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Prevalence of group B streptococcus (GBS) in third trimester – A prospective cross sectional study

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Abstract
Introduction: Group B streptococcus (GBS) is a leading cause of morbidity and mortality among newborns. Universal screening for GBS among women at 35 to 37 weeks of gestation is more effective than administration of intrapartum antibiotics based on risk factors. Lower vaginal and rectal cultures for GBS are collected at 35 to 37 weeks of gestation, and routine clindamycin and erythromycin susceptibility testing is performed in women allergic to penicillin. Women with GBS bacteriuria in the current pregnancy and those who previously delivered a GBS-septic newborn are not screened but automatically receive intrapartum antibiotics.

Aims and Objectives

1 To assess the prevalence of G B S in the third trimester of pregnancy.
2 To study the antibiotic the isolated organism is sensitive to.
3 To assess the maternal and fetal morbidity in terms of the infection prevalence.

Materials & Methods: A prospective cross sectional study was conducted in M S Ramaiah medical college, among 350 women with the gestational age of more 32 weeks. Vaginal swabs were collected for all the women and culture sensitivity was performed and results analyzed.

Results: Women between the ages of 18 to 40 were included in the study, with the mean and standard deviation of 25.30 ± 4.95. 9 (2.57%) out of the total 350 pregnant women were found to be positive for GBS colonization in the culture.

Conclusion: The rate of GBS Colonization in the Vagina or rectum among pregnant women varies with ethnic group, geographic area and age. In the study we have conducted the rate of GBS colonization was 2.57%. All the organism's isolated were found to be sensitive to penicillin, erythromycin and cepholosporins. They study needs to be carried out in a larger sample before a vaccine is proposed.

Keywords: Group B streptococcus, antibiotic, third trimester, pregnancy.

Introduction

The GBS is a gram-positive diplococcus (Streptococcus agalactiae) and is normally present in genitourinary tract of 15-25 per cent of the total women population [1]. Vertical transmission of this organisms from the mother to the fetus may lead to neonatal GBS disease, Colonization of this organism in the blood or CSF may leads to septicemia and meningitis in neonates respectively [2 – 3]. In the United States, 5 - 20 per cent mortality in neonates (aged < 7 days) is due to septicemia caused by GBS because of exposure of the organism in the maternal genital tract [4]. The various complication GBS causes in both the mother and fetus are premature rupture of membrane, preterm labor, still birth, low birth weight, urinary tract infections, chorioamnionitis, postpartum endometritis, postpartum wound infection, septic pelvic thrombophlebitis, endocarditis and sepsis [2, 5]. However there is a controversy about the prevention of the infection.

Materials & Methods

The study was conducted in the M S Ramaiah Medical Teaching Hospital over a period of 30 months, between September 2009 to March 2012. The Research Ethical Committee of the institution has provided clearance and approved the study. A total of 350 pregnant women between the ages 18 – 40 years were included in the study, of gestational age at greater than 32 weeks. All the subjects were explained about the purpose of the study and were ensured strict confidentiality. Written informed consents were taken from each of the patients.

Two vaginal swabs and one rectal swab were collected from all pregnant women included in the study. One vaginal swab was used for gram's stain.

One vaginal swab and rectal swab were inoculated separately into Stuarts transport media. In the laboratory, the swabs were transferred to Todd Hewitt broth media containing nalidixic acid 15µg/ml and gentamycin sulfate 8µg/ml. The same being incubated at 37 °C over night.

All swabs were later plated on 5 percent sheep blood agar and incubated at 37 °C in candle jar overnight. Plates were further incubated for 24 hours before being declared as negative.

Typical colony morphology, Bile esculin hydrolysis and CAMP test were done. On blood agar the colonies were grey, soft, shiny, convex, moist, regular about 1mm in diameter and surrounded by a small zone of β hemolysis.

Confirmations of GBS were done by latex agglutination using Streptex typing kit (Hi Media). The antimicrobial susceptibility testing was done by Kirby Bauer disc diffusion method according to the National committee for Clinical laboratory standards [6].

The objective of identifying the prevalence of G B S in late pregnancy was based on the presence of culture positive G B S infection when compared to the age of the mother, parity, and gestational age. However the relationship of the rate of infection with parity is established only in cases of GBS colonization

Results

A total of 350 pregnant women were enrolled in this study. The age of the participants ranged from 18-40 years with mean of standard deviation of 25.30 ± 4.95. The gestational age of all the 9 positive patients were between 35-37 weeks period of gestation.

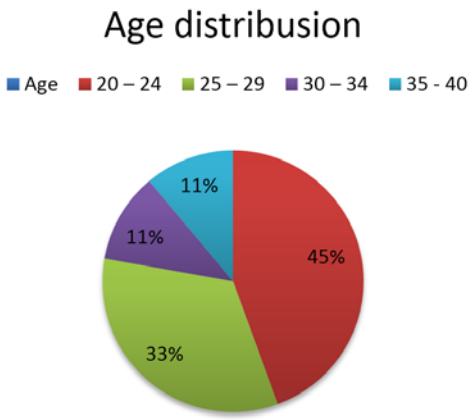
Nine out of total 350 vaginal swabs of pregnant women were found to be positive for GBS colonization, while none of the rectal swabs were positive for GBS colonization. Among the nine samples being positive for GBS colonization, 4 (44.4%), 3 (33.3%), 1 (11.1%), and 1 (11.1%) were from 20 -24 years, 25 – 29 years, 30 -35 years and > 35 year of age respectively (Table-1). Likewise, 6 (66.6%) and 3 (33.3%) samples being positive for GBS colonization were primigravida and gravida-2 respectively.

Further, three (33.33%) out of nine positive for GBS colonization developed premature rupture of membrane and draining of amniotic fluid, four (44.44%) out of nine positive for GBS colonization had pregnancy induced hypertension, one of them had severe pre eclampsia with pre term induced delivery and one had normal delivery. Above all, all nine positive for GBS colonization underwent vaginal delivery with no fetal mortality.

All the nine positive isolates were sensitive to ampicillin, cefoxitin, erythromycin, penicillin and clindamycin and were resistant to bacitracin.

Table 1: Frequency Table of nine cases positive for GBS colonization with respect to age

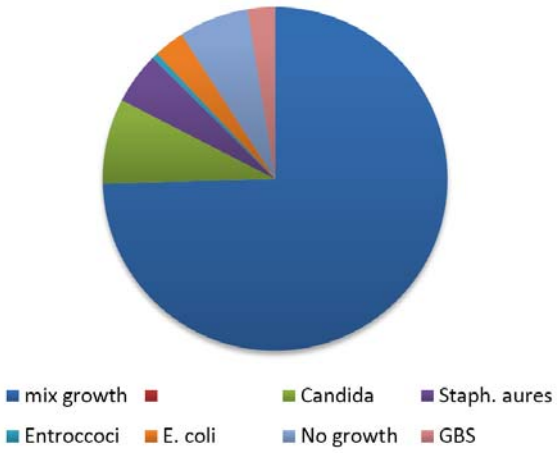
Age (in years)	Number of patients	Percentage
20- 24	4	44.4
25 - 29	3	33.3
30 - 34	1	11.1
35 - 40	1	11.1
Total	9	100



Although only nine samples of the total 350 were positive for GBS, the rest of the samples were positive for mixed flora (74.6%), candida species (8%), staphylococcus species (4.9%), and enterococci species (2.9%), while no growth was observed in 6.6% of the total cases (Table -2).

Table 2: Frequency table indicating isolation of organism in all cases

Organism	Number of patients	Percentage
Mixed Growth	261	74.6
Candida	28	8.0
Staph. aures	17	4.9
Entroccoci	2	0.6
E. coli	10	2.9
No growth	23	6.6
GBS	9	2.6
Total	350	100.0



Among the 9 women who had a positive culture of GBS, all had preterm rupture of membrane. Every single neonate needed a complete detailed blood investigation. One of the nine neonates was found to have a positive culture, and treated with penicillin. 3 were treated with empirical antibiotics due to persistent tachycardia and fever, but revealed negative blood reports.

Discussion

Streptococcous agalactia (Group B Streptococcous) is an important cause of infection in pregnant women and their newborn. In our study the colonization of G B S were positive in 9 cases out of 350 pregnant women with a rate of 2.6%. This result is almost similar to the study conducted by Kulkarni et al [7]. All the isolates positive for GBS were from vaginal smears with majority being collected at 35-37 weeks of gestation. All isolates were sensitive to ampicillin, cefoxitin, erythromycin, penicillin and clindamycin and were resistant to bacitracin. Among the G B S positivity 6(66.7%) were primigravida and 3(33.3%) were multigravida, the result being similar to study conducted by Tsering *et al.* [8]. G B S has been associated with adverse pregnancy outcome [9] The presence of G B S colonization has been associated with preterm labour and premature rupture of membrane [10]. In the present study also, 33.33% developed premature rupture of membrane and 44.44% had PIH, one of them had severe preeclamsia with pre term. The CDC recommended 2 ways to prevent early GBS infections:

First being - The "universal approach." Is to Screen all pregnant women at 35-37 weeks and treat everyone who is positive with antibiotics during labour. And second the" risk-based approach." Treat laboring women with antibiotics if they have one or more of these risk factors: GBS in the urine at any point in pregnancy, previously gave birth to an infant with early GBS infection, goes into labor at less than 37 weeks, has a fever during labor, or water has been broken for more than 18 hours .

The revised 2010 GBS American Academy of Pediatrics guidelines for neonatal management was designed in a manner to broaden the scope, which was to include all neonates, to make the recommendations more clear, and to decrease unnecessary laboratory investigation and use of antibiotics for infants who are at low risk. Even though this strategy will not prevent all infections, but will result in a further decrease in cases of perinatal GBS disease. The management of neonates continues to be based on clinical signs, the presence of maternal risk factors for GBS neonatal disease, and the likely efficacy of IAP (or treatment of the mother in the case of clinical or occult chorioamnionitis) in preventing early onset disease.

All newborn infants with signs suggestive of sepsis should have a full diagnostic evaluation, including a lumbar puncture if the infant is stable enough to undergo the procedure; 15% to 38% of infants with early-onset meningitis have sterile blood cultures, so evaluating the cerebrospinal fluid is required for optimal diagnostic sensitivity [11-14]. If the care provider believes that a noninfectious condition is responsible for the infant's signs (eg, transient tachypnea of the newborn) and there are no maternal risk factors for sepsis in an otherwise well-appearing infant, the lumbar puncture can be deferred or eliminated. Empirical antimicrobial therapy, typically intravenous ampicillin and gentamicin (unless local antibiotic-resistance patterns suggest the need for another combination), then should be initiated promptly. Chorioamnionitis continues to be a significant risk factor for early-onset GBS sepsis in infants born to GBS-colonized women. All newborn infants appearing normal who are born to women who have a clinical diagnosis of chorioamnionitis from their obstetric provider should undergo a "limited evaluation," which includes a complete blood cell (CBC) count and differential and a blood culture before initiation of empirical antimicrobial therapy. The sensitivity of the CBC count is improved if delayed for 6 to 12 hours after birth. Empirical therapy should be discontinued as soon as the clinical course and laboratory evaluation exclude sepsis. The indications for maternal IAP remain unchanged and include 1 of more of the following:

(1) GBS culture positive within preceding 5 weeks
(2) GBS status unknown with 1 or more intrapartum risk factors including less than 37 weeks' gestation, prolonged rupture of membranes for 18 hours, or temperature of 100.4°F (38.0 °C)
(3) GBS positive bacteriuria during current pregnancy
(4) History of a previous infant with GBS disease.

When a cesarean delivery is performed before onset of labor with intact amniotic membranes, the risk of early-onset GBS disease among infants is extremely low [15,16] and hence, IAP is not recommended for cesarean deliveries performed under these circumstances, regardless of the GBS colonization status of the woman or even the gestational age of the infant.

Conclusion

The cause of GBS as a cause of neonatal sepsis is underestimated in India, and this could be because of the lack of appropriate screening methods and strategies. Continues surveillance are essential in understanding the extend of the disease.

The rate of colonization of GBS in the Vagina or rectum among pregnant women varies with ethnic group, geographic area and age of the woman. In our study the rate of GBS colonization was 2.57%(i.e 9/350) .All the organism isolated were found to be sensitive to penicillin, erythromycin and cepholosporins. Because a of the small sample size, in comparison to the dreaded complication of the maternal and neonatal GBS disease, a larger sample of GBS serotypes may be required to explain before the development of vaccine in the future.

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