**Short Communication**

**Group B *Streptococcus* Infection: Epidemiology, Serotypes, and Antimicrobial Susceptibility of Selected Isolates in the Population beyond Infancy (excluding Females with Genital Tract- and Pregnancy-Related Isolates) at the University Malaya Medical Centre, Kuala Lumpur**

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**SUMMARY:** Group B *Streptococcus* (GBS) infection was studied in 49 patients collected at convenience (convenience sampling), excluding infants and women with genital tract- and pregnancy-related isolates, according to the availability of stocked isolates and easy accessibility to epidemiological data. The data were examined both prospectively and retrospectively from 2003 - 2005 at a tertiary-level multidisciplinary hospital in Kuala Lumpur, Malaysia. Skin and soft-tissue infections in 35 patients (71.4%) were the most common clinical presentation, while diabetes mellitus was the most common underlying condition (35 patients, 71.4%). All GBS isolates were sensitive to penicillin, and most isolates tested were sensitive to erythromycin (97.7%). Serotyping of 45 GBS isolates using a commercial serotyping kit revealed that the most common serotype was Ia (22.2%), followed by VI (17.8%), III and V (13.3% each). Others included Ib, II, IV, VIII, and VII; 13.3% were nontypeable. The findings of this pilot study are limited by the small sample size, the sampling method and the possibility that the cases are not wholly representative of the University Malaya Medical Centre population. Further studies from our hospital with larger numbers and using probabilistic sampling techniques are required to confirm the relatively high occurrence of serotype VI (the second most common serotype) in the population studied.

*Streptococcus agalactiae* or group B *Streptococcus* (GBS) is a significant cause of infection in neonates, infants, pregnant females, and nonpregnant adults over the age of 65 years (1,2). Most adults with invasive disease have underlying conditions, the most important being diabetes mellitus, and a diverse spectrum of infections have been described (1,2).

The classification of GBS has evolved over time. Nine serotypes (Ia, Ib, and II to VIII) have been described (2), and serotype IX has been recently proposed (3). Serotypes Ia, III, and V are important causes of invasive disease in pregnant women, neonates, and nonpregnant adults (2,4). Type V has been found to be emerging (4,5) and in some studies was the most common serotype among nonpregnant adults (4-6). However, serotypes may vary with time as well as geographically, and surveillance is important with regard to the formulation of multivalent vaccines against common invasive serotypes (4,5,7).

This study was conducted to establish the epidemiological features of GBS infections, their serotypes and antimicrobial susceptibility in the population beyond infancy but excluding women with genital tract- and pregnancy-related isolates at the University Malaya Medical Centre (UMMC), a tertiary-level multidisciplinary hospital in Kuala Lumpur, Malaysia. The population consisted of 50 patients who had GBS isolated from invasive or noninvasive samples sent to the Medical Microbiology (MMB) laboratory, UMMC, from various suspected sites of infection. One case was omitted later as it was discovered to be not from the UMMC. The cases were collected at convenience (convenience sampling) according to the availability of stocked isolates and easy accessibility to epidemiological data, both prospectively in 2005 and retrospectively from 2003 - 2004. Thirty-eight cases were from 2005, 10 cases from 2004, and 1 case from 2003. (Some cases for which stocked isolates were available were not included because their data had not been collected, and some cases were not included because their isolates had not been stocked). Epidemiological data collected included age, sex, ethnic group, possible site of infection, type of sample isolating GBS, underlying conditions present and organisms isolated in cases of mixed cultures. All isolates were identified by standard laboratory methods and stored at −70°C. Antimicrobial susceptibility results by the CLSI (8) disk diffusion method were retrieved from the Laboratory Information System of the MMB laboratory. Only 45 of the 49 isolates from the patients were available for typing using the Essum GBS Serotyping Kit (ESSUM ProBiotics; ESSUM AB, Umeå, Sweden). Isolates were initially tested with serotype 1-V reagents, and those that were ungroupable with these reagents were retested later with serotype VI-VIII reagents. Isolates that did not agglutinate with any serotype reagents or that demonstrated nonspecific light agglutination were labeled as nontypeable (NT).

The results revealed only 1 patient in the 0- to 10-year age group (9 years) (Table 1); the rest were adults. There were 32 (65.3%) males and 17 (34.7%) females. Most patients were in the 41-60 age group (24 patients, 49.0%), followed by the 61-80 age group (14 patients, 28.6%). Among adults, infection is reportedly common in those of advanced age, especially in those >65 years old (1,2). The epidemiology of GBS disease may differ in developing countries where there is a lower overall life expectancy (1). In our study, 85.7% of the cases were distributed among the Indian and Malay eth-
nic groups, with a minority of Chinese. This could be related to the higher frequency of diabetes mellitus among Indians and Malays in Malaysia than among Chinese (9). In the United States (US), a higher incidence is reported in the black population (1,2). The infections seen in our study included skin and soft-tissue infections (35 patients, 71.4%, of whom 2 patients were also thought to have osteomyelitis), a possible urinary tract infection (9 patients, 18.4%), pneumonia (3 patients, 6.1%), and primary bacteremia (2 patients, 4.1%). GBS was isolated from various samples: pus/wound swabs/tissue (34 patients, 69.4%), urine (9 patients, 18.4%), blood (5 patients, 10.2%), and pleural fluid (1 patient, 2.0%).

Of the 45 isolates, 39 (86.7%) were serotyped using the serotyping kit, and 6 (13.3%) were NT, including 2 isolates with nonspecific agglutination (Table 2). The most common serotype was Ia (10 isolates, 22.2%), followed by VI (8 isolates, 17.8%), III and V (6 isolates, 13.3% each). Serotypes VI and VIII are predominant among Japanese pregnant women (7) but rare in the US (5,10). Other serotypes in our study were Ib, II, IV, VIII, and VII. A study from our hospital published in 1987 by Ngeow and Puthucheary (11) reported that of 350 GBS isolates from adults and neonates (the majority of adult isolates were from the genitourinary tract), serotype III predominated (50.9%), followed by II and Ic; only 4.9% of isolates were NT. However, that study was based on the older classification and in a different population selection, hence the results are not directly comparable to those of the present study.

Diabetes mellitus was the most common underlying condition seen in 35 patients (71.4%), followed by neurological conditions (cerebrovascular accidents and apoplexy) (8 patients, 16.3%) and malignancy (6 patients, 12.2%), among others. Only 1 patient (2.0%) did not have any identifiable underlying condition. GBS was isolated from mixed cultures in most instances from the clinical samples (27 samples, 55.1%). The most common organisms isolated together were Staphylococcus aureus (11 samples, 22.4%), Escherichia coli (4 samples, 8.2%), and Klebsiella pneumoniae and Proteus spp. (3 samples, 6.1%) each.

All 49 isolates were sensitive to penicillin and vancomycin. Of the 48 isolates tested, 100% were sensitive to ampicillin, 97.7% (43 tested) were sensitive to erythromycin and 97.6% (42 tested) were sensitive to clindamycin. Our low rate of resistance to erythromycin (2.3%) is slightly higher than the 1.7% from an earlier study from our institution (12) but still lower than rates in Canada (6.7%), US (among neonates, 20.2%), and Taiwan (46%) (6,13,14). Resistance to erythromycin and that to clindamycin were reported to be higher in serotype V (15), contrary to a report from Taiwan (14). In the present study, the 1 isolate that tested resistant to erythromycin belonged to serotype VI.

Although most invasive GBS isolates are typeable, NT invasive isolates have also been reported (4-6). In our study, which included invasive and noninvasive isolates, 6 (13.3%) were NT, which is higher than in some other reports (4,5) but similar to the rate of 13% reported in a Canadian study involving invasive isolates in adults (6). Possible reasons why GBS are NT include insufficient production of the relevant antigen, presence of a genetic defect in serotype antigen production, or the presence of a new serotype (10). The NT isolates in our study were not explored further. In summary, this pilot study previews the epidemiological features and serotypes of GBS infections in a selected population from our hospital in Malaysia. The study is limited by a small sample size and a convenience sampling method, and there is a possibility of selection bias, i.e., that the cases are not wholly representative of the UMMC population. Further studies from our hospital with larger numbers and using probabilistic sampling methods in case collection are required to confirm the relatively high occurrence of serotype VI (second most common serotype) in the population studied.

ACKNOWLEDGMENTS

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<td>22 (44.9)</td>
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NT, nontypeable; N/A, strain not available.

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