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DISTRIBUTION OF SEROTYPES CAUSING INVASIVE PNEUMOCOCCAL DISEASE IN ADULTS IN 2010-2013 IN SPAIN. THE ODIN STUDY

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BACKGROUND AND AIMS

• Streptococcus pneumoniae (SP) is a major cause of morbidity and mortality, especially in young children and the elderly. Inclusion of pneumococcal conjugate vaccines (PCV) into pediatrics National Immunization Programs (NIP) have showed to be effective in preventing pneumococcal disease in countries with a high vaccine uptake. Surveillance of SP serotypes distribution is needed to assess changes over time in both children and adults in order to guide public health decisions on pneumococcal vaccination. In Spain, PCV7 and/or PCV13 have been included in the pediatric immunization program only in two regions (Madrid from November 2006 until June 2012 and Galicia since January 2011).
• This 3-year study aimed to analyze changes over time in serotype distribution of invasive pneumococcal disease (IPD) in adults in Spain. In addition, we analyzed differences between serotype data from two regions with a very different approach to pediatric pneumococcal vaccination, Madrid and Barcelona, with an estimated PCV7/PCV13 vaccine coverage of 95% in Madrid and 50% in Barcelona (private market) for children aged 2-59 months.

METHODS

• A prospective, active, hospital-based surveillance of culture-confirmed IPD cases in adults (≥18 years) was performed in 9 Spanish hospitals for a three years period (1st period: 1st August 2010-1st June 2011, 2nd period: 2nd June 2011-1st June 2012; 3rd period: 2nd June 2012-1st June 2013). Two centers were located in Madrid and 2 in Barcelona.
• IPD was defined as presence of clinical signs/symptoms not attributable to any other cause simultaneously with growth of SP in one or more normally sterile fluids.
• All pneumococcal isolates were sent to the reference laboratory (National Center of Microbiology) for serotyping by the Quellung reaction or dot blot assay. Serotypes 6A, 6B, 19A and 19F were identified by real-time PCR.
• Comparisons between proportions were performed by the chi-square test and Fisher's exact test when necessary.

RESULTS

• A total of 637 patients with an IPD episode were included in this three years study. Data presented correspond to 637 SP isolates availables (4 non-typeable).
• Table 1 shows PCV13 serotypes distribution by study period. PCV13 + 6C accounted for 112 (58.6%), 117 (52.5%) and 113 (56.5%) isolates in the 1st, 2nd and 3rd period, respectively.
• Figure 1 shows distribution of most frequent isolates by study period. Isolates belonging to non-PCV13 + 6C serotypes accounted for 281 (44.4%) isolates, being serotypes 8 (6.0%), 15A (3.8%), 22F (3.6%), 11A (3.2%), 24F (3.0%), 16F (2.7%) and 12F (2.4%) the most prevalent in global in decreasing order, with other 22 different serotypes showing <2.4% isolates each.
• Different serotype distribution was found in Madrid (n=169) and Barcelona (n=213) (Figure 2), with lower percentage of PCV7 isolates in Madrid (6.5% vs. 17.4%, p=0.002). Among non-PCV13 serotypes, serotype 8 (14.2% vs. 3.3%, p<0.0001) and 16F (5.9% vs. 0.5%, p=0.003) were more frequent in Madrid, and serotype 24F in Barcelona (5.6%vs. 0.6%, p=0.008).

Table 1. PCV13 serotypes distribution by study period. 2010-2013

Serotype	2010-2011 N (%)	2011-2012 N (%)	2012-201313 N (%)	Total N (%)
1	12 (6.3)	8 (3.3)	13 (6.5)	33(5.2)
3	22 (11.5)	27(11.2)	27 (13.5)	76(12)
4	7 (3.7)	5(2.1)	6 (3)	18(2.8)
6A	3 (1.6)	2(0.8)	1(0.5)	6(0.9)
5	0	0	1(0.5)	1(0.2)
6B	3 (1.6)	1(0.4)	0	4(0.6)
6C	11 (5.8)	11(4.5)	10(5)	32(5.1)
7F	16 (8.4)	20(8.3)	12(6)	48(7.6)
9V	2 (1)	7(2.9)	2(1)	11(1.7)
14	11(5.8)	9(3.7)	11(5.5)	31(4.9)
18C	1 (0.5)	3(1.2)	3(1.5)	7(1.1)
19A	18 (9.4)	21(8.7)	20(10)	59(9.3)
19F	4 (2.1)	10(4.1)	5(2.5)	19(3)
23F	2 (1)	3(1.2)	2(1)	7(1.1)
TOTAL PCV13+6C	112(58.6%)	127 (52.5%)	113(56.5%)	239 (55.2%)

Figure 1. Distribution of most prevalent serotypes (no. of isolates) by study period. 2010-2013

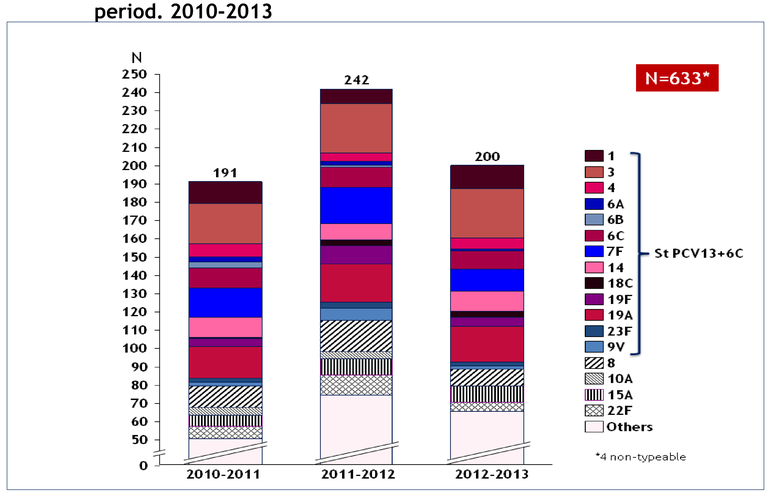
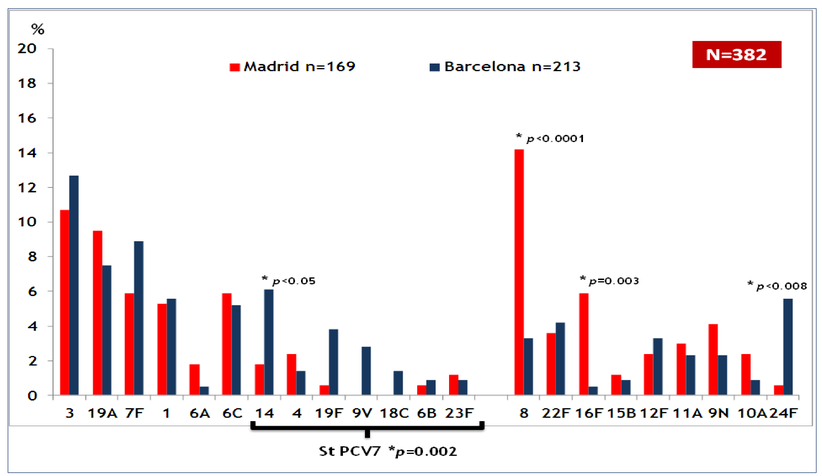


Figure 2. Serotype distribution (%) in Madrid vs. Barcelona. 2010-2013



CONCLUSIONS

• Over the study period, serotypes included in PCV13+6C were maintained around 55%, with no changes in serotype distribution. No increase in non-PCV13 serotypes were observed along the study period.
• Differences were only found in Madrid versus Barcelona for PCV7 serotypes, with percentages significantly lower in Madrid than in Barcelona, after 7 years of PCV7 included in the pediatric immunization program in Madrid Region. Direct pneumococcal immunization of adults with PCV13 is needed in countries without PCV13 included in the pediatric NIP and with a heterogeneous uptake of PCV13 in the pediatric population.

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