Invasive pneumococcal disease at University Medical Centre Ljubljana before and after introduction of routine pneumococcal vaccination

Marko Pokorn¹, Katja Jarc², Klavdija Strajnar², Metka Paragi³
¹Department of Infectious Diseases, UMC Ljubljana, Slovenia
²Children's Hospital, UMC Ljubljana, Slovenia
³National Laboratory of Health, Environment and Food, Ljubljana, Slovenia

Background and aims

In Slovenia, surveillance of invasive pneumococcal disease (IPD) in children has been performed since 1993. All pneumococcal isolates are sent to the National Reference Laboratory for serotyping. In 2015, the 10-valent pneumococcal conjugate vaccine (PCV10) was introduced (2+1 vaccination schedule with no catch-up) in the NIP on non-mandatory basis with 48.4% coverage in 2015 and 49.4% in 2016. The aim of the study was to assess features of IPD and pneumococcal serotypes in children <15 years of age treated at the University Medical Centre Ljubljana (UMCL) in a two-year period before and after introduction of PCV10 vaccination.

Methods

Data on demographic, clinical and laboratory features of IPD in children <15 years treated at UMCL from 2013 to 2016 were collected. All isolates were serotyped and antimicrobial resistance was assessed.

Figure 1. Number of IPD cases

Results

Throughout the study period there were 100 IPD cases, 67 in 2013/14 and 33 in 2015/16. After PCV10 introduction, there was a 85% reduction of IPD cases in infants (13 vs. 2), followed by 75% in 24-59 month olds (20 vs. 5) and a 24% in those 12-23 months old (21 vs. 16). The most common syndrome in both periods was bacteremia, followed by pneumonia. Among pneumococcal isolates, in both periods vaccine serotypes prevailed. An increase in serotype 3, 6A and 19A cases was not observed. The majority of isolates were penicillin-susceptible (87% in 2013/14, 90% in 2015/16), the remaining demonstrated intermediate resistance. All isolates were sensitive to cefotaxime. In 2013/14, 75% of isolates were PCV10 and 91% were PCV13 serotypes, whereas in 2015/16, 76% of isolates were PCV10 and 88% were PCV13 serotypes.

Figure 2. IPD cases in various age groups, 2013/14 vs. 2015/16

Dicussion

In the first 2 years after introduction of PCV10 vaccination, a 50% decrease in number of IPD cases was observed at the largest and one of the two university hospitals in Slovenia. The decrease was most prominent in infants as this is the vaccinated cohort. The PCV10 vaccination rate is slightly below 50% which is in strong contrast with DTaP IPV Hib vaccination rate amounting to 94.1% in 2016. One possible explanation for this discrepancy is the fact that PCV10 is offered on non-mandatory basis whereas the DTaP IPV Hib vaccination is mandatory. Due to the low PCV10 vaccination rate and short observation period, no serotype replacement was observed in our patients. This is especially true for serotypes 3, 6A and 19A.

Table 1. Number of IPD syndromes

Syndrome	2013/14	2015/16
bacteremia	25	17
pneumonia	23	12
meningitis	2	0
ethmoiditis	9	2
AOM	5	1
mastoiditis	1	0
SA	2	0
peritonitis	0	1

Conclusions

After PCV10 introduction in 2015 with roughly 50% vaccination coverage, a 50% decrease in number of IPD cases was observed at UMCL with vaccine serotypes predominating. The decrease in IPD numbers was most prominent in infants. The majority of isolates remain penicillin-susceptible. Further surveillance is needed to monitor changes in IPD epidemiology. Moreover, additional effort should be directed towards increasing pneumococcal vaccine uptake.

Figure 3. Distribution of pneumococcal serotypes, 2013/14 vs. 2015/16