Prevalence and capsular-polysaccharide type distribution of colonizing group B streptococci (GBS) isolated from recto-vaginal samples in pregnant women in Hanoi, Vietnam.

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OBJECTIVES
1. To provide data concerning GBS colonization among pregnant women in Vietnam.
   • Determination of the prevalence of GBS colonization among pregnant women seeing doctors at the Bach Mai Hospital in Hanoi.
2. To characterize relevant clinical and epidemiological markers of the isolated GBS strains.
   • Determination of their capsular-poly saccharide (CPS) types and distribution.
   • Determination of their pili types and distribution.
   • Determination and description of their antimicrobial susceptibility profile.
   • Determination and distribution of macroline/lincomamide (MLS) resistance genotypes.

STUDY POPULATION AND METHODS

Population: During November and December 2015, 888 recto-vaginal swabs were collected from pregnant women at 35-37 weeks’ gestation, at the Bach Mai Hospital in Hanoi.
Culture method: All specimens were directly cultured on ChromID Strepto agar (bioMérieux®) for GBS detection (pale pink to red colonies). All isolated GBS were stored deep-frozen in brain-heart-broth with glycerol (20%) and afterwards sent to the Belgian NRC for further confirmation and characterization.

CPS Typing: types Ia, Ib, II to IX
   • Serotyping, Latex agglutination (Streep B Latex, Statens Serum Institut, Denmark)
   • Genotyping, PCR.

Pili characterization: P1I, P1Ia & P1Ib
   • Multiplex PCR (Springman, AC. et al, 2014 BMC Microbiol. 29,14,159).

Antimicrobial susceptibility testing (EUCAST 2017)
   • Disk diffusion, categorization S.I.R.
   • Dtest screening for inducible resistance to lincomamide.
   • Determination of MLSc
     • Dtest diffusion method
     • Microdiffusion method, using Sensititre® system with customized microplates.

Molecular characterization of MLS resistance
   • Multiplex PCR for EmrB, EmrT, MefA and LsaC genes

RESULTS

Prevalence of GBS colonization
   • 111/888 swabs were positive for GBS: the colonization rate among pregnant women from Hanoi was 12.5%.
   • 90 strains of GBS were stored and further sent to Belgium for further characterization.

Distribution of CPS types

Pili characterization

Antimicrobial susceptibility profile (1)

<table>
<thead>
<tr>
<th>Antimicrobial agent</th>
<th>Susceptible %</th>
<th>Intermediate %</th>
<th>Resistant %</th>
<th>Type of Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penicillin</td>
<td>100</td>
<td>0</td>
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<tr>
<td>Erythromycin</td>
<td>26.6</td>
<td>1.1</td>
<td>72.2</td>
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<td>Clindamycin</td>
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<td>0</td>
<td>77.8</td>
<td>3.3 Inducible R</td>
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<td>Maxifloxine</td>
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<td>0</td>
<td>18.9</td>
<td>74.4 constitutive R</td>
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<tr>
<td>Tetracycline</td>
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<td>0</td>
<td>93.3</td>
<td></td>
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<tr>
<td>Vancomycin</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Antimicrobial susceptibility profile (GBS strains isolated from pregnant women’s vagina-cervical swabs, Hanoi 2015 (EUCAST 2017 breakpoints))

Susceptibility to beta-lactams

All isolates were fully S to penicillin and according to Kimura’s procedure and interpretative criteria, no decreased susceptibility to beta-lactams was detected.

Antimicrobial susceptibility profile (2)

Sensitivity to macrolide/lincomamide

High resistance rates were determined with 72% for erythromycin and 78% to clindamycin. As shown in the following figure the major phenotype of resistance is MLS. No isolated resistance to macrolide was detected, while 5% demonstrated an isolated resistance to clindamycin. The EmrB gene is present alone in the majority of the resistance strains (83%). The gene LsaC was detected among 6% of the resistant isolates; 11% harbored a combination of genes. None of the 4 research genes were detected among the susceptible isolates.

Distribution of the pili genotypes of 90 GBS strains isolated from pregnant women’s vagina-cervical swabs, Hanoi.

Distribution of the resistance phenotypes to macrolide/lincomamide among the 70 GBS isolates expressing resistance to macrolide/lincomamide.

INTERPRETATION

- The observed prevalence rate of GBS carriage among pregnant women in Hanoi, Vietnam was 12.5%. This colonization rate is quite low when compared with European or North American rates. Even if the culture methods used selective differential agar there was no selective enrichment step.
- The serotype distribution, with the most prevalent serotypes V, Ib and III, differs from what is described in Europe or North America. On the other side, the pili distribution is similar to the one observed among European countries as for Belgian strains.
- Concerning the susceptibility to antibiotics, fortunately, penicillin remains effective on all the tested strains. Nevertheless, we observe a high rate of resistance to erythromycin (73%) and clindamycin (78%) among these Vietnamese strains. These results are consistent with Asian ones but higher than European ones. Resistance rate to maxifloxacin is 18.9%, much higher than in Europe (<5%) but more similar to resistance rate found in China. The high resistance rate to tetracycline is typically associated to high strains of GBS since the emergence of GBS as the most important bacterial pathogen among neonates.

DISCUSSION & CONCLUSION

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