Early onset GBS disease in Newborn

Upender Munshi M.D.
Neonatology Division, Department of Pediatrics
Albany Medical Center, Albany, N.Y. 12208

Early onset Neonatal GBS Disease

CDC

- GBS: Important Pathogen in Neonatal sepsis for last 30 years
- >7500 cases of GBS sepsis & meningitis in Newborn annually
- Perinatal GBS disease burden
  Neonatal illness / death, long-term disability
  Maternal morbidity
- Neonatal direct costs--$ 300 million/ year
GBS Neonatal Infection

• Early onset: Usually occurs within first 24 hours of life (0-6 days) 80% of GBS disease predominantly respiratory symptoms.
• Late onset: occurs 3 to 4 weeks of age (7 days to 3 months) 20% of GBS dis. manifests as meningitis, occult bacteremia or focal lesions as osteomyelitis, septic arthritis

Epidemiology of Early Onset Neonatal GBS Disease

• Maternal vaginal and lower GI Colonization is 15% to 30%
• Neonatal Colonization from the vertical transmission is 30% to 50%
• Neonatal disease occurs in about <1% after exposure to colonized mother.
Epidemiology EOGBS Disease (cont.)

- Incidence: about 1 to 3 cases per 1,000 live births (1.8) in early to mid 90s
- Mortality: 5% (up to 20% in Preterm)
- Morbidity is high especially after meningitis.
  (Serotype III is predominantly seen in meningitis)

EOGBS Disease Clinical Manifestations:

- Respiratory Distress: D/R or afterwards, (Grunting, Nasal Flaring, Retractions, cyanosis)
- Apnea
- Irritability, lethargy, poor feeding,
- Temperature instability
- Shock, poor perfusion, met.acidosis
- DIC, Acute Renal Failure, seizures
Early Onset GBS Disease

Diagnostic tests: (isolation of GBS)
- CBC: wbc, Diff I:T, Thrombocytopenia
- CXR
- Blood Culture
- CSF
- Urine culture,
- Urinary antigen? may be +ve due to direct contamination or absorption from GI colonization.

Group B Streptococci on Gram staining
Bilateral Diffuse Reticulogranular Opacity
RDS vs GBS pneumonia

Hyaline Membrane with GBS pneumonia
Early Onset GBS Disease

Management of EOGBS Disease

- I.V. Antibiotics: Pen.G or Amp. with an aminoglycoside pending Cultures
- Respiratory support as required, watch for PPHN
- I.V Fluids and if necessary vasopressors to maintain adequate perfusion.
**GBS Disease in infants**

*CDC*

<table>
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<tr>
<th>Age in Weeks</th>
<th>% of Cases</th>
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<td>&lt;7days</td>
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</tr>
<tr>
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<td>9</td>
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**GBS Disease in infants**

*CDC*

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<th>Age in Days</th>
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Risk Factors for Early Onset Neonatal GBS Disease

- Maternal GBS colonization
- Maternal GBS Urinary Tract Infection
- Invasive GBS dis. in previous sibling
- Prematurity, <35 weeks
- PPROM
- Maternal Fever >38 C
- Signs of Chorioamnionitis
- Repeated vaginal Examinations.

Maternal GBS UTI/Bacteriuria

- Prevalence: 2.5% in pregnant women.
- 5/68 infants born with Mat.GBS bacteriuria had confirmed GBS sepsis as compared with 0/2677 without bacteriuria (p< .001)
  Moller et el Lancet 1984;2:69

- In 55 infants born to Mothers with GBS UTI/bacteriuria, 44% had sepsis, 39% had pneumonia, 6% had bacteremia.
Previous sibling with invasive EOGBS Disease

• Women may remain colonized with the same GBS strain and fail to develop protective levels of type specific antibodies. Dykes et al Obstet Gynecol 1985

• GBS sepsis in subsequent pregnancies has been reported. Risk? Carstensen et al J infect,1988;17:201 Faxelius et al J Perinatal med.1988;16:423

• Multiple gestation is not an independent risk factor but if one neonate has infection concordance in others has been reported up to 40%.

Maternal GBS Colonization

• Screening GBS Culture: offered to all
Timing: 35-37 weeks gestation.
Method: Lower vaginal and rectal swabs collected in selective broth.

Degree of Colonization: Heavy, Light or 1+, 2+, 3+

• Rapid test: Strep B OIA, Sensitivity is from 40-83% and Specificity of 92% Benitz et al Pediatr 1999, 103(6).
Prematurity and EOGBS Disease

- Sepsis incidence increases with decreasing gestational age.
  Yancey et al 1996 Obstet Gynecol, 87:188
- Preterm labor is correlated to subclinical Maternal infection
- OR associated with EOGBS increased with decreasing gestational age from 3.25 at 34-36 wks to 32.1 at <28 wks
  Benitz et al 1999 Pediatr 103(6)

Intrapartum Fever & EOGBS Disease

- Maternal fever may be an early sign of Chorioamnionitis
- Maternal Fever > 38C is associated with GBS disease in newborn
- Epidural Analgesia may be associated with maternal fever.
Rates of EOGBS Disease by Prenatal Colonization and Risk Factors
Boyer & Gottof 1985

Cases per 1000 Live Births

- Col+ RF+
- Col+ RF-
- Col-, RF+
- Col-, RF-

Cases per 1000 live births

History of GBS prevention

- GBS Association 1991 (Parents of affected babies)
  www.groupbstrep.org
- AAP Guidelines 1992 screening at 28 wks & IPA.
- ACOG Guidelines 1993 IP Abx on Risk Factors
- CDC Consensus draft 1996
  Screening at 35-37 wks & Risk Factor based
Incidence of Early and late onset Invasive GBS disease
(California, Georgia and Tennessee) NJEM 2000;342:15-20.

Timing of IP Ampicillin and transmission of GBS to newborn  CDC

<table>
<thead>
<tr>
<th>Interval</th>
<th>GBS Carrier Mom</th>
<th>GBS Colonized Baby</th>
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<tbody>
<tr>
<td>No Amp</td>
<td>209</td>
<td>98(47%)</td>
</tr>
<tr>
<td>&lt;1 hour</td>
<td>30</td>
<td>13(43%)</td>
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<tr>
<td>1-2 hrs</td>
<td>36</td>
<td>7(19%)</td>
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<tr>
<td>2-4hrs</td>
<td>80</td>
<td>2(2.4%)</td>
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<tr>
<td>&gt;4hrs</td>
<td>105</td>
<td>1(0.9%)</td>
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Neonatal Antibiotic Prophylaxis

- Universal Neonatal Penicillin Prophylaxis: no longer recommended.
- Selective Neonatal prophylaxis: for the infants of GBS colonized Moms who received IPAntibiotics.
  1 dose Penicillin I/M
  Gotoff and Boyer 1997 Pediatrics;99(6)
  4 doses of I/M ampicillin q 12 hourly  Benitz et al 1999 Pediatr;103(6)

AAP Recommendations 1997
(Endorsed by CDC and ACOG)

Risk Factors:
- Previous Infant with GBS Dis?
- GBS Bacteriuria?
- Delivery <37 weeks Gest?

YES
Give Intrapartum ANTIB.

NO
Collect vaginal, rectal culture at 35-37 weeks gestation

Not Done

Risk Factors:
- Intrapartum Fever >38C
- PROM >18 hrs

GBS +ve
Offer Intrapartum ANTIB.

No

No Intrapartum ANTIB.

GBS Neg.
Empirical Management of Newborn after Maternal IP Antb.

Can Intrapartum Antibiotics prevent infections other than EOGBS

- IP antibiotics use has lead to study fall in Early onset sepsis by GBS and other organisms (1991-1997)
  Isaacs & Royle Australian study group for neonatal infection 1999 Pediatr Infect Dis J
- IP antibiotic prophylaxis increases the incidence of gram-negative neonatal sepsis (1992-1996 to 1997)
  Levine et al 1999 Infect Dis Obstet & Gynecol
Concerns about Increased use of Intrapartum Antibiotics

• Bacterial Resistance: GBS sensitivity

  Increased incidence of Ampicillin resistant *E. Coli* infections observed in infants

  *Levine et al 1999 Infect Dis Obst Gynecol*
  *Mercer et al 1999 Am J Obstet Gynecol*

  ?Time to go back to penicillin

• Anaphylactic reactions.

Summary

• EOGBS incidence is down after IP Antibiotics
• Penicillin may be preferred to Amp. because of increasing bacterial resistance
• Symptomatic infants (GBS or not) need full evaluation and treatment.
• Asymptomatic infants with adequate maternal Prophylaxis need only observation for 48 hr.
• Less than adequate or no prophylaxis and asymptomatic infants need cbc and atleast 48 hrs. observation. If abnormal> C/S and treat.
• Maternal chorio, evaluate/Rx neonates imperically.