IJN
Iranian Journal of Neonatology
http://ijn.mums.ac.ir

Open Access
Original Article

A survey on the prevalence of group B Streptococcus in pregnant women referred to the obstetrics and Gynecology ward at babol Ayatollah Rouhani hospital

Mohsen Haghshenas Mojaveri[1*],Yadollah Zahedpasha[1],Nesa Asnafi [2],Javad Farhadi[3]

1 Neonatologist, Non- Communicable Pediatric Diseases Research Center, Babol University of Medical Sciences, Babol, Iran.
2 Infertility and Reproductive Health Research Center,Babol University of Medical Sciences, Babol, Iran.
3 Babol University of Medical Sciences, Babol, Iran.

ABSTRACT

ABJECTIVE: Prenatal infections are one of the fundamental causes of early puerperal complications in mothers and neonates. These infections are mostly due to colonized organisms in pregnant woman's genitor-urinary system. The aim of this study was to determine the incidence of streptococcus group B (GBS) colonization in parturient women and the rate of pathogen transmission to the newborn

METHODS:Totally 400 pregnant women (gravid one and nuliparity and gestational age35-37 weeks) applied for this study.Vaginal and rectal samples was given from all mothers and skin samples were given from their child, and if the neonates become symptomatic and admission accord the blood samples were given to evaluate blood culture. After sample culturing on the specific environment data analyzed by SPSS software

***RESULTS*:**GBS colonization was seen in 15.2% of mothers and 7.75%oh their child. Vertical transmission rate was 49.2%. Also it was significant relation between organism colonization prevalence and prolonged ruptured of membrane more than 18 hours. (P=0)

***DISCUSSION*:**According to high prevalence of GBS colonization and vertical transmissions rate in our city and ,it seems that prophylaxis for GBS is necessary to protect neonats.

KEY WORDS:neonatal infection, prenatal infection, GBS , colonization

ABBREVIATIONS:

CDC=Centers for disease control and prevention
ACOG=AmericanCollegeofObstetriciansandGynecologists
AAP= AmericanAcademyofPediatrics
TTN=Transient Tachypnea of Newborn
MAS= Meconium Aspiration Syndrom
PROM= premature rupture of membrane

Introduction

Group B streptococci are colonized in the lower digestive tract and genital-urinary system. The colonization of the group B streptococcus in pregnant women is generally asymptomatic, but bacteria can cause urinary tract infection, chorioamnionitis, endometritis in the mother and Meningitis and septicemia in the neonate.

Invasive GBS infection in 1970's was a major cause of neonatal mortality in the United States of America. In the mid-1980s, clinical trials showed that prescribing antibiotics for GBS carriers can protect their babies.In year1996, CDC in collaboration with ACOG and AAP recommended antimicrobial prophylaxis against this diseaseas an alternative for disease screening in women who the risk of infection transmission was high in them formally (2). But a study of big cohort during 1998 and 1999 showed that Screening and prevention for obstructionin cases of this microbe carriers causes better prevention of the disease in neonates(3).The transient carrier state has been observed in the vaginal canal of 10 to 30 percent of pregnant women.Although the incidence of

* *Mohsen HaghshenasMojaveri, - Neonatologist, Non-Communicable Pediatric Diseases Research Center, Babol University of Medical Sciences, Babol, Iran. Email Address:matia.mojaveri@yahoo.com*

carrierdepends onthe time of pregnancy period when sampling was performed in it and the used cultivation techniquesbut similar incidenceobserved in non-pregnant women.
Approximately 60 percent of babies born from carrier mothers remain colonized with organisms acquired from their own mothers. (2)
If the mother is highly colonized by bacteria, the probability of the infant colonization increased at birth. From other risk factors for colonization of the infant can be noted to preterm Labor, Prolonged rupture of membranes, and fever during labor. (4) Colonization and subsequent disease in the infant can occurIn the womb, during birth or in the first months of life.disease occurrence in infants less than 7 days, is called disease with early onset , and disease occurrencein newborn between 8 to 28 dayswill be considered asdisease with late onset.(5)
Prolonged rupture of membranes, preterm delivery, maternal fever during labor, the infection of urinary tract with GBS during pregnancy,the history of Previous pregnancywith complications related to GBS infection are the risk factors.(4) In response to these findings, CDC, ACOG and AAP offered a revised Instructions based on the risk approach instead of screening pregnant women for GBS. (6)

Now, in our country GBS screening is carried out only on special and in high risk cases, and with regard to the carrier frequency of this organism is dissimilar in different regions and there are not the exact statistics about the status of prevalence of these organisms in our region, this study was conducted with the aim of the screening and the determine of the prevalence of GBS in mothers and their infants .

Material and Method

Four hundred pregnant women who were referred to maternity ward of Rouhani hospitals to give birth were studied in conformity with inclusion and exclusion criteria. Exclusion criteria were diabetes during pregnancy and the use of antibiotics in the month prior to admission. Between weeks 35 and 37 the rectovaginal samples were taken from all patients. After the birth of the babies, skin sample were taken from the axillary and groin. In cases who infants had the cultivation of marked positive skin and required hospitalization the blood sample were taken from them for checking the blood culture, the samples were cultivated and investigated in the laboratory.

The swabsamples obtained from the pregnant women's vagina in weeks 35 to 37 wereculturedon the environment of SBA(Sheep Blood Agar) and Mac Ager and at the same timedirect smear for Gram staining was perform. After 24 hours of Incubation of culture plates In the 37 ° C incubator, the smooth and transparent colonies with a light gray apparent formed on SBA environmentwas evaluated for hemolysis and smears were prepared and again Gram staining was performed for Gram-positive cocci in chains (Catalase-negative strap colonies) and then Catalase test was performed for the separation of Staphylococcus from Streptococcus, andsuspected coloniesofstreptococciexaminedfor resistance tobacitracin and CAMP test. Group B streptococcus colonies in the vicinity of the S.Auresus cultivation createdhemolysis halo in the form of the arrow that indicates the sample was positive CAMP and so B group streptococcuswas detected.
In order to cultivation in neonatal a skin biopsy was performed and in hospitalized newborns after washing and disinfection of the skin 5cc blood was taken as sample and was added to the Blood culture vitro .This vitro was placed In the Incubator at a temperature of 37 °c for 48 hours and after that transferred to theBlood Agar and MC Cangi culture vitro. Other required information include gestational age, premature rupture of membranes, early neonatal sepsis, fever after childbirth, baby's gender, and the interval between premature rupture of membrane to labor collected from the patient's medical records or by asking them.

Results

In this study, 434 women were studied who 34 women excluded from the study due to the contamination of samples or non-delivery in Ayatollah Rouhani hospital. The mean duration of pregnancy was 37.9±2.07 weeks. Two hundreds and five infants were girls (%51.3) and 195 newborn were boys (%48.7) (205 to 195). (Diagram 1)

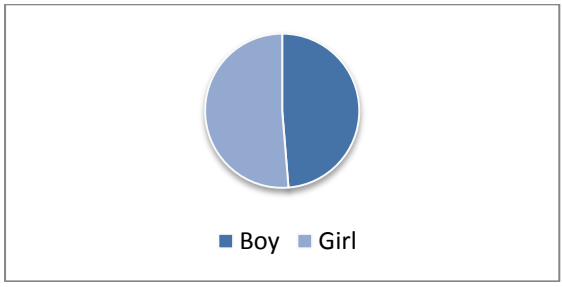

Diagram2: Distribution of neonatal sex

Overall %15.2 of the samples taken from the mothers (61 people of 400 women) were infected with B group streptococci. In 31 cases of 61 GBS-positive mothers, the samples taken from the vagina were positive (%50.8), in 20 cases the samples taken from the rectum were positive (%32.8) and both samples were positive in 10 cases (%16.4).Among the skin samples taken from infants %7.75(31 cases) infected with group B streptococci. Among these,8cases (8.25%) required hospitalization due to the occurrence of symptoms that was included of three cases of sepsis, one cases of TTN4, and one case of MAS1.And for these babies were sent blood culture that based on the response of the laboratory blood cultures were negative in all cases of GBS and Enterobacter was reportedin only one sample.

The rate of transmission from mothers to infants was determined %49.2 in this study.

The mean age of them others was 25.9±4.2 years inthisstudy.69% of mothers were in 25 to30 years age group and older than 35 years age group had the lowest members (8%).

The mean gestational age among women with GBS negative culture was 37.96 ± 2.08 weeks and among women with GBS positive culture was 37.62±2.05 which there were no significant differences between two groups (P>0.05). (Diagram 2)

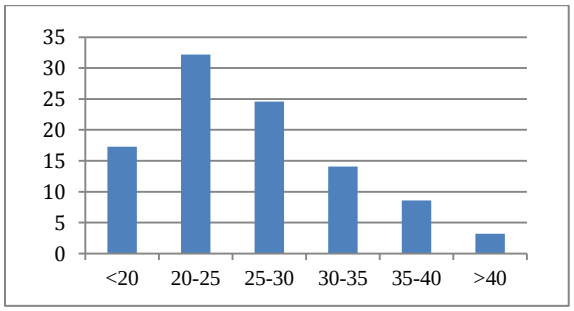

Diagram2: Distribution of maternal age at the time of pregnancy

Twelve percent of women with GBS positive culture (48patients) had fever.

In37 cases (9%), preterm delivery occurred, that of this number only 5 mothers (%13.5) were infected with Strep and there was no significant correlation between infection and preterm delivery (P> 0.05).

Three neonate of 37 premature newborn infants (0.7%) were infected which there was no significant correlation between being pre-term and infected with Group Streptococcus (p>0.05).

There was significant relationship between the rupture of membranes duration and Infection with GPS, so that the prevalence of GBS in infants who had PROM more than 18 hours was significantlygreater compared to infants who had PROM less than 18 hours(P=0). A comparison between neonates whose mothers had not PROM and the neonates delivered from mothers with PROM Less than 18 hours showed no significant differences (P>0.05).(Table 1)

Table 1: Frequency of neonatal GBS infection according to PROM duration

			PROM duration			Sum
			No PROM	<18 hours	>18 hours	
GBS	Positive	Number (%)	4(1)	5(1/3)	22(5/5)	31(7/8)
	Negative	Number (%)	327(81/8)	24(6)	18(4/5)	369(92/3)
Sum		Number (%)	331(82/8)	29(7/3)	40(10)	400(100)

Discussion and Conclusion

In this study a total of 400 mothers and their newborns enrolled into the study that in% 15.2 of mothers and% 7.75 of infants GBS culture was positive.

In study 1197 pregnant women were studied in Shiraz in year 2008, in this study pregnant women regardless of gestational age were studied. The GBS infection rate in newborns was determined %1.9 in this study that was more than the value found in our study. Perhaps the cause of this difference is that pregnant women were studied regardless of their gestational age. In this study the average age of the pregnancy was 32.8 weeks, but in our study, only pregnant women with gestational age of 35 to 37 weeks were studied (7).

In study that was conductedbynomura, 203pregnant women with a diagnosis of preterm

labor or PROM1were studied in Brazilin2009.in this study the colonization rate of GBS was determined %27.6 which the difference is justified due to the different sample size of two groups. In this study, the colonization rate of neonates determined % 3.1that was almost half the prevalence of the colonization of neonates in our study (8).

In another study was conducted in Turkey in year 2009(9), five hundreds pregnant women were studied who were hospitalized for vaginal delivery that GBS colonization in %9.2of them were reported that was somewhat less than the findings of the present study. One of the different items between these two proposals that might lead to the differences in the results of two studies was non- exclusion of women taking the antibiotic from turkey's study which this cansignificantlyreduce the incidence of GBS in that study. Another notable point in this study was the low incidence of GBS in the infants of this study than the newborns of our study (%1/6 against the %7.75). Also the rate of vertical transmission from mother's to infants in this study was only %15.2, which was much lower than%47 of our study.

In a study was conducted by Bakhtiari and colleagues in 2007 in Tehran (10)to evaluate the PCR method compared to culture methods for the diagnosis of B group streptococcus carriers, of 125 study pregnant cases who the sample was taken from them At their thirty-fifth to thirty-seventh weeks of pregnancy, Culture was positive in only10 cases, but, when using PCR as a diagnostic technique for GBS, twelve people (%9.6) had positive cultures. The sensitivity and specificity of PCR test in this study were determined 98% and83%, respectively.

In the year 1999 a study was done by Kubota in Japan (11) in order to investigate the relationship of the colonization of group B Streptococcus and pregnancy outcomes. The result of this study showed, there was no significant difference between the rates of preterm labor and PROM between GBS-positive *and GBS-negative women*. These findings were similar to our study.

In another study that was conducted in Trinidad in 2003by FITZROY A. ORRETT (12), the prevalence rate of GBS colonization was determined %32/9 in pregnant women under study who all of them were singlet on pregnant. Only 13 newborn born to these mothers were hospitalized that 5 cases hospitalized due to sepsis, 3 cases hospitalized due to RDS and 4cases hospitalized because of prematurity.

In a study was carried out by Kadanli and colleagues (13) in the year 2005inTurkey, 32% of 150 pregnant women under the study and%17.3 of their infants GBS were colonized by GBS which his much higher than our study results. The rate of vertical transmission from mother to child was %54.2 in this study which was similar to our study. In this study, the mean of gestational age at *GBS-negative women* were 39.1± 1.2 weeks and at *GBS-positive women* were 38.8± 1.4 that similar to our study, there was no difference in the mean of gestational age between the GBS-positive women and GBS-negative women.

In another study that was conducted by kunez & et al in Germany in 2003, 869 pregnant women and 845 baby were under study that only 657of them were mother and child. The rate of vertical transmission from mother to baby was determined %11.2 in this study. This value is much less than our study's finding that can be justified due to the differences between the health level of these two community.

In a study was carried out by Chaudhry and colleagues(15) in the year 2010inPakistan, 200 pregnant women were studied. In this study the transfer rate to infants were determined 53% that was similar to the results of our study. As well as the rate of GBS colonization was determined %5.8 in mothers, that the reason of this difference to our study result can be attributed to the different sampling method of these two studies. In the Chaudhry's study the samples were taken only from vaginal but in present study *Recto-vaginal samples* obtained from the pregnant women, also In our study, all individuals weregravid1, but in Chaudhry's study all gravity enrolled in the study.

Conclusions:

In this study, the prevalence of GBS in mothers was %15.2 and its prevalence in infants was

%7.75.With regard to the high prevalence of GBS colonization in pregnant women and high rates of transmission to their infants, further studies are necessary to set the protocol for prophylaxis against GBS in pregnant women and newborn infants.

Acknowledgement

Authors appreciate the staff of Obstetrics and Gynecology and laboratory ward of Rouhani hospital for their kind cooperation to prepare this article.

References

1.Jones FS. Studies in Bovine Mastitis: Iv. The Sources of Infection in Streptococcic Mastitis. J Exp Med.1918;28(6):735-48.

2.Gladstone IM, Ehrenkranz RA, Edberg SC, Baltimore RS. A ten-year review of neonatal sepsis and comparison with the previous fifty-year experience. Pediatr Infect Dis J. 1990;9(11):819-25.

3.Baker CJ, Barrett FF. Transmission of group B streptococci among parturient women and their neonates. J Pediatr. 1973;83(6):919-25.

4.Baker CJ. Group B streptococcal infections. Clin Perinatol. 1997;24(1):59-70.

5.Burman LG, Christensen P, Christensen K, Fryklund B, Helgesson AM, Svenningsen NW, et al. Prevention of excess neonatal morbidity associated with group B streptococci by vaginal chlorhexidine disinfection during labour. The Swedish Chlorhexidine Study Group. Lancet. 1992 11;340(8811):65-9.

6.Baker CJ, Goroff DK, Alpert S, et al. Vaginal colonization with group B streptococcus: a study in college women. J Infect Dis. 1977;135(3):392-7.

7.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.

8. Nomura ML, Passini Junior R, Oliveira UM, Calil R. Group B streptococcus maternal and neonatal colonization in preterm rupture of membranes and preterm labor. Rev Bras Ginecol Obstet. 2009;31(8):397-403.

9.Eren A, Kucukercan M ,Oguzoglu N, Unal N, Karateke A. The carriage of group B streptococci in Turkish pregnant women and its transmission rate in newborns and serotype distribution. Turk J Pediatr. 2005;47(1):28-33.

10.Bakhtiari R, Soltan Dallal M, Zaemi Yazdi J, Fallah J, Amir Mozaffari N, Pourmand M et al . Evaluation of PCR method for diagnosis of Group B Streptococcuscarriage in pregnant women. Iranian J Med Microbiology. 2007; 1(2):1-8.[persian]

11.Kubota. T, Jinushi. M, Sato. T, Machida. M. Colonization by group B streptococci and preterm birth . Contemp Rev Obstet Gynaecol. 1999;11(2):99-104.

12.Orrett FA. Colonization with Group B streptococci in pregnancy and outcome of infected neonates in Trinidad. Pediatr Int. 2003;45(3):319-23.

13.Kadanali A, Altoparlak U, Kadanali S. Maternal carriage and neonatal colonisation of group B streptococcus in eastern Turkey: prevalence, risk factors and antimicrobial resistance. Int J Clin Pract. 2005;59(4);437-440

14.Kunze M, Ziegler A, Fluegge K, Hentschel R, Proempeler H, Berner R. Colonization, serotypes and transmission rates of group B streptococci in pregnant women and their infants born at a single University Center in Germany. J Perinat Med. 2011;39(4):417-22.

15.Chaudhry BY, Akhtar N, Balouch AH. Vaginal carriage rate of group B Streptococcus in pregnant women and its transmission to neonates. J Ayub Med Coll Abbottabad. 2010 Oct;22(4):167-70.