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Group B Streptococcus Colonization: Prevalence and its Effect on Maternal and Neonatal Outcome

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Abstract: ***Introduction: Group B Streptococcus (GBS), a leading cause of perinatal morbidity and mortality, asymptomatically colonizes the vaginal and rectal areas of women.The colonization of these regions is a risk factor for subsequent infection in pregnant women and newborns.The aim of this study was to find out the extent of Group B Streptococcus colonization in pregnant women and to determine the maternal and neonatal outcome in thosecolonized with Group B Streptococcus. Methods: It was a prospective study in which vaginal and rectal samples were collected from 485 healthy pregnant women, between the 35th and 37th weeks of pregnancy enrolled in the antenatal OPD at the Obstetrics and Gynecology department of Lady Hardinge Medical college and associated hospital. All the samples were cultured and subcultured after enrichment in a selective medium. Results: GBS strains were isolated from 13 out of 485 women, corresponding to detection rates of vaginal/rectal GBS colonization of 2.89%.Of the organisms the high vaginal swab in most had growth of Ecoli (88.6%) and enterococci (48.7%).The colonization rates in vagina, rectum and both vagina and rectum were 1.34%, 0.66% and 0.89% respectively.The occurrence of premature rupture of membranes was comparatively higher in the GBS positive group than in the GBS negative group (23% verses 11%).There was an increased frequency of preterm labor in women who were GBS positive compared to GBS negative women (30.7% and 9.2%). However neonatal outcome were favourable in both the groups. Conclusions: As the rate of GBS colonization in our population was low so, there is likely to be the possibility of increasing the chances of antibiotic resistance in the women due to intrapartum antibiotic prophylaxis.***

1. Introduction

Group B Streptococcus (GBS) is a gram positive coccus and facultative anaerobe. They are normally present in vagina asymptomatically, however in some women with low immunity GBS can cause maternal and neonatal complications leading to a high maternal and neonatal mortality and morbidity[1].

In pregnancy colonization with GBS may lead to obstetric complications like premature rupture of membranes (PROM), preterm delivery, chorioamnionitis, postpartum endometritis, wound infection, sepsis and asymptomatic bacteriuria[2].

The neonates acquire the GBS infection during the delivery and GBS can cause neonatal sepsis.GBS can also pass through the cervix without causing serious cervicitis, and cross intact amniotic fluid causing amnionitis thereby infecting the fetus in the uterus[3]. Two distinct clinical syndromes namely - the early-onset neonatal disease (EOGBS) and the late-onset neonatal disease (LOGBS), due to GBS infection are known[4]. At birth 50% neonates are colonized when born to GBS positive women and out of that 2% of neonates develop early onset GBS infection[1].

Epidemiological studies in India have shown lower colonization and infection rates in general[3]. Vertical transmission varies from 40-70% of newborns whereas, 1-2% full term infants born to infected mothers suffer from severe clinical sequelae like sepsis, pneumonia, or meningitis[2].

Intensified efforts were made to prevent this devastating infection by identifying and treating pregnant women who carry GBS or who are at highest risk of transmitting the organism to a newborn. Hence, CDC recommends prenatal screening for vaginal andrectal GBS colonization of all pregnant women between 35-37 weeks of gestation and subsequent administration of antimicrobial drugs to women positive for GBS at the time of delivery[3].According to RCOG, it is recommended that 3 g intravenous benzyl penicillin be given as soon as possible after the onset of labor and 1.5 g 4th hourly until delivery. Clindamycin 900 mg should be given intravenously 8th hourly to those allergic to benzyl penicillin[5].

Owing to limited studies in India, the spectrum of GBS disease remains a largely under recognized problem. Thus, there is a need for large prospective studies based on an optimum screening protocol for Indian population to know the exact prevalence of GBS in our population and association of GBS with maternal and neonatal outcome.

2. Methodology

A prospective observational study was conducted between november2015 to march 2017 at Lady Hardinge Medical College & smt. Sucheta Kriplani Hospital, a tertiary care teaching institute located at New Delhi. Pregnant women with a gestational age of 35-37 weeks, attending the antenatal clinic of LHMC, were enrolled in the study and followed up until delivery. A detailed obstetric history was taken especially to identify the risk factors for GBS colonization. Those with history of intake of antibiotics

during the past six weeks or having fever ,UTI , cough or preexisting medical disorders complicating pregnancy were excluded from the study. This study was approved by the Ethical committee of LHMC and informed consent was obtained from the patients.All the pregnant women enrolled in the study received standard antenatal care along with iron and folic acid supplementation.

After taking detailed history and consent for screening, vaginal and anal swabs were collected from 485 obstetric patients at 35-37 weeks of gestation.These swabs were introduced in to 5 ml of enrichment broth [toddhewittbrothwithgentamicin (8mcg/ml) and nalidixicacid (15mcg/ml)]andincubatedovernight at 35°C aerobically with 5 to 10% CO_2 (carbon dioxide). After 24 to 36 hours, 10 ul loopful of the todd hewitt broth culture was then subcultured on 5% sheep blood agar and theplates were incubated overnight at 37°C in 10% CO_2 (carbon dioxide). Then, the enrichment broth subcultures were examined for the presence of GBS colonies.

Betahemolytic colonies on sheep blood agar plates, suggestive of GBS were identified by using standard microbiological techniques (smear microscopy, catalase test, CAMP test, hippurate hydrolysis and bacitracin susceptibility).These colonies were further confirmed by sero grouping using a latex agglutination antigen-detection kit. Results of the study were tabulated and analysed using standard statistical methods such as SPSS 16.0 software version.The P-value of less than 0.05 was considered statistically significant

3. Results

Out of 485 pregnant women enrolled in the study, 36 women were lost to follow up. Of the remaining 449 women, GBS colonies were isolated from 13 women in their vaginal and rectal swab culture. Thus the GBS colonization rate was 2.89% (13 out of 449 women). Of the 13 colonized patients, six had strains cultured only from vaginal swabs, while three had strains isolated only from rectal swabs and another four had strains isolated simultaneously from both the vaginal and rectal swabs.The rate of detection was more in vagina than rectum (46.1% verses 23.1%) and it was 30.8% in combination sample of both vagina and rectum.

The age of the participants ranged from 18 years to 36 years with a mean ± SD of 25.27$\pm$3.64 years.The BMI in majority of women in both GBS positive (77%) and negative group (78.4%) was normal (18.5 to 24.9).

In pregnant women, colonization of vagina with more than one micro organism apart from GBS was present.In one third of the women (33.4%) vaginal swab (HVS) was found to be positive for micro organisms other than GBS and most commonly were Ecoli (88.6%) and enterococci (48.7%). (table 1)

Table 1: Profile of micro organisms in women with positive vaginal colonization (HVS) other than GBS(n=150)

Organisms	Number (n=150)*	Percentage
Ecoli	133	88.6
Enterococci	73	48.7
Klebsiella	51	34
Staphylococcus	46	30.6
Candida	30	30.6
Streptococci viridans	18	12
MRSA	17	11.3
Mixed	5	3.3
Proteus	1	0.7

In the present study the occurrence of premature rupture of membranes was comparatively higher in the GBS positive group than in the GBS negative group (23% verses 11%, p=0.44).There was also higher incidence of preterm labor in women who were GBS positive compared to GBS negative women (30.7% and 9.2%). The difference in the rates of preterm labor in both the groups was statistically significant (p= 0.03).The overall neonatal outcome in both the groups was favourable.

Table 2: Distribution of Pregnant Women according to maternal and neonatal complications with respect to GBS and other vaginal organism.

Complications	GBS positive		GBS negative	
	HVS positive (n=11)	HVS negative (n=2)	HVS positive (n=139)	HVS negative (n=297)
Premature rupture of membranes	3	0	25	23
	27%	0%	18%	7.70%
Preterm labor	4	0	14	26
	36.40%	0%	10.10%	8.80%
Neonatal sepsis	1	0	2	1
	9.10%	0%	1.40%	0.30%
Neonatal death	0	0	2	0
	0%	0%	1.43%	0%
Pyrexia	1	0	4	11
	9.10%	0%	2.90%	3.70%
Stitchline discharge	1	0	3	5
	9.10%	0%	2.20%	1.70%

4. Discussion

The GBS colonization rate in our study was 2.89%.In the present study, despite using selective enrichment broth, we observed GBS colonization only in a small number of pregnant women (2.89%), suggesting that maternal colonization with GBS is low in our population.Our rate was comparable to that of other Indian studies by Sharmila V etal[6],Kulkarni A et al[7] and Rita M etal[8]in which GBS colonization rate varied from 1.6% to 2.5%.

Out of total 449 women, the colonization rates of GBS in vagina, rectum and both vagina and rectum were 1.34%, 0.66% and 0.89% respectively. The results of our study was comparable to study done by Joachim A etal[9](2009) who also reported a higher detection of GBS in the vagina compared to rectum(12.3% and 5%).

Pregnancy state is associated with an increased susceptibility to infections in comparison to non pregnant women.In our

study various maternal complications were premature rupture of membranes and preterm term labor pains and were more in GBS positive women. However, we did not find any case with chorioamnionitis, postpartum endometritis, wound sepsis and bacteriuria. The association of GBS colonization with PROM and preterm labor was first reported by Regan JA etal[2] (1981) who found an increased incidence of PROM and preterm labor among women colonized with GBS.

In GBS positive group, one each out of 13 women (7.7%) had pyrexia and stitch line discharge.Our study was similar to a study done by ShetA et al[10] (2004)in which less commonly GBS was isolated in cases of postoperative wound infection, pelvic abscess, septic pelvic thrombophlebitis and osteomyelitis.

At birth, 50-65% ofinfants who are born to colonized mothers have positive GBS cultures from mucus membranes and skin (external ear canal, throat, umbilicus and anorectalsites)[5]. Approximately 98% of colonized newborns remain healthy, but 1-2% develops invasive disease.In the present study one out of 13 women (7.7%) with positive GBS colonization had neonatal sepsis in the baby however the GBS culture in the baby was found to be negative.

5. Conclusion

The GBS colonization rate was 2.89%.The exact association of GBS colonization with maternal complications is difficult to comment upon because of less number of GBS positive women.In all these scenarios mentioned in the present study, the 2010 CDC guidelines recommendation of a universal culture-based strategy for identifying candidates for GBS intrapartum antibiotic prophylaxis should be reconsidered in routine practice in our population because analyzing the risks and benefits and in view of low GBS colonization rate, its concluded that there could be a possibility of increasing the chances of antibiotic resistance in the women due to intrapartum antibiotic prophylaxis which is not needed. However, more studies on this pattern need to be carried out to confirm these findings.

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