

The Serotype Distribution of Group B Streptococci Isolated from Pregnant Women

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ÖZET

Hamilelerden İzole Edilen Grup B Streptokoklarda Serotip Dağılımı

B grubu streptokoklar (BGS, Streptococcus agalactiae), yenidoğan ve obstetrik sepsislerinin en sık etkenleridir. Yaşlı ve bağışıklık sistemi baskılanmış kişilerdeki septisemilerde giderek önemleri artmaktadır. Bu çalışmada 1026 gebeden vajinal ve rektal sürüntü örnekleri alınarak, B grubu streptokok saptanma oranı ve serotip dağılımı araştırılmıştır. Sürüntü örneklerinden gentamisin ve nalidiksik asit içeren Todd-Hewitt buyyona ekim yapılmıştır. BGS tanımı lateks aglütinasyon yöntemiyle yapılmıştır. Gebelerden alınan 100 örnekte BGS saptanmıştır (% 9.74) ve en sık saptanan serotip (%29) Tip Ia olmuştur. Bunu sırasıyla Tip II (%25), ve Tip III (%15) izlemiştir.

Anahtar kelimeler: B grubu streptokok, serotip, gebelik

SUMMARY

Group B streptococcus (GBS; Streptococcus agalactiae) is the most common cause of neonatal and obstetric sepsis and is an increasingly important cause of septicemia in elderly individuals and immunocompromised patients. In the present study, the serotype distribution and the prevalence of GBS isolates from 1026 pregnant women were studied by collecting vaginal and rectal swabs. The swabs were inoculated into the Todd-Hewitt broth containing gentamicin sulphate and nalidixic acid. GBS were identified by latex agglutination. A hundred women (% 9.74) were positive for GBS, resulting serotype Type Ia (%29) as the most frequent. Serotype II (%25) and III (%15) were other predominant serotypes among GBS isolates from pregnant women.

Key words: Grup B streptococci, serotype, pregnancy

INTRODUCTION

Group B streptococci (GBS) were used to be known to cause mastitis only in cows up to 1930's. After Lancefield and Hare isolated GBS strains in vaginal cultures from postpartum women in 1935, Fry was first reported that three cases of fatal puerperal sepsis caused by GBS. After 1960's increasing number

of newborn and maternal infections caused by this microorganisms were reported (1). Majority of the newborn infections occurred by vertical transmission and were also acquired from community. It is now well known that there is a high correlation between the maternal anorectal and urogenital carriage and the newborn infections. Colonization rate of GBS changes according to age, race, parity and sexual activity. GBS have been isolated from vaginal cultures of pregnant women at rates ranging from 5 to 35 %

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in industrialized countries (2). Low rates of vaginal colonization have been reported from some developing countries including Libya (5%), Saudi Arabia (13.9%) and India (5.8 %) (3), but higher rates have been reported from Ivory Coast (19.33%) (4) and Nigeria (19.5%) (5).

GBS are classified into serotypes on the basis of structural differences in capsular polysaccharides (Ia, Ib, II-VI) and serotyping has been used as an epidemiological tool to study GBS infection (6). In previous studies a distribution of capsular serotypes Ia, Ib, II and III, with few nontypeable isolates in neonates with early-onset disease and among pregnant women with vaginal GBS colonization have been reported. Late-onset neonatal disease and meningitis among neonates are due primarily to serotype III (3,7,8).

The aim of this study was to establish the rates of maternal carriage and serotype distribution of GBS isolated from a group of pregnant women in Turkey. Besides, this is the first report of serotype distribution of GBS from our country.

MATERIALS AND METHODS

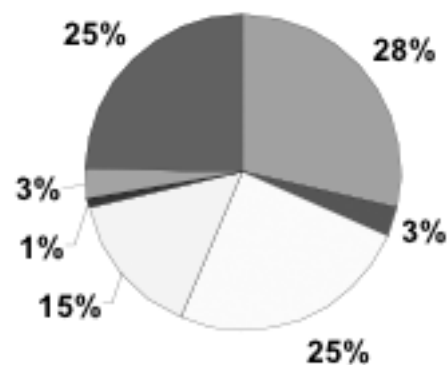
Bacterial isolates. During the period of January 2001 to April 2003, we studied 1026 pregnant women who gave birth to their children with vaginal delivery in Zeynep Kamil Women's and Children's Disease Education and Research Hospital, University of Kahramanmaraş, Faculty of Medicine, University of Maltepe, Faculty of Medicine, Gulhane Military Medical Academy, Faculty of Medicine. Vaginal and rectal swabs were taken at the time of delivery. All culture swabs were inoculated directly into the selective Todd-Hewitt Broth (THB) (Oxoid Ltd. U.K) containing gentamicin sulphate 8 µg/ml. (Schering Corporation), and nalidixic acid 15 µ/ml. (Winthrop Laboratories). The broth cultures were incubated overnight at 37° C and then streaked on to the 5 % sheep blood agar plates and were incubated under the same conditions. Colonies were identified presumptively by morphology, Gram's staining and catalase reactions. Gram positive cocci with catalase negative reaction were further identified according to their sensitivities to bacitracin (0.04 IU) sulfamethoxazole-trimethoprim (SXT, 23.75µg/ml-1,

25µg/ml) and CAMP factor positivities. Isolates were identified serologically by latex agglutination after enzyme extraction (Streptex kit, Wellcome Diagnostics, U.K). A hundred isolates of GBS from pregnant women were kept frozen in THB supplemented with sheep blood until serotyping were performed.

Serotyping. Serotyping was done by Hemolytic Streptococcus Group B Typing Sera (Denka Seiken, Japan). The typing sera used in this study were Ia, Ib, II, III, IV and V. Briefly; a colony of GBS was incubated overnight in 5 ml. of THB. The cells were then resuspended for digestion in a mixture of THB, swine pancreatic extract, and pH indicator. The pH was adjusted to range from 8.0 to 8.5, and the mixture was incubated for 1 hour at 37°C for digestion. After digestion, the mixture was suspended in 0.5 ml. of phosphate-buffered saline solution. This suspension was heated to 120°C for 30 minutes, and then agglutination tests were carried out on a glass slide with each of the 6 antisera. Serotype designation was determined by a strong agglutination reaction within 1 minute. If no designation could be made, the isolate was determined to be "non-typeable".

Figure 1. Serotype distribution of 100 GBS isolates

RESULTS



Of the 1026 women in labor, 100 (9.74%) were colonized with GBS and all of them were serotyped. The distribution of GBS serotypes isolated from the pregnant women is shown in Figure 1. No mothers were colonized with more than one serotype of GBS. About 75 of the 100 (75%) GBS isolates were typeable. Type Ia was the most frequent GBS serotype, isolated found in 29 (29%) of the 100 colonized wo-

men. Other most common serotypes were type II (25%) and type III (15%). Type V and Type Ib, were with the same percentage of 3%. Type IV being found in only one woman. However 25 (25%) isolates were non-typeable.

DISCUSSION

GBS have long been known to be among the main causal agents of neonatal infections. Between 5%-35% of pregnant women have been reported to be colonized with this pathogen (2,3). However serotyping is an important tool in epidemiological studies of Group B streptococcal (GBS) infections and ongoing surveillance to monitor GBS serotype distribution will be needed to guide the development and use of GBS conjugate vaccines.

To our knowledge this is the first study about serotyping of GBS from our country. GBS was isolated in 100 of 1026 pregnant women (9.74%). It has been demonstrated previously that swabbing of multiple sites, especially the lower vagina and anorectum increases the isolation rates from 4.6 to 41% (3). In our study colonization rate (9.74%) was relatively lower than industrialized countries. In industrialized countries type I, II and III have been distributed among GBS strains isolated from asymptomatic infants, children and adults. Type IV, V and non typeable strains have been rare (3).

Different studies have examined maternal colonization and serotype distribution have found very different results. In the study of Uh et al the colonization rate of GBS were found 5.9% and the common serotype was type Ib (48.3%); others were Ia (24.1%) and III (20.7%). In this study type II, V and VI were absent (9). In another study from Gambia maternal colonization of GBS were 22%, and common serotype was type V (38%). The second frequent type was II (28%), and the others were type I, III, IV respectively. (10). In 441 Japanese women, 16% were GBS positive; serotypes VI (24.7%) and VIII (35.6%) were the most common colonizers, whereas 11.3% were serotype III (11). In the Netherlands, Jacomina et al (12) found a 13.9% carrier rate. In the same study they found serotype distribution as follows: type III (29%), type Ib (27%), type II (12%) and type Ic

(10%).

In the study of Moyo et al (13) which was determined prevalence and capsular distribution, carriage rate was 31.6% and the common serotype was III (41.8%), others were: V (37.4%), Ia (11%), IV(3.3%), III(3.3%), II (1%).

Data about serotype distribution in GBS isolates from colonization is not yet available from our country. This is the first study of serotype distribution of GBS isolated from Turkish pregnant women. The most common serotype was Ia (29%). Type II and type III 25% and 15% respectively. Type Ib (3%), V (2%) and IV (1%) were other rare serotypes. The prevalence of non-typeable strains in our study was 25%. Other authors have reported that non-typeable strains account for 2%-24% of vaginal isolates (10,11,14,15). In our study, although non-typeable serotypes were higher than reported from other countries; the distribution of serotypes among GBS isolates from pregnant women is similar to that of the reports from industrialized countries (3).

The variability in frequency of non-typeable isolates and the differences in colonization rates of the other serotypes are in keeping with differing epidemiology of colonization between regions. Additional studies are needed to further elucidate the epidemiology, the pathogenicity and the relevance of this organism in Turkey.

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