CHARACTERIZATION OF CHILDREN WITH TRUE POSITIVE BLOOD CULTURES IN NORTHERN ISRAEL, 2007-2017: A RETROSPECTIVE STUDY

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Introduction: Vaccination of children with the conjugated pneumococcal vaccine has reduced the burden of invasive pneumococcal disease in countries where there is widespread use. We characterized the true positive blood cultures (BC) of children aged 3 months to 18 years who presented to a Medical Center in Northern Israel following Prevnar implementation.

Methods: We retrospectively reviewed demographic, clinical and laboratory data of patients with true bacteremia emphasizing age, young group, 3-36 months, and old group, 3 -18 years, and whether there was a focus of infection or bacteremia without focus. Pneumococcal isolates were typed at the National Laboratory for Streptococcus pneumoniae.

Results:

- Overall, 909 (2.7%) of the 34066 samples were with growth, but 562 (1.6%) were deemed contaminants and 246 (0.7%) excluded as patients did not meet inclusion criteria thereby yielding 101 true positive blood cultures for analysis (Figure 1, Table 1).
- Focal infection with concomitant bacteremia was more common than bacteremia alone- overall, 73/101 (72%) versus 28/101 (27.7%), $p < 0.001$, in the young group, 34/51 (66%) versus 17/51 (33%) $p = 0.02$, and old group, 39/50 (78%) versus 11/50 (22%), $p = 0.001$, respectively (Table 2).
- Streptococcus pneumoniae was the most common pathogen overall, 29/101 (29%), and in the young group 22/51 (43%), but rare in the old group 7/50 (14%). In the latter, Brucella spp. predominated 13/50 (26%) followed by Staphylococcus aureus 12/50 (24%), (Figure 2, Figure 3).
- In the young group, pneumococcal bacteremia with serotype strains was not uncommon, especially in children who were not fully immunized with Prevnar.
- Serotype 19A was the most common non- PCV isolated serotype.

Figure 1. Study algorithm

Table 1. Distribution of positive BC by age

Age	Total Positive BC N(%)	Bacteremia N(%)
All (% out of total samples (34,066))	663 (1.94)	101 (0.3)
3 months - 3 years	428 (1.25)	51 (0.15)
3 years - 18 years	235 (0.69)	50 (0.15)
P value	.001	.92

Table 2. Bacteremia without focus vs. focal infection

Age	Bacteremia	Bacteremia without focus N(%)	Focal infection N(%)	P value
All	101	28 (27.7)	73 (72)	<.001
3 months - 3 years	51	17 (33)	34 (66)	.02
3 years- 18 years	50	11 (22)	39 (78)	.001

Figure 2: Pathogens detected in positive blood cultures, overall

Discussion:

- Our study confirms that vaccination with pneumococcal conjugate vaccine greatly reduces the incidence rate of invasive pneumococcal disease, a trend that may justify a new approach to the febrile child in the ED.

Limitations: The retrospective nature of the study, and its power pose limitations. Moreover, since the study was performed at a single institution, its findings may not generalizable to other pediatric settings. Some blood cultures deemed contaminants, may have been “true positive” BC.

Figure 3: Pathogen distribution among the young and old groups

Conclusions:

- In conjunction with decreased bacteremia rates, there have been changes in the predominating pathogens and the clinical presentation
- In the older group, Brucella predominated, followed by S. aureus and S pneumoniae in decreasing order.

- Conjugate pneumococcal vaccine decreased the incidence rate of pneumococcal bacteremia.
- Focal infection was more common than bacteremia without focus, amongst children up to 3 years.
- Ongoing surveillance is warranted to better understand the widespread implications of Prevnar, including serotype replacement and increasing prominence of other pathogens.