

Evaluation of Group B Streptococci Colonization Rate in Pregnant Women and Their Newborn

Abdolkarim Hamedi¹, Farideh Akhlaghi², Seyed Javad Seyedi¹, and Abdolali Kharazmi²

¹ Department of Pediatric, Faculty of Medicine, Mashhad University of Medical Science, Mashhad, Iran

² Department of Obstetrics and Gynecology, Faculty of Medicine, Mashhad University of Medical Science, Mashhad, Iran

Received: 1 Nov. 2011; Received in revised form: 30 Nov. 2012; Accepted: 5 Dec. 2012

Abstract- Group B Streptococcus (GBS) is one of the most important bacteria in the majority of maternal and neonatal infections, such as chorioamnionitis, endometritis, bacteremia, sepsis and meningitis. During pregnancy, GBS screening is one of the recommended strategies that are recommended by center of disease control (CDC). This study was aimed to determine the rectovaginal colonization prevalence among pregnant women, and also the rate of transmission to their offspring. Between June 2008 and April 2009, two hundred pregnant women admitted in department of Obstetrics and Gynecology (Ghaem Hospital, Mashhad, Iran) were enrolled in present study. Samples from maternal rectum and vagina as well as neonate ear and umbilical cord were taken for culture. The colonization rate for GBS in pregnant women and their neonates was around 6% and 5% respectively. All the carrier mothers were cases with premature rupture of membranes (at least 18 hours before delivery). In terms of colonization, there was a significant correlation between mothers and newborns, and more than 80% of neonates from GBS carrier mothers were colonized by GBS.

© 2012 Tehran University of Medical Sciences. All rights reserved.

Acta Medica Iranica, 2012; 50(12): 805-808.

Keywords: Colonization; GBS; Neonates; Vagina

Introduction

Group B Streptococcus (GBS) is one of the most important causes of prenatal and newborn infections. In addition, it can be a serious pathogen to induce bacteremia in pregnant women. The colonization of GBS in pregnant women's vaginas and rectum can cause chorioamnionitis and transferring the organism to newborns as well. At the time of labor, neonate can be infected by this microorganism. The colonization rate of GBS in pregnant women's urogenital system is between 10% and 40%. It appears that 50% of these women transfer these bacteria to their babies when giving birth. As a result, 1 to 2% of these newborns may also suffer from severe infections such as meningitis, pneumonia or sepsis (1). This infection can occur both as an early onset disease (the first week after labor) and a late onset disease (until 12 week after labor) (2). Maternal chemoprophylaxis, in time of delivery, can decline the transferring possibility from mother to newborn and, as a result, may reduce the number of infected cases and the severity of the disease. Since the colonization of this organism is really common among pregnant women, the

present study was aimed to assess the colonization rate of these bacteria in mother and newborn in northeast of Iran.

Materials and Methods

It was a prospective study based on the information collected from 200 pregnant women referred to the labor unit of Ghaem Hospital (Mashhad, Iran). Inclusion criteria were normal vaginal delivery and also negative history of vaginal manipulations. All mothers had formal consent. Our study was confirmed by ethical committee of Mashhad University of Medical Science. Enrolled women were examined and follow-up was done. Questionnaires, about mothers and their babies, were filled in, then samples from women's vaginal and rectal secretions as well as newborn's umbilical cord and ear were taken for culture. Antibiogram was also created if the result of culture was positive within 48 hours. Afterwards, cultures were put in the environments such as Tryptic Soy Broth (TSB), blood agar and Mueller-Hinton agar. Finally, after 48 to 72 hours the results of cultures were recorded. The information of

Corresponding Author: Farideh Akhlaghi

Department of Obstetrics and Gynecology, Omalbanin Hospital, Azadi street, Mashhad, Iran
Tel: +98 511 2231444, 915 3162763, Fax: +98 511 2231444, E-mail: akhlaghif@mums.ac.ir

Group B streptococci colonization in pregnant women

samples and the result of cultures were registered in questionnaires and the outcomes were analyzed by SPSS.

Results

Table 1-3 show distribution of enrolled mother on age, gestational age and rate of colonization with GBS. Most mothers were 20-24 years old with gestational age between 38-40 weeks. The positive (carrier) culture rate for GBS in mother was 6%. The vagina was the most sites for positive culture.

The rate of colonization in pregnant women was 6% and 5% in their newborns. All the carrier mothers were cases with premature rupture of membranes (PROM at least 18 hours before delivery). 80% of infants colonized by this organism, had carrier mothers. In 10% of cases, the colonization was in umbilical cord.

Table 1. Distribution of mothers on age group.

Age (year)	No	Percent
15-19	20	10
20-24	70	35
25-29	44	22
30-34	50	25
35-39	16	8
Total	200	100

Table 2. Distribution of mothers on gestational age.

Gestational age	No	Percent
<34 weeks	16	8
34-37	52	26
38-40	128	64
>40	4	2
Total	200	100

Table 3. Distribution of Vaginal colonization.

Organism	No	Percent
Lactobacillus/Corynebacterium	152	76
E.coli	30	15
Enterococcus	30	15
Candida	22	11
Klebsiella	18	9
S.epidermidis	20	10
GBS	12	6

Discussion

The colonization of GBS usually happens in pregnant women urogenital systems. This study was done to define the rate of the colonization in pregnant women and newborns in northeast Iran. In the study of Ma *et al.* from China, GBS colonization among 1039 pregnant women was recorded as 11.07%, which is similar to our research (3). In the study of Kowalska *et al.* from the Netherlands the rate of being GBS carrier in pregnant women's genital system was around 20% (4). Toslia *et al.* from Germany reported the incidence of 6.6% (5). Therefore, in every country the preventive evaluations about the effects of colonization in newborns may be different and needs to be evaluated.

Stapleton *et al.* claimed that these groups are at risk of GBS colonization during pregnancy (6): Black women, women who work in caring centers and women who have massive muscle mass.

In a study from Saudi Arabia, EL-Kersh *et al.* reported that the colonization rate of GBS in pregnant women was 27.6%, which is more than all other reports (7). The study of Kowalska *et al.* included the pregnant women and their newborns from Obstetric and Gynecology department of National Research Institute of Mother and Child during 2001 and 2002 years. The prevalence of pregnant women with GBS colonization in their study was 19.7% and greater than our results. 70 of 203 neonates from mothers with positive results of their screening had the GBS colonization confirmed. The prevalence of confirmed streptococcal colonization in neonates was 34.5% (8). In Turkey this rate was reported as 8% (9). Tor-Udom *et al.* from Thammasat Hospital (Thailand) claimed that the number of positive cultures from vagina, perinea and rectum were equal and colonization rate was 16% (10). This rate was higher in PROM cases (11). So in order to increase newborn health conditions, prevention should be promoted (12). If mother's condition is unknown or her culture is positive or she is a high risk woman did not receive any medications, a culture should be provided from newborn and ampicillin therapy can be started, then if the culture was negative, ampicillin therapy could be stopped, otherwise it must be continued for 5 to 7 days (13). The possible etiological implications are commented on, and vaginal and rectal cultures are recommended for GBS screening in pregnant women (14). In report of Mashhad GBS colonization in pregnant diabetic mothers was more than non-diabetic pregnant women (15). In study from Shiraz on 1197 pregnant women, the incidence of positive vaginal culture for GBS was 9.1% (16).

American academy of pediatrics has reported a new guideline for screening GBS in pregnant women and recommends prophylactic antibiotic for all pregnant carriers (17). This academy suggests below points:

- 1- Provide high risk pregnant women (diabetics, PROM more than 18 hours, before 37 week preterm labor, temperature $>38^{\circ}\text{C}$ at the time of delivery and the history of GBS infection in previous pregnancy) with culturing between 36 and 38 weeks.
- 2- Prescribe intrapartum ampicillin or penicillin for high risk women (mentioned above).
- 3- If the culture is negative or intrapartum is adjusted, there is no need to do something special for the newborns.

GBS is a main cause of prenatal infections and neonatal sepsis. GBS is also a risk factor associated with chorioamnionitis and transmission of the infection to the infant (15). Our study showed that the rate of GBS colonization in our district in mother and newborn was ~11%, which needs intensive preventive cares. In terms of GBS colonization, we found a correlation between mother and newborn as more than 80% of neonates from GBS carrier mothers were colonized by GBS.

Acknowledgment

This study was supported by a grant from Dean of Research, Mashhad University of Medical Science. We would like to thank Mrs. Zahra Negahban and Dr. Mehrdad Javdani who helped us to perform this study.

Reference

1. Bevilacqua G. Prevention of perinatal infection caused by group B beta-hemolytic streptococcus. *Acta Biomed Ateneo Parmense* 1999; 0(5-6):87-94.
2. Dani C, Martelli E, Rubaltelli FF. Prophylaxis of group B beta-hemolytic streptococcal infections. *Acta Biomed Ateneo Parmense* 2000;71 Suppl 1:541-5.
3. Ma Y, Wu L, Huang X. Study on perinatal group B Streptococcus carriers and the maternal and neonatal outcome. *Zhonghua Fu Chan Ke Za Zhi* 2000; 35(1):32-5.
4. Kowalska B, Niemiec KT, Drejewicz H, Polak K, Kubik P, Elmidaoui A, Gierowska-Bogusz B, Jaczynska R. Prevalence of group B streptococcal colonization in pregnant women and their newborns based on the results of examination of patients in the Obstetric and Gynecology Department of the National Research Institute of Mother and Child--a pilot study. *Ginekol Pol* 2003; 74(10):1223-7.
5. Tsolia M, Psoma M, Gavrioli S, Petrochilou V, Michalakis S, Legakis N, Karpathios T. Group B streptococcus colonization of Greek pregnant women and neonates: prevalence, risk factors and serotypes. *Clin Microbiol Infect* 2003;9(8):832-8.
6. Stapleton RD, Kahn JM, Evans LE, Critchlow CW, Gardella CM. Risk factors for group B streptococcal genitourinary tract colonization in pregnant women. *Obstet Gynecol* 2005;106(6):1246-52.
7. El-Kersh TA, Al-Nuaim LA, Kharfy TA, Al-Shammary FJ, Al-Saleh SS, Al-Zamel FA. Detection of genital colonization of group B streptococci during late pregnancy. *Saudi Med J* 2002;23(1):56-61.
8. Kowalska B, Niemiec KT, Drejewicz H, Polak K, Kubik P, Elmidaoui A, Gierowska-Bogusz B, Jaczynska R. Prevalence of group B streptococcal colonization in pregnant women and their newborns based on the results of examination of patients in the Obstetric and Gynecology Department of the National Research Institute of Mother and Child--a pilot study. *Ginekol Pol* 2003;74(10):1223-7.
9. Barbaros I, Murat C, Mehmet V, Ismet TA, Can K, Sukufe D, Ismail C, Yildiz P. The colonization incidence of group B streptococcus in pregnant women and their newborns in Istanbul. *Pediatr Int* 2005;47(1):64-6.
10. Tor-Udom S, Tor-Udom P, Hiriotte W. The prevalence of streptococcus agalactiae (group B) colonization in pregnant women at Thammasat Hospital. *J Med Assoc Thai*.2006;89(4):411-4.
11. Orafu C, Gill P, Nelson K, Hecht B, Hopkins M. Perianal versus anorectal specimens: is there a difference in Group B streptococcal detection? *Hopkins M: Obstet Gynecol* 2002;99(6):1036-9.
12. Larcher JS, Capellino F, De Giusto R, Travella C, Balangione FG, Kreiker, Cardona HP, Zarate A, Vilaro M, Hernandez D, Ruiz Orrico G. Group B streptococcus colonization during pregnancy and prevention of early onset of disease. *Medicina (B Aires)* 2005; 65(3):201-6.
13. Bevilacqua G. Prevention of perinatal infection caused by group B beta-hemolytic streptococcus. *Acta Biomed Ateneo Parmense* 1999;70(5-6):87-94.
14. Matorras R, Garcia-Perea A, Usandizaga JA, Omenaca F. Recto-vaginal colonization and urinary tract infection by group B Streptococcus in the pregnant diabetic patient. *Acta Obstet Gynecol Scand* 1988;67(7):617-20.
15. Akhlaghi F, Hamedi AB, Naderi Nasab M. Comparison of Group B streptococcal colonization in the pregnant diabetic and none diabetic women. *Acta Medica Iranica* 2009;47(2):103-8.

Group B streptococci colonization in pregnant women

16. Namavar Jahromi B, Poorarian S, Poorbarfehee S. The prevalence and adverse effects of group B streptococcal colonization during pregnancy. Arch Iran Med 2008; 11(6):654-7.
17. Trends in Perinatal Group B Streptococcal Disease. 2009. MMWR. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5805a2.htm>.