>EO %</td>
<td>0.5</td>
<td>L 0.1</td>
</tr>
<tr>
<td>BA %</td>
<td>8.7</td>
<td>H 1.1 H</td>
</tr>
<tr>
<td>RBC</td>
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<td>L</td>
</tr>
<tr>
<td>HGB</td>
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<td>L</td>
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<tr>
<td>HCT</td>
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<td>L</td>
</tr>
<tr>
<td>MCV</td>
<td>117.6</td>
<td>H</td>
</tr>
<tr>
<td>MCH</td>
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<tr>
<td>MCHC</td>
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<tr>
<td>RDW</td>
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<tr>
<td>PLT</td>
<td>578</td>
<td>H</td>
</tr>
<tr>
<td>MPV</td>
<td>7.2</td>
<td>L</td>
</tr>
</tbody>
</table>
• Comment on this blood report.
• List 2 possible causes for anaemia in this lady
WBC

 VOLUME

 DF1

WBC 5.5
%

NE 54.7  3.0
LY 34.1  1.9
MO  7.5  0.4
EO  3.0  0.2
BA  0.7  0.0

RBC 4.28 L
HGB 9.7  L
HCT 29.9 L
MCV 69.7 L
MCH 22.6 L
MCHC 32.4 L
RDW 18.4 H

PLT 331
MPV 8.8
• Comment on this blood report.
• List 2 possible causes for anaemia in this lady
Thank you!