TRENDS IN PEDIATRIC PNEUMOCOCCAL PLEURAL EMPYEMA FOLLOWING PNEUMOCOCCAL CONJUGATE 13-VALENT VACCINATION: 10 YEARS OF ACTIVE SURVEILLANCE IN A MEXICAN HOSPITAL

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Background

- We have previously published the first Mexican study showing a decrease in pneumococcal invasive disease following implementation of the 13-valent pneumococcal conjugate vaccine (PCV13), however, the impact of this vaccine on Pneumococcal Pleural Empyema (PPE), serotypes distribution, and appearance by other non-pneumococcal bacteria has not been yet published. The Tijuana, Mexico and San Diego, California border is considered the most transited border in the world.

Methods

- Since October-2005 until September-2015 (10 years), Active Surveillance for pleural empyema (PE) in children < 16 years old was performed in the Tijuana, Mexico, General Hospital (TGH).
- Diagnosis of PE was established by Light criteria of a pleural effusion with a community acquired pneumonia + bacterial isolation by standarized cultures. For Streptococcus pneumoniae isolates serotype identification was performed using the Quellung reaction (Statens Serum Institute®, Copenhagen, Denmark)
- A descriptive analysis for all PPE was performed using Excel®
- Admission data: Age, gender, days of symptoms, use/not use of antibiotics, pre-disposing conditions, PCV-7 or 13 – status, etc...
- Hospitalization data: Pleural fluid analysis, CBC, antibiotics used, chest tube (yes/no) and duration, pleural decortication (yes/no), hospitalization days, other complications, etc...

Results

- A total of 48 PE were diagnosed.
- Bacterial identification was possible in 35 (73%) cases. Among these, 26 (74.28%) were caused by S. pneumoniae.
- Median age for PPE was of 3.91 years (4 months -15 years)
- Median days of symptoms was of 9 (3-21).
- All but one had any PCV vaccination (only PCV7 in 10, PCV7 and PCV13 in 2, only PCV13 in 13)
- One patient had both GCD and IgG deficiency, but this patient had a PE caused by K. oxytoca.
- All but 2 received oral antibiotics (amoxicillin mostly).
- All but one required chest tube for a median of 6 days (3-18).
- Pleural decortication was performed in 10 patients (38.5%).
- One patient died.
- Clindamycin and Ceftriaxone/Cefotaxime was given to all patients.
- Hospitalization days median was of 15 (10-28).
- Before PCV13 implementation (a period of 77 months), the total number of PPE were of 21 (3.27 cases per year), with serotypes 3, 19A and 6A/C accounting for 64.3% of all cases (See Figure 1).
- Following PCV13 introduction (43 months period), PPE dropped to 5 cases (1.4 cases per year), with isolation of serotypes 6A/C, 7B, 15, 3 and 24F, (See Figure 1).
- Appearance of non-PPE started to appear since 2010 with two cases, but have increased since implementation of PCV13 (seven cases). Non-pneumococcal isolates have been Staphylococcus aureus (3), Streptococcus pyogenes (2), as well as Streptococcus salivarius, Group Milleri Streptococcus, Klebsiella oxytoca and Pseudomonas aeruginosa (one each, (See Figure 2).

Conclusions

1. Following PCV13 universal vaccination, all PPE cases have decreased, with a trend on decrease on serotypes 6A/C, 3 and 19A.
2. This study shows an impact of PCV13 on PPE, however, early appearance (replacement?) of other pneumococcal serotypes, and non-pneumococcal bacteria causing PE is present. PE still is a considerable infectious diseases in Tijuana, Mexico, with significant impact on morbidity.
3. Continuous active surveillance for PE is mandatory.