

Prevalence of Group B Streptococcal Positive Rectovaginal Culture in Pregnant Women with Membrane Rupture Referred to Alzahra and Beheshti Hospitals in the first Half of 2018-2019

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Abstract

Introduction: Group B streptococcus leads to the most common aggressive bacterial infection and has the highest morbidity and mortality in infants in the first trimester of life. So based on this importance, in this study we aimed to evaluate the prevalence of group B streptococcal (GBS) positive rectovaginal culture in pregnant women with membrane rupture.

Methods: This prospective cohort study was conducted from 2018 to 2019 in Alzahra and Beheshti hospitals in Isfahan on 312 pregnant women with membrane rupture. The culture of the rectovaginal for GBS was performed, and specimens were evaluated for Streptococcus group B and considered positive or negative. Finally, maternal information and the results of cultures were analyzed, and the correlation between positive rectovaginal cultures and other information was evaluated.

Results: The patients were divided into two groups of positive and negative rectovaginal cultures for GBS; there were 22 cases of positive rectovaginal cultures for GBS. No significant differences were observed between the two groups based on age, pregnancy age, abortion history, history of neonatal sepsis, antibiotic usage in pregnancy, interval between admission and delivery, interval between PROM and admission, and neonatal admission in the NICU ($p > 0.05$). 9 cases with positive urine culture and 13 cases with negative urine culture had positive rectovaginal culture for GBS, so there was a significant relationship between rectovaginal culture for GBS and urine culture for GBS ($p = 0.001$).

Conclusion: Positive rectovaginal culture for GBS is an important risk factor for the mother with PROM and also it can be associated with the positive urine culture of GBS.

Keywords: Rectovaginal, Group B Streptococcus, Membrane Rupture, Urine Culture

Introduction

Group B Streptococcus (GBS), or Streptococcus agalactiae, is a gram-positive bacteria that colonizes the gastrointestinal and genitourinary tracts.¹ Group B streptococcus leads to the most common aggressive bacterial infection and has the highest morbidity and mortality in infants in the first trimester of life. These infectious diseases include pneumonia, septicemia, and meningitis. This bacterium is transmitted vertically and initially from colonized mothers as a result of transmission during particularly vaginal delivery.¹⁻³

Research has shown that the prevalence of positive strep throat cultures among pregnant women is about 20-30%.^{4,5} Prophylactic antibiotic use in pregnancy can prevent infection and serious neonatal complications in

infants.^{1,2,6} Penicillin has been recognized as a selective treatment for prophylaxis in pregnancy.⁷⁻⁹

One method to determine the target group for prophylaxis is to obtain recto-vaginal cultures from all pregnant women between the gestational ages of 35 and 37 weeks and receive prophylactic regimens if they are streptococcal. Another approach is to start prophylactic treatment without risk-based culture such as preterm delivery, premature rupture or prolonged membranes, bacteriuria, or a history of having an infant with an infection.¹⁰

Due to the overuse of antibiotics during pregnancy in recent years and the change in sex life of individuals,¹¹ it was decided to measure the prevalence of GBS

positivity in pregnant women with membrane rupture. Individuals with membrane rupture were selected because they have primarily a risk factor for initiating prophylactic treatment against Group B streptococci and on the other hand, the onset of labor is conceivable in the next few days, thereby enabling the infant to study, which it also provides in most cases.¹² At the time of this study, the culture test was not used as a screening method to initiate the prophylactic regimen¹³ at the study center, and the prophylactic regimen was given to those at risk. Therefore, in light of the aforementioned points and the importance of evaluating the prevalence of GBS in pregnant women, this study aimed to investigate the prevalence of streptococcal group B positive cultures in pregnant women with membrane rupture.

Materials and Methods

This prospective cohort study was conducted in the first half of 2018-2019 in Alzahra and Beheshti hospitals in Isfahan. It was approved by the ethical committee of the Isfahan University of Medical Sciences with the code IR.MUI.MED.REC.1398.705. All the mothers with gestational ages of 30 to 35 weeks were enrolled. Patients with a history of using vaginal cream, lubricants, or traditional sterilizer (vinegar) in the last 10 days were ruled out of the study. The mothers with no membrane rupture were excluded after the examination. All pregnant women with membrane rupture who meet the inclusion criteria were included in this study. A questionnaire including the gestational age, maternal age, timing of rupture of membranes, type and duration of antibiotic use in pregnancy, and history of previous pregnancies were completed for each of the participants, and all of them were evaluated for recto vaginal culture at the time of admission. All mothers were provided with an informed consent form before entering the study if they wanted to participate. The culture specimen was shaped so that the mothers were placed in a lithotomy position, with two swabs initially taken 2 cm from the vaginal entry in such a way that they did not contaminate the cervix and were not infected by hand. Then, with the second swab, the specimen was taken from the external anal sphincter, and both specimens were placed in a glass tube containing the transducer. The samples were refrigerated for up to 96 hours at room temperature.

At the earliest opportunity, samples were sent to the laboratory for culture. Samples were written on the

mother's name, and the date and file number were indicated. The specimens were evaluated for Streptococcus Group B culture in the laboratory, and after 48 hours, the culture was considered positive or negative. Finally, maternal information and the results of cultures were analyzed in SPSS software version 24. Mothers were evaluated at delivery centers in the study centers, and their infants were followed up for admission to the maternity care unit for up to two months. Statistical analysis was done by SPSS 24 software and analyzed. Quantitative data were reported as mean + SD, and qualitative data were reported as N (%). Chi-square analysis was performed to test for differences in proportions of categorical variables between the two groups, and a t-test was used to compare the means of the two groups. A significance level of less than 0.05 was considered in all tests.

Results

In this study, 312 women patients with PROM and a mean age of 29.60 ± 5.01 years (16 to 43 years) at a gestational age of 30.60 ± 5.71 weeks were enrolled. Most of the patients had one parity (117 cases, or 37.5%), and 73 (23.4%) cases had an abortion history; history of neonatal sepsis was observed in 3 (1%) cases; 75 cases (24%) used antibiotics in pregnancy; and 44 cases (14.1%) had a positive urine culture for GBS. The mean interval between admission and delivery and the interval between PROM and admission were 5.97 ± 17.04 h and 2.19 ± 4.01 days, respectively, and also 170 (54.5%) of neonates were admitted into the NICU. 22 cases were positive rectovaginal cultures for GBS, the patients were divided into two groups as positive rectovaginal and negative rectovaginal cultures for GBS. There was no significant difference between the two groups based on age, pregnancy age, abortion history, history of neonatal sepsis, antibiotic usage in pregnancy, interval between admission and delivery, interval between PROM and admission, and neonatal admission in the NICU ($p > 0.05$). The mean interval between PROM and admission was 4.03 ± 2.21 days in GBD negative and 3.91 ± 1.99 days in GBS positive, which showed no significant difference. 9 cases with positive urine culture and 13 cases with negative urine culture had positive rectovaginal culture for GBS, so there was a significant relationship between rectovaginal culture for GBS and urine culture for GBS ($p = 0.001$) (Table 1).

Discussion

GBS is the most common invasive bacterial infection

Table 1. Variables of Study based on the Rectovaginal Culture for GBS

Variables	Rectovaginal culture for GBS		p-value	
	Negative	Positive		
Age	27.48±5.03	31.09±4.36	0.14	
Pregnancy age	30.52±5.75	31.63±5.26	0.38	
Parity	1	107 (36.9%)	10 (45.5%)	0.78
	2	108 (37.2%)	6 (27.3%)	
	3	59 (20.3%)	4 (18.2%)	
	4	14 (4.8%)	2 (9.1%)	
	5	2 (0.7%)	0	
Abortion history	No	224 (77.2%)	15 (68.2%)	0.23
	Yes	66 (22.8%)	7 (31.8%)	
History of neonatal sepsis	No	287 (99%)	22 (100%)	0.80
	Yes	3 (1%)	0	
Antibiotic usage in pregnancy	No	219 (75.5%)	18 (81.8%)	0.35
	Yes	71 (24.5%)	4 (18.2%)	
Interval between admission and delivery (h)	16.83±5.90	19.97±6.90	0.79	
Interval between PROM and admission (day)	4.03±2.21	3.91±1.99	0.80	
Positive Urine culture for GBS	No	255 (87.9%)	13 (59.1%)	0.001
	Yes	35 (12.1%)	9 (40.9%)	
Neonatal admission in NICU	No	132 (45.5%)	10 (45.5%)	0.58
	Yes	158 (54.5%)	12 (54.5%)	

and the most common cause of mortality and morbidity in neonates, especially in the first 3 months. Here, we evaluated 312 pregnant women and showed that 7.05% of women had positive culture results for GBS. It has also indicated that no significant difference was found between GBS and other factors such as age, pregnancy age, abortion history, history of neonatal sepsis, antibiotic usage in pregnancy, interval between admission and delivery, interval between PROM and admission, and neonatal admission in the NICU. It was shown that there was a significant relationship between rectovaginal and urine cultures for GBS. Patients with positive rectovaginal cultures also had higher frequencies of positive urine cultures.

Previous studies have evaluated the prevalence rate of GBS infection among pregnant women. A cross-sectional study was performed by Woldu and others in 2014 in Ethiopia on 300 pregnant mothers. They declared that 7.2% of women had a positive rectovaginal culture for GBS. They also showed that recto-vaginal GBS colonization among near-term pregnant mothers is reasonably high in Ethiopia, which demands appropriate antimicrobial prophylaxis to prevent potential adverse maternal and neonatal outcomes.¹⁴ These results are also in line with our findings, which put emphasis on the pivotal role of screening pregnant mothers for GBS. Furthermore, Valkenburg-van den Berg and colleagues also performed a study on 1702 pregnant women and showed a 21% carrier frequency for GBS. They also showed that no differences in colonization were found between women with respect

to age, parity, or socio-economic background.^{15,16} In a cross-sectional study by Javanmanesh and colleagues, 1064 women were evaluated, and positive rectovaginal cultures for GBS were assessed. They reported a 22.76% prevalence rate for GBS and suggested that GBS culture should be performed as a screening method for women.¹⁷ These results showed a higher frequency of positive GBS culture in pregnant women, but they also declared that no significant difference was found between mothers with positive GBS culture and others regarding age and other demographic and socio-economic factors. These data are in line with our results. We were also unable to identify a group of pregnant women at high risk for GBS colonization.

Furthermore, Zamzami and colleagues investigated 326 parturient women in 2010 in Saudi Arabia and declared that the prevalence of intrapartum GBS colonization increased as women approached term.¹⁸ These put emphasis on higher frequencies of GBS colonization in women with a higher gestational age. Hadavand and colleagues also evaluated 210 pregnant women with a gestational age of 35-37 weeks. They assessed the rectovaginal cultures of women and reported a 3.3% positive rate,¹⁹ which is lower than our results. They also reported that no relationship among age, job, education, number of pregnancies, blood pressure background, diabetes, and preterm childbirth and a positive culture was observed, which is also in line with our findings. Darabi and others showed that defining a high-risk group for women with GBS colonization is not possible; however, screening

strategies with rectovaginal culture must be performed. They investigated 186 pregnant women and reported an 11.8% prevalence rate for GBS colonization.²⁰ Warriar et al. revealed that there was a significant association between GBS colonization and PROM. In their study, 21 out of 40 pregnant mothers had PROM (52.5%), though there was no significant association in relation to hours of PROM.²¹ Taken together, these findings are also in line with the current study. Previous reports showed a variable prevalence rate for rectovaginal culture, but they believed that defining a high-risk group of mothers was not possible because no significant difference could be found between GBS-positive mothers and healthy women, as well as the outcomes between neonates who were born to GBS-positive mothers as compared to those born to negative screen-result mothers.^{22,23} Our findings also supported this issue. The most important limitation of our study was that following the positive GBS culture of pregnant women to determine the high rate of PROM and infantile infection was not possible because, ethically, these patients should be treated with suitable antibiotics.

Conclusion

Regarding the positive rectovaginal culture for GBS is an important risk factor for mother with PROM, the results of this study showed the association of positive rectovaginal culture for GBS with positive urine culture for GBS and no effect of other factors on positive rectovaginal culture for GBS. In this regard, we need to other study in large sample size to provide our results.

Conflict of Interest

The authors declare no conflicts of interest.

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