Viral Disease in Pregnancy

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Objective: Review of viruses commonly encountered in pregnancy

- Cytomegalovirus
- Parvovirus
- Influenza
- (ZIKA)
Cytomegalovirus

- Most common perinatal viral infection that results in major neonatal / childhood morbidity
- 40,000 infants in U.S. are affected each year
  - 1-1.3% birth prevalence
- Wide range of outcomes
  - Asymptomatic Infection
  - Hearing loss
  - Death
Cytomegalovirus

- Previous exposure: 40-80% pregnant women
- Susceptible to primary infection: 20-60%
- 1-4% of seronegative women will acquire a primary infection during pregnancy
- CONGENITAL INFECTION CAN OCCUR WITH BOTH PRIMARY AND RECURRENT CMV INFECTIONS
Risks for maternal and neonatal infection

Primary CMV Infection

- 30-50% of women of child-bearing age are susceptible to primary CMV infection
- 1-4% will experience a primary infection during pregnancy
- 40% of fetuses will be infected
- 10-15% are symptomatic at birth
- 25% develop sequelae by age 2

Recurrent CMV Infection

- 50-70% of women of child-bearing age are susceptible to recurrent CMV infection
- Of previously infected, 0.5-2% will develop a fetal infection
- <1% are symptomatic at birth
- 8% develop sequelae by age 2
CMV Symptoms

- Neonatal
  - Jaundice
  - petechial rash
  - Hepatomegaly
  - death

- Childhood
  - hearing loss
  - developmental delay
  - Seizures
  - Death

(NEJM 1992)
## Diagnosis: Ultrasound Findings

<table>
<thead>
<tr>
<th>Condition</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cerebral calcifications</td>
<td>15%</td>
</tr>
<tr>
<td>Microcephaly</td>
<td>15%</td>
</tr>
<tr>
<td>Echogenic bowel</td>
<td>15%</td>
</tr>
<tr>
<td>Fetal growth restriction</td>
<td>13%</td>
</tr>
<tr>
<td>Ventriculomegaly</td>
<td>10%</td>
</tr>
<tr>
<td>Ascites</td>
<td>8%</td>
</tr>
<tr>
<td>Pericardial effusion</td>
<td>7%</td>
</tr>
<tr>
<td>Hyperechogenic kidneys</td>
<td>4%</td>
</tr>
<tr>
<td>Hepatomegaly</td>
<td>4%</td>
</tr>
<tr>
<td>Placentomegaly</td>
<td>4%</td>
</tr>
<tr>
<td>Hepatic calcifications</td>
<td>1%</td>
</tr>
</tbody>
</table>
Diagnosis: Maternal Serology

- IgM: High false + rate
  - EBV
  - IgM may persist for months

- IgG with Avidity testing
  - Low avidity
  - primary infection vs non-primary infection
  - Early in response (16-18 weeks after primary infection)
Amniocentesis

- Performed:
  + > 6 weeks after maternal infection
  + > 21 weeks gestation
    + Specificity of 97-100%
  + False negative

- Repeat amniocentesis >21 weeks

- SEVERITY OF INFECTION CANNOT BE DETERMINED BY AMNIOCENTESIS
CMV: To screen or not? To treat or not?

- Not recommended
  - No well define disease process
  - No effective early intervention

- “A Randomized Trial of Hyperimmune Globulin to Prevent Congenital Cytomegalovirus” (NEJM 2014:370:1316-26)
  - No benefit of treatment compared to placebo
  - Expensive
  - Adverse events recorded in treatment group (13% vs 2%)

- Anti-viral therapy
  - Case reports suggest decrease viral load
  - Currently not recommended
Human Parvovirus B19

- Common Childhood Illness (1983)
- Adverse pregnancy outcomes
  - Miscarriage
  - Fetal anemia
    - Cytotoxic to erythroid progenitor cells
  - Hydrops
    - Anemia
    - P-antigen on fetal cardiac myocytes
- Fetal death
  - 10% if infected <20 weeks
Diagnosis: Suspected exposure

- Maternal serology
  - IgG
  - IgM
- Ultrasound
  - MCA Doppler studies
  - Fetal hydrops
Test for Parvo B19 IgG / IgM

- IgG + IgM-
  - No evidence of recent infection
    - Routine care

- IgG- IgM-
  - Susceptible
    - Re-test 4 weeks OR onset of symptoms

- IgG +/- IgM+
  - Acute parvo infection
    - Ultrasound MCA Doppler
Management

- Weekly sonographic evaluation of fetus for 8-12 weeks post exposure
- MCA Doppler Studies to evaluate the risk of fetal anemia
- In-utero transfusion
Prognosis

+ Good
  + Case reports: 1-10 year follow up
+ No evidence of long term sequelae
+ Normal neurologic development
+ Virus not teratogenic
Influenza A and B

- Acute respiratory illness
- Seasonal (Fall-Early Spring)
- Worldwide epidemics
  - Up to 20% US population
  - 5-50,000 flu related deaths
Influenza A and B

- Increased morbidity and mortality in pregnancy
- Shift from cell mediated immunity
- Decreased lung capacity

2009: pregnant women 5% of all flu related deaths but only 1% of all cases of flu.

Reports of 25% maternal mortality related with severe influenza
Peak Month of Flu Activity
1982-2014

![Graph showing the peak months of flu activity from 1982 to 2014. The graph indicates that February is the peak month with the highest number of flu cases, followed by December and January. October, November, March, April, and May have significantly lower activity.](image-url)
Vaccination

- 2004: Inactivated vaccination for all pregnant women recommended by CDC, ACOG

- 2014-15: CDC survey indicates that only 50% of pregnant women are vaccinated.

- 60% providers recommend AND offer vaccination

- 15% providers recommend NOT offer vaccination

- 20% providers NEITHER recommend NOR offer vaccination

- Benefit both mother and newborn
Dry Bones

FEAR ITSELF

FIRST THEY SCARED US WITH BIRD FLU

THEN THEY SCARED US WITH SWINE FLU

WE'RE NO LONGER SCARED OF THE FLU

NOW WE'RE SCARED OF THE VACCINE!
Anti-viral therapy

+ Prophylaxis for significant exposure

  vs

+ Early treatment based on symptoms
  + Oseltamivir (TAMIFLU)
  + Treat within 48 hours of symptoms
Flu Shots and Pregnancy: What Doctors Might Learn

By Ann Lukits

Women who decline to get a flu shot during pregnancy are more likely, after they give birth, to ignore guidelines for vaccinating their babies—presenting an early clue for doctors who may want to discuss the importance of childhood immunizations, according to a study in the Journal Preventive Medicine.

Recent research has shown that many pregnant women get no advice regarding infant vaccinations or advice that contradicts current recommendations, the study said. Outbreaks of measles and other preventable diseases have occurred in recent years in children who aren't up to date on their immunizations, but efforts to boost vaccination rates have had little effect, the researchers said.

The latest study, at the University of Minnesota, found that 73.5% of children whose mothers reported having a prenatal flu shot got the full slate of recommended vaccines by age 3, compared with 62.6% of children born to mothers who didn't get a prenatal flu shot.

The Centers for Disease Control and Prevention recommends pregnant women be vaccinated against the flu, tetanus, diphtheria and pertussis, but prenatal vaccination rates are low, the study said.

The study used a state registry to obtain immunization data for 4,022 children born in Minnesota between 2009 and 2011. Infants were considered fully immunized if they had been vaccinated for diphtheria, tetanus, polio, pertussis (whooping cough), measles, mumps, rubella, Haemophilus influenzae type b (bacterial meningitis), hepatitis B, varicella (chicken pox) and pneumococcal conjugate (various bacterial infections), by 36 months of age. Prenatal flu shots were self-reported by mothers as part of a larger study.

About two-thirds of the mothers who received prenatal flu shots. Among all offspring, 69% had completed the full vaccination series by age 3, and 96% had received one or two of the vaccines. About 2%, or 86 children, didn't have any vaccinations.

Caveat: The study was limited to Minnesota and used self-reported prenatal influenza vaccine data.
Questions and Answers for Healthcare Providers Caring for Pregnant Women and Women of Reproductive Age with Possible Zika Virus Exposure

“CDC has updated its interim guidelines for US health care providers caring for pregnant women...”

Summary

- CMV: IgM and IgG with avidity testing
  - No screening or treatment outside research protocol (Stay Tuned!)
  - Outcome of infected infants highly variable

- Parvovirus B19: IgM
  - Patient education
  - Overall outcome is good

- Influenza A and B: clinical diagnosis
  - Early treatment
  - VACCINATE!