NASOPHARYNGEAL STREPTOCOCCUS PNEUMONIAE CARRIAGE IN ALGERIAN HEALTHY CHILDREN BEFORE AND POST 13 VALENT PNEUMOCOCCAL CONJUGATE VACCINE IMPLEMENTATION

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Background

S.pneumoniae serotypes in colonization should be an indicator for invasive infections. Since June 2016 , PCV13 was implemented nationwide in Algeria. Nasopharyngeal carriage of *S.pneumoniae* has allowed in Algiers, to assess its rate, antibiotic resistance and serotypes implicated in pre and post vaccine periods.

Results

Prevalence of *S.pneumoniae* nasopharyngeal carriage in asymptomatic children was 28.3% and 33% in pre and post vaccine periods respectively.

Figure 1. Prevalence in asymptomatic *S.pneumoniae* carriage in 2016 and 2017

Table 1. *S.pneumoniae* asymptomatic carriage prevalence in children according to age groups

Age (months)	Pre-vaccine period		Post vaccine period	
	Total (num)	<i>S.pneumoniae</i> carriage (%)	Total (num)	<i>S.pneumoniae</i> carriage (%)
0 - 6]	160	28.1	104	28.8
]6 - 12]	42	31	12	33.3
]12 - 24]	35	22.9	78	37.2
]24 - 60]	17	11.8	15	40
Average age (months)	9.6	7.9	12.3	13.6

Discussion

- * Rates of *S. pneumoniae* asymptomatic carriage in children less 5 years old vary in the country according to the study periods. It was at 32% in 2012 [2] , 28.3% in 2016 and 33% in 2017.
- * Penicillin non-susceptible (MIC≥0.12µg/ml) Pneumococcus was higher than described in 2012(69.4%). However, PGMIC≥2µg/ml determined by Walk Away must be confirmed by E.Tests
- * Erythromycin, co-trimoxazole. and tetracycline are markers of multi drug resistance which was reported at > 42% .
- * Children were co-colonized with pneumococci belonging to two different serogroup/types in 9.7% and 14.5% in pre and post vaccine periods respectively.
- * In pre and post vaccine periods, vaccine serotypes 6A/B, 19F, and 23F were the most common and the most resistant in rates and levels to antibiotics
- * Serotypes 14 and 19A are less frequent than in 2012.
- * Non-conjugate vaccine serotypes accounted for 25.5% in 2016 and 34.5% in 2017. Serotype 15A/B was the predominant.
- * The 13-valent conjugate vaccine covered 74.5% of all serotypes in 2016 and 65.3% in 2017.
- * Multiplex PCR used for pneumococcus serotyping is applicated for the first time in Algeria
- * The 54 isolates remained non typeable by multiplex PCR must be performed by Quellung reaction.

Conclusion

Natural or vaccine-induced fluctuations occur over time in serotypes distribution and antibiotic resistance. Therefore, regular monitoring of serotypes distribution in carriage of *S.pneumoniae* is important after vaccine implementation in Algeria.

Materiel and methods

A prospective studies were conducted in pre-vaccine (February to May 2016) and post vaccine (February to May 2017) periods at Laboratory of Clinical Microbiology, at CHU Mustapha, Algiers, Algeria.
No duplicative 254 and 209 asymptomatic healthy children aged 0 – 60 months were included respectively.
S.pneumoniae was isolated from nasopharyngeal samples and identified by standards methods.
Antibiotic susceptibility testing was determined by an agar disk diffusion method and minimal inhibitory concentration (MIC) was determined using MicroScan WalkAway system according to the Clinical and Laboratory Standards Institute (CLSI, 2014).
S. pneumoniae ATCC 49619 was used as the quality control strain.
Capsular serotyping was done using multiplex PCR and Quellung reaction with specific type antiserum (Statens Serum Institute) as previously described [1] .

Table 2. *S.pneumoniae* antibiotic resistance in carriage considering periods

Antibiotic Resistance (%)	Pre-vaccine period 2016	Post vaccine period 2017
Penicillin G		
MIC ≥0,12 µg/ml	57,4	49,3
MIC ≥2µg/ml	22,2	30,4
Erythromycin	68,5	63,8
Co-trimoxazole	54	26
Tetracycline	48,6	61,8

Table 3. *S.pneumoniae* serogroups/types implicated in children asymptomatic carriage shown by period.

Serogroups Serotypes (num)	Pre-vaccine period	Post vaccine period	Total
PCV 13 serotypes			
4	0	0	0
6A/B	15	14	29
9V/A	2	1	3
14	3	2	5
18C	1	1	2
19F	7	8	15
23F	11	4	15
1	0	0	0
5	0	0	0
7F	0	1	1
3	0	0	0
19A	2	1	3
Sub Total	41	32	73
Non conjugate vaccine serotypes			
15A/B	6	9	15
10A	2	3	5
11A	0	3	3
17	1	0	1
8	1	1	2
35B	0	1	1
G	3	0	3
I	1	0	1
Subtotal	14	17	31
Non -Typeable	24	30	54
Sub Total	38	47	85
Total	79	79	158

References

- [1] Hanifa Ziane, Vera Manageiro, Eugénia Ferreira Soumia Bektache, Mohamed Tazir, Manuela Caniça. Capsular typing of Streptococcus pneumoniae isolated in an Algerian hospital using a new multiplex PCR-based scheme. Journal of Microbiological Methods 119 (2015) 243–246. [2] Hanifa Ziane, Vera Manageiro, Eugénia Ferreira, Inês Barata Moura, Soumia Bektache, Mohamed Tazir, Manuela Caniça. Serotypes and antibiotic susceptibility of Streptococcus pneumoniae isolates from invasive pneumococcal disease and asymptomatic carriage in a pre-vaccination period, in Algeria .Front Microbiol. 2016; 7: 803