Population dynamics of Streptococcus pneumoniae of serogroups 15 and 23 after PCV10 introduction in Brazil

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Pneumococcal diseases represent a major public health challenge worldwide, particularly in young children. In Brazil, *Streptococcus pneumoniae* is the main pathogen associated with meningitis and one of the leading causes of community-acquired pneumonia. In 2010, the 10-valent pneumococcal conjugate vaccine (PCV10) was introduced into the Brazilian National Immunization Program for childhood vaccination. Studies conducted by our group in young children before and after PCV10 introduction in Brazil revealed a substantial reduction in colonization with vaccine serotypes and an increase in colonization with non-vaccine serotypes. Among them, those belonging to serogroups 15 and 23 represented nearly 20%. Thus, we characterized 95 pneumococcal isolates of different serotypes within serogroups 15 (n=47) and 23 (n=48) regarding genetic lineage by MLST and antimicrobial resistance. Isolates were collected between 2009 and 2019 in Rio de Janeiro. Most (n=82; 86.3%) isolates were obtained from colonization, especially in children ≤ 6 years old. Thirteen (13.7%) isolates were recovered from disease in patients with cancer, mostly adults. Two major clonal complexes (CCs) clustered serogroup 23 isolates: (i) CC42, closely related to the international clone Tennessee^{23F}-4, and mostly represented by ST42 (serotype 23A) in both pre- and post-PCV10 periods and by ST727 (serotype 23B) in the pre-PCV10 period, and (ii) CC338, comprising the international clone ST338 Colombia^{23F}-26 mostly associated with serotype 23F in the pre-PCV10 period and with serotypes 23A and 23B in the post-PCV10 period. Two major STs represented serotype 15B/C isolates in both pre- and post-PCV10 periods: ST1262 and ST766. One major CC (7093) grouped serotype 15A/F isolates. All isolates were susceptible to chloramphenicol, levofloxacin, rifampicina, and vancomycin. The highest frequency of non-susceptibility was observed to sulfamethoxazole-trimethoprim (n=39; 41.1%). Twelve (12.6%) isolates were non-susceptible to tetracycline, especially in the post-PCV10 period. Penicillin non-susceptible pneumococci (PNSP) made up 21.1% (n=20) isolates (MICs of 0.12-6 µg/mL). Seven (7.4%) isolates were resistant to erythromycin (MICs of 1.0->256 µg/mL), all recovered in the post-PCV10 period; four isolates had the $cMLS_B$ phenotype, mostly associated with the *erm*(B), and three isolates had the M phenotype associated with the *mef*(A/E) gene. Erythromycin resistance and/or penicillin non-susceptibility were mostly associated with ST1262-15B/C, ST338-23A/B/F, and ST63-15A/F (international clone Sweden^{15A}-25). Post-PCV10 pneumococcal population dynamics in Brazil were characterized by capsular switching in serogroup 23 as well as by clonal expansion and persistence of internationally recognized antimicrobial resistant lineages associated with both serogroups 15 and 23.

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