Antimicrobial susceptibility patterns of group B *Streptococci* isolated from pregnant women in Trinidad, West Indies

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Group B *Streptococcus* (GBS) is a common perinatal pathogen frequently associated with neonatal sepsis and meningitis with resultant high mortality in developing countries.[1,2] The reservoir of GBS is the gastrointestinal tract with consequent colonization of the vagina, where the organisms are usually asymptomatic. Infants may therefore become infected through vertical transmission during birth from high risk mothers, such as those with premature delivery (<37 weeks gestation), intrapartum fever (temperature >38^{0}C) and prolonged rupture of membranes (>18hrs). Maternal carriage of GBS has been reported to be between 4.6-30% in developed countries such as the United States of America and the United Kingdom, with the incidence of neonatal infection varying between 0.3 and 5 per 1000 live births.[3] Carriage rates among developing countries differ considerably with rates lower than some developed countries and significantly higher in others. Low carriage rates have been reported from Libya (5%) and India (5.8%),[4] whereas, higher rates of colonization were documented from Trinidad, West Indies (31-33%).[5]

Group B *Streptococcal* neonatal and maternal diseases are potentially preventable. Studies have shown that intrapartum antibiotic prophylaxis decreases the incidence of neonatal GBS infection. Intrapartum ampicillin (rather than penicillin) prophylaxis to high-risk mothers has been recommended because of the former's broader spectrum of activity. For persons allergic to the penicillins, clindamycin or erythromycin have been recommended. Recently, increasing resistance has been noted to clindamycin (3-13%) and erythromycin (7-15%) among GBS isolates, which has been associated with treatment failures. This study was undertaken to evaluate whether changes in GBS antimicrobial susceptibility has occurred in this modern era of liberal use of antimicrobial agents among third trimester pregnant women in Trinidad, West Indies. Rectal and vaginal isolates of GBS were obtained from 405 women in their third trimester of pregnancy during routine antenatal visits from July to August, 1992 and October, 2000 to March, 2001. One hundred and thirty strains of confirmed GBS that were frozen at -20^{0}C were thawed and incubated at 35-37^{0}C for 18-24 hrs in Todd-Hewitt broth to confirm viability. Antimicrobial susceptibility testing to 9 antibiotics (**Table 1**) was carried out on Mueller-Hinton agar supplemented with 5% sheep blood, using the disk diffusion technique. From the 405 third trimester pregnant women, 32% (130/405) of them were colonized with GBS. All 130 GBS isolates were fully susceptible to ampicillin, amoxicillin-clavulanic acid and cephalothin (**Table 1**). The greatest prevalence of resistance was seen with tetracycline (93.8%) followed by gentamicin (90.8%) and trimethoprim-sulfamethoxazole (83.1%). Resistance rates to the other antibiotics: erythromycin, clindamycin and chloramphenicol were less than 8%.

Intrapartum antibiotic administration has been shown to interrupt transmission of GBS from mother to infant. Group B *Streptococcus* has remained sensitive to the penicillins, particularly penicillin G and ampicillin. Penicillin G is preferred, but because of ampicillin's wider spectrum of activity against both gram-positive and gram-negative bacteria, concerns have been expressed about increasing resistance to ampicillin among gram-negative organisms such as *Escherichia coli* and *Enterobacter* species. Also, treatment failure rates of up to 50% have been reported when penicillin G or ampicillin was used to

Table 1 - Antimicrobial susceptibility patterns of GBS strains isolated from third trimester pregnant women.

Antimicrobial	Sensitive (%)	Resistant (%)
Ampicillin	130 (100)	0
Amoxicillin-clavulanic acid	130 (100)	0
Cephalothin	130 (100)	0
Erythromycin	123 (94.6)	7 (5.4)
Clindamycin	121 (93.1)	9 (6.9)
Chloramphenicol	120 (92.3)	10 (7.7)
Trimethoprim-sulfamethoxazole	22 (16.9)	108 (83.1)
Gentamicin	12 (9.2)	118 (90.8)
Tetracycline	8 (6.2)	122 (93.8)

GBS - group B *Streptococcus*

eradicate GBS from the vagina of pregnant women. Alternative therapeutic options such as erythromycin and clindamycin, have been used especially in patients allergic to penicillin, but increasing resistance to both drugs have been reported.[3]

Erythromycin has a wide spectrum of activity against most genital tract pathogens, is safe in pregnancy and has a low incidence of gastrointestinal side effects when given in the base form. The rate of resistance to erythromycin in this study was 5.4%. Because of its efficacy in pregnancy, erythromycin has been used to treat genital tract infections due to chlamydia, and resistance to erythromycin among GBS maybe induced due to prior, repeated exposure to the drug.

Postpartum endometritis is a common and serious threat to women after childbirth, and clindamycin plus an aminoglycoside are frequently used in management of this disease. Many women who are chlamydia-positive in the first trimester of pregnancy may develop postpartum endometritis post-vaginal delivery. In addition to its use in postpartum disease; clindamycin has been shown to provide good coverage against GBS vaginal colonization. But as with erythromycin, increasing rates of resistance (up to 15%) to clindamycin have been recorded. Although the prevalence of resistance to erythromycin (5.4%) and clindamycin (6.9%) in our study was low, it raises concerns about the possibility of inadequate prophylaxis for GBS using these drugs as alternative therapeutic options in penicillin-allergic patients. The incidence of maternal morbidity due to postpartum wound infections and postpartum endometritis is largely unknown in Trinidad, West Indies. Two previous studies from this country have shown that maternal antenatal GBS vaginal colonization is high (31-33%),[1,5] but no program has been instituted for prophylaxis of high-risk mothers so far.

Many clinical laboratories do not routinely assay in-vitro susceptibility of GBS to the ß-lactam antibiotics such as ampicillin and cephalothin. However, because of reports of treatment failure with these drugs, as well as GBS tolerance to alternative prophylaxis drugs such as erythromycin and clindamycin, it is recommended that routine in-vitro susceptibility testing be carried out on all GBS isolates to guide doctors in appropriate choice of prophylaxis and therapy.

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