Hematological Disorders

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Anemia in pregnancy

- Hemoglobin (Hgb) <11 g/dL in the first or third trimesters and <10.5 g/dL in the second trimester
- Dilatational effect.

Anemia in pregnancy

Table 14.4 Laboratory Ranges

Laboratory reference ranges
- Ferritin 20–150 ng/mL
- Folate 3–18 ng/mL
- B12 (cobalamin) 250–1200 pg/mL
- MCV 80–100 μm³

Normal hemoglobin electrophoresis
- Hgb A₁ > 95%
- Hgb A₂ < 3.5%
- Hgb F < 1%

- Anemia.
- Rh Isoimmunization.
- Thrombocytopenia
- Sickle Cell Anemia & Thalasemia.
Macrocytic anemia (Hgb < 110 g/L – actual hemoglobin (g/L)

IV iron sucrose [calculated as: weight before pregnancy (kg)

and severe allergic reaction (10–12). Trials have reported that

compare potential adverse effects such as venous thrombosis

administration are associated with better hematologic indices

pregnancy.

forms of prevention or therapy, including self-donation during

tant maternal or perinatal outcomes (8).

more effectively than oral iron polymaltose complex (300-mg

iron-deficiency anemia and restored iron stores faster and

globin level (9,10). Gastrointestinal side effects (e.g., constipa-

There is

Prepare team regarding increased risk in the event of hemor-

Antepartum testing

Figure 14.2

Figure 14.3

Figure 14.4

Prevention & Therapy

❖ Daily requirement during pregnancy 27 mg

❖ Oral Vs. IV

❖ Side effects

Hematological Disorders - November 3, 2016
Hemolytic disease of the fetus/neonate

- Immunologic disorder that occurs in a pregnant, Rh-negative woman who is carrying an Rh-positive fetus.

- Risk of immunisation 2%

**Fig. 1** Pathogenesis of Rh Hemolytic disease of newborn

**Fig. 2:** Decline in death rate for all causes of HDN in U.S, 1968-75 (modified from 6)

Deaths per 10,000 live births

- Rh Disease
- Without mention of cause
**Risk of immunisation**

- Spontaneous abortion 3.5%
- Induced abortion 5.5%
- Ectopic pregnancy 1%
- APH
- Invasive procedures e.g. amniocentesis or chorionic villus sampling
- Abdominal trauma
- After external cephalic version.

**Clinical management algorithm of RhD isoimmunization.**

**Quantification test**

- Kleihauer-Betke test
- Percentage of fetal cells × 5000
Prevention of RhD Alloimmunization

- Blood group
- Antibody screen
- If +ve; Antibody identification
- Antibody titer
- If increases, MCA PSV
- Doppler
- fetal blood transfusion if MCA PSV > 1.5 MOM

Thrombocytopenia

Etiology
- Increased destruction: Autoimmune
- Consumptive: TTP, DIC
- Reduced platelet production: bone marrow

Table 39-1 The Most Common Causes of Maternal Thrombocytopenia

- Gestational/incidental thrombocytopenia of pregnancy (75%-80%)
- Hypertensive disorders: preeclampsia/HELLP syndrome (15%-20%)
- Immune thrombocytopenic purpura (3%-4%)
Gestational Thrombocytopenia

Incidental finding
Incidence 8%

Pathophysiology:
❖ Accelerated platelet activation is suspected to occur at placental circulation.
❖ Accelerated consumption of platelets is due to the reduced lifespan of platelets during pregnancy.

❖ 90% platelet counts greater than 100 x 10⁹/L.
❖ 6% platelet counts less than 100 x 10⁹/L.
❖ 1% platelet counts less than 70 x 10⁹/L.

Gestational Thrombocytopenia

❖ 1. It occurs in the last half of pregnancy.
❖ 2. There is no previous history of thrombocytopenia (with the exception of thrombocytopenia in previous pregnancies).
❖ 3. There is no association with fetal thrombocytopenia.
❖ 4. The thrombocytopenia is mild and asymptomatic.
❖ 5. The thrombocytopenia should resolve spontaneously postpartum.

Management
❖ Antepartum: No treatment is necessary
❖ Labor and delivery: Mode of delivery
❖ Regional anesthesia considerations

Hematological Disorders - November 3, 2016
**Preeclampsia/Eclampsia/HELLP**

- Thrombocytopenia is usually moderate and platelet count rarely decreases to $< 20,000 \times 10^9/L$.
- Correlates with the severity of the disease.
- Incidence of thrombocytopenia 20%

**Pathophysiology:**
- Vascular endothelial damage increases platelet activation.

**Treatment:**
- Delivery
  - **Goal:**
    - Maintain platelet counts
    - $>20,000 \times 10^9/L$ for vaginal delivery
    - $50,000/\mu L$ for cesarean delivery.
    - If platelets $< 50,000/\mu L$ prior to cesarean delivery, transfuse platelets just prior to surgery and/or intraoperatively.
    - Regional anaesthesia !!

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**Immune Thrombocytopenic Purpura (ITP)**

- Incidence is $1/1000-10,000$ pregnancies

**Pathophysiology:**
- Antibodies directed against platelet glycoproteins
- Antiplatelet antibodies may cross the placenta

**Maternal treatment**
- platelets level $> 50 \times 10^9/L$ - No treatment
- platelets level $< 50 \times 10^9/L$:
  - Steroids, Response time is 3-7 days
  - IVIG Response time is 6-72 hours
  - Splenectomy
  - platelet transfusion
Immune Thrombocytopenic Purpura (ITP)

Fetal consideration:

- Severe neonatal thrombocytopenia 12%.
- Intracranial haemorrhage is rare (1%) not related to the mode of delivery.
- Vaginal delivery never has been proven to cause intracranial hemorrhage.
- Cesarean delivery should be reserved for obstetrical indications only.

Sickle cell disease

- Autosomal recessive
- Chronic hemolytic anemia and vaso-occlusive events.
- Mild to moderate chronic anemia
- Hemoglobin electrophoresis

Effects of Sickle Cell Disease on Pregnancy

<table>
<thead>
<tr>
<th>Complication</th>
<th>HBSS</th>
<th>HBSC</th>
<th>HBSS(9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnancy loss (mostly first trimester)</td>
<td>7-36% (9-10)</td>
<td>9% (10)</td>
<td></td>
</tr>
<tr>
<td>Fetal death</td>
<td>No increase (8,9)</td>
<td>No increase (8,9)</td>
<td></td>
</tr>
<tr>
<td>Fetal growth restriction (FGR)</td>
<td>40% (9)</td>
<td>21% (9)</td>
<td></td>
</tr>
<tr>
<td>Small for gestational age (SGA)*</td>
<td>21% (11)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute anemia</td>
<td>4% (11)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Painful crisis*</td>
<td>20-60% (8,9,11)</td>
<td>19-26% (9,11)</td>
<td></td>
</tr>
<tr>
<td>Urinary tract infections</td>
<td>15% (8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Premature birth</td>
<td>45% (9,11)*</td>
<td>22% (9)</td>
<td></td>
</tr>
<tr>
<td>Preeclampsia</td>
<td>10% (9,12)</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Alloimmunization*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antepartum admissions*</td>
<td>62% (9)</td>
<td></td>
<td>26% 2.8(9)</td>
</tr>
<tr>
<td>Postpartum infections*</td>
<td>1.4 (12)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Effects of Pregnancy on Sickle Cell Disease

Table 15.2 Complications: Effects of Pregnancy on Sickle Cell Disease

<table>
<thead>
<tr>
<th>Complication</th>
<th>HBSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal mortality</td>
<td>0.5–2.1% (8,11,12)</td>
</tr>
<tr>
<td>Acute chest syndrome</td>
<td>7–20% (8,11)</td>
</tr>
<tr>
<td>Thromboembolic events</td>
<td>2.5 (12)</td>
</tr>
<tr>
<td>Cerebral vein thrombosis</td>
<td>4.9 (12)</td>
</tr>
<tr>
<td>Pyelonephritis</td>
<td>1.3 (12)</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>9.8 (12)</td>
</tr>
<tr>
<td>Sepsis</td>
<td>6.8 (12)</td>
</tr>
<tr>
<td>SIRS</td>
<td>12.6 (12)</td>
</tr>
<tr>
<td>Pulmonary hypertension</td>
<td>6.3 (12)</td>
</tr>
<tr>
<td>No. of blood transfusions</td>
<td>22.5 (12)</td>
</tr>
<tr>
<td>Postpartum infection</td>
<td>1.4 (12)</td>
</tr>
</tbody>
</table>

% is reported if available in the source study. Otherwise, the effect is listed as Odds Ratios or Relative Risks.

Sickle cell disease

THERAPY

- Painful crisis
- Transfusions:
  - Symptomatic or orthostatic from anemia
  - Hemoglobin of <6 g/dL
  - Hematocrit <25%
  - Acute stroke or chest syndrome
  - Multiple organ failure.

Prenatal Care

- History
- Laboratory studies
- Serial urine cultures
- CBC every trimester
- Folate supplementation up to 4 mg daily plus prenatal vitamin. Ferrous sulfate 325 mg only if iron deficient
- Pneumococcal and influenza vaccines.

Thalassemias
Thalassemias

- Absent or underproduction of a structurally normal Hb chain
- α-thalassemia, the α-globin chain is underproduced
- β-thalassemia, the β-globin chain is underproduced
- Fragile red cell

Table 14.2 Types of α-Thalassemia

<table>
<thead>
<tr>
<th>Type of α-Thalassemia</th>
<th>Genetics</th>
<th>Clinical Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>α-Thalassemia silent carrier (asymptomatic)</td>
<td>α/α, α/α'</td>
<td>None-mild Low-normal or low May be present No</td>
</tr>
<tr>
<td>α-Thalassemia trait (mild anemia)</td>
<td>α/α'</td>
<td>None-mild Low-normal or low May be present No</td>
</tr>
<tr>
<td>α-Thalassemia major (Cooley anemia)</td>
<td>α/α'</td>
<td>Severe Low Present Always</td>
</tr>
<tr>
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</table>

Effect of Thalassemias on pregnancy

- Trait
- More severe; Infertility, RPL, PTB
Questions ?