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Short communication

The association of preterm labor with vaginal colonization of group B streptococci

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Abstract

Background: Group B streptococcus is regarded as a potential factor for adverse outcomes of pregnancy such as preterm birth.

Objective: To study the association of maternal vaginal colonization with group B streptococcus (GBS) and preterm labor.

Materials and Methods: From April 2005 to May 2006, vaginal culture for GBS were conducted in 101 laboring women with a gestational age of 24-37 weeks and 105 women admitted for term delivery at maternity center of Afzalipour Hospital in Kerman, Iran. Student`s t test and Chi square test were used to compare continuous and categorical data between the groups. Using multivariate logistic regression the association between GBS colonization and preterm labor was analyzed. P-values<0.05 were considered as significant.

Results: Colonization was detected in 9.2% of all mothers. Although GBS colonization was found more frequently in preterm than term patients (12 v/s 7 cases), the difference was not statistically significant. However, GBS positivity was roughly associated with preterm labor. Age was also a risk factor for GBS colonization. No case of perinatal sepsis occurred during the study period.

Conclusion: Maternal colonization for GBS is relatively low in our center. Increasing age enhances the risk of colonization. Vaginal colonization of GBS is relatively associated with preterm labor.

***Key words**: Group B streptococcus, Preterm labor, Vaginal colonization.*

Introduction

Preterm delivery is a relatively common condition in obstetrics. It comprises 7% of all deliveries, but accounts for more than 80% of perinatal morbidity (1). Recently, the association of maternal GBS colonization with preterm labor has become a subject of controversy. In 1996, the Centers for Disease Control and Prevention, accounted preterm delivery as a risk factor for group B streptococcal sepsis and recommended the use of prophylactic antibiotic in preterm labor (2) . Regan et al (1996) found that women heavily colonized with GBS at the time of delivery were more likely to deliver prematurely (3). Feikin et al (2001) study also indicated an association between GBS colonization at delivery and preterm birth (4). On the contrary, other

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investigators reported no association between preterm labor and cervicovaginal GBS colonization (5, 6). The prevalence of maternal colonization varies in countries owing to socioeconomic and ethnic differences (3-6). As the contribution of GBS to preterm labor may also be influenced by ethnicity and geographic variations, we performed the present study to assess the association between preterm labor and GBS vaginal colonization in women attending Afzalipour Maternity Center, Kerman, Iran. This center is the main referral maternity center of Kerman Medical University and admits patients from all over the province of Kerman, which is located in southeast of Iran with a hot and dry climate.

Materials and methods

During a year from April 2005 to May 2006, 101 women with preterm labor and 105 patients randomly admitted for delivery at a gestational age of 38-40 weeks entered this case- control study. Preterm labor was considered as the occurrence of four uterine contractions in a 20 minutes time period plus cervical dilatation greater than 1 cm and cervical effacement of 80% or more before 37 weeks of gestational age based on the last menstrual period or ultrasonographic report in the first half of pregnancy. Multifetal pregnancy, previous preterm delivery, underlying disease, uterine anomaly, placenta previa, current antibiotic usage, rupture of membranes ≥ 6 hours were excluded. Demographic and obstetric data was gathered for each patient. All participants gave written informed consent. Samples were collected from the upper thirds of vagina and cultured on blood and chocolate agar plates (Merck, Germany), and then incubated in 5- 10% carbon dioxide at 37ºC for 24 hours.

The small round bacterial colonies with almost flat surface (discoid like) on blood agar were regarded as β hemolytic and group B streptococcus at first stage. Further differential tests including Gram stain, Bacitracin, SXT, VP, CAMP and hipurate hydrolysis were performed on each isolate. Additional confirmation was carried out by using a specific test for GBS, MASTSTREP (agglutination tests from Mast Company, UK).

Statistical analysis

Data were analyzed using SPSS software (version 15). Student`s t test, Chi square test were used to compare continuous and categorical data between cases and controls. Using multivariate logistic regression the associations between selected characteristics and preterm labor were analyzed. The Hosmer–Lemeshow test was used to assess model fit. P-values<0.05 were considered as significant.

Results

The majority of women in both groups were young (mean age: 26.3 years) and had low parity (mean: 0.8). The groups were comparable regarding age, gravidity and other obstetric parameters (Table I). No difference in socioeconomic and ethnic status was expected, as all patients attended a public center.

The frequency of positive cultures was calculated to be 9.2% in the entire study population. Although a greater number of preterm patients (11.9%) in comparison to the term group (6.7%) revealed positive culture for GBS, the difference was not statistically significant (Table I). Age revealed a significant association with preterm labor (Table II). Besides, as it is shown in Table 2 the odds of preterm labor was roughly associated with GBS culture positivity (OR: 2.96, 95%CI: 0.96-9.17). No case of neonatal sepsis was developed during the study period.

Discussion

Maternal colonization rate was calculated to be 9.2% in our study. Reported GBS colonization rates in the world are quite variable, but generally range from 6 to 30% (5,7,8). The differences in colonization rates depend on the particular population and especially on the laboratory methods used to identify GBS (9). The additional tests performed in our study may account for the lower frequency of colonization in our population in comparison to other developing countries (10).

In Nomura et al (2006) study, Colonization rate for women with preterm premature rupture of membranes was 30% (9). However, 21.1% of our study population who presented with ruptured membrane revealed positive culture for GBS. This difference can best be explained by the geographical variation of GBS colonization. No significant difference was found in colonization between term and preterm patients on admission in our study that corroborates Kubota's findings (6). However, based on multivariate logistic regression, GBS positive women were nearly three times more likely to suffer from preterm

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labor than negative ones which is consistent with other studies (3, 4). The p-value for this odds ratio was almost significant, and worth considering. In contrast, Tsolia et al (2003) found no association between prematurity and GBS colonization (5).

Researchers have shown that the risk of early onset sepsis in colonized neonates is increased in case of prolonged membrane rupture, maternal signs of infection, amnionitis, intrapartum fetal monitoring, or if the baby has a low birth weight or is born preterm (8). As intrapartum fetal monitoring is not used in our center and cases with prolonged membrane rupture were excluded, lack of neonatal sepsis was not a surprising finding.

In the present study older women were more at risk of preterm labor. This can be due to more frequent conditions for contamination these women experience over time. On the other hand, gravidity and parity showed no significant association with preterm labor while Tsolia et al (1998) indicated that multiparity was associated with a lower colonization rate (5). This inconsistency is related to the socioeconomic differences in the population studied.

Although the colonization rate of GBS is relatively low in our center, it can be regarded as a risk factor for preterm labor. Therefore, Prophylactic antibiotic therapy should be considered in these patients. Older women are more susceptible to be colonized with this microorganism. More investigations are required to confirm the association of age and colonization rate.

Table I. Clinical and obstetric characteristics in preterm and term participants.

Characteristics	Term	Preterm	p-value
Mean age (SD)	25.6 (5.9)	27 (6)	0.09
Mean gravidity (SD)	2.2 (2.4)	2 (1.6)	0.51
Mean parity(SD)	0.9 (1.4)	0.7 (1.2)	0.54
Mean of living child (SD)	0.8 (1.3)	0.7 (1.1)	0.59
Previous abortion (%)	12(11.4)	13(12.9)	0.75
Ruptured membrane (%)	31(29.5)	6(5.9)	0.001
Positive culture (%)	7(6.7)	12(11.9)	0.19

Table II. Logistic regression analysis to assess the association between selected characteristics and preterm labor.

Characteristics	Adjusted odds ratios	95% confidence intervals	p-value
Age	1.10	1.03-1.16	0.004
Gravidity	0.92	0.72-1.16	0.47
Parity	1.01	0.46-2.22	0.99
Living child	0.73	0.33-1.63	0.45
Previous abortion			
No	1	-	-
Yes	1.15	0.42-3.17	0.79
Positive culture			
No	1	-	-
Yes	2.96	0.96-9.17	0.06

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