DISTRIBUTION OF CAPSULAR TYPES AND ANTIMICROBIAL SUSCEPTIBILITY PROFILE OF GROUP B *STREPTOCOCCUS* ISOLATED FROM COLONIZED PREGNANT WOMEN IN RIO DE JANEIRO

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Introduction

Streptococcus agalactiae or Group B *Streptococcus* (GBS) is the leading cause of neonatal infections, that includes pneumonia, meningitis and sepsis, as well as invasive infections in adults. GBS is a member of the intestinal and vaginal flora, and the main risk factor for neonatal infections is maternal colonization. GBS strains can be divided into ten distinct serotypes (Ia, Ib, II to IX) based on the diversity of polysaccharide capsule, the main virulence factor and epidemiological marker of the species [1]. Therefore, knowledge of the distribution of GBS serotypes among pregnant women plays an important role in understanding the epidemiology of the pathogen. It is also essential to guide the development of vaccines based on capsular polysaccharides, since maternal immunization is a promising alternative to prevent GBS neonatal infections.

While effective vaccines are not available, the main recommendations for the prevention of neonatal streptococcal infections rely on screening of colonized pregnant women and intrapartum antibiotic prophylaxis (IAP), with penicillin or alternatives, including clindamycin [2]. Given the reports of resistance and/or reduced susceptibility to the antimicrobials used in the IAP, investigation of the susceptibility profile is essential.

Material and Methods

Isolates (n=204) were recovered from urine (81) and vaginal secretion (123) samples from pregnant women assisted in the antenatal care service of Instituto Fernandes Figueira and Hospital Universitário Antônio Pedro, between January 2019 and July 2024. Species identification was performed after blood agar growth, using standard phenotypic tests (hemolysis, catalase, growth in Enterococcosel medium, CAMP, and sodium hippurate hydrolysis).

GBS isolates were submitted to capsular typing (Ia to VIII) by PCR-based method, according to previously described protocols [3,4]. DNA was obtained by thermal and enzymatic lysis. Amplification products were subjected to electrophoresis on 1% agarose gel and visualized under UV light.

Isolates were submitted to antimicrobial susceptibility testing by disk-diffusion method, according to the CLSI guidelines [5]. Macrolide resistance phenotypes were investigated by the double-disk test [5].

Results and Discussion

Capsular type Ia was the most frequent (36.5%), followed by III (20.8%), V (18.3%), II (14.7%), Ib (5.1%) and IV (4.1%). Five isolates were nontypeable (NT). The distribution of GBS capsular types may vary according to location, period, and clinical origin. GBS type Ia has been reported as the most frequent in pregnant women in Brazil, while in other parts of the world, type III isolates predominate among neonatal infections. Overall, the most prevalent serotypes worldwide are Ia, Ib, II, III, and V [6].

All isolates were susceptible to penicillin and vancomycin. Although GBS remains susceptible to the antimicrobials recommended for the treatment of infections and IAP, a reduction in susceptibility to penicillin has been observed. Resistance to vancomycin is a rare event [7].

Resistance to levofloxacin was observed in five (2.4%) isolates. Studies in Brazil have detected 1-7.1% of GBS fluoroquinolone resistance [8]. Tetracycline resistance was identified in 158 (77.4%) isolates and similar resistance rates are reported by other studies [9,10].

A total of 51 (25%) isolates were non-susceptible (NS) to erythromycin (32 intermediate and 19 resistant), while nine (4.4%) were resistant to clindamycin. Macrolide resistance M phenotype was prevalent (82.3%), followed by $iMLS_B$ (9.8%) and $cMLS_B$ (7.8%), with the last two also conferring resistance to clindamycin. Other studies conducted in Rio de Janeiro also found an increasing trend in resistance to macrolides and prevalence of the M phenotype. In contrast, other national and international studies observed the prevalence of MLS_B phenotypes [8].

Multidrug-resistant (MDR) were detected in nine (4.4%) isolates, which occurs when bacteria are resistant to three or more classes of antimicrobials [11]. Simultaneous resistance to clindamycin, erythromycin, levofloxacin, and/or tetracycline was observed. MDR GBS isolates also were detected in studies carried out in other countries [7].

Conclusion

Our study brings the distribution of GBS capsular types, which is useful to predict the local impact of the hexavalent vaccine under development since capsular types found here are present in the vaccine formulation.

Despite the high incidence of erythromycin NS isolates, they have not developed yet significant resistance to clindamycin. In view of this, clindamycin remains a useful alternative to IAP among penicillin-allergic pregnant women. The presence of MDR isolates, although not constituting an emergency situation, highlights the need to continuously monitor the antimicrobial susceptibility profile.

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