

SHORT REPORT

Serotype distribution and antibiotic susceptibility of group B streptococci in pregnant women

A. DHANOA^{1*}, R. KARUNAKARAN² AND S. D. PUTHUCHEARY²

¹ School of Medicine and Health Sciences, Monash University, Malaysia

² Department of Medical Microbiology, Faculty of Medicine, University of Malaya, 50603 Kuala Lumpur, Malaysia

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SUMMARY

Group B streptococcus (GBS) is a leading cause of neonatal sepsis and is usually acquired via the woman's birth canal. GBS serotypes isolated from 200 pregnant women were determined. Serotypes V (19%) and VI (17%) were the most frequent followed by serotypes III (12%), Ia (11.5%) and IV (10%); 17% of the strains were non-typable. All isolates were susceptible to penicillin, 96% to erythromycin and 97.5% to clindamycin. The emergence of new GBS serotypes has important implications for vaccine prevention strategies.

Key words: Antibiotic susceptibility, GBS, Malaysia, pregnancy, serotypes.

Streptococcus agalactiae (group B streptococcus; GBS) is a leading cause of invasive neonatal infections associated with high morbidity and mortality. Infection usually presents either as early onset (within 6 days of life) with bacteraemia, pneumonia or meningitis or late-onset (7–89 days of life) [1]. Early onset neonatal disease is associated with maternal intrapartum GBS colonization and transmission is thought to occur vertically, either through ascending spread of the organism into the amniotic fluid or through the birth canal at time of delivery [1]. Genital and lower gastrointestinal tract colonization of GBS occurs in about 10–40% of pregnant and non-pregnant women [1]. A previous study from Malaysia reported that the genital carriage rate of GBS in parturients was 9.7% and the average annual incidence of neonatal GBS septicaemia in babies born in hospital was 0.4/1000 live births [2]. Women with prenatal GBS colonization have a

25-fold higher risk of delivering a baby with early onset GBS disease compared to non-colonized women [3].

There are at least nine recognizable GBS serotypes based on capsular polysaccharide antigens, i.e. serotypes Ia, Ib and II–VIII [4]; with serotype IX proposed recently [5]. The serotype distribution of GBS varies with geographical region and time and hence conjugate vaccines developed for major disease-causing GBS serotypes may not be universally optimal [4, 6, 7].

A Medline search revealed no recently reported study from Malaysia describing serotypes of GBS in pregnant women and data from South East Asia are scarce. Therefore, the current study was undertaken to determine the serotypes and antimicrobial susceptibility of GBS in pregnant women attending the University of Malaya Medical Centre (UMMC). This laboratory-based prospective study was conducted from March to August 2008. Two hundred non-duplicate GBS isolates were collected from vaginal swabs from pregnant women attending as outpatients or in-patients at UMMC. The samples, in either Amies

* Author for correspondence: Dr A. Dhanoa, School of Medicine, Monash University, Jalan Lagoon Selatan, 46150 Sunway, Selangor, Malaysia.
(Email: amrecta.dhanoa@med.monash.edu.my)

Table 1. Serotype distribution of GBS isolates from pregnant women

Serotype	Ethnic group			Total (%) (n=200)
	Malay (%) (n=151)	Chinese (%) (n=24)	Indian (%) (n=25)	
Ia	15 (9.9)	1 (4.2)	7 (28)	23 (11.5)
Ib	3 (2)	0	0	3 (1.5)
II	8 (5.3)	1 (4.2)	2 (8)	11 (5.5)
III	20 (13.2)	3 (12.5)	1 (4)	24 (12)
IV	16 (10.6)	3 (12.5)	1 (4)	20 (10)
V	27 (17.9)	3 (12.5)	8 (32)	38 (19)
VI	29 (19.2)	3 (12.5)	2 (8)	34 (17)
VII	9 (6)	1 (4.2)	0	10 (5)
VIII	3 (2)	0	0	3 (1.5)
Non-typable	21 (13.9)	9 (37.5)	4 (16)	34 (17)

or Stuart's transport media were directly plated onto blood agar, chocolate agar, modified Thayer–Martin agar (MTM) and Sabouraud's dextrose agar (SDA). Isolates were identified as GBS by colonial morphology, a positive CAMP test and a positive group B Lancefield antigen detected by a commercial *Streptococcus* typing kit (Avipath-strep; Omega Diagnostics, Scotland, UK). Isolates were stored at -80°C and serotyped by co-agglutination (Essum GBS serotyping kit; Sweden) with reagents for serotypes Ia, Ib, II–VIII. Isolates not agglutinating with any of the reagents as well as those having non-specific weak agglutination with more than one serotype were termed non-typable (NT). Antimicrobial susceptibility testing was performed and interpreted by the Clinical and Laboratory Standards Institute (CLSI) disc diffusion method [8] and susceptibility to penicillin, erythromycin, vancomycin and clindamycin was recorded. For pregnant women with recurrent GBS isolates, only the first was included for analysis. Ethical approval to conduct this study was obtained from the Research Ethics Committee, UMMC.

The ethnic distribution was Malays (75.5%), followed by Indians (12.5%) and Chinese (12%). The mean age of the women was 28.9 (± 4.7) years. Of the 200 GBS isolates, serotypes V (19%) and VI (17%) were predominant followed by serotypes III, Ia and IV which were isolated at almost similar frequencies (12%, 11.5% and 10%, respectively). Serotypes II, VII and VIII constituted 12% of the isolates (Table 1) and 17% were NT. Serotypes V (17.9%) and VI (19.2%) isolates were the most prevalent types in Malay women whereas in Chinese women, 37.5% were serologically NT; serotypes V (32%) and Ia (28%) predominated in Indian women.

All isolates were susceptible to penicillin and vancomycin, but eight isolates (4%) were resistant to erythromycin and five (2.5%) were resistant to clindamycin. Four of the erythromycin-resistant strains, were also resistant to clindamycin. Two each of the erythromycin-resistant strains belonged to serotype Ib and NT, respectively, and one each were of serotypes II, III, IV and V.

The epidemiology of GBS serotypes not only varies in different geographical areas but also changes over time. There is no previous reported study from Malaysia describing serotypes of GBS in pregnant women. However, a study reported from UMMC about two decades ago [9], mainly involving genitourinary isolates from adults and some neonatal isolates, found serotype III to be predominant (50.9%), followed by serotype II. Serotyping was performed with a limited set of antisera (Ia, Ib, Ic, II and III) and so is not directly comparable with the current study. Nevertheless, the number of serologically NT isolates found in 1987 comprised only 4.9% of all isolates and 5.3% of genitourinary isolates [9]. The serotype distribution of GBS in antenatal women is clearly quite different and more diverse. Two serotypes (V and VI) accounted for 36% of the isolates with 33% falling in serotypes III, Ia and IV. The predominance of serotypes V and VI in pregnant Malaysian women is in contrast to the high prevalence of serotypes II and III in a study from China [10] and serotype Ib in Korea [11]. Serotype V has become increasingly frequent in pregnant women in the USA, New Zealand and Kuwait [6, 12, 13]. By contrast, serotype VI appears to be rare in pregnant women in other countries with the exception of Japan and Kuwait [7, 13]. Interestingly serotype VIII, which is common in pregnant

Japanese women [7], represented only 1.5% of our isolates. Serotype IV, noted in 10% of our subjects, is also uncommon in most studies, with the exception of United Arab Emirates [14]. The proportion of NT isolates in the current study (17.1%) is similar to that reported from Kuwait [13].

An earlier study from UMMC found all GBS genital tract isolates to be susceptible to penicillin with 1.7% resistance to erythromycin [15]. The resistance rates to erythromycin (4%) and clindamycin (2.5%) found in the current study were lower compared to studies from Taiwan which had resistance of 33% to erythromycin and 41.6% to clindamycin [16]. Relatively high rates of resistance to erythromycin and clindamycin were also noted in a study in the USA [6] where resistance was 12% and 8%, respectively. Resistance to these antibiotics was not associated with serotype V strains as reported by Grimwood *et al.* [12].

In summary, this study provides current data on the common serotypes and antimicrobial susceptibility of GBS vaginal isolates from antenatal women in Malaysia. The emergence of new GBS serotypes and as yet low rate of resistance to erythromycin are findings with important implications for prevention and treatment strategies. Realizing the limitations of our study, further studies and surveillance data from Malaysia are required to monitor the current disease burden of GBS as well as monitoring colonizing and invasive serotypes in both antenatal women and neonates. This information is necessary to implement an effective global vaccine strategy and intrapartum antibiotic prophylaxis, which are the key preventive strategies for neonatal GBS infections.

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DECLARATION OF INTEREST

None.

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