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Antenatal Screening for Group B Streptococci to Prevent Early Neonatal Sepsis

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Original Research Article

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Abstract: Neonatal sepsis due to Group B Streptococcus (GBS) continues to be a major problem despite preventive strategies. The attack rate of neonatal GBS infection in India is approximately 1 per 1000 live births. However association of GBS colonisation with complicated labour has not been studied widely except a few reports. This study was carried out to detect GBS colonization in women during complicated labour and to document antibiotic susceptibility pattern of these isolates to prevent infections leading to unfavourable outcome in mothers and neonates. GBS colonisation was seen in women with complicated labour highlights the fact that further case control studies need to be done to associate the role of GBS colonisation with complicated labour.
Keywords: Neonatal, Streptococcus, Group, labour.

INTRODUCTION

Streptococcus agalactiae commonly known as Group B streptococcus is a well-known pathogen causing wound infections, upper respiratory tract infections and sepsis. However in the recent years GBS has gained importance as a rising pathogen due to its association with colonization in antenatal mothers and associated sepsis in newborn. In the mother, it is one of the important causes of chorioamnionitis, postpartum endometritis, urinary tract infections, post cesarean febrile illness, and rarely, endocarditis. GBS colonizes the lower genito-urinary and gastro intestinal tracts in adults, with the colonization being chronic or intermitten.

In antenatal mothers who are colonized with GBS, infection in fetus can occur either during the intra-uterine or in perinatal period.

This transmission rate from mother to fetus is estimated to be between 40- 73%. Of the babies born to colonized mothers, 1-2% develops infection in the immediate neonatal period (early onset sepsis). Over the past few years reduction in incidence of vertical transmission of GBS to the newborn is of main concern. Despite excellent progress in reducing the burden of GBS disease in the first week of life, commonly referred to as early-onset disease, GBS continues to be the leading cause of early-onset sepsis and meningitis in the United States. About 10-30% of pregnant women are colonized (1). The estimated incidence of neonatal GBS infection in colonised antenatal mothers and infants are 10 and 50 per cent respectively in india (2).

The Centres for Disease Control (CDC) recommends that routine screening must be carried out in all pregnant women between 35-37 weeks of gestation for vaginal and rectal GBS colonization in developed countries. However no such guidelines exist in developing countries like India. Using this strategy, GBS infection among newborn in the USA has been reduced from 1.7-1.9 per 1000 live births in the early 1990s, to 0.34-0.37 per 1000 newborn in 2008 (6).

The GBS colonization rate in the vaginal flora of pregnant women varied from 2% to 30.9% as reported by various workers [1-5]. This study was undertaken to analyse the magnitude of this problem in pregnant women in our area, to understand the antibiotic sensitivity pattern and to formulate preventive strategies to prevent infection in newborn

MATERIALS AND METHODS

Study Area and Period

The present hospital based cross sectional study was carried out in the Department of Microbiology, Sree Balaji Medical College, and Chennai from June 2017 to December2017. Source Population 400 pregnant women were studied attending the antenatal clinics. These women were in the age group of 19 years to 37 years.

Processing and Analysis

High vaginal swab was collected from antenatal women with complicated labour (PROM and Pre term labour) attending OBG labour room. The swabs were immediately transported to the Microbiology laboratory. One swab was used for direct gram staining and the other swab was inoculated on to sheep blood agar containing 5% sheep blood; it was incubated at 37ºC for 24-48 hours.

Identification was done based on gram stain, colony morphology, catalase reaction, CAMP test, hippurate hydrolysis test. The Presumptive Diagnosis of GBS was based on the following Criteria Direct gram staining showing gram positive cocci arranged in pairs and short chains.

The colony appearance of GBS on sheep blood agar at 24 hours is usually grey, smooth, shiny, convex, moist, regular, soft and mucoid in appearance and about 1 mm in diameter, often surrounded by a small hazy zone of beta hemolysis. The confirmation of GBS was madebased on catalase activity. Other confirmatory tests carried out were CAMP and Hippurate hydrolysis test. Antimicrobial sensitivity of the GBS was done by the Kirby-Bauer disc diffusion. Five antibiotic discs were employed namely Penicillin (10µ g), Erythromycin 15µg Ceftriaxone e 30 µg), Clindamycin (2 µg). Cefazolin (30µg), Cotrimoxazole (30 µg) and Ciprofloxacin (30µg) and the data was analyzed and interpreted.

RESULTS AND DISCUSSION

In the present study, out of 400 women, 25 (6%) showed GBS colonization (figure 1). A total of 400 gravid women who were attending to OBG Department were included in this study. Monyama, *et al*. [3] showed that 30.9% of pregnant women were colonized by GBS. In a study done by KP Patil, *et al*. showed the GBS carriage rate 12.5%. In comparison to the above studies, our study shows the incidence rate of 6.0%, which is lower. In a study done by Fareha *et al*. the colonization rate was 2% .Our incidence rate was found to be higher. The incidence rate in our study (6%) correlates with the study done by tupili ramya, *et al.* [5], which also showed the colonization rate of 7% and Madhavi *et al*. [4] with a colonization rate of 7.5%

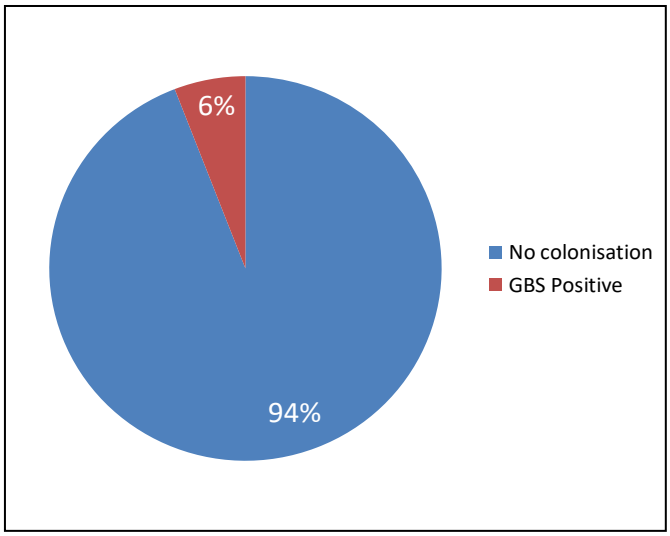

Fig-1: Distribution of Group B Streptococci isolates from high vaginal swabs among antenatal women screened during labour (n=400)

The reasons for variation in GBS maternal colonization in different geographic areas may be attributed to various reasons which mainly include the socioeconomic factors and personal hygiene by antenatal mothers .Other factors may be varying clinical practices, prior antibiotic therapy, and technique of sample collection and processing. Ethnic and genetic factors might play a role in variation of the rates of infection with GBS.

Eight (32%) of the colonized women had premature rupture of membranes and 12(48%) had preterm labour. Four (16%) of them were multigravida with previous bad obstetric history. One patient had abortion at 20 wks gestation (figure 2).

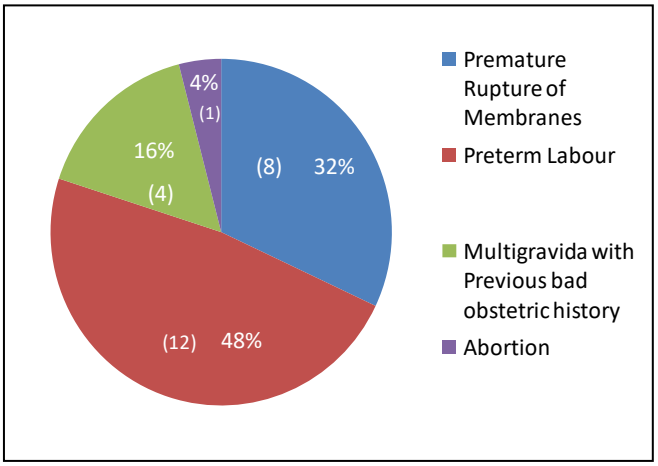

Fig-2: Complications that occurred during labour in patients with positive culture (n= 25)

In a study done by KP Patil *et al*. premature rupture of membranes was seen in 11% of neonates which is low when compared to our study. Khatoon F *et al*. has showed 5.6 % which has a similar result to this study. While the significance of GBS colonization as a cause of preterm delivery is gaining importance, its role in miscarriages has not been attributed to. Conflicting reports have been published to explain the role of GBS infection and miscarriage (2- 3). There was no significant association between pregnant women who had a history of miscarriages, stillbirth and group B streptococcus colonisation in the current study.

Empirically antibiotics was started in 14(66%) of the colonized mothers out of which one baby developed blood culture proven sepsis due to Group B Streptococci despite antibiotic treatment (Figure 2).

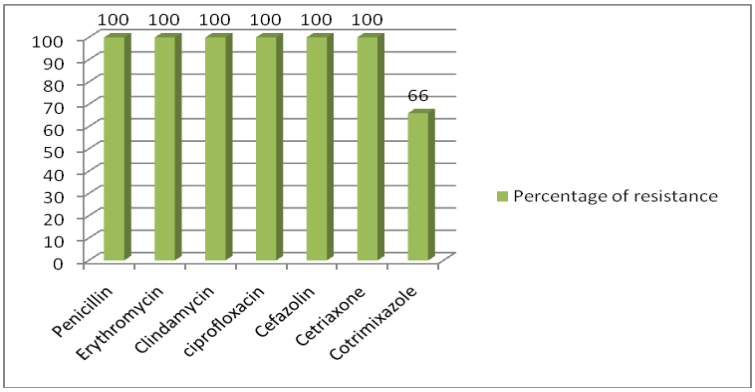

Fig-3: Antibiotic sensitivity pattern of GBS in colonised mothers treated with empirical antibiotics (n= 14)

According to revised CDC guidelines for the prevention of neonatal GBS disease, all pregnant women should be screened at 35–37 weeks' gestation for vaginal and rectal GBS colonization. IAP administration, at the time of labor or rupture of membranes, should be performed in several cases: 1) women who tested positive for GBS colonization, except those with a planned caesarean section before onset of labor and with intact amniotic membranes; 2) women in whom screening was not performed or results were not available at the time of labor or delivery, and presented at least one of any following conditions: a) women who were <37 weeks and 0 days' gestation; b) who had a duration of membrane rupture ≥18 hours; c) who had a temperature of ≥38°C.

Moreover, IAP is indicated in: 1) women positive for GBS isolated from the urine at any time; 2) women with symptomatic or asymptomatic GBS urinary tract infection detected during their current pregnancy; 3) women who had a previous infant with invasive GBS disease.

Penicillin is the recommended IAP agent, ampicillin is routinely administered as a standard dose of 2 g intravenously from the onset of labor plus 1 g intravenously every 4 hours until delivery. Beta-lactam allergic patients receive erythromycin or clindamycin intravenously in equivalent dosage. Women with reported beta-lactam allergy, but at low risk for anaphylaxis should receive cephazolin, while those at high risk of anaphylaxis (prior history of anaphylaxis, angioedema, respiratory distress or urticaria following administration of a penicillin or cephalosporin) should receive clindamycin (if the GBS is susceptible) or vancomycin.

The IAP has been judged totally appropriate if all items were in accordance with the guidelines, partially appropriate if antibiotic was chosen from preferred or alternative antibiotics suggested by the guidelines, but at least one of the other main components did not follow adherence to the guidelines, and inappropriate if the antibiotic choice was not recommended by the guidelines or all four criteria were considered as non-compliant with the guidelines.

All the group-B streptococci showed 100% sensitivity to Penicillin, Erythromycin, and Clindamycin, ciprofloxacin, Cefazolin, Cetriaxone and only 66% sensitivity to Cotrimoxazole.

According to Jannati, *et al*. [6] all isolates was susceptible to ampicillin, vancomycin and penicillin. 96.7% and 93% of isolates were susceptible to erythromycin and clindamycin respectively and 83.9%, 14.2%, 12.5% isolates were resistant to Cotrimoxazole, ciprofloxacin and ceftriaxone respectively. According to Tupili *et al*. all the strains were 100% sensitive to Ampicillin, Penicillin, Ceftriaxone, Vancomycin and 90.47% sensitive to Clindamycin.

REFERENCES

1. Khatoon F, Nigam A, Sharma NR, Srivastava R, Sangal R, Malik N. Prevalence and risk factors for group B streptococcal colonization in pregnant women in northern India. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2016 Dec 7;5(12):4361-4.
2. Patil KP, Singla SS, Nagmoti MB, Swamy MK. Group B Streptococci Colonization in Pregnant Women: Is Screening Necessary? J South Asian Feder Obst Gynae. 2013;5(2):64-67.
3. Monyama MC, Bolukaoto JY, Chukwu MO, Maloba MR, Moyo SR, Mavenyengwa RT, Nchabeleng M, Lebelo SL. Group B streptococcus colonisation in pregnant women at Dr. George Mukhari Hospital, South Africa. Southern African Journal of Infectious Diseases. 2016 Jul 18;31(3):74-8.
4. Ding S, Chen JS, Luan D, Boey FY, Madhavi S, Lou XW. Graphene-supported anatase TiO 2 nanosheets for fast lithium storage. Chemical Communications. 2011;47(20):5780-2.
5. Ramya T, Naidu KV, Gangaram U. Isolation of Group B Streptococci from Antenatal Women. Int. J. Curr. Microbiol. App. Sci. 2016;5(5):848-54.
6. Jannati E, Roshani M, Arzanlou MO, Habibzadeh S, Rahimi G, Shapuri R. Capsular serotype and antibiotic resistance of group B streptococci isolated from pregnant women in Ardabil, Iran. Iranian journal of microbiology. 2012 Sep;4(3):130.