Long term impact of PCV13 implementation on community acquired pneumonia in children: a time series analysis of an 8 years prospective multicenter study

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BACKGROUND AND OBJECTIVES

In 2010, 13 valent pneumococcal conjugate vaccine (PCV13) was implemented in France, 5 years after PCV7 implementation. We aimed to assess the long term effect of PCV13 implementation on community acquired pneumonia (CAP) in children.

METHOD

We conducted a quasi-experimental, population-based interrupted time series analysis based on a multicenter prospective cohort in 8 French pediatric emergency departments (PEDs), from June 2009 to May 2017.

All patients < 15 years with chest radiography-confirmed CAP were enrolled. The main outcome was the number of CAP per 1,000 PEDs visits in children less than 15 years old over time, analyzed using the segmented regression model with autoregressive error, adjusted on "flu like" syndromes.

RESULTS

We enrolled 12,587 children with confirmed CAP. Among them, CAP with pleural effusion occurred in 673 cases (5%). PCV13 implementation was followed by a sharp decrease of CAP number per 1,000 PEDs visits (-0.8% per month, $p < 0.0001$), and reached 44% decrease in May 2014. Then, we observed a slight increase from June 2014 to May 2017 (+0.9% per month, $p = 0.0009$) but the level reached was far from reaching Pre-PCV13 level.

CAP with pleural effusion, hospitalized CAP, CAP with high inflammatory biomarkers, and proven pneumococcal CAP immediately decreased after PCV13 (-48%, -30%, -30% and -54%; $p = 0.01$, $p = 0.02$, $p = 0.01$ and $p = 0.01$ respectively), and remained stable thereafter.

Over the study period, the rate of virus detection in CAP steady increased ($p = 0.01$).

Figure 1: Impact of PCV13 on CAP in children

Figure 2: Severe CAP and CAP where pneumococcus is likely to be causal

Figure 3: Evolution of virus detection in CAP

CONCLUSION

PCV13 implementation led to a major reduction of CAP in children, but a recent slight increase is observed and must be followed. The sustainability of low number of severe CAP, and CAP where invasive *pneumococci* are likely to have a causative role suggests a lesser virulence of non-PCV 13 serotypes implicated, and an increasing role of viral coinfections.

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