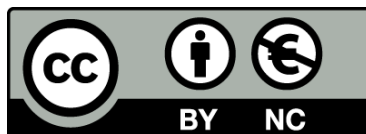




UNIVERSITAT_{DE}
BARCELONA

Impact of molecular methods in the analysis of the invasiveness of *Streptococcus pneumoniae*

Eva del Amo Morán



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CONCLUSIONS

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According to the objectives previously established, the conclusions obtain from the studies conducted in this doctoral thesis were:

Paper 1:

High invasiveness of pneumococcal serotypes included in the new generation of conjugate vaccines

1. The analysis of the pneumococcal strains isolated in our area revealed that serotypes 1, 5, 7F and 19A were significantly associated with a high invasive disease potential, whereas serotypes 6C, 11A and 23A were significantly associated with low invasive disease potential.
 - 1.1. Serotypes included in PCV13 presented the highest invasiveness while a low attack rate was observed for the non-PCV13 serotypes. These data should encourage the introduction of PCV13 in the children's vaccination calendar.
 - 1.2. After implementation of PCV7, serotypes 1, 5, 7F and 19A became the most prevalent serotypes in IPD in children in our area showing a significant high invasive disease potential.

Paper 2:

Estimation of the invasive disease potential of *Streptococcus pneumoniae* in children by the use of direct capsular typing in clinical specimens

2. The addition of the use of molecular techniques in direct sample for the detection and the capsular identification of *Streptococcus pneumoniae* offered a more accurate picture of the pneumococcal population, in both IPD and carriage, resulting in an adjustment of the invasive disease potential of some serotypes. This new analysis showed a significantly association with high invasive disease potential for serotypes 1, 7FA and 3, whereas a significant association with low invasive disease potential was observed in serotypes 19FBC, 6A, 6C, 11AD, 15BC, 21, 23A, 23B, 10FC33C, 35B and 34.

2.1. The ability of molecular techniques to detect multiple colonization in direct sample in the carriers population increased the number of serotypes that could be identified and revealed a rate of co-colonization of 26.4%.

2.2. Temporal changes in serotypes were observed during the study period, between the PCV7 era and the new conjugate vaccines era (PCV10-13). A reduction in serotypes 1 and 7FA was revealed while serotypes 3 and 6A experienced an increase.

Paper 3:

Serotypes and clonal diversity of *Streptococcus pneumoniae* causing invasive disease in the era of PCV13 in Catalonia, Spain

- 3.1. After the introduction of PCV13, there has been a significant decrease in the proportion of PCV13 serotypes causing IPD and a significant increase in the proportion of non-PCV13 serotypes. Worth mentioning is the increase experienced by serotype 12F (in high association with ST989) and, when analyzed by age groups, the increase of serotype 24F in children less than 2 years old (the major clone being the multi drug resistant ST230).
- 3.2. Despite the observed decline, PCV13 serotypes continue to be the major serotypes causing IPD in our geographical area (with a special concern for the increase of the ST156 serotype 14) which highlights the need for complete vaccination in all children population.
- 3.3. The study of the genetic population of the serotypes offers a more complete knowledge of the pneumococcal invasiveness, explains temporal trends and differences in geographical areas, and provides useful information for the prediction of which serotypes could be replacing the ones included in the vaccines. For a better interpretation of the pneumococcal behavior, the analysis of the clonal types associated with a serotype should be performed along with the capsular identification.