The colonization of women genital tract by \textit{Streptococcus agalactiae}

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\textbf{Abstract}

\textit{Objectives:} \textit{Streptococcus agalactiae} is a group B \textit{Streptococci} (GBS) which temporarily colonizes urogenital and gastrointestinal tract. During last few years the percentage of GBS infection in pregnant women and newborns is growing. The study investigated the vaginal colonization rate of GBS in population of nonpregnant and pregnant women which were hospitalised in Department of Obstetrics and Pathology of Pregnancy of Medical University in Lublin, Poland in 2008. \textit{Methods:} The material for the analysis were specimens which were taken from vagina from women in 2008. \textit{Results:} The prevalence of GBS in women was 4.33\%. \textit{Conclusion:} Because of the clinical consequences of infection of \textit{S. agalactiae} in women and newborns it is advised to have antenatal screening with using vaginal swabs in 35-37 week of gestation and to order antibiotic prophylaxis. Propagation of rapid screening tests for \textit{S. agalactiae} appears to be purposeful.

\textbf{Key words:} \textit{Streptococcus agalactiae}, women, pregnancy, colonization

\textbf{Introduction}

\textit{Streptococcus agalactiae} is Gram-positive, pyogenic, beta-hemolytic group B streptococci (GBS), facultative anaerobe bacteria, oxidase- and catalase-negative. The current classification of \textit{S. agalactiae} was made by indentifying superficial proteins and many types of polysaccharide capsules [1]. GBS can be found by means of rapid diagnostic tests based on detecting specific of each group of bacteria antigens using latex agglutination, capillary precipitation or immunodiffusion as well as PCR (polymerase chain reaction) [2, 3], PFGE (pulsed field gel electrophoresis) and MLST (multilocus sequence typing), therefore the congeniality between the strains of GBS can be detected.

\textit{Streptococcus agalactiae} commonly presents in the gastrointestinal and genital tract. The colonization can be intermittent, transient or persistent. Among Polish women asymptomatic carriage rate based on vaginal and rectal swabs ranges from 17.2 to 21\% [4, 5, 6, 7]. Worldwide prevalence of GBS ranges from 9.1 to 29.3 \% [4, 8-10]. Although the result concerning prevalence of \textit{S. agalactiae} only in vagina is 4\% [11].

Among pregnant women the streptococci B infection is mainly asymptomatic. The urinal tract is the most frequent infected (2-4\%). The existence of GBS in women genital tract can lead to upwards infections causing intrauterine inflammation and therefore inflammation of fetal membranes, endometritis and/or sepsis, preterm birth, meningitis and abscesses in true pelvis [12].

The GBS is the leading cause of mortality and morbidity among newborns. Due to vertical transmission occurring prior or during the labour and delivery 40-60\% of neonates are colonizes by the pathogen, with only 1-3\% becoming infected [3]. More frequent the infections caused by \textit{S. agalactiae} are observed among preterm infants than neonates born in time (25.2\% vs 7.2\%) [12]. This bacteria is still the main pathogen causing sepsis at birth [13].

Among adults especially with deficiency of immune system, metabolic diseases or kidney disfunction \textit{Streptococcus agalactiae} can lead to bacteraemia, skin and subcutaneous infections, pneumonia, endocarditis, meningitis and inflammation of urogenital tract.

\textit{S. agalactiae} is susceptible to penicillin, cephalosporin and vancomycin but resistant to clindamycin and erythromycin [8].

Because of the growing number of infections caused by GBS international and Polish guidelines were proposed to prevent infections by reducing or eliminating the transmission to the infant by using ante-natal screening and intra-partum antimicrobial prophylaxis. Therefore, to maximize the likelihood of \textit{S. agalactiae} recovery, it is recommended to proceed recto-vaginal screening at 35-37 weeks of gestation for all pregnant women [14].

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The indications for intra-partum antibiotic prophylaxis are: positive screening for GBS in present pregnancy, GBS bacteriuria at any time during pregnancy, having had a previous infant with invasive GBS infection, lack of data about colonization by S. agalactiae and additional factors that increase the risk of infection: premature rupture of membranes, pre-term labour or pre-term rupture of membranes at less than 37 weeks of gestation, prolonged interval (18 hours or more) between rupture of membranes and delivery, low fetal birth weight, high level of colonization by GBS, intra-partum maternal temperature of 38.0°C or greater [1].

Material and methods

The research obtained pregnant and non-pregnant women hospitalized in Department of Obstetrics and Pathology of Pregnancy of Medical University in Lublin between January and December 2008. The number of 2098 swabs were collected from vagina from patients admitted to the hospital. In the Obstetric Ward 1222 specimens were taken and in Pathology of Pregnancy Ward 876 vaginal swabs. Every patient gave informed consent to participate the study.

The vaginal specimens were taken by midwife or doctor by using single use swab and then placed in non-nutrient transport medium. The specimens were then cultured in standard Columbia Agar broth medium supplemented with 5% of sheep blood. Then the broth culture was incubated in 5% carbon dioxide for 24-48 h. The evaluation of the culture was done in Chair of Medical Microbiology SPSK 1 in Lublin.

All the data about medical history of patients was analyzed on the base of medical card. The details of the data included: age, reason of admission to hospital, gestational age at vaginal swab, gestational age at delivery and mode of delivery.

The statistical analysis was performed using Pearsons $\chi^2$ test using Statistic ver. 8.0 2007 for Windows.

Results

Of the 2098 vaginal specimens 91/2098 (4.33%) were GBS positive. In the Obstetrics Ward 1222 swabs were taken and 59/1222 cases of GBS were detected (4.83%). From patients hospitalized in Pathology of Pregnancy Ward 876 specimens were collected. In 32 women S. agalactiae was found, which is 3.65%. There were no significant statistic differences of prevalence of Streptococcus agalactiae between patients admitted to Obstetric Ward compared to all patients hospitalized in our Department ($p = 0.51, \chi^2=0.43$). Comparing colonization of GBS in pregnant and non-pregnant women in Pathology of Pregnancy Ward to overall colonization in the Department there was no significant differences ($p = 0.39, \chi^2 = 0.73$) (Tab. 1).

The range of age of patients hospitalized was from 18 to 42 years old. The reason for admitting to the Department in 1468 cases was the initiation of uterus contractions. In this group in 63 women the bacteria was detected. Among 644 to whom cesarean section was proceeded 32 were GBS positive (4.97%). In the rest of 824 it was the vaginal delivery. In this group 31 women in labor had S. agalactiae, which is 3.76%. The existence of GBS did not affected the mode of delivery ($p = 0.26, \chi^2=1.28$) (Tab. 1). The mean gestational age during the delivery was 35 ± 7 weeks. There were no cases of using forceps or vetouse. No patient volunteered a history of having delivered a previous child with GBS sepsis.

Among all patients treated for different complications in early and late pregnancy 12 women were dismissed undelivered. In 2 cases pregnancy ended with spontaneous abortion. The mean gestational age at vaginal swab test was 24 ± 18 weeks.

The qualifications for operations in 14 women were: myomas of corpus of the uterus and therefore the amputation of uterus, laparoscopic excision of endometrial cyst, histopathological diagnostic of incorrect cytosmears, excision of cervical polypus and histerosalphingography. No case of postoperative complications were observed and mean time of hospitalization was 2 days.

For all GBS positives cultures antibiograms were performed. All the bacterial strain were susceptible to penicillin.

Discussion

In this study mean vaginal colonization of S. agalactiae was 4.33%. There was no significant statistical difference between our results and populations worldwide ($p > 0.05$) [11].

There is no published data on the influence of GBS colonization due to pregnancy outcome. We did not observe any significant adverse effect on mode of delivery arising from GBS colonization.

There is also lack in published data concerning the effect of S. agalactiae on the course of operations and frequency of complications.

The person who collected the swabs did not effect the results of the exam [15]. In executed antibiograms there were no penicillin resistant strains.
Although the incidence of GBS colonization in this study is similar to that reported in developed countries it is advised to run prophylactic vaginal swabs in pregnant women between 35 and 37 week of gestation, because of the eventual consequences of infection for mother and her offspring. The isolation of the Streptococcus agalactiae form vagina can proceed in ordering antenatal antibiotic prophylaxis and reduce possible adverse effects of GBS. Making cultures from vaginal specimens during the admission of woman to the hospital by using traditional way can lead to delays in instituting treatment.

The fast ways of detecting GBS are also important for patients admitted for short gynecological operations. Sooner exam result or running a rapid diagnostic test screening for this pathogen seems to be the most optimal way for the future. However, question of costs remains unanswered at this time.

**Conclusion**

Because of the consequences of clinical infections of Streptococcus agalactiae it is advised to use the antenatal screening in our population and rapid diagnostic tests.

<table>
<thead>
<tr>
<th>Event</th>
<th>Exam</th>
<th>Control</th>
<th>Carriers</th>
<th>Percentage</th>
<th>Statistics</th>
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<td>Number of patients</td>
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<td>Obstetric Ward</td>
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<td>1163</td>
<td>59</td>
<td>4.83%</td>
<td>p &gt; 0.05</td>
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<tr>
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<td>3.65%</td>
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<tr>
<td>Vaginal delivery</td>
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<td>31</td>
<td>3.76%</td>
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<tr>
<td>Caesarian section</td>
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<td>612</td>
<td>32</td>
<td>4.97%</td>
<td>p &gt; 0.05</td>
</tr>
</tbody>
</table>

$p > 0.05$ non significant

**Table 1. Prevalence of Streptococcus agalactiae in control and exam group of patients**

**References**


