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Invasive Pneumococcal Disease (IPD) in children under 2 years old: 4 year after the introduction of the Pneumococcal Conjugate Vaccine (PCV13).

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Background and Aims

Streptococcus pneumoniae (Spn) is an important cause of invasive diseases, with a high rate of morbi-mortality worldwide. We aimed to evaluate changes in the serotype distribution and antibiotic resistance of Spn causing IPD in children <2y.o. before and after the introduction of PCV13 in the National Vaccination Program (NVP) in Jan-2012 for children <2 y.o.

Methods

Spn isolates from sterile fluids (150 hospitals/24 provinces) were received at NRL between Jan-2010 and Dec-2016 and serotyped by Quellung. MIC was performed by agar dilution (CLSI). Three periods were defined and compared: pre-PCV13 (2010-11), transitional (2012) and post-PCV13 (2013-2016).

Results

From 1821 Spn isolated in children <5 y.o, 1029 (56,5%) were <2 y.o. Diagnosis: pneumonia (42%), meningitis (28%), sepsis (16%), other(14%). The number of IPD cases received at NRL decreased 55.3%, from 235 in pre-PCV13 to 105 (annual average<2 y.o.) in post-PCV13.

PCV13-serotypes decreased from 86.3% (prePCV13) to 23.6% (postPCV13) related to serotypes 14, 6A, 6B and 5 (p<0.05). Non-PCV13-serotypes reached 64%, mainly due to 24F/A/B (16.2%), 12F (9.1%) and 23B (3.3%).

Comparing pre-PCV13/post-PCV13 periods we observed: Penicillin No-susceptibility (PEN-NS) 38.2% (31.4% MIC=0.12-1mg/L; 6.6% MIC=2mg/L; 0.2% MIC=4mg/L)/37.9 (33.7% MIC=0.12-1mg/L; 3.8% MIC=2mg/L; 0.5% MIC=4mg/L), cefotaxime (meningitis) 5.7%/3.3%, (non-meningitis) 0.6%/0.2%; amoxicillin 0.2%/0%; meropenem 7.6%/3.8%; erythromycin 32.3%/26%; tetracycline 20.8%/31.3%; trimethoprim-sulfamethoxazole(SXT) 38.9%/43.7%. No resistance to chloramphenicol, levofloxacin, rifampicin, ceftaroline or vancomycin was detected. We observed a significant (p<0.05) increase in tetracycline and SXT resistance, and a decrease in erythromycin. Main serotypes associated with PEN-NS were (pre-PCV13/post-PCV13): 14 (43%/9.5%), 24(3.9%/39.2%), 19A (12.8%/9.5%), 6A (13.4%/2.5%), 6B (11.2%/3.8%).

Conclusion

PCV13-serotypes are showing a constant decrease since the introduction of the vaccine in the NVP. The non-PCV13-serotypes remain rising, being the most prevalent 24 F/A/B and 12F. Resistance to penicillin, erythromycin and tetracycline in post-PCV13 period was mainly associated with the serotypes 24, 19A and 14.

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