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Prevalence of positive recto-vaginal culture for Group B streptococcus in pregnant women at 35-37 weeks of gestation

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Abstract

Background: Recto-vaginal colonization of Group B streptococcus (GBS) has been known as an important issue in mother and newborn's health, which is getting frequent in developing countries. Screening test have been introduced and utilized in many countries and is recommended by many researchers. However, due to lack of information in prevalence of GBS, especially in Iran, there are doubts and controversies regarding whether it is necessary to execute any effort to run screening tests. The aim of this study is to determine the prevalence of positive recto-vaginal culture for GBS in pregnant women between 35-37 weeks of pregnancy in Tehran.

Methods: In this cross-sectional study, pregnant women in 35^{th}-37^{th} week of pregnancy were included. All hospitals in Tehran, Iran, were stratified and clustered, and the sampling was done randomly. All recto-vaginal samples were referred to Firoozgar Hospital's pathology laboratory in less than an hour and the results were reported afterwards. Other demographic information and pregnancy and neonatal-related complications such as previous pre-term delivery, PROM (Premature rupture of membrane) and neonatal sepsis and maternal infection were evaluated.

Results: The prevalence of positive GBS cultures was 22.76% (234 Out of 1028). No significant difference was found in positive cultures with mother's age, educational level, and history of pregnancy, maternal complications, and previous neonatal sepsis.

Conclusion: Due to similar results with other countries, recto-vaginal GBS culture screening is recommended in Iranian urban pregnant women regarding high prevalence and higher neonatal complication.

Keywords: Group B Streptococci, Pregnancy, Neonatal infections, Maternal complications.

Introduction

Group B streptococci (GBS) are a group of bacteria which is found in 15-40% of healthy women's colon and vagina. Pregnant women with colonized vagina with GBS are prone to transmit it to their newborn (1-3).

According to previous studies, GBS infection is seen in 1 out of 2000 births in UK and 10% mortality have been demonstrated in these newborns. However, not all mothers transmit GBS; as only one newborn will present with GBS infection from 100-200 GBS colonized mothers. Thus, the centers for disease control (CDC) and the American college of obstetricians and gynecologists (OBGYN) has recommended routine screening test in week 35^{th} to 37^{th} of pregnancy for recto-vaginal GBS colonization in all pregnant women and use of intrapartum prophylaxis if the screening test was positive, which has been shown to be the way to prevent further transmission (4-5).

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There are limited reports of lactation transmission; most of them were pre-term neonates with late-onset GBS. It has been demonstrated that GBS has been detected in 2-4% of breast feeding women's milk. GBS pathogen is the most prevalent infection in the first week of life, presenting in two forms: early-onset and late-onset. Early onset infection will flare-up in the first week and mainly (90%) in the first 12 hours. The newborn will present with symptoms such as breathing problems, blood pressure and heart rate instability, gastro-intestinal and urinary system disturbances, sepsis, pneumonia and meningitis. A late-onset infection is usually presented with meningitis and septicemia in weeks or even months after birth (6-7).

In Stroll et al study in 1998, Middle-East and North Africa has the highest prevalence of GBS colonization with 22%, as other regions had lower prevalence such as Asia and Oceania and sub-Sahara Africa with 19%, India and Pakistan with 12% and the United States with 14% (8). An epidemiologic study in Iran has demonstrated that GBS colonization was seen in 9.1% to 26.7% of Iranian pregnant women (9-13). Other studies with lower accuracy in different cities show that the prevalence of GBS colonization varies in different parts of Iran and the highest percentage was found in Tehran's pre-term and term pregnant women (13). However, this information was based on a single hospital with low sample sizes which cannot determine an accurate estimation for GBS prevalence. Thus, knowing Tehran as a high prevalent city in the region, we conduct this epidemiologic study to determine the prevalence of GBS colonization, risk factors, maternal and neonatal complication in Tehran.

Methods

In this cross-sectional study, after stratification and randomization, 1028 pregnant women, living in Tehran, with gestational age of 35 to 37 weeks were enrolled. All of these patients were referred to women's or general hospital clinics affiliated to the university for routine pregnancy visits or pregnancy complications. Two specimens were taken from each patient's rectum and vagina, separately, with sterile swabs. Patients with history of antibiotic use in the last 4 weeks, vaginal cream, lubricants or traditional sterilizer (vinegar) in the last 10 days were ruled-out from the study. The swabs were preserved in an examination tube and transferred to a single university laboratory center.

Sampling was done based on our calculation and strata in Tehran metropolis, and distribution of population; which 155 patients were enrolled from northern Tehran (Taleghani and shoahad-e-Tajrish hospitals), 517 from central Tehran (Firoozgar and Mirza-Kouchak-Khan hospitals) and 356 from southern Tehran (Akbarabadi Women's hospital).

Before including any individual in our study, all subjects signed a consent form stating that they are willing to participate in our study. All subjects could exit the trial whenever they want and no charges were defined for the participant. None of the information analyzed in this research will be released individually and all participants were included as anonymous. The Results of the screening test was informed to the patients individually and positive results were treated with appropriate Antibiotics.

Statistical analysis

The data were analyzed using SPSS software version 16. Data are expressed as mean ± standard deviation (SD) unless otherwise stated. Student t-test was used to evaluate the significance of differences between mean values of continuous variables and Mann–Whitney-U test was used for non-parametric distribution between the study groups. Chi-square analysis was performed to test for differences in proportions of categorical variables between two or more groups. Logistic regression tests were performed as suitable. The P-value of less than 0.05 was considered to be statistically significant.

Results

At the beginning of the study, 1064 patients were available, but after considering our exclusion criteria, 1028 patients were enrolled. In overall, 234 (22.76%) of our samples were positive for GBS.

The mean age was 26.70±5.05 years (minimum 16 and maximum 42 years). No significant difference was found in age between GBS positive and negative group (p=0.469). The Table 1 represents the educational level of the mothers regarding GBS colonization. As seen, no significant difference was found between our 2 groups (p=0.733). For further analysis, all pregnant women were categorized into 3 educational levels (illiterate, elementary and higher). The odds ratio of the educational levels for recto-vaginal GBS colonization was 1.3 (CI: 0.89-1.6). Occupational status of the mothers had no significant difference among positive and negative GBS mothers (OR=1.01, CI: 0.6-1.6, p=0.964). Furthermore, no significant difference was found in history of pregnancy and childbirth with GBS colonization. The OR (Odds ratio) for GBS colonization in more than 1 pregnancy was 1.06 (CI: 0.8-1.42) and more than 1 child birth was 1.08 (CI: 0.81-1.44)

Nineteen (1.8%) of our patients had previous preterm labor. No significant difference was found in GBS positive colonization between these patients and term delivery mothers. Furthermore, the history of PROM (Premature rupture of membrane) was found in 15 (1.4%) patients, which also no significant difference was found.

Eight (0.8%) of our patients had pathologic infection and 11 neonates had neonatal GBS complications. No significant relation was found between previous neonatal sepsis and GBS positive mothers (P=0.1284; OR= 3.24, CI: 0.9312-11.3); however, not significant, the statistics are clinically important and may become significant with higher sample size.

Table 1. Baseline characteristics of patients enrolled in the study. Age is presented in mean ± SD.

		GBS positive	GBS negative	p
Age		26.5±5.1	26.8±5.04	0.469
Education				0.733
	Illiterate	7 (2.9%)	19 (2.3%)	
	Elementary	37 (15.2%)	100 (12.2%)	
	Guidance	68 (15.2%)	235 (28.6%)	
	Diploma	80 (32.9%)	278 (33.9%)	
	Academicals	51 (21%)	189 (23%)	
Employment	Yes	26 (10.7%)	87 (10.6%)	0.964
	No	217 (89.3%)	734 (89.4%)	
Gravid				0.657
	Null	126 (51.9%)	439 (53.5%)	
	Multi	117 (48.1%)	382 (46.5%)	
Hx of Preterm Labor	Yes	6 (2.5%)	11 (1.4%)	0.259
	No	237 (97.5%)	766 (98.6%)	
Hx of PROM	Yes	4 (1.6%)	10 (1.3%)	0.752
	No	239 (98.4%)	767 (98.7%)	
Maternal Infection	Yes	2 (0.8%)	5 (0.6%)	0.674
	No	241 (99.2%)	772 (0.4%)	
Neonatal Infection	Yes	5 (2.1%)	5 (0.6%)	0.128
	No	238 (97.9%)	772 (99.4%)	

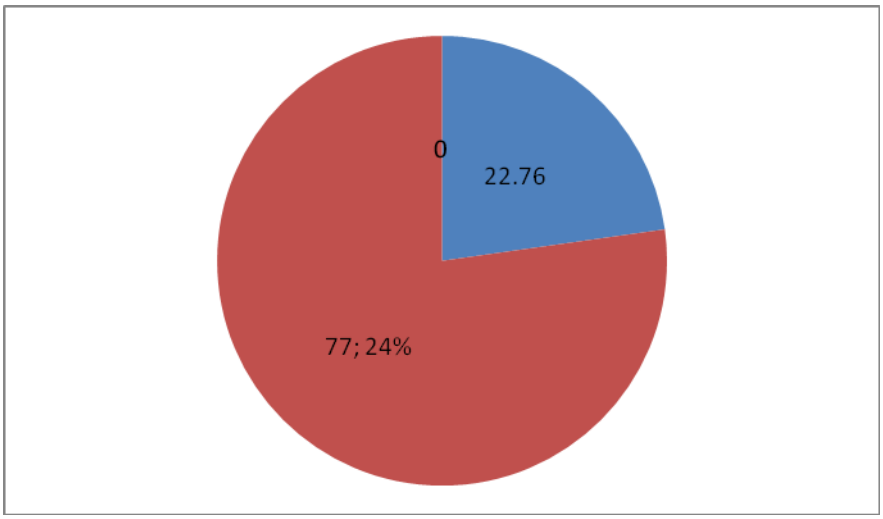

Fig. 1. GBS careers in our mother's population (Blue: positive, red: negative)

Discussion

In our study, the prevalence of GBS colonization in the 3rd trimester of patients visited in university affiliated women's hospitals was 22.76%. No relation was found between positive GBS cultures and history of Preterm labor, PROM and maternal infection.

Epidemiologic studies on GBS in pregnant women across the world show high distribution of GBS colonization. However, according to expanse and intensity of GBS infection and importance of mother and child health against pregnancy related infections, several communities such as CDC and American collage of OBGYN in 2002 have recommended GBS screening test for all pregnant women to determine and control the infection. With due regard to the GBS colonization prevalence in different regions and its cost-effectiveness, it seem that screening test can be beneficial for health care system's decision makings.

According to a review article published in 2010 which consist of 76 original articles, the maximum prevalence was reported 36%, and no relation was found with GBS colonization and preterm labor. However, GBS colonization had higher prevalence in women with preterm labor. (14). These results demonstrated that Middle East and especially Iran is accounted for high risk countries for GBS colonization. In a study in northern Iran, the prevalence of positive GBS cultures was near 15% (15). Other studies revealed a 18% prevalence in Isfahan and 13% in southern parts (16-17). The highest percentage was reported from Hamadan (a city in western Iran) with a prevalence of 26.7%. The recent study has also shown that patients without GBS colonization in 31st week of gestation have significantly lower prevalence of GBS colonization in 37th week pregnant women (11). This study also demonstrated that no significant relation was found between parity and GBS colonization. Another study, conducted in Tehran, has also found a 20.6% prevalence of GBS colonization; which is somewhat close to our results. It seems that pregnant women living in Tehran are more prone to this colonization.

The most important limitation of our study was the inability to follow the positive GBS culture pregnant women to determine the high rate of PROM and infantile infection; because ethically, we had to treat these patients with suitable antibiotics. However, other retrospective studies are recommended to evaluate this information in developing countries such as Iran.

Conclusion

Based on high prevalence of GBS in Tehran, international recommendations, and similar results from other countries (a prevalence between 20-30%), it seems that

screening tests for pregnant women in the 3rd trimester may result in higher hygienic level of mothers and neonates and lower neonatal sepsis.

Our study could not find any significant relation between GBS colonization and other childbirth complications; however, in some complications such as previous neonatal infection, the statistics are clinically important and will be become significant with higher sample size. Further investigation is recommended.

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