

CONFLICT OF INTEREST: NONE DECLARED

ORIGINAL PAPER

Group B Streptococci Investigation in Pre-term Labors

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Background: Pre-term delivery is still a main cause of perinatal mortality and morbidities. This study was designed to find any association between maternal Group B Streptococcus (GBS) colonization and pre-term delivery. **Method:** This case-control study was conducted from March 2010 to May 2011 at two referral university hospitals (Al-Zahra and Shaheed Beheshty), Isfahan University of Medical Sciences, Isfahan, Iran. The study sample of pregnant women was composed of a control group of 200 term pregnancy with at least 37 complete weeks, and a case group of another 200 women between 20 to 37 weeks of pregnancy with pre-term labor. Maternal GBS colonization was compared between two groups. **Results:** Maternal age (26.03 ± 4.81 vs. 27.19 ± 5.60 , $P=0.07$) and gravid (1.75 ± 0.88 vs. 1.83 ± 1.08 , $P=0.52$) were similar in case and control groups. Level of education and gestational age were significantly higher in control versus case group ($P=0.01$, $P=0.00$). History of antibiotic use during pregnancy was more frequent in case group compared with control group ($P=0.00$). There were 59/151 (39.1%) positive vaginal samples in case group compared with 36/178 (20.2%) in control group ($P=0.000$). There were 55/151 (36.4%) positive rectal samples in case group versus 30/178 (16.9%) in control group ($P=0.000$). **Conclusion:** This study showed that GBS colonization was statistically higher in pre-term labors compared with term deliveries. To understand the mechanism of GBS effect on pregnancy, large observational studies are needed, with clearly defined outcomes, and with prognostic risk factors for pre-term delivery taken into account. **Key words:** Pre-term Labor; Group B Streptococcus; Recto vaginal.

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1. INTRODUCTION

Pre-term delivery is still a main cause of perinatal mortality and morbidities. The evidences showed the rates of pre-term labor increased from 9.7% in 1990 to more than 10.8% in 2004 in the developed countries (1, 2). In Iran, the rate of pre-term labors was estimated about 13.9% (3). These data highlight the importance of identifying pregnant women at a risk of pre-term labor and the need to develop prevention strategies.

Pre-term labor has already been shown to be associated with some sociodemographic and pathological factors, such as low socioeconomic level, genitourinary tract infection (4, 5). However, the mechanisms of pre-term labor have been controversial yet. Maternal genital tract coloni-

zation with specific organisms can play a role in pre-term delivery. Bacterial products such as phospholipases A₂ and C, endotoxin, and induction of the cytokine cascade can stimulate the prostaglandin pathway and initiate labor (1, 2). Even in non-pregnant women, the presence of pathogens in the genitourinary tract has been shown to induce cytokine production (6, 7). Therefore, the mechanism by which the presence of genitourinary infections may lead to pre-term labor seems to be related to the immune system. Up to 36% of pregnant women are colonized with Group B Streptococcus (GBS), most often without having symptoms (6, 8). In Iran, the rate of GBS colonized mother was estimated about 15-18% (9, 10). Pre-term delivery in GBS col-

onized mothers is a recognized risk factor for early onset neonatal GBS disease (GBS-EOD) (11), but whether maternal GBS genital colonization is related to pre-term delivery is unclear. This study was designed to find any association between maternal GBS colonization and pre-term delivery.

2. METHODS AND MATERIALS

This case-control study was conducted from March 2010 to May 2011 at two referral university hospitals (Al-Zahra and Shaheed Beheshty), Isfahan University of Medical Sciences, Isfahan, Iran. The study sample of pregnant women was composed of a control group of 200 term pregnancy with at least 37 complete weeks, and a case group of another 200 women between 20 to 37 weeks of pregnancy with pre-term labor. Exclusion criteria were hypertension, cardiovascular diseases, placenta abruption, Pre-term Premature Rupture of Membranes (PPROM), multi fetal pregnancy and the use of antibiotics during the two preceding weeks. The diagnosis of pre-term labor was documented according to contractions of four in 20 minutes or eight in 60 minutes plus progressive change in the cervix, or cervical dilatation greater than 1 cm or cervical effacement of 80 percent or greater (12). The Ethics Committee of the Isfahan University of Medical Sciences approved the study protocol and informed consent was obtained from all women after full explanation of the study aims and protocol. After registering demographic data such as maternal and gestational age, gravid, level of education and history of antibiotic use during pregnancy, women underwent a speculum

examination at which two vaginal and rectal swabs were collected for investigation of GBS.

Samples were collected from the proximal third of the vaginal introitus and from inside the anus through the anal sphincter. Two swabs (one vaginal and one anorectal) were separately inoculated into two tubes containing Todd-Hewitt broth (manufactured by Alpha Biosciences, Inc. Maryland, USA), supplemented with gentamicin and nalidixic acid immediately and incubated for 24 hours, and then subcultured for 24 hours on non-selective 5% blood agar plates. The final identification of GBS in all samples was made by the CAMP test, which is based on the production of an arrow-shaped hemolysis zone in conjunction with a *Staphylococcus aureus* colony in a blood-agar plate. Detection rates and each sampling site were calculated. Chi-square and independent tests were used to detect significant differences, and a P value < 0.05 was considered statistically significant.

3. RESULTS

Of 200 women in case group, 49 women were excluded in order to PPRM. Of 200 women in control group, 22 women were excluded in order to PROM. One hundred and fifty one women in case group and 178 women in control group were enrolled in the study. The mean of maternal age was 26.03±4.81 years (range: 17-36 years) in case group and 27.19±5.60 years (range: 17-42) in control group. Demographic and obstetric characteristics of the women enrolled in the study were shown in Table 1. There were 8 (5.3%) women in case group and 2 (1.1%) women in control group who had not answered to level of education. Twenty four (15.9%) women in case group and 6 (3.4%) in control group were not assured about the antibiotic using during pregnancy. Therefore, they were excluded from final analysis of these factors. There were 59/151 (39.1%) positive vaginal samples in case group compared with 36/178 (20.2%) in control group. According to Chi-square test there was statistical difference between two groups (P=0.000). There were 55/151 (36.4%) positive rectal samples in case group versus 30/178 (16.9%) in con-

Variables	Case group	Control group	P value
Maternal age (Year)	26.03±4.81	27.19±5.60	0.07*
Gestational age (week)	32.12±2.65	39.29±0.96	0.000*
Gravid	1.75±0.88	1.83±1.08	0.520*
Level of education			
Non-educated	4	0	0.011**
Under Diploma	59	52	
Diploma	64	104	
Bachelor and above	16	20	
Antibiotic use during pregnancy	18 (11.9%)	4 (2.2%)	0.000**
*Independent t-test, **Chi-square test			

Table 1. Demographic and obstetric characteristics of the women enrolled in the study

trol group. According to Chi-square test there was statistical difference between two groups (P=0.000). All women with positive rectal samples had positive vaginal results in investigation of GBS.

4. DISCUSSION

This study showed that GBS colonization was statistically higher in pre-term labors compared with term deliveries. Lower level of education and positive history of antibiotic use during pregnancy were related to higher prevalence of pre-term labor. Investigation of GBS colonization for all pregnant women between 35 and 37 weeks is recommended, and in situations of risk of pre-term delivery, which are pre-term labor and pre-term premature rupture of membranes (13). Evidences suggested antibiotic prophylaxis of colonized women, during labor, greatly reduces the risk of neonatal disease (14). Previous studies showed GBS isolation is 20% to 40% greater when combined vaginal and anorectal cultures are collected (15-16). A significant proportion of women were found to have only one of these sites colonized; this proportion was 18% to 24% higher in anorectal compared to vaginal samples (16). Our results were not agreed with them. We found all women with positive rectal samples had positive vaginal results in investigation of GBS. This result may indicate that anorectal sampling is not necessary for screening of GBS. We used Todd-Hewitt enriched medium with gentamicin and nalidixic acid for investigating GBS to inhibit growth of Gram-negative bacteria, and it has greater sensitivity when compared to other nonselective media, such as blood or Granada agar (17). Our study showed positive GBS cultures more frequently in patients with pre-term delivery. Also we found that positive history of antibiotic use during pregnancy is related

to higher frequencies of pre-term labor. It may be because of the change of vaginal microbial ecosystem due to antibiotic use. Our results indicated that level of education had a reverse relation with frequency of pre-term labors. This result is agreed with Nomura et al. (18) study which GBS colonization are more frequent than women who had lower level of education. The high sample size and being multicentric are strengths of our study. Not determining the another risk factors of pre-term labor such as cigarette smoking, use of cocaine, uterine malformation, and multi fetal gestation was limitation of our study.

5. CONCLUSION

This study showed that GBS colonization was statistically higher in pre-term labors compared with term deliveries. To understand the mechanism of GBS effect on pregnancy, large observational studies are needed, with clearly defined outcomes, and with prognostic risk factors for pre-term delivery taken into account.

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