Optimizing care of anaemic women through pregnancy at institutional level

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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
- RR

How her heart is coping

- 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 months of supplementation is indicative of iron deficiency. (WHO)
- Normally iron increases by 0.5 to 1 gram per week .

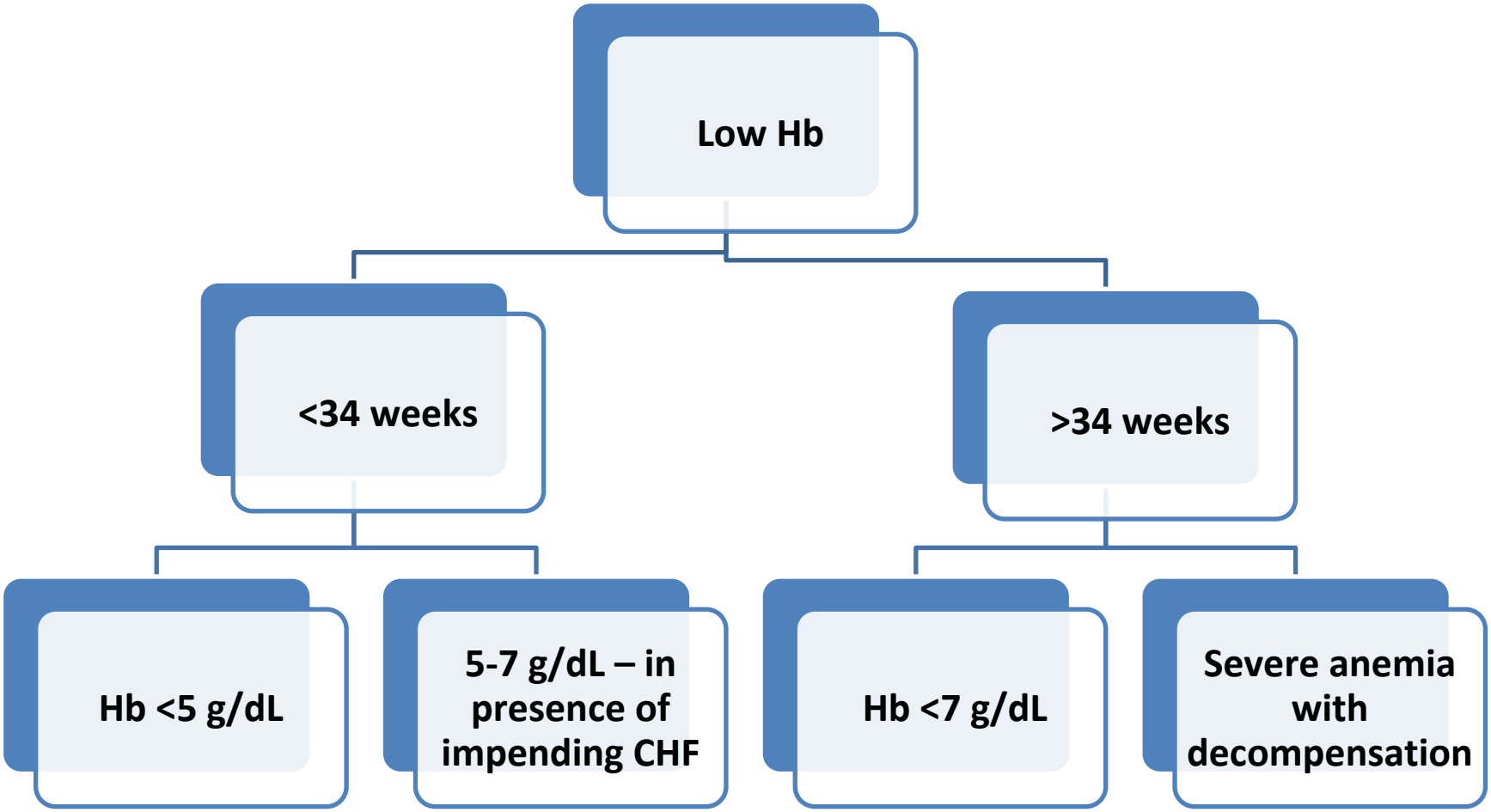
Follow up

- Can be tried safely only if follow up assured.
- Counselling plus health provider visits

- Tab Albendazole 400 mg 1st dose in 2nd trimester – as endemic area (WHO)

- Would you give her blood?

Blood - antepartum



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

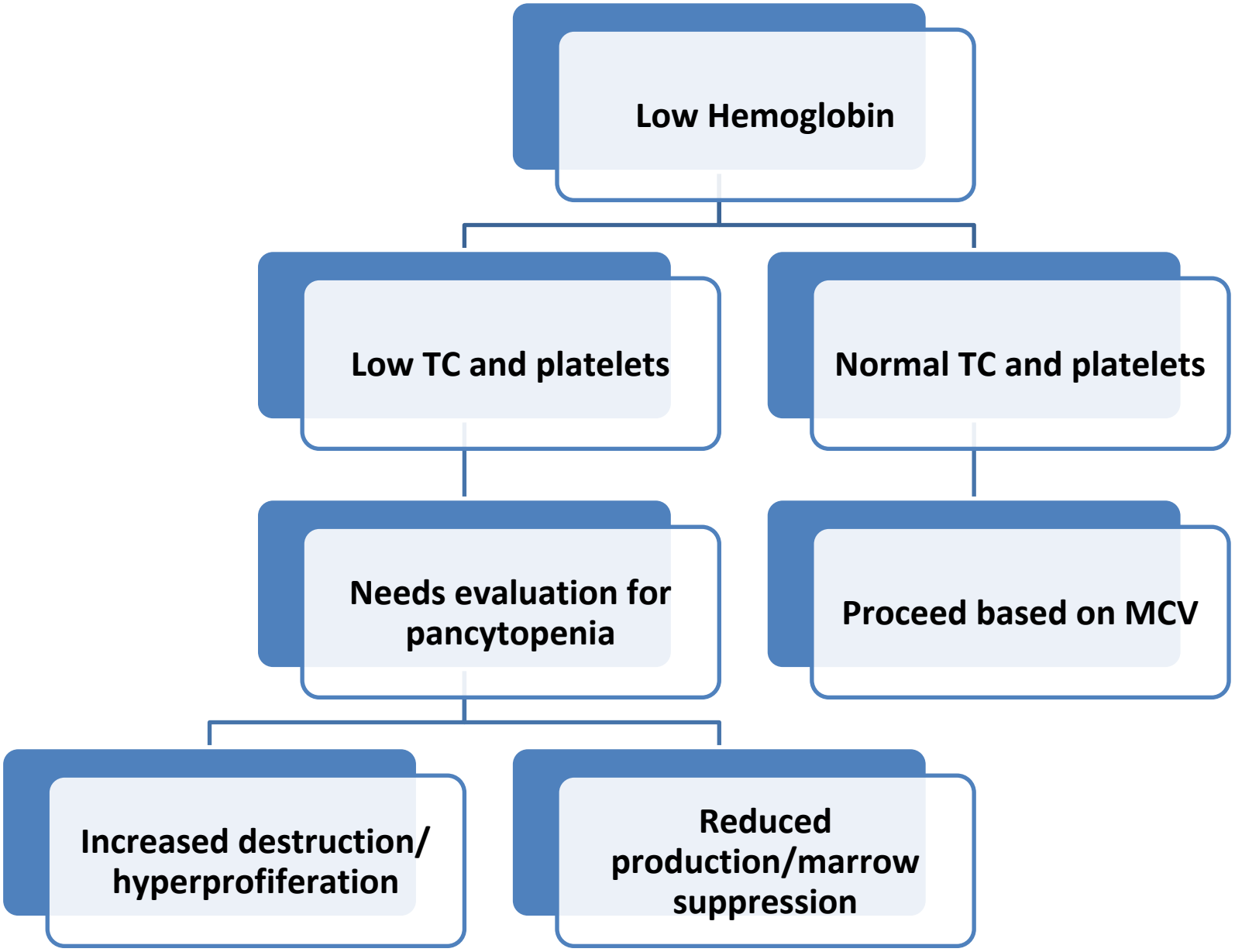
- HB, TLC, DLC, Platelets
- MCV
- Sickle preparation/ solubility test (if not done)
- P/S for MP (if available)
- Peripheral smear for RBC morphology (if available)

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
Normal TC and platelets
Needs evaluation for pancytopenia
Proceed based on MCV
Increased destruction/ hyperprofiferation
Reduced production/marrow suppression

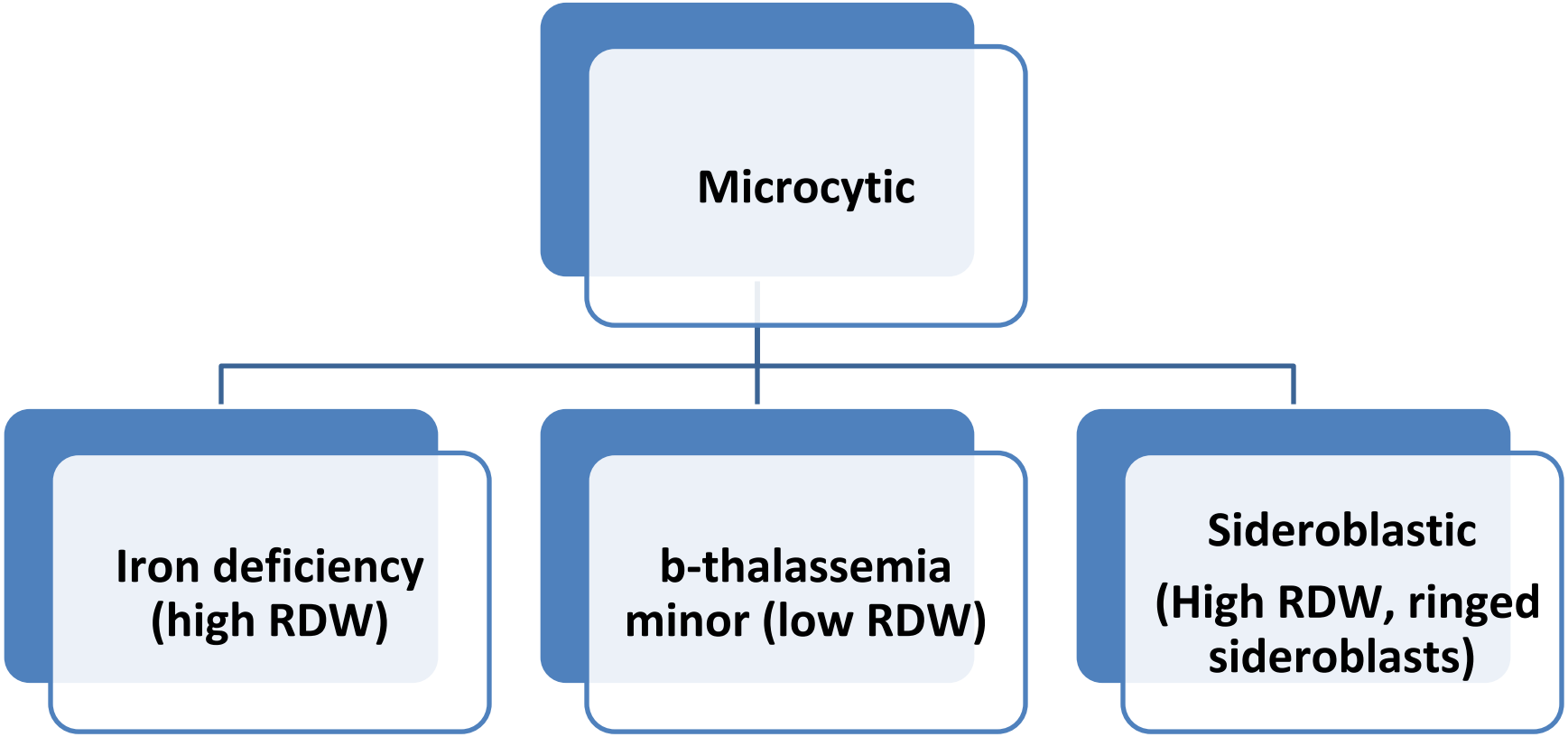
- Further work up requires MCV
- If CHC does not have the coulter tests - samples for further analysis at DH must be collected and blood must be given PRIOR to referral.
- Referral includes a possibility that the patient gets lost to follow up.

Anaemia classification based on MCV

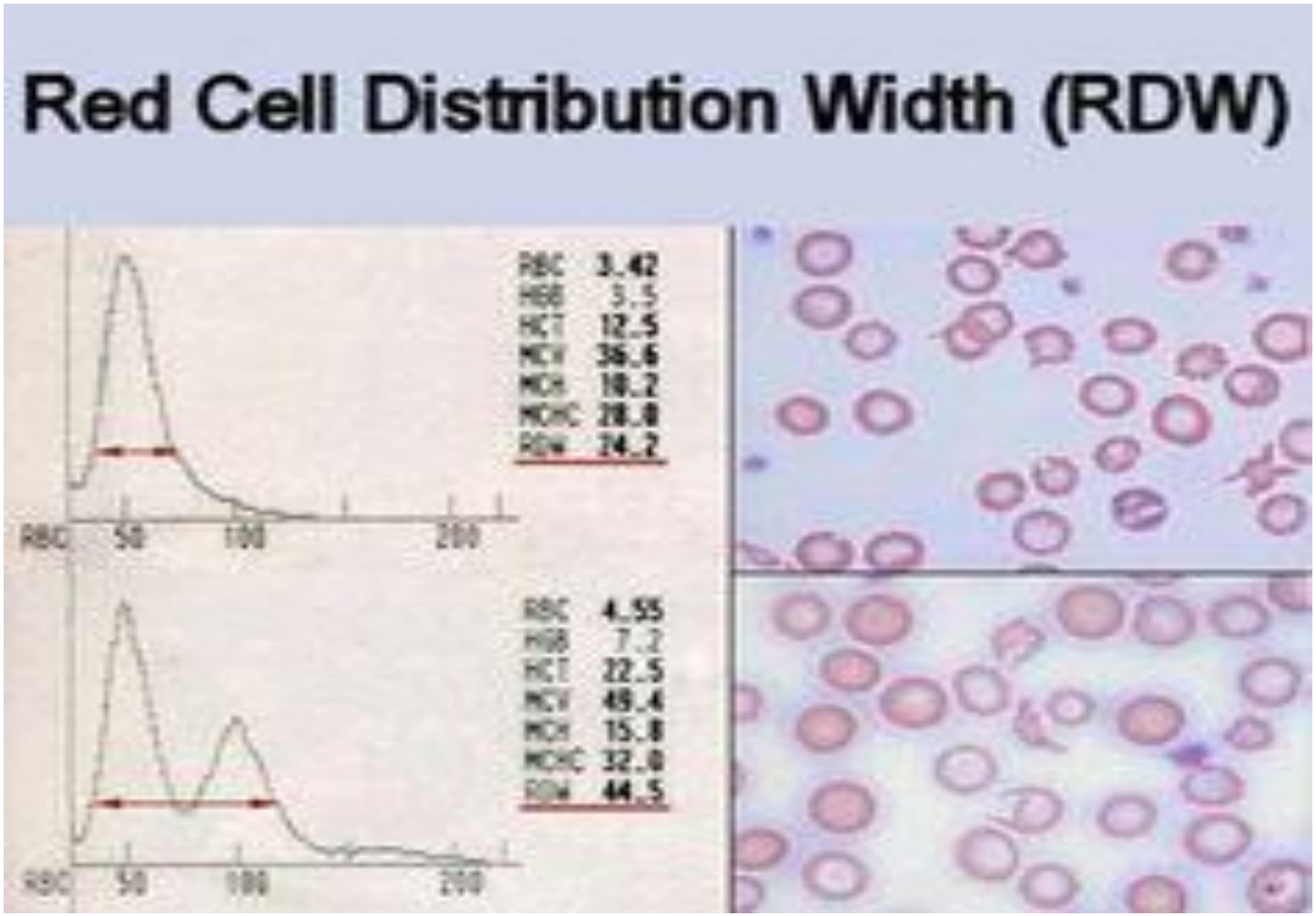
Microcytic (<80)	Normocytic (80-100)	Macrocytic (>100)
• Iron deficiency • Thallassemia • Anaemia of chronic disease • Sideroblastic • Lead poisoning • Copper deficiency	• Early iron def. • Acute blood loss • Sickle cell disease • Anaemia of chronic disease • Bone marrow disease • CRF • Hypothyroidism	• Vitamin B12 deficiency • Folic acid deficiency • Liver disease • Alcohol use • Myelodysplastic syndromes

- If her platelets are 2.5 lakhs and MCV is 50

In a microcytic anaemia(MCV < 80)



Red cell distribution width- 11.5 to 14.5

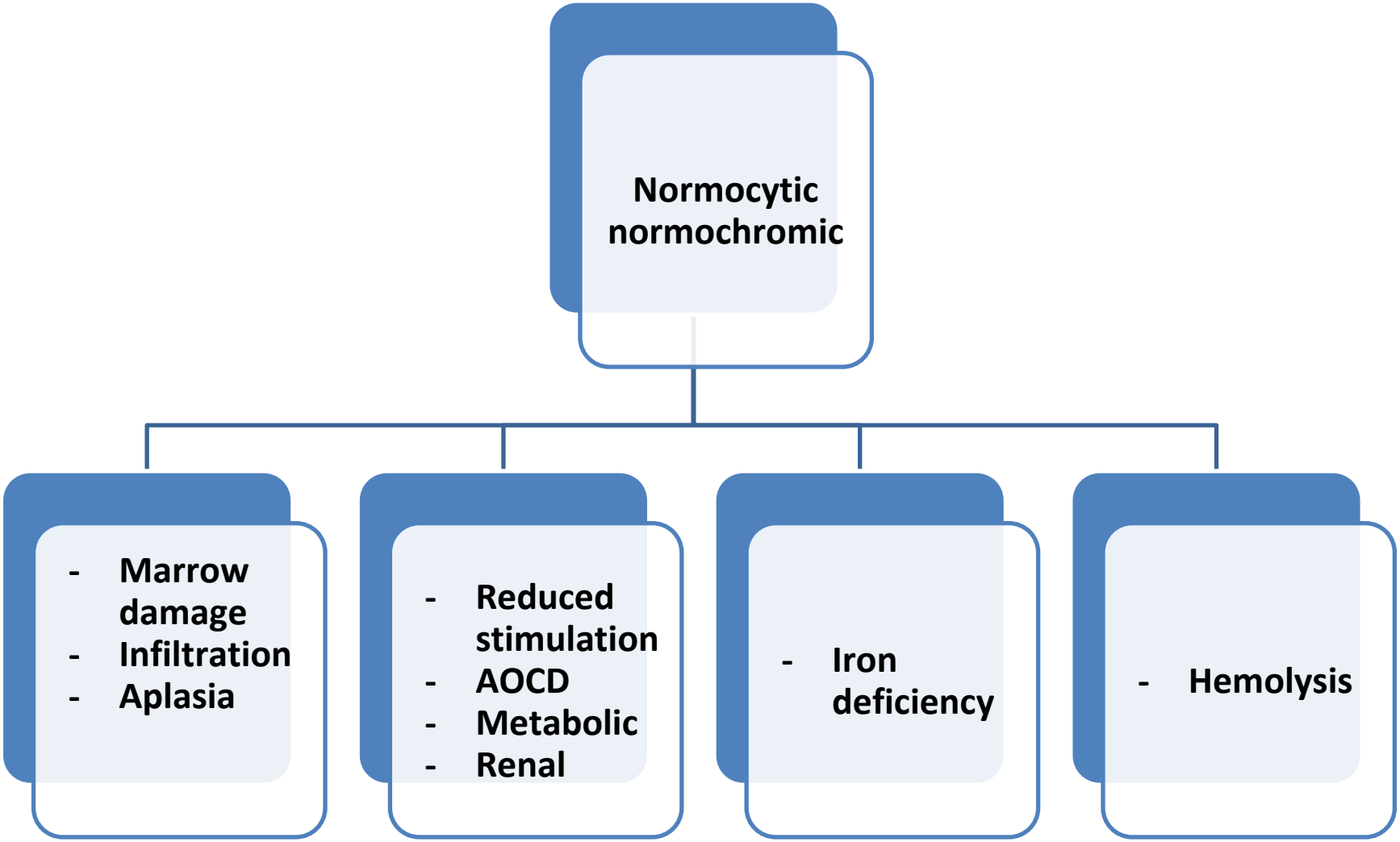


To differentiate anaemia and thalassemia

- 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

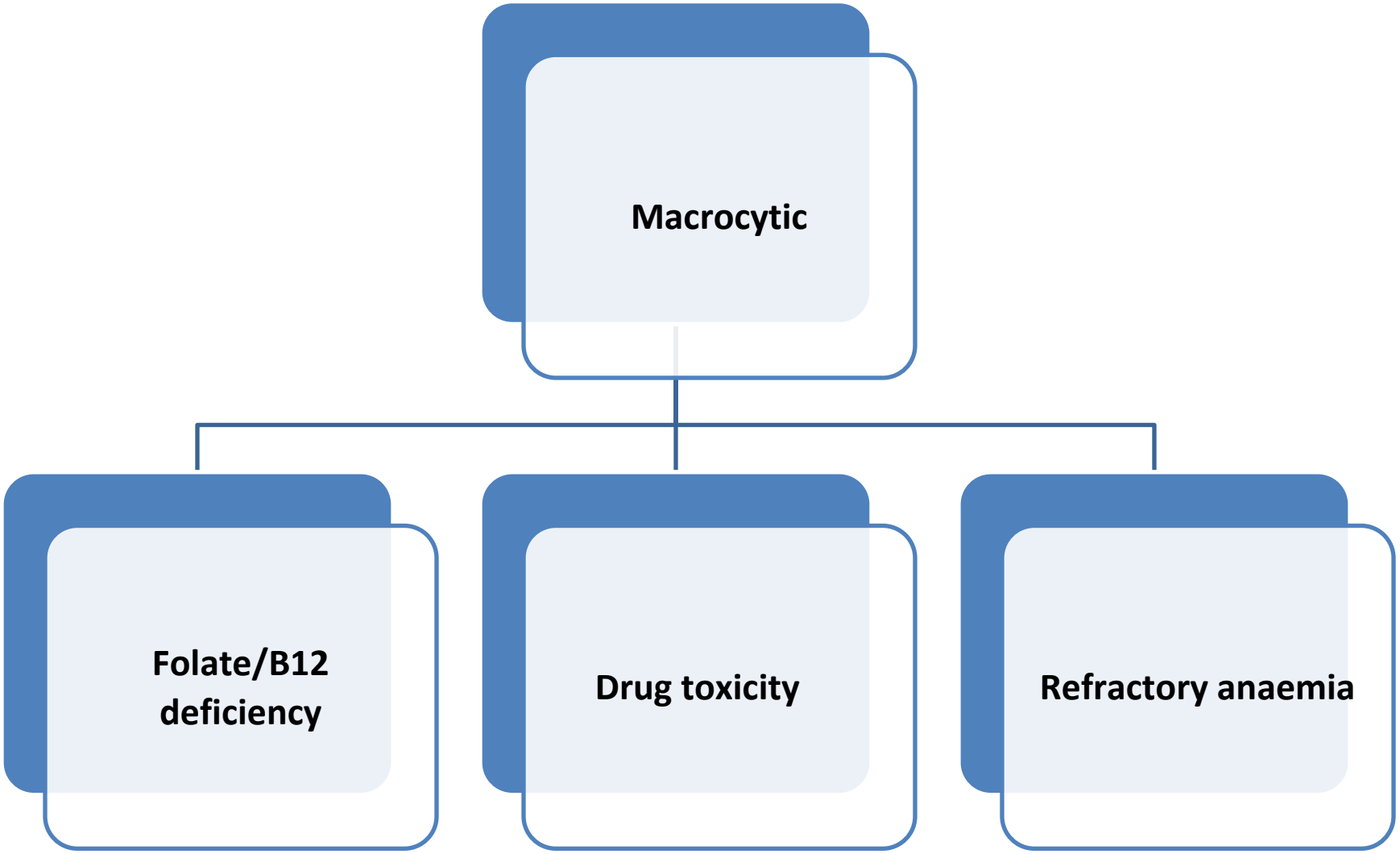
Normocytic normochromic



- 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


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 inject able 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. Adrenanaline - 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, murmers (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?

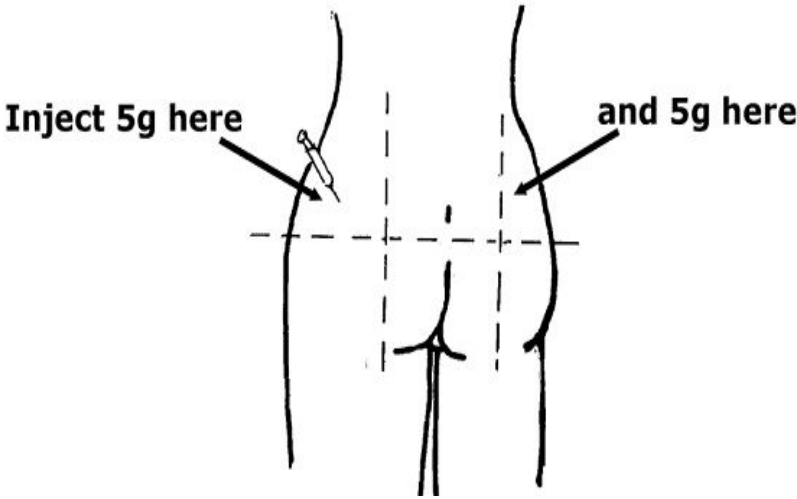
- HELLP syndrome.
  - Hemolysis (elevated bilirubin, P/S if available)
  - Elevated liver enzymes
  - Low platelets (<100,000)

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
- MgS04 (if severe PIH) - per Pritchard's regimen
- Fluids

At all levels of care - MgS04

- Loading dose - Inj MgS04 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



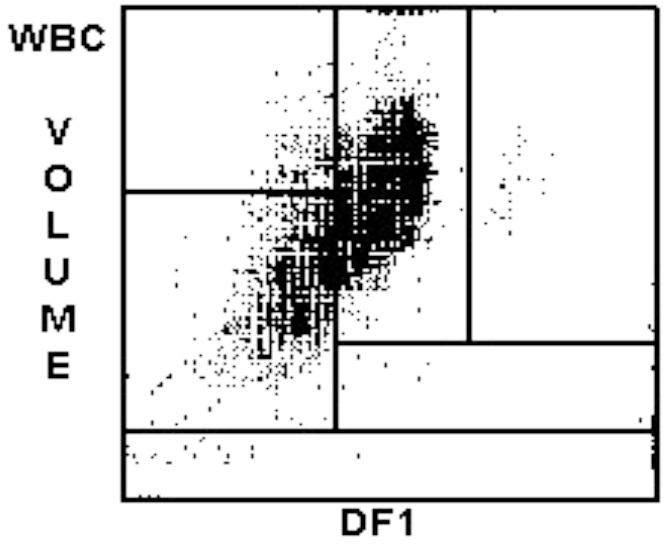
Monitoring specifically

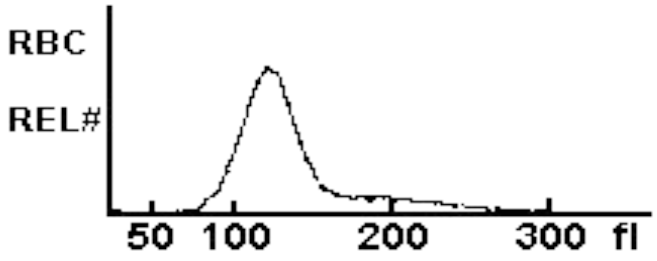
- BP’s - anti hypertensive as needed
- Sensorium - prognostication
- Urine output - magnesium safety, guide fluid management
- Knee jerks - magnesium toxicity
- Respiratory rate - magnesium toxicity
- Watch for pulmonary oedema
- GRBS - as is usual in altered mental status

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

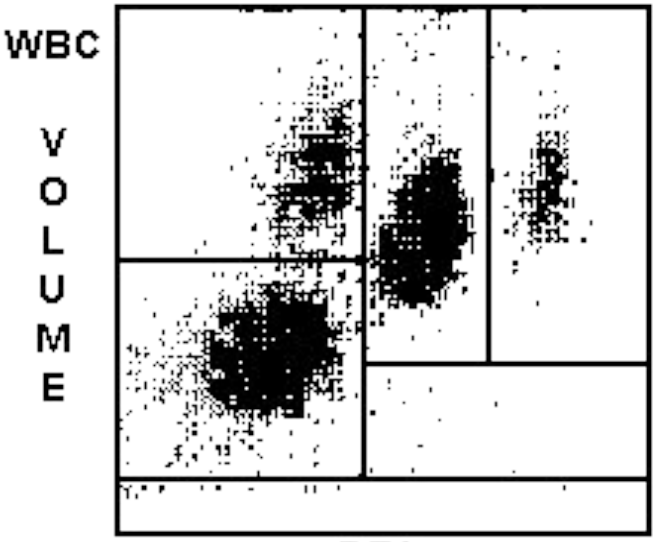
Skill station 3 - interpreting blood reports

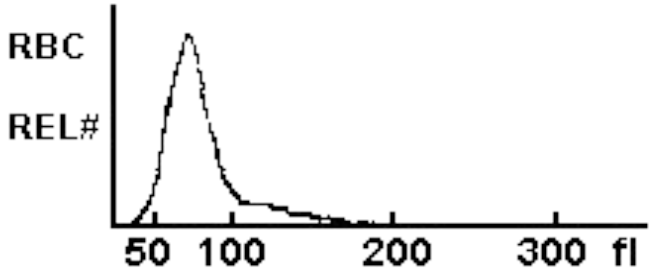




WBC	12.1	H			
	%			#	
NE	71.1		H	8.5	H
LY	15.9		L	1.9	
MO	3.3			0.5	
EO	0.5		L	0.1	
BA	8.7		H	1.1	H
RBC	2.69	L			
HGB	10.6	L			
HCT	31.6	L			
MCV	117.6	H			
MCH	39.6	H			
MCHC	33.7				
RDW	14.1				
PLT	578	H			
MPV	7.2	L			

- Comment on this blood report.
- List 2 possible causes for anaemia in this lady





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!