The GBS PRO SCREENING

Belgian reference laboratory for GBS

Pierrette Melin

University hospital of Liege Medical microbiology
“Evidence-based”

Prevention of perinatal Group B streptococcal infections

Guidelines from Belgian Council of Hygiene - July 2003

http://www.health.fgov.be/CSH_HGR

General Recommendations
& Specific suggestions

WORKING GROUP:
Gynecologists-obstetricians
Pediatrician-neonatologists
Microbiologists
French/Flemish
University/non-university

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Van Eldere J.

Sccr.: Dubois JJ, CSH
Intrapartum antimicrobial prophylaxis (IAP) Universal prenatal screening at 35-37 weeks gestation

Risk-based approach reserved for women with unknown GBS status at time of labor.

Gyneco-Obstetricians

Pediatricians

Laboratory microbiologist

Labor/delivery Ward
Why IAP?

Why a Screening-based approach?

- Risks for GBS EOD
- Goals of IAP
- Effectiveness
- Belgian choice
- Concerns about use of prophylaxis
- Concerns about number of candidates for IAP
- Cost-effective analysis
GBS VERTICAL TRANSMISSION

GBS colonized mothers

60 - 40 %

Non-colonized newborns

Colonized newborns

40 - 60 %

Risk factors

2 - 4 %

GBS EOD

96 - 98 %
Asymptomatic

sepsis, pneumonia, meningitis, long term sequelae

CDC
GBS maternal colonization

**Risk factor for early-onset disease (EOD):**

vaginal GBS colonization at delivery

- **GBS carriers**
  - 10 - 30 % of women
  - Clinical signs not predictive
  - Dynamic condition
  - Prenatal cultures late in pregnancy can predict delivery status
Additional Risk Factors for Early-Onset GBS Disease

◆ Obstetric factors:
  ◆ Prolonged rupture of membranes,
  ◆ Preterm delivery,
  ◆ Intrapartum fever
◆ GBS bacteriuria
◆ Previous infant with GBS disease
◆ Immunologic:
  ◆ Low specific IgG to GBS capsular polysaccharide

No difference in occurrence either in GBS Positive or Negative women, except intrapartum fever

Lorquet S., Melin P. & al.
J Gynecol Obstet Biol Reprod 2005
GBS EOD - Belgian data

- **Incidence**
  - 1985: 3/1000 live births
  - 1990: 3 cases + 4 likely cases/1000 live births
  - 1999, estimation: 2/1000 live births

- **Meningitis**: 10%

- **Mortality**: > 14%

- **60% EOD (130 cases): WITHOUT any maternal/obstetric risk factor**

- **Prenatal screening**
  - Recto-vaginal cultures: 13-25% GBS Positive

*P. Melin, 2001 - Reference laboratory for GBS.*
Prevention of perinatal GBS EOD

- **Intrapartum antibiotics**
  - Highly effective at preventing EOD in women at risk of transmitting GBS to their newborns (≥ 4 h)

**INTRAPARTUM ANTIMICROBIAL PROPHYLAXIS (IAP)**

- **Main goal:**
  - To prevent 70 to 80% of GBS EO cases
- **Secondary:**
  - To reduce peripartum maternal morbidity
How best to identify women at risk?

CDC 1996 recommendations

« IAP »

35-37 wks Screening-based strategy

Or

Risk factors-based strategy
Impact of prevention practices
Rate of Early- and Late-onset GBS Disease in the 1990s, U.S.

S. Schrag, New Engl J Med 2000
Screening for GBS or risk-factors?

P. Melin, 40th ICAAC, 2000
L. Mahieu, 2000, J Obst Gyn;5:460-4
Effectiveness of both CDC 1996 approaches


“RF” easier and cheaper than “screening” BUT

- Population-based surveillance study, U.S.
  - 312 GBS EOD ; > 600 000 live births
    - AUDIT (5144 files): « IAP given when mandatory »
      - 52 % of all deliveries had screening
      - IAP given more often if « GBS Positive screening » than if presence of >= 1 RF

“Screening” > 50 % more effective than “RF”
Why is Screening more protective than the risk-based approach?

Broader coverage of « at-risk » population

- Captures colonized women without obstetric RF
- High level of compliance with recommendations
- Enhanced compliance with risk-based approach cannot prevent as many cases as universal screening
Universal prenatal screening & RF reserved for unknown GBS culture results

Endorsed by AAP and by ACOG in 2002
Screening-based strategy for prevention of GBS perinatal disease (Belgian CH, 2003)

Recto-vaginal GBS screening culture at 35-37 weeks of gestation

For ALL pregnant women

- Intrapartum fever > 38°C***
- ROM > 18 hrs

Intrapartum prophylaxis NOT indicated

 unless patient had a previous infant with GBS invasive disease or GBS bacteriuria during current pregnancy or delivery occurs < 37 weeks' gestation *

INTRAPARTUM ANTIBIOPROPHYLAXIS INDICATED

GBS Neg

Not done, incomplete or unknown GBS result

! Facultative! Intrapartum rapid GBS Ag test**

≥ 1 Risk factor:
- Intrapartum fever ≥ 38°C***
- ROM ≥ 18 hrs

if NO if YES

GBS POS

Neg Pos

if YES

Intrapartum prophylaxis NOT indicated
Prenatal GBS screening: Laboratory procedure (Belgian CH, 2003)

Minimum:

- **35-37 wks V+R**

  Selective enrichment broth (eg. LIM)

  *Overnight, 35-37°C*

  Sub-culture onto “Granada” agar

  *Overnight, 35-37°C anaerobically*

- **Presence of orange colonies = GBS**

- **Absence of orange colonies**

  **POSITIVE screening**

  **Negative screening**
What to do in case of Positive GBS screening?

- Send results to requesting doctor and a copy to expected site for delivery
- DO NOT treat during pregnancy if asymptomatic
  - (! To treat if GBS bacteriuria !)
- To schedule IAP
Feasibility in Belgium

- **Screening**
  - Follow-up visit already scheduled around 35-37 wks gestation
  - Accessability to laboratories

- **IAP (intra-venous)**
  - Most of deliveries occur at hospital
Concerns about potential adverse / unintended consequences of prophylaxis

- **Allergies**
  - Anaphylaxis occurs but rarely

- **Changes in incidence or resistance of other pathogens causing EOD**
  - Data are complex ...
  - BUT Most studies: stable rates of « other » sepsis

- **Changes in GBS antimicrobial resistance profile**
Concerns about potential adverse / unintended consequences of prophylaxis

- Management of neonates
  - Increase of unnecessary evaluation
  - Increase of unnecessary antimicrobial treatments
Management of neonates at risk for GBS EOD

Rem.: 95% of GBS EOD are symptomatic < 24 h of live

Neonates born to women who received IAP
Symptomatic NN / asymptomatic NN
At low/at high risk

To minimize unnecessary evaluation and antimicrobial treatment
Concerns about the number of women who are given IAP

Prevalence of factors inducing the decision of IAP (CHR Liege, 2002, 1350 consecutive deliveries)

<table>
<thead>
<tr>
<th>FACTORS</th>
<th>« SCREENING » OPTION</th>
<th>« RISK FACTORS » OPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prematurity</td>
<td></td>
<td>17 %</td>
</tr>
<tr>
<td>GBS bacteriuria</td>
<td></td>
<td>1.2 %</td>
</tr>
<tr>
<td>GBS Positive ROM &gt;= 18 h</td>
<td>15-25 %</td>
<td></td>
</tr>
<tr>
<td>T° &gt;= 38°C</td>
<td>/</td>
<td>19 %</td>
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</table>

Lorquet, Melin, Foidart, J Gynecol Obstet Biol Reprod 2005
Perinatal GBS disease burden

- Neonatal illness / death,
- Long-term disability
- Maternal morbidity

*Neonatal direct costs plus indirect costs.*
### Rough cost-effective « analysis »

<table>
<thead>
<tr>
<th>Criteria for IAP</th>
<th>Screening option</th>
<th>RF options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients treated/1000 births</td>
<td>+/- 250</td>
<td>+/- 250</td>
</tr>
<tr>
<td>GBS cases prevented (%)</td>
<td>75 %</td>
<td>&lt;&lt; 50 %</td>
</tr>
<tr>
<td>Patients treated/prevented case</td>
<td>111</td>
<td>166</td>
</tr>
<tr>
<td>Lab cost /prevented case</td>
<td>2,200 €</td>
<td>/</td>
</tr>
<tr>
<td>IAP cost /prevented case</td>
<td>N € x 111</td>
<td>N € x 166</td>
</tr>
<tr>
<td>Min. cost /case (8 d, ICU/NN)</td>
<td>+/- 3,300 €</td>
<td>+/- 3,300 €</td>
</tr>
<tr>
<td>Indirect cost, sequelae, etc</td>
<td>not estimated*</td>
<td>not estimated*</td>
</tr>
</tbody>
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**Hypothesis:** GBS prevalence in women: 20%; Natural incidence of GBS EOD: 3/1000; prevalence of RF as in our study in Liege in 2002

*If additional cost/case > 4500 €, Screening is cost effective versus RF*
Strains isolated from neonatal EOD or LOD and sent to the Belgian ref. Lab. for GBS
Prevention of GBS perinatal Diseases
PRO-SCREENING

Currently the best choice but NOT the ideal strategy
Temporary, waiting for vaccines, other approach

- To implement in the daily practice
- V+R Screening method
- !! Transmission of results !!
Key GBS Resources

- **MMWR**: August 16, 2002 / 51(RR11); 1-22
- **ACOG Comm Opin 2002, N°279**
  - Obstet Gynecol, 2002;100:1405-12
- **CDC ’s GBS Internet page**
  - [http://www.cdc.gov/groupBstrep/](http://www.cdc.gov/groupBstrep/)
- **Conseil supérieur d’hygiène (brochure strep B)**