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Prevalence of Group B Streptococcal Carriage in Pregnant Women

KEYWORDS: Group B streptococci, pregnancy, colonisation.

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ABSTRACT *Group B streptococci (GBS), also known as Streptococcus agalactiae, constitute one of the leading pathogens associated with early and late onset neonatal sepsis. Early onset neonatal sepsis is usually due to vaginal carriage in the mother and vertical transmission to the newborn infant during birth. 50 antenatal cases were screened for Group B streptococcal carriage during 35-37 weeks of pregnancy out of which only one case (2%) was found to be colonised with Group B streptococci. Antimicrobial susceptibility testing was done for the isolate. Appropriate antibiotic prophylaxis is necessary to prevent maternal complications and neonatal sepsis.*

Group B streptococci (GBS) are emerging pathogens whose carriage may result in a spectrum of conditions from asymptomatic colonization to sepsis in a pregnant woman and her newborn. The lower gastrointestinal tract is the most likely human reservoir of GBS, with secondary spread to the genitourinary tract.

Group B streptococci, also known as Streptococcus agalactiae, constitute one of the leading pathogens associated with both early and late onset neonatal sepsis. Early onset neonatal sepsis is normally related to vaginal carriage in the mother and subsequent vertical transmission during birth. GBS is also responsible for adverse pregnancy outcomes like premature rupture of membranes, preterm labor, clinical and subclinical chorioamnionitis[1].

GBS carriage in pregnant women varies with the ethnic group, geographic area and age. Identification of colonization is important for taking preventive measures, such as antibiotic prophylaxis against neonatal disease[2]. To reduce the incidence of neonatal disease caused by GBS, the Centers for Disease Control and Prevention (CDC) recommends the use of intrapartum antibiotic prophylaxis in pregnant women who are carriers of GBS[3].

MATERIALS AND METHODS

Fifty vaginal swabs were collected from pregnant women in the gestational age of 35-37 weeks attending the antenatal clinic in a tertiary care hospital. The study was conducted over a period of one month.

Selection Criteria: Pregnant women in 35-37 weeks of pregnancy were selected for the study. Those who had had no intake of antibiotics within the past 2 weeks and/or with no pre-existing medical disorders complicating pregnancy were included in the study.

The lower vagina (introitus) is most suitable for culturing for streptococcal colonization. Two swabs were used to collect samples from each pregnant woman prior to the 1st pelvic examination without any antiseptic preparation of the perineum or vulva.

One swab was used to make wet film and Gram stain and the other swab was used for cultures. The wet film was examined for the presence of motile Trichomonas vaginalis trophozoites. The Gram stained smear was examined for the presence of candidosis, bacterial vaginosis and gonococcal infection. The 2nd swab was inoculated on blood agar medium and incubated at 35-37°C in a humid atmosphere in air plus 5-10% carbon dioxide. Beta- haemolytic colonies that were about 2mm in diameter were taken up for further processing. Gram staining was done; those having 4-6 gram positive cocci in chains were considered. Catalase test was done.

CAMP test was done for the isolates that were catalase negative. Area of increased haemolysis occurs where the beta-haemolysin secreted by the Staphylococcus and the CAMP factor secreted by the Group B streptococcus intersect.

Hippurate hydrolysis test was done for the isolate. In the test of Hwang and Ederer (1975) all the group B streptococci hydrolyse sodium hippurate but groups A, C, F and G do not. Some Group D and very few viridans Streptococci do so.

Latex agglutination test was done for serogrouping of the isolates. The HiStrep™ latex test kit LK06-25NO was used for serogrouping.

Antibiotic susceptibility testing was performed by Kirby-Bauer disc diffusion method with the following antimicrobial drugs:

- Penicillin (10 U)
- Amoxycillin (10µg)
- Gentamicin (10µg)
- Erythromycin (15µg)
- Ceftriaxone (30µg)
- Ciprofloxacin (5µg)

RESULTS

Table 1: Age distribution of pregnant women taken for the study

Age group	No. of cases
10-20	24
21-30	24

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31-40	2
Total	50

Age-wise distribution of pregnant women from whom vaginal swabs were collected is shown in Table 1 and Fig.1. In the age group of 10-20 years (most were in between the age groups of 18-20years) there were 24 cases. They were all primigravidas. There were 24 cases in the age group of 21-30 years and 2 cases were between 31-40 years.

Table 2: Case distribution as per gestation period

Gestation period (weeks)	No. of cases
35	21
36	13
37	16

Table 2 and Fig. 2 show the case distribution of pregnant women according to their period of gestation. Out of a total of 50 cases examined, 21 cases were in the 35 weeks, 13 in 36 weeks and 16 cases were in the 37 weeks of gestation. The period of 35-37 weeks of pregnancy is chosen to screen for Group B streptococci as chances of detection are better and incidence of neonatal septicaemia is more in the newborns of these women who carry the organism.

Fig. 1: Age distribution of pregnant women in positive cases

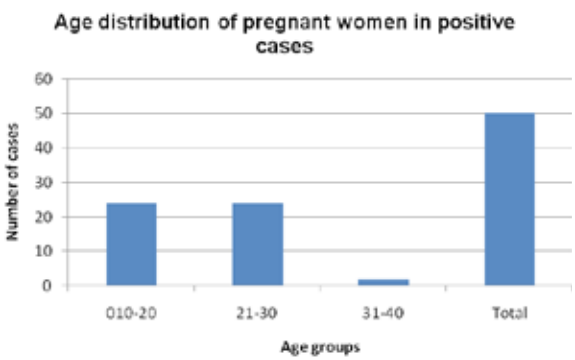

Fig. 2: Case distribution as per gestation period

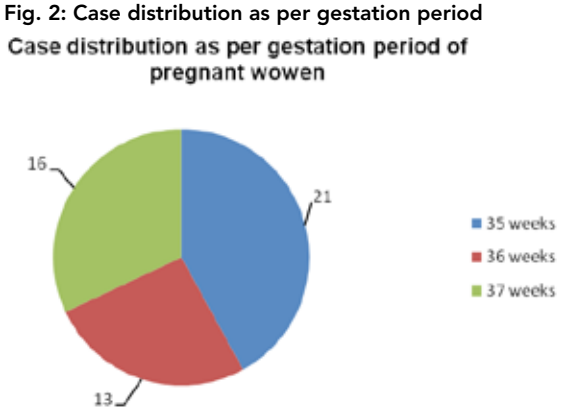

Fig. 3: Women testing positive for Group B streptococci

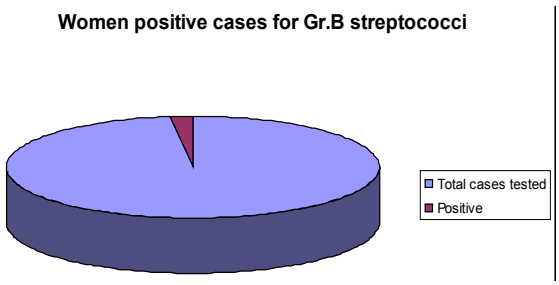

Fig. 4: Sensitivity and resistance to various antibiotics for Group B streptococci isolated

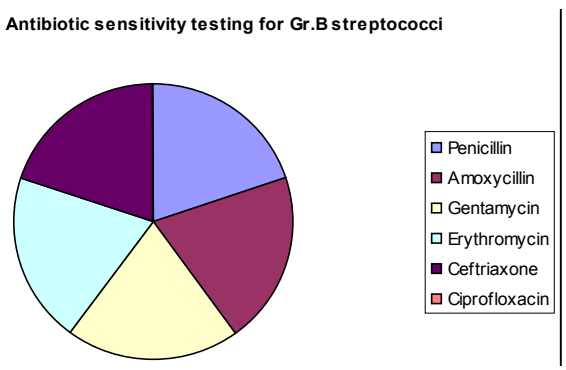

Table 3: No. of women testing positive for Gr. B streptococci

Total number tested	Positive cases
50	01 (2%)

Table 3 and Figure 3 shows only 2% positivity for Group B streptococcal carriage in pregnant women

Table 4: No. of positive cases as per age group for Group B streptococci (n = 50)

Age group (Years)	No. of positive cases
10 - 20	-
21 – 30	1
31 - 40	-

Table 4 shows that the positive case for group B streptococci was in the age group of 21-30 years.

Table 5: No. of positive cases in 35 – 37 weeks of gestation period

Period of gestation (weeks)	No. of positive cases
35	01 (2%)
36	-
37	-
Total	01 (2%)

The case positive for Group B streptococci was a 23 year-old housewife in 35 weeks of pregnancy (Table 5).

Table 6: Sensitivity and resistance to various antibiotics for Group B streptococci (n=1)

Antibiotic used	No. of sensitive cases	No. of resistant cases
Penicillin	1	-
Amoxycillin	1	-
Gentamicin	1	-
Erythromycin	1	-
Ceftriaxone	1	-
Ciprofloxacin	-	1
Total	5 (83.3%)	1 (16.7%)

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The group B streptococcal isolate was susceptible to all the tested antibiotics except ciprofloxacin (Table 6 and fig 4).

DISCUSSION

Group B Streptococci (GBS) have gained importance in the past decades because of its ability to cause serious infections in newborns like septicaemia and meningitis. The prevalence of GBS varies from place to place [4]. It has not been adequately studied from developing countries like ours. The present study was carried out to know the prevalence rate of group B Streptococci colonizing pregnant women attending the antenatal clinic in a tertiary care hospital. The effects of the geographical region and race on the incidence of GBS may be related to the differences in nutrition, socioeconomic status, sexually transmitted diseases or host immunity[1].

Fifty samples of vaginal swabs from 35-37 weeks gestation were taken and studied for the presence of group B Streptococci. Table 1 shows majority of pregnant women taken up for study were in the age group of 10-20 years and 21-30 years (24 numbers each).

Table 2 shows the case distribution according to the period of pregnancy. There were more cases (21) in 35 weeks of pregnancy followed by 16 cases in 35 weeks and 13 cases only in 36 weeks. Table 3 shows that only 2% of the cases were positive for group B Streptococci. Table 4 shows that only 1 case (2%) was positive in the age group of 21-30 years. She was a 23 year old housewife named Gowri Y. in 35 weeks of pregnancy. There was no positive case in the age groups 10-20 and 31-40 years.

Group B streptococcal colonisation rate has been reported to be 2.52% in pregnant women and 1.26% in neonates in an Indian study [5]. Group B streptococcus was initially thought to be a commensal until 1937. But in 1938 Fry R. M., reported 7 cases of Group B streptococci associated puerperal fever with 3 deaths. There were reports of Group B streptococci acting as a significant maternal and neonatal pathogen with mortality rate of 15-50% from US and Western Europe during 1970s and 1980s [6].

There are 9 serotypes out of which 3 (Ia, III and V), which account for 87% of invasive diseases in new born infants and parturient women[7]. A polysaccharide capsule is the most important virulent factor [6].The lower rates of Group B streptococcal diseases in India may be due to the prevalence of less virulent strains or high levels of transplacentally acquired protective antibody in serum and unrecognised causes of neonatal or premature deaths or still birth. An Australian study reported the incidence of Group B streptococci in 8.6% cases and a positivity rate of 1.7% in culture[8].

The prevalence rate of neonatal sepsis is 1.7 – 0.6 per 1000 newborn babies. The CDC recommends that if GBS is isolated in antenatal woman, she should receive intrapartum Penicillin G 5 million units , then 2.5 million units every 4 hrs for all those with normal deliveries. Intrapartum chemoprophylaxis decrease the neonatal colonization and significantly decrease the risk of infant disease and in future GBS infection could be prevented with immunoprophylaxis and vaccination [9]. A vaccine can stimulate upto 4 fold rise in antibody concentration in 90 % of the recipients after 8 weeks of administration [10].

Table 6 shows our isolate was sensitive to penicillin, erythromycin, amoxicillin , gentamicin, ceftriaxone and resistant to ciprofloxacin .

Chemoprophylaxis is recommended for group B streptococcal carriage in pregnant women [6]. Penicillin G 5 million units then 2.5 million every 4 hrs after delivery , or Ampicillin 2 gm in i.v load ; 1 gm every 4 hrly. In Penicillin allergic patients , Cefazolin 2 gm i.v dose is given and then 1 gm is given every 8 hrly until delivery . In Penicillin allergic patients , Clindamycin 900 mg i.v every 8 hrly or Erythromycin 500 mg i.v every 6 hrly can also be given [11]. All the group B isolates were sensitive to ampicillin , erythromycin , penicillin followed by chloramphenicol and resistant to gentamicin followed by tetracycline and kanamycin in the Indian study [5].

Universal culture-based screening at 35 to 37 weeks of gestation is being done in most hospitals and the administration of intrapartum antibiotics have decreased the rate of early-neonatal GBS sepsis, prevention of preterm birth and preterm premature rupture of membranes necessitate the promotion of new strategies for eradication of GBS carriage [1]. Ideally, immunization strategies against GBS would help prevent the adverse maternal and neonatal effects of GBS colonization.

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