Early-onset Group B Streptococcal Disease Prevention: For Obstetrics

Overview of CDC Prevention Guidelines, 2010

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GBS Disease in Infants Before Prevention Efforts

GBS Maternal Colonization

- GBS Carriers
  - 10% - 30% of women
  - Higher proportion in African Americans and nonsmokers
  - GBS usually live in gastrointestinal tract but can spread to the genital tract
  - No symptoms or signs on examination
  - Colonization comes and goes over months
  - Not a sexually transmitted infection

- Risk factor for early-onset disease: GBS colonization during labor and delivery
  - Prenatal cultures late in pregnancy can predict delivery status

Mother to Infant Transmission of GBS

- GBS colonized mother
- 50% Non-colonized newborn
- 50% Colonized newborn
- 2% Early-onset sepsis, pneumonia, meningitis
- 98% Asymptomatic

Additional Risk Factors for Early-onset GBS Disease

- Obstetric risk factors:
  - Preterm delivery
  - Prolonged rupture of membranes (>18 hours)
  - Infection of the placental tissues or amniotic fluid / fever during labor
  - GBS in the mother’s urine during pregnancy (marker for heavy colonization)
  - Previous infant with GBS disease
  - Low maternal levels of anti-GBS antibodies

- Demographic risk factors
  - African American
  - Young maternal age

Prevention of Early-onset GBS Disease

- Intrapartum antibiotics (IAP)
  - Highly effective at preventing early-onset disease in women at risk of transmitting GBS to their newborns
  - Efficacy in clinical trials: 100%
  - Effectiveness in observational studies: 86-89%

- Challenge: How best to identify women who should receive IAP?
Rate of Early-Onset GBS Disease in the 1990s, United States

Proportion of Women with an Indication for GBS IAP Who Received GBS IAP

Rate of Early- and Late-Onset GBS, 1990-2008

Rate of Early-onset GBS Disease by Race and Gestational Age, 2000-2007

Indications for Intrapartum GBS Prophylaxis

- Previous infant with invasive GBS disease
- GBS bacteriuria during current pregnancy
- Positive GBS screening test during current pregnancy
- Unknown GBS status AND any of the following:
  - Delivery at <37 weeks gestation
  - Amniotic membrane rupture ≥18 hours
  - Intrapartum temperature ≥100.4 F (≥38.0 C)
Intrapartum GBS Prophylaxis Not Indicated

- Colonization with GBS during a previous pregnancy
  - Unless another indication during the current pregnancy
- GBS bacteriuria during a previous pregnancy
  - Unless another indication during the current pregnancy
- Negative vaginal and rectal GBS screening test during the current pregnancy
  - Regardless of intrapartum risk factors
- Cesarean delivery performed before labor onset on a woman with intact amniotic membranes
  - Regardless of maternal GBS test status
  - Regardless of gestational age

GBS Resistance: Clindamycin and Erythromycin

All Ages, 2001-2008*

<table>
<thead>
<tr>
<th>Year</th>
<th>Clindamycin</th>
<th>Erythromycin</th>
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</thead>
<tbody>
<tr>
<td>2001</td>
<td>25.6%</td>
<td>47.7%</td>
</tr>
<tr>
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<td>47.7%</td>
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<tr>
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<tr>
<td>2004</td>
<td>24.8%</td>
<td>47.7%</td>
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<tr>
<td>2005</td>
<td>24.8%</td>
<td>47.7%</td>
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<tr>
<td>2006</td>
<td>24.8%</td>
<td>47.7%</td>
</tr>
<tr>
<td>2008</td>
<td>24.8%</td>
<td>47.7%</td>
</tr>
</tbody>
</table>

*Isolates are from CO, GA, MD, MN, NY, and OR. 2007 data excluded since only early-onset isolates were tested.
Source: Active Bacterial Core surveillance / Emerging Infections Program

Antimicrobial Susceptibility Testing for Penicillin-Allergic Women at High Risk of Anaphylaxis

- GBS resistance to clindamycin or erythromycin
  - Resistance to erythromycin is associated frequently but not always with resistance to clindamycin
  - Some isolates susceptible to clindamycin but resistant to erythromycin may have inducible clindamycin resistance
- Antimicrobial susceptibility testing should be performed on antenatal GBS isolates from penicillin-allergic women at high risk for anaphylaxis
  - Should include testing for inducible resistance (e.g. D-zone test)
- Specimens from penicillin allergic women at high risk for anaphylaxis should be clearly labeled

Intrapartum Testing for GBS

- Nucleic acid amplification tests (NAAT) such as PCR an option for intrapartum GBS testing for women who are GBS unknown at labor onset and have no risk factors
- Lower sensitivity for direct specimens (no enrichment)
  - Positive result: Administer IAP
  - Negative result and patient does not develop intrapartum temperature $\geq 100.4^\circ F$ ($\geq 38.0^\circ C$) or have ROM $\geq 18$ hours: No IAP
  - Negative result and patient develops intrapartum temperature $\geq 100.4^\circ F$ ($\geq 38.0^\circ C$) or has ROM $\geq 18$ hours: Administer IAP
Antibiotics for IAP

- Penicillin the first-line agent for IAP
  - Dosage: 5 million IU IV then 2.5-3.0 million IU IV every 4 hours
  - Revised dose (2.5-3.0 million IU) consistent with available penicillin formulations
  - Ampicillin an acceptable alternative

Antibiotics for IAP in Women Allergic to Penicillin

- Cefazolin best option for a woman allergic to penicillin but not at high risk for anaphylaxis
- Drugs with less evidence for effectiveness (e.g., clindamycin, vancomycin) only for women at high risk of anaphylaxis
  - High risk for anaphylaxis defined as history of anaphylaxis, angioedema, respiratory distress or urticaria following penicillin
  - Erythromycin no longer included as option

Antibiotics for IAP in Women Allergic to Penicillin

- Women at high risk for anaphylaxis following penicillin or a cephalosporin may receive CLINDAMYCIN for GBS IAP if:
  - Their GBS isolate is susceptible to clindamycin and erythromycin OR
  - Their GBS isolate is susceptible to clindamycin but resistant to erythromycin and testing for inducible resistance is negative

- Women at high risk for anaphylaxis following penicillin or a cephalosporin may receive VANCOMYCIN for GBS IAP if:
  - Their GBS isolate is intrinsically resistant to clindamycin OR
  - Their GBS isolate shows inducible resistance to clindamycin OR
  - Their GBS isolate’s susceptibility to clindamycin and erythromycin is unknown

2010 GBS Guidelines: Algorithm for Selecting IAP Regimens