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Research article

A STUDY ON PREVALENCE OF GROUP B STREPTOCOCCI AS A COLONISER IN WOMEN OF REPRODUCTIVE AGE GROUP

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ABSTRACT

The present study was undertaken to detect the presence of Group B streptococci (GBS) as a coloniser among women of reproductive age group attending to outpatient clinic in Obstetrics and Gynaecology at Dr.PSIMS &RF general hospital, Chinnaoutapalli. **Methods**: Two low vaginal swabs were collected from 200 women in the age group of 15-45 years and the swabs were subjected to microscopy, culture, Christie, Atkins and Munch-Peterson test (CAMP) and antibiotic susceptibility testing by Kirby-Bauer disc diffusion method. **Results**: Of the total 400 vaginal swabs collected from 200 women 7 were found to be colonized with Group B streptococci which were mostly susceptible to ceftriaxone and erythromycin and all were resistant to penicillin except strain 1.**Conclusion**: Detection of colonization with GBS and treatment helps in reducing the incidence of neonate acquiring GBS infection.

Keywords: Streptococci, colonization, CAMP test, neonatal meningitis, antibiotic sensitivity

INTRODUCTION

Women of reproductive age group are at risk of acquiring urogenital infections. The microbes present in the normal gastrointestinal flora are the most common etiological agents. The proximity between the anus and vagina facilitates entry these microbes into urogenital tract. Several bacteria are implicated as the common agents causing urogenital infections among women of reproductive age group especially pregnant women.[1] These organisms produce urinary tract infections, bacteraemia and endometritis and related complications such as pre maturity and pre-term labour and even to meningitis and pneumonia in the newborn with high rate of mortality.[1]

Group B streptococcus (GBS) is a facultative gram positive coccus known to be responsible for bovine mastitis (1930's). It is non-pathogenic commensal of human flora of female genital tract. By 1970's group B streptococcus was recognized as one of the leading causes of neonatal mortality and morbidity. [2] It is estimated to be responsible for neonatal infections with case fatality ratio of 50% and at a frequency of 2-

3 per 1000 live births.[2] It is said to be the leading cause of neonatal sepsis, meningitis and pneumonia. Streptococcal colonization as a risk factor for pre-term delivery is a subject of conflicting opinions.[1] This bacterium is normally found in vagina and rectum of 15% - 40% of all healthy women of reproductive age group. Those women who test positive for group B streptococcus are said to be colonized. The vast majority of group B streptococcal infections are acquired during childbirth when a baby comes into direct contact with bacteria which are carried by mother as normal vaginal flora.[2]As estimated 12000 infants in US will become infected with group B streptococcus each year and will result in deaths of an estimated 2000 infants yearly, while leaving others with physical or mental disabilities. Group B streptococcus usually causes infant illness within first 7 days of life, but late onset infections may occur up to 3 months of age. Performance of a caesarean section will not eliminate the risk of infection.[3]

That is why many western countries like USA, Canada have made a national policy to screen women of reproductive age group especially pregnant women to detect group B streptococcus vaginal colonization which was backed by CDC. Few countries have also formed a national protocol for prophylactic antibiotic treatment for such women. Such national policies have brought down rates of group B streptococcal infections in reproductive age group women, pregnant women and neonatal sepsis markedly.[4] Group B streptococcal infections are more common than other illnesses for which pregnant women are screened such as Rubella, Down's syndrome, Spina bifida etc. Yet, group B streptococcus remains generally unknown to public. Geographical, ethnical, social, economic conditions and rate of group B streptococcal colonization has also been studied and also the rate of acquisition of group B streptococci by infants was related to the heaviness of vaginal carriage in the mother during labour and total acquisition rate was found to be ranging from 4% to 48%.[5] Further detailed research in this direction would help in understanding epidemiology of group B streptococcal colonization.

Group B streptococcal vaginal colonization is detected in the majority of post pubertal women. Group B streptococcus has also been detected on the external genitalia of men. With a degree of colonization increasing among women of reproductive age group there is increased frequency of urinary tract infections. The degree of colonization in pregnant women and rates of neonatal sepsis are directly proportional.[6] In women of reproductive age group it may cause symptoms irrespective of the time of acquisition (colonization). In pregnant women neonatal transmission rate is less in early colonization. But acquisition after 24 weeks of gestation, the chances of neonatal transmission is more.[6,7]Though many western researchers have been working on group B streptococcal colonization, only few Indian studies are available on this problem.

This attempt is made at DR.PSIMS & RF to find out the incidence of group B streptococcus as a colonizer among women of reproductive age group.

MATERIALS & METHODS

Subjects: 200 women of reproductive age attending to obstetrics and gynaecology OPD at Dr. PSIMS and RF during the period of May 2009 to February 2011 were included in this study.15-45 yrs of age (post-pubertal or reproductive) group was taken as inclusion criteria. 83 pregnant women and 117 in non-pregnant women were included in the present study. Out of 83 pregnant women, 41 were third trimester, 29 were in second trimester and thirteen were in first trimester. Women having any type of bleeding disorders like Dysfunctional uterine bleeding (DUB) etc. were excluded.

METHODS

After taking informed consent from all the participants; two vaginal swabs taken from all subjects and the swabs were immediately transported to the microbiology laboratory.

Direct Microscopy: One swab was used to inoculate 5% sheep blood agar and then used for wet mount and gram staining. Findings of preliminary microscopic examination were recorded. The other swab was used for enrichment culture with Brain Heart Infusion (BHI) broth with antibiotics (gentamicin-15 mcg/ml and Nalidixic acid-8 mcg/ml) which after 24hrs incubation was inoculated on to 5% sheep blood agar. [8]

After overnight incubation the growth on plates were read and suspected colonies on blood agar were subjected to catalase test and Gram staining. Gram positive and catalase negative colonies were subjected to CAMP test and confirmation was done by Latex agglutination using latex suspension coated with anti-serum (Bio-merieux).[9] Plates which did not yield growth of streptococci were further incubated for 24 hours, read and processed similarly for suspected colonies. The enrichment broth was subcultured and read and processed similarly. Specimens yielding group B streptococcus either on direct inoculation or on subculture of enrichment medium were recorded as positive.

Antibiotic susceptibility of the isolated group B streptococci was done by employing Kirby – Bauer disc diffusion method. [8]

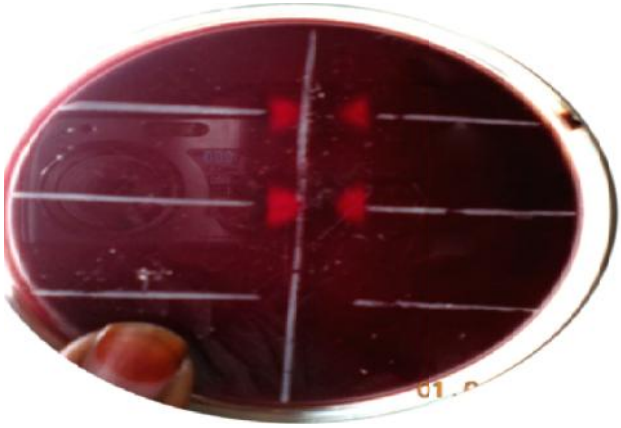

Fig 1: Christie, Atkins and Munch-Peterson test (CAMP test)

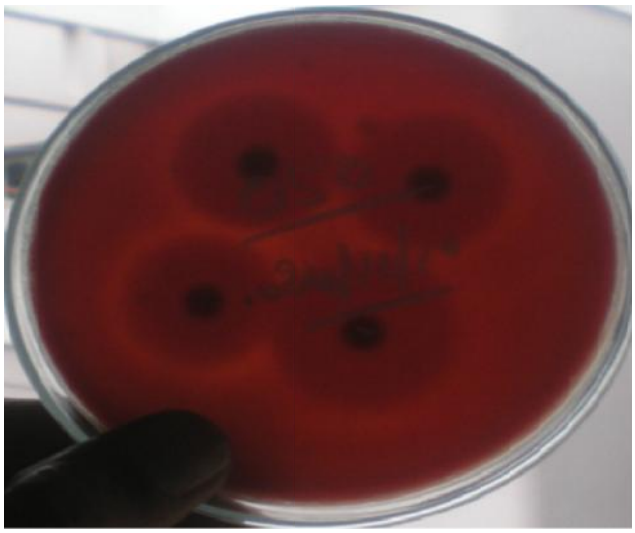

Fig 2: Antibiotic Sensitivity testing by Kirby-Bauer Disc diffusion technique

RESULTS

200 women in the reproductive age group were included in the study. Out of the 200 women 83 (41.5%) women were pregnant and 117 (48.5%) were nonpregnant women.

GBS was isolated from 7 women which indicate an incidence of 3.5%. Out of the 7 women who were positive for GBS, 3 were pregnant in the age group of 23-24yrs and gestational age between 20-37 weeks. The other four were non pregnant and belonged to the age group of 30-35 yrs.

Antibiotic sensitivity testing was done for all the isolated group B streptococci by Kirby Bauer disc diffusion method (Himedia, P-SD028, E-SD013, C-SD010) on 5% sheep blood agar plates and the diameter of the clear zone around the disc was measured under transmitted light with measuring scale and results interpreted as susceptible(S), intermediate (I), resistant(R) as per the CLSI criteria.[8]

Table 1: Standard zone size interpretation chart for the antibiotics tested against GBS [8, 10]

Drug	Potency	Zone of inhibition (in mm)		
		Sensitive	Intermediate	Resistant
Penicillin	10U	28	20-27	(≤)19
Erythromycin	15mcg	21	16-20	(≤)15
Ceftriaxone	30mcg	27	25-26	(≤)24

Table 2: Antibiotic sensitivity patterns of group B streptococcal isolates (total no.7)

Strain No.	Penicillin	Erythromycin	Ceftriaxone
002	I(24)	R(14)	S(28)
003	I(25)	S(25)	S(28)
050	I(25)	S(25)	S(27)
055	I(25)	R(14)	R(24)
117	S(29)	S(22)	S(29)
131	I(27)	S(21)	S(28)
180	I(23)	S(22)	S(28)

***Figures in brackets indicate the zone of inhibition (in mm)**

DISCUSSION

GBS is one of the common agents causing urogenital infections among women of reproductive age group especially pregnant women and also is the leading cause of neonatal infections in the western hemisphere. These infections in turn lead to UTI, bacteremia, endometritis in women of reproductive age group and in pregnant women UTI, endometritis, amnionitis, post-partum wound infections and neonatal complications such as prematurity, preterm labor GBS pneumonia and meningitis[1].

The recognition that maternal colonization with this organism is a key factor in the occurrence of GBS infections associated with neonatal mortality and morbidity was a milestone in the history of perinatal health. In fact this awareness has created a radical change in antenatal health practice, but the spectrum of GBS disease remains largely an under recognized problem.

The CDC advocated the prevention of GBS infection in reproductive age group women, especially in pregnancy by chemoprophylaxis in women with culture evidence of recent rectal or vaginal colonization. According to them even women without a known GBS status but delivering before 37 weeks of gestation with PROM or intrapartum fever are also advised to be given antimicrobial prophylaxis presumably to prevent GBS infection. Even women who are not pregnant and present with UTI, endometritis should be screened for GBS colonization through culture for evidence of rectal/vaginal swabs [3].

Very few Indian studies are available where an attempt for detecting GBS colonization has been done in women of reproductive age group. Even the studies on pregnant women do not throw light on the time of colonization, efficiency of transmission and the incidence of neonatal disease. The Indian studies available for review have reported lower colonization and infection rates in general. However on closer analysis taking into consideration use of adequate culture techniques and microbiological media some of the GBS colonization rates reported from India and other developing countries are similar to those reported in the United States. In our study out of 200 samples, 7 samples yielded the growth of GBS which accounts for 3.5%.In the present

study, utmost care was taken for processing the samples and standard guidelines were followed.

A further prospective study in this direction and screening of newborn babies for GBS colonization would help in knowing the magnitude of GBS related problems. Our statistics correlate with results of R Mhasker Rita et al who have reported an incidence of 1.65% vaginal colonization. [10] Kulkarni et al has observed a low rate of GBS colonization (2.52%). [11]

El Kersh et al observed a rate of 2.6% GBS vaginal colonization among 151 cases who were negative for GBS colonization in earlier visits. Findings of authors are correlating with that of Mhaskar Rita et al [10] Kulkarni et al [11] and with findings of El Kersh et al. [12]

High rates of GBS colonization were detected among Saudi women (25.7%). Similarly a very high GBS colonization rate was identified by J Motlova et al (29.3%) [13], Orett FA (32.9%) [14] in their respective studies. Most of the studies detected that GBS colonization occurred in pregnant women more frequently during late stages of pregnancy. These workers also opined that early colonization of GBS has no significance in prematurity or abortion. [13, 14]

Orett FA [14] has observed a higher rate of colonization among women of East Indian origin. Most studies in India detected only 1.5%-2.5% of GBS colonization among Indian women which was correlated with the present study. But other international studies revealed vaginal colonization rate as 21.7% and anorectal carriage as 24.4 % [13].

In the present study author could not follow up the positive cases, especially pregnant women to detect whether neonatal transmission has occurred or not. Based on the findings of the present study and the findings of other Indian reports it can be presumed that GBS related problems in women of reproductive age group is at a low rate in our country. However a nationwide multicenter study is needed to substantiate this finding. A nationwide screening for GBS colonization in women of reproductive age group, especially in pregnant women may not be cost-effective and may not be necessary keeping the low rates of reported colonization rates which are confirmed.

However it is difficult to arrive at such a conclusion based on very few studies available. There is a need for government/non-government organization funded projects to the screen, especially all antenatal women for urogenital pathogens, like Chlamydia, Mycoplasma, Urea plasma etc. along with GBS. Screening of GBS in 3rd trimester in pregnancy helps in detection of colonization and also in preventing neonatal diseases. Performance of Caesarian section will not eliminate the risk of infection. So a national policy to screen women of reproductive age group especially pregnant women to detect for GBS vaginal colonization and a protocol for prophylactic antibiotic treatment should be designed which would help to bring the rate of GBS colonization and neonatal sepsis markedly. Prophylactic immunization with Group B streptococcal vaccines in prevention of colonization in women of reproductive age group and neonatal disease should be evaluated.

CONCLUSION

To conclude, there are very few studies in literature which throw light on detecting GBS colonization in women of reproductive age group. In the present study, an attempt was made to provide knowledge regarding prevalence of GBS colonization in women of reproductive age group which also included pregnant women. Although this study was not interventional and the positive cases were not followed, a further study for screening of GBS colonization will be helpful in preventing intra-partum, post- partum and neonatal complications. Present study also provides implications for giving prophylactic antibiotics before caesarian sections which would have a paramount contribution in preventing neonatal meningitis.

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