Prevalence of Beta-hemolytic Group B Streptococcus in pregnant women with threatened preterm labor

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ABSTRACT

Objective: To determine the prevalence of Beta-hemolytic Group B Streptococcus (GBS) in pregnant women with threatened preterm labor, due to the limited research in Peru regarding this topic. **Material and methods:** Swabs of both rectum and lower third of the vagina were taken from pregnant women with threatened preterm labor diagnosis that were hospitalized in the Pathological Pregnancy Unit at the Hospital Daniel Alcides Carrion, between August and November 2015. All samples were carried in AMIES transport medium and taken to the microbiology laboratory for culture. **Results:** GBS was not isolated in any of the 30 pregnant women who took part in the study. 60% of the samples were positive for *E. coli,* 6.7% for *Enterobacter aerogenes* and *Gardenella vaginalis,* and 3.3% for *Klebsiella pneumoniae,* and 23% had normal vaginal flora. **Conclusions:** None of the participants in this study presented Group B streptococcus colonization.

Key words: Beta-hemolytic Group B Streptococcus. Threatened preterm labor. Vaginal and rectal swab.

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INTRODUCTION

Beta-hemolytic Group B Streptococcus is a large positive encapsulated coccus that frequently colonizes the gastrointestinal and genitourinary tract. According to the World Health Organization (WHO), the prevalence of GBS in pregnant women ranges from 5% to 40% and half of them present vaginal colonization. On the other hand, the Center for Disease Prevention and Control (CDC) indicates that the prevalence is approximately 25% and most of the cases are asymptomatic[1]. These percentages may vary according to race, age, parity, ethnic factors, socioeconomic level, geographic region, as well as for a vaginal yeast infection or for having recent sexual intercourses[2].

Maternal genital tract colonization is associated to the development of early neonatal sepsis, which can appear during labor -in 25-85% of cases, by transmission from the vaginal or colon-rectal mucosa colonized (vertical transmission)- or during pregnancy, when the fetus sucks infected amniotic fluid, a situation that occurs more frequently in women with preterm labor2,3. GBS infection can also cause premature rupture of membranes, prematurity, low birth weight, subclinical chorioamnionitis, fetal death, postpartum endometritis, and surgical wound infection after cesarean section, and has been found in more proportion in preterm births[2,4].

The threat of preterm birth may have a multifactorial origin, but the most commonly known cause is the subclinical intra-amniotic infection and inflammation, which is present in 18% of pregnant women hospitalized with threatened preterm labor[4]. Infection of the genital tract and subsequent production of bacteria products, such as phospholipase A2 and C, endotoxins and cytokines stimulate the production of prostaglandins, which is why labor begins[3,5,6].

The CDC has established a protocol for the prevention of GBS infection in which is indicated that all pregnant women between 35 and 37 weeks of gestation are screened for the presence of GBS. Likewise, it indicates to perform the screening among pregnant women with the threat of preterm labor with or without intact membranes. Such procedure consists of carrying out swabbing of the lower third of the vagina and rectum to perform a culture[7,8].

In our country, it has not been possible to establish a true prevalence rate of GBS colonization. Likewise, at national level, literature related to GBS colonization is scarce and given that the National Hospital Daniel Alcides Carrión does not have statistical information related to the incidence of GBS colonization in high-risk pregnant women. The objective of this study is to determine the prevalence of GBS in pregnant women with threatened preterm labor.

MATERIALS AND METHODS

An observational cross-sectional study was performed. The population studied was all pregnant women diagnosed with threatened preterm labor hospitalized in the Pathological Pregnancy Unit of the National Hospital Daniel Alcides Carrión, from August to November 2015.

An interrogation, medical history review and physical examination were performed on all selected patients and this information was recorded in the data collection instrument. Patients were informed in clear and simple language of the procedure to be performed, the objectives of the research, technique, importance and benefits, and they were asked to sign the informed consent, in order to have their approval.

The inclusion criteria for this study were: patients with gestational age between week 22 and 36 6/7 with threatened preterm labor and single active gestation. The study excluded all patients whose gestational age was doubtful, patients in labor, with antibiotic treatment or who had received local at least 48 hours before the study.

Sampling consisted of the introduction of swab into distal third of vagina and rectum. Then the sample was smeared on a slide and the swab was placed in Amies transport medium without charcoal. All samples collected were immediately transported to the microbiology laboratory for gram staining and culture.

The information collected was entered into a database in Microsoft Excel 2013. The data processing and analysis was performed through the program IMB SPSS Statistics 23.0.

RESULTS

The total number of patients who participated was 30. The minimum age was 19 years, the maximum was 41 years and the average age was 28 years. 33.33% were between 20 and 24 years old, and 26.67% between 35 and 39 years. The age groups with the lowest percentage were 15 to 19 and 40 to 44, both with 3.33%. Only 6.67% had primary education, 73.3% had secondary education and only 20% had higher education. Regarding the occupation, 86.67% were housewives, 3.3% were students, and 10% were engaged in other activities.

Regarding their gynecological and obstetrical history, it was found that the minimum gestational age was 26 weeks, the maximum of 36 and the average 33. 53.33% of the patients were between 29 and 34 gestation weeks, 36.67% between 35 and 37, and 10% between 22 and 28. Regarding the number of sexual partners, 43.3% reported having had two partners, 30% claimed to have had, 6.7% indicated that they had four, and finally, 20% reported having had one sexual partner. In relation to parity, 96.7% were multipregnant: 30% were in their second gestation; 23.3% in the third; 20% in the fourth; 16.7% in the fifth, and 3.3% in the sixth gestation.

43.3% had two prenatal controls; 26.7% received three controls; 16.7%, only one control; 10% had four controls, and 3.3% received five prenatal controls. 86.7% out of the 30 pregnant women who were part of the study denied having preterm birth in previous pregnancies. Only 13.3% of pregnant women presented this symptoms. The comorbidities presented by the patients at the time of the study are found in Table 1.

The four pregnant women with chorioamnionitis presented positive culture for E. Coli, moreover a patient with urinary tract infection was isolated.

Table 1. Comorbidities

	N	%
None	25	83,3
Chorioamnionitis	4	13,3
ITU	1	3,3
Total	30	100,0

DISCUSSION

In recent years, GBS has been shown to be an important cause of a wide range of infections during gestation, puerperium and neonatal period, as well as a trigger for preterm delivery as a consequence of the subclinical infection. In Peru, there are few studies in relation to the prevalence of GBS in pregnant women, even more in pregnant women with high obstetric risk, such as those with a diagnosis of threatened preterm labor.

The sociodemographic characteristics described in this study are similar to those found in the study by Hadavand *et al*[9] (2015) in Iran, in which the average age was 27 years; the minimum, 17 years and the maximum, 40. 83% of pregnant women were housewives and more than one half had only secondary education.

The study by Collins *et al*[10] in Peru in 1998 showed no association between age, parity, number of sexual partners, and GBS colonization. In another study, conducted by Zusman *et al*[11], there was no clear relationship among age, parity, obstetric history, social and economic characteristics. In this paper, it was not possible to determine the relationship among these variables, due to the absence of GBS isolation. Further studies should be carried out in the future to clarify this doubt. As for chorioamnionitis, it is widely described in the literature, the relationship between this pathology and this microorganism, which is associated to 8% of chorioamnionitis cases (according to a study published by the *National Institute of Health* in 2010[12]), but under GBS, which is associated to 15% of cases.

Due to the high prevalence of this pathogen, in future studies it will be necessary to investigate its role as a trigger of multiple obstetric pathologies in this

population. It is worth noting the low percentage of medical records of preterm labor, considering that the most important risk factor for presenting a threat of this type of labor is to have had it in previous pregnancies. Future research should investigate what other risk factors exist for the development of threatened preterm labor, which have not been evaluated in this study.

None of the 30 pregnant women tested positive for GBS. 60% tested positive for *E.coli,* 6.7% for *Gardenella vaginalis* and *Enterobacter aerogenes* respectively, and 3.3% was positive for *Klebsiella peumoniae*. 23.3% out of the pregnant women presented normal vaginal flora. The lack of isolation of this bacterium could be due to the scarce diversity of culture media for an adequate identification, since the microbiology laboratory only had blood agar culture and gram staining for the identification of this microorganism. In the studies conducted in Peru by Tamariz *et al*[13] in 2004 and in Brazil, by Zusman *et al*[11] in 2006, they not only used blood agar but also cultures with Todd Hewitt medium and naladixic acid. Both obtained GBS prevalence of 10.9% and 17.9%, respectively. The lack of other more sensitive culture medium may have played a role in the absence of isolation. In the study, Tamariz *et al* mentioned the use of inadequate methodology as a cause of insufficient diagnosis of GBS. A study conducted in Iran by Shirazi *et al*[14] in 2012 found *E. coli* in 3.6% of pregnant women, *Enterococcus Spp.* in 2.1%, *Klebsiella* in 0.9%. Compared to this research, we observed values higher than those found in the study mentioned before, especially of *E.coli,* since this population is positive in more than a half of the pregnant women. In another study conducted by Palencia A.[15] in 2009, GBS, *E. coli* and *Klebsiella* are mentioned as important causes of intra-amniotic infection and subsequent cause of preterm labor as a consequence, especially after 32 weeks of gestation.

Many authors have reported different prevalence levels of GBS in different regions of the world. For example, India / Pakistan 12%, America 14%, Asia-Pacific 19%, Sub-Saharan Africa 19%, Middle East / North Africa 22%, and 6.5% to 36% in Europe, showing the geographical impact on this bacteria[16]. In our study, the 30 pregnant women came from the region Callao, which makes to question whether the absence of isolation of this microorganism was related to an inadequate intake of the sample, its incorrect preservation, the lack of more and specific culture media, or the probable low or no prevalence of GBS in Callao. Further studies on this subject will be necessary to evaluate the impact of this bacterium on this population.

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CONFLICTS OF INTEREST

The authors do not report conflicts of interest regarding the present manuscript.

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