ABSTRACT

OBJECTIVE: 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 nulliparity and gestational age 35-37 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% of 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=American College of Obstetricians and Gynecologists
AAP=American Academy of Pediatrics
TTN=Transient Tachypnea of Newborn
MAS=Meconium Aspiration Syndrome
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 1996, CDC in collaboration with ACOG and AAP recommended antimicrobial prophylaxis against this disease as an alternative for disease screening in women who risk the infection transmission was high in them formally (2). But a study of big cohort during 1998 and 1999 showed that Screening and prevention for obstruction in 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
carrier depends on the time of pregnancy period when sampling was performed in it and the used cultivation techniques but similar incidence observed 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 occur in 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 occurrence in newborn between 8 to 28 days will be considered as disease 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 pregnancy with 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 swabs samples obtained from the pregnant women’s vagina in weeks 35 to 37 were cultured on the environment of SBA (Sheep Blood Agar) and Mac Ager and at the same time direct smear for Gram staining was performed. 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 environment was 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, and suspected colonies of streptococci examined for resistance to bacitracin and CAMP test. Group B streptococci colonies in the vicinity of the S. Auresus cultivation created hemolysis halo in the form of the arrow that indicates the sample was positive CAMP and so B group streptococcus was 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 the Blood 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)
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, 8 cases (8.25%) required hospitalization due to the occurrence of symptoms that was included of three cases of sepsis, one cases of TTN, and one case of MAS. 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 in this study. 69% of mothers were in 25 to 30 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)

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

In 37 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 significantly greater 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

<table>
<thead>
<tr>
<th>PROM duration</th>
<th>No PROM</th>
<th>&gt;18 hours</th>
<th>&lt;18 hours</th>
<th>Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td>GBS Positive</td>
<td>Number</td>
<td>1 (0.7)</td>
<td>5 (1.3)</td>
<td>31 (7.8)</td>
</tr>
<tr>
<td>GBS Negative</td>
<td>Number</td>
<td>327 (81.8)</td>
<td>24 (6)</td>
<td>369 (92.2)</td>
</tr>
<tr>
<td>Sum</td>
<td>Number</td>
<td>331 (82.8)</td>
<td>29 (7.3)</td>
<td>400 (100)</td>
</tr>
</tbody>
</table>

**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 conducted by Nomura, 203 pregnant women with a diagnosis of preterm...
labor or PROM1 were studied in Brazil in 2009. 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 % 3.1 that 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 %9.2 of 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 can significantly reduce 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 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 only 10 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% and 83%, 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 2003 by 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 4 cases hospitalized because of prematurity.

In a study was carried out by Kadanli and colleagues (13) in the year 2005 in Turkey, 32% of 150 pregnant women under the study and %17.3 of their infants GBS were colonized by GBS which is 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 657 of 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 2010 in Pakistan, 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 were gravid 1, 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
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.

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References