



# Urinary Tract Infection & Anemia in Pregnancy

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# Urinary Tract Infections in Pregnancy

- ▶ Common medical complication of pregnancy (2-10%). 2<sup>nd</sup> most common infection
- ▶ pathophysiology: ascending bacteria from vagina and rectum
- ▶ Most common causative organisms: gram –ve enteric bacteria (e.g: E.Coli 60-80%, Proteus, K. Pnemoniae, Pseudomonas, and GBS)
- ▶ Lactobacilli cause no UTI

# Changes in Pregnancy causing urinary stasis

- ▶ Kidneys: ↑ in length, weight, and pelvis size (physiologic hydronephrosis); Rt > Lt
- ▶ Ureters: dilated or hydroureter (Rt > Lt), urinary stasis
- ▶ Mechanism: hormonal or mechanical
- ▶ Consequences: ↑ risk of urinary tract infections



# Risk Factors for UTI's in Pregnancy

1. Female Gender
2. Mechanical obstruction: ureteropelvic junction, urethral or ureteric stenosis, & calculi
3. Functional obstruction: pregnancy & vesicoureteral reflux
4. Others: Systemic diseases: DM, sickle cell trait/disease, gout, cystic renal disease



# Urinary Tract Infections in Pregnancy

Urinary Tract Infections (terminology )

- ▶ Bacteriuria

Bacteria in the urine

- ▶ Significant bacteriureia

= or  $> 10^5$  CFU/mL of urine

- ▶ Asymptomatic bacteriuria

- ▶ Lower UTI /cystitis

- ▶ Upper UTI / pyelonephritis

# Classification of UTI's

## Clinical:

- ▶ Asymptomatic (8%)
- ▶ Symptomatic (1-2%)

## Anatomical:

- ▶ Lower tract dis: asymptomatic bacteriuria and acute cystitis
- ▶ Upper tract dis: acute pyelonephritis

# Types of UTI Recurrences

## 1. Relapse:

same organism within 2-3 wks

2<sup>nd</sup>ry to perineal colonization or inadequate Rx

## 2. Reinfection:

2<sup>nd</sup>ry to recurrent new organism within 12 wks

bladder bacteriuria

## 3. Superinfection:

new organism while on Rx

## 4. Recurrent UTI:

2 in 6months or = >3 in 1year

# Asymptomatic Bacteriuria (ABU)

- ▶ Incidence in pregnancy: 2-10% similar to sexually active women
- ▶ Consequences: acute pyelonephritis (30%)
- ▶ Clinical presentation: ??
- ▶ Diagnosis: ?
- ▶ Management: outpatient Abx ( amoxil, 1<sup>st</sup> generation cephalosporin, nitrofurantoin)
- ▶ length: 3-10 days



# Acute Cystitis

- ▶ Incidence in pregnancy: 1-2%
- ▶ Consequences: acute pyelonephritis (30%)
- ▶ Clinical presentation:
- ▶ Diagnosis:
- ▶ Management: outpatient Abx , analgesics
- ▶ Length: 7-10 days
- ▶ Re culture

# Acute Pyelonephritis

- ▶ Incidence in pregnancy: 2-4%
- ▶ Most commonly in second Trimester
- ▶ Clinical presentation: fever/chills, CVA tenderness, nausea and vomiting
- ▶ Consequences: sepsis, adult respiratory syndrome, anemia, renal failure, preterm labor
- ▶ The leading cause of ARDS and septic shock in pregnancy

# Acute Pyelonephritis

- ▶ Diagnosis:

S&S

Leukocytosis

Urine culture

Blood culture +ve in 10%

- ▶ Management: Inpatient

- Admission - Antipyretic agents

- Abx ( i.v. ampicillin or cephalosporin then p.o)

- ▶ Length: 10-14 days

- ▶ Re culture 10-25% recurrent

# Prevention

- ▶ Prenatal screening for ASB in pregnant women
- ▶ Hygiene
- ▶ Increase intake of water
- ▶ Consumption of Cranberry products



# Anemia in pregnancy

# Introduction

- ▶ It's a global health problem
- ▶ Commonest medical disorder in pregnancy
- ▶ Prevalence varies from population to another (e.g: in India between 50-70% while in USA is 2-4%)
- ▶ Nutritional anemia (iron deficiency) is commonest
  
- ▶ It is important contributor to maternal & perinatal morbidity & mortality as a direct or indirect cause

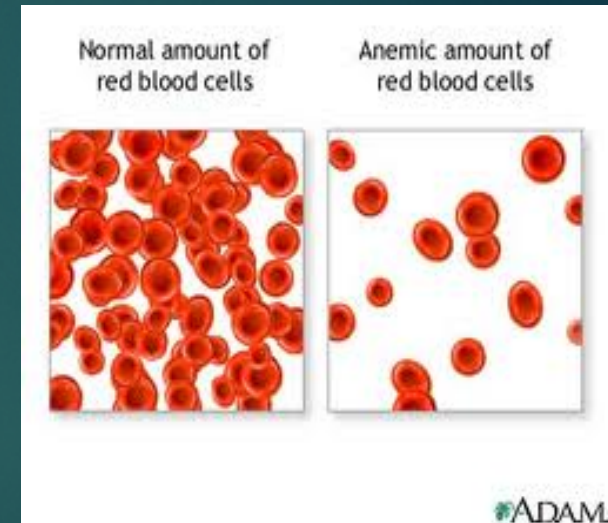
# Definition - Anemia

▶ A condition where circulating levels of Hb are quantitatively or qualitatively lower than normal

▶ Non pregnant women Hb < 12gm%

▶ Pregnant women (WHO) Hb < 11 gm%  
Haematocrit < 33%

▶ Pregnant women (CDC) Hb < 11 gm%  
1<sup>st</sup>&3<sup>rd</sup> Trimester  
2<sup>nd</sup> trimester Hb < 10.5 gm%



# Anemia Severity Classification

Hb values:

- ▶ Mild 10.0-10.9 gm%
- ▶ Moderate 7-9.9
- ▶ Severe <7
- ▶ Very Severe <4



# Patho-physiology of Anemia in Pregnancy

- ▶ Blood volume increases 40-45% in pregnancy (between 10 to 24 weeks)
- ▶ Increase in plasma is more as compared to red cell mass leading to hemodilution & decrease in Hemoglobin level
- ▶ Red cell mass (driven by an increase in maternal erythropoietin production) also slightly increases
- ▶ Hematocrit decreases from between 38% - 45% in healthy non-pregnant women to about 34% during late single pregnancy and to 30% during late multifetal pregnancy

# Patho-physiology of Anemia in Pregnancy

- ▶ Iron stores are depleted with each pregnancy
- ▶ Too soon & too many pregnancies result in higher prevalence of iron deficiency anemia
- ▶ Women who take iron supplements have less pronounced changes in hemoglobin, as they increase their red cell mass in a more proportionate manner than those not on hematinic supplements.

# Symptoms of anemia during pregnancy

- ▶ Weakness or fatigue
- ▶ Dizziness
- ▶ Shortness of breath
- ▶ Rapid or irregular heartbeat
- ▶ Chest Pain
- ▶ Pale skin, lips, and nails
- ▶ Cold hands and feet
- ▶ Trouble concentrating

# Most Critical Period

- ▶ 28-30 weeks of pregnancy
- ▶ In labor
- ▶ Immediately after delivery
- ▶ Early Puerperium

# Investigation

- ▶ Severity of anemia – Hb & Haematocrit, at first visit, 28-30 weeks & 36 weeks
- ▶ Type of anemia – GBP microcytic, macrocytic, dimorphic, normocytic, hemolytic, pancytopenia
- ▶ Bone marrow activity – reticulocyte count (N .2-2%), higher bone marrow activity is seen in
  - ▶ hemolytic anemia
  - ▶ following acute blood loss
  - ▶ iron def anemia on treatment
- ▶ Cause of anemia – by various investigations

# Special Investigations

- ▶ Serum Ferritin – abnormal if  $< 20$  ng/ml (N 40-160 ng/dl), assess iron stores
- ▶ Serum Iron – N 65-165 ug/dl, decreases in Fe def anemia
- ▶ Serum Iron binding capacity – 300-360 ug/dl, increases with severity of anemia
- ▶ Percentage saturation of transferrin – 35-50%, decreases to less than 20% in Fe def anemia
- ▶ RBC Protoporphyrin – 30ug/dl, it doubles or triples in Fe def anemia ( substrate to bind with Fe, can not be converted into Hb in Fe def)

# Effect of Anemia on Pregnancy & Mother

- ▶ Predisposed to infections like – UTI, puerperal sepsis
- ▶ Increased risk to PPH
- ▶ Subinvolution of uterus
- ▶ Lactation failure
- ▶ Maternal mortality – due to
  - ▶ CHF,
  - ▶ Cerebral anoxia,
  - ▶ Sepsis,
  - ▶ Thrombo-embolism

# Effect of Anemia on Fetus & Neonate

- ▶ Higher incidence of abortions, preterm birth, IUGR
- ▶ IUFD
- ▶ Low APGAR at birth
- ▶ Neonate more susceptible for anemia & infections
- ▶ Higher Perinatal morbidity & mortality
- ▶ Anemic infant with cognitive & affective dysfunction



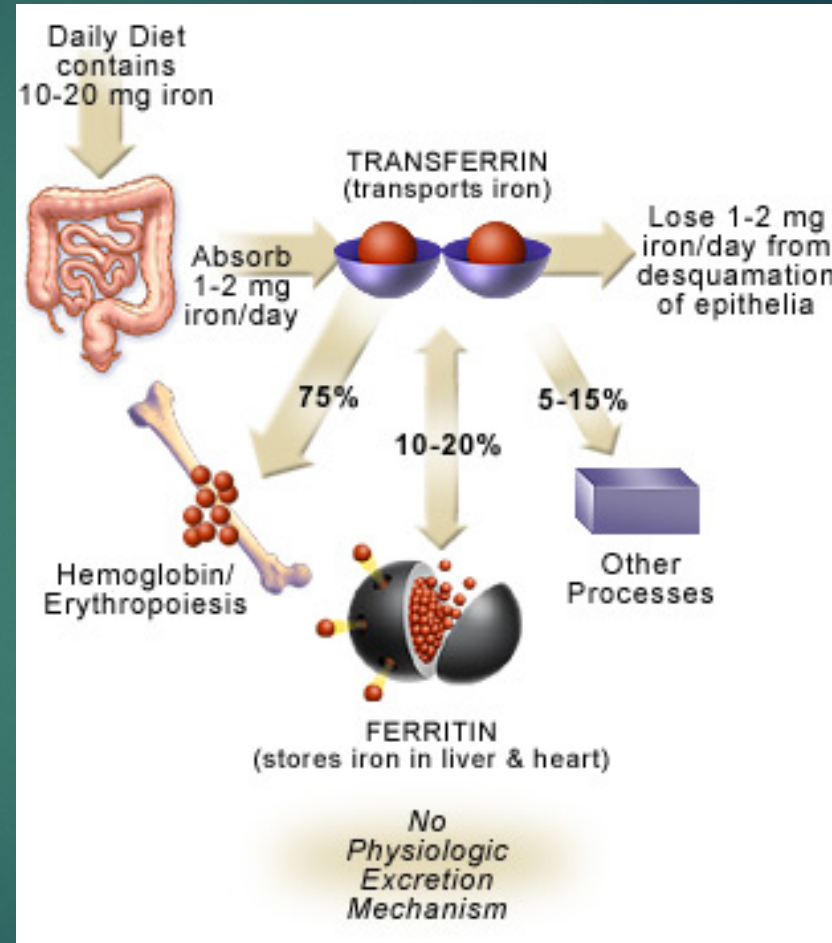
# Causes of Anemia in Pregnancy

Most Common Causes:

- ▶ Iron deficiency
- ▶ Folate deficiency
- ▶ Vitamin B12 deficiency
- ▶ Hemoglobinopathies

# Pharmaco-kinetics of Iron / daily requirement

- ▶ Normal diet contain about 14 mg of iron
- ▶ Absorption of iron is 5-10% (1-2 mg) & 3-4% in pure veg diet
- ▶ Additional daily iron demand in early pregnancy 2-3 mg/day
- ▶ In late pregnancy 6-7 mg/day
- ▶ So daily supplement of 40-60 mg of elemental iron is required during pregnancy
- ▶ Folic acid requirement is also increased 400-600 ug/day
- ▶ In strict veg Vit B 12 is also deficient





## e-Library of Evidence for Nutrition Actions (eLENA)

### Daily iron and folic acid supplementation during pregnancy

Guidance summary\*

#### WHO recommendations

Daily oral iron and folic acid supplementation is recommended as part of the antenatal care to reduce the risk of low birth weight, maternal anaemia and iron deficiency.

#### Suggested scheme for daily iron and folic acid supplementation in pregnant women

Target group	Pregnant women
Dose	Iron: 30–60 mg of elemental iron <sup>a</sup>
	Folic acid: 400 µg (0.4 mg)
Frequency	One supplement daily
Duration	Throughout pregnancy. Iron and folic acid supplementation should begin as early as possible
Target group	All pregnant adolescents and adult women
Settings	All settings

a. 30 mg of elemental iron equals 150 mg of ferrous sulfate heptahydrate, 90 mg of ferrous fumarate or 250 mg of ferrous gluconate.

#### Remarks

- In settings where anaemia in pregnant women is a severe public health problem (40% or higher), a daily dose of 60 mg of elemental iron is preferred over a lower dose.

# Iron deficiency anemia

- ▶ CBC, MCV value (MCV is low)
- ▶ Measurement of serum iron, ferritin, and transferrin
- ▶ Decreased serum iron and ferritin and increased serum transferrin levels confirm the diagnosis.
- ▶ Usually ferrous sulfate 325 mg orally once/day
- ▶ Parenteral therapy

IM: 20% of pregnant women do not absorb enough supplemental oral iron or non-compliance

IV: faster increases in Hb and better replenishment of iron stores in comparison with oral therapy

# Differentiation between iron deficiency anemia & Thalassemia

Investigations	Normal values	Fe Def Anemia	Thalassemia
MCV	75-96 fl	reduced	V reduced
MCH	27-33pg	reduced	V reduced
MCHC	32-35 gm/dl	reduced	N or reduced
HbF	<2 %	normal	Raised
HbA2	2-3%	N or reduced	Raised >3.5%
Serum Iron	60-120 ug/dl	reduced	Normal
Serum Ferritin	15-300 ug/L	reduced	Normal
TIBC	300-350 ug/dl	Raised	Normal
Bone iron stores		reduced	Normal
Free erythrocyte protoporphyrin (FEP)	<35 ug/dl	>50	Normal

# Treatment for Iron Deficiency Anemia

- ▶ Improving diet rich in iron (e.g. leafy vegetables)
- ▶ Heme iron (e.g. animal source) is higher and better absorbed
- ▶ Treat worm infections
- ▶ Food fortification with iron
- ▶ Iron & folic acid supplementation during pregnancy
- ▶ Iron absorption enhanced by citrus fruits, Vit C
- ▶ Avoid tea, coffee, Ca, phytates, phosphates, oxalates



# Folate deficiency (Megaloblastic Macrocytic Anemia)

- ▶ Increases risk of neural tube
- ▶ Deficiency occurs in 0.5 to 1.5% of pregnant women
- ▶ Diagnosis Measurement of serum folate
- ▶ Severe megaloblastic anemia may warrant bone marrow examination and further treatment in a hospital
- ▶ Treatment is folate 1 mg po daily

# Indications for Blood Transfusion

- ▶ Severe anemia first seen after 36 weeks of pregnancy
- ▶ Anemia due to acute blood Loss – APH & PPH
- ▶ Associated Infection
- ▶ Patient not responding to oral or parenteral therapy
- ▶ Anemic & symptomatic pregnant women (dyspneic, with heart failure etc) irrespective of gestational age

