



Characterization of acute meningitis by *Streptococcus pneumoniae* in the pediatric population treated in 10 Hospitals of the city of Bogotá, Colombia, from 2008 to 2019



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INTRODUCTION

Infections caused by *Streptococcus pneumoniae* are considered a public health problem, and one of the leading causes of morbidity and mortality worldwide, especially in children younger than five years. Such conditions are associated with invasive infections such as pneumococcal bacteremia peritonitis, arthritis, septic pericarditis, septicemia and meningitis. The latter is one of this organism's most serious infections, with high rates of morbidity and mortality among the pediatric population. Since 2012, mass vaccine PCV10 campaigns have been implemented in Colombia.

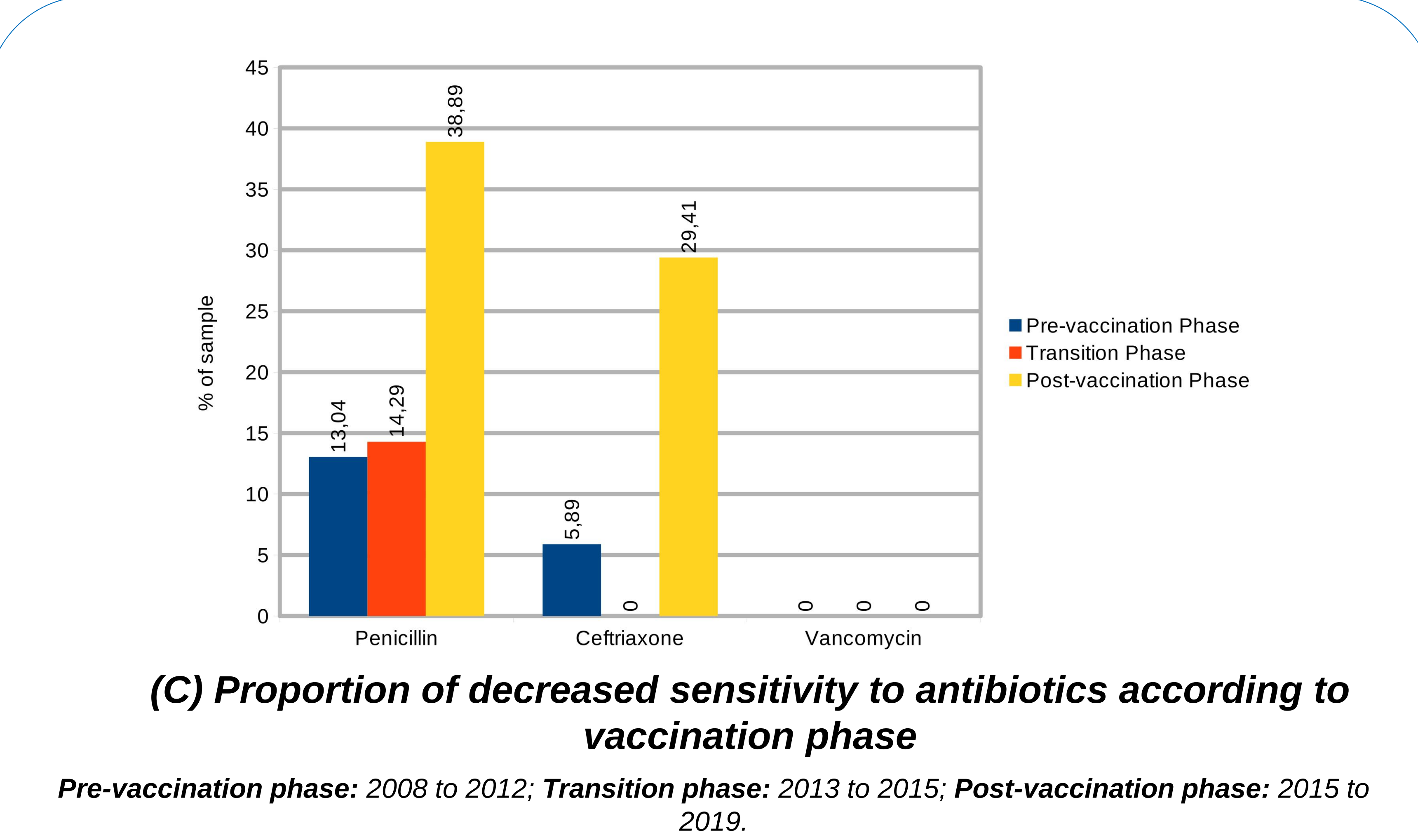
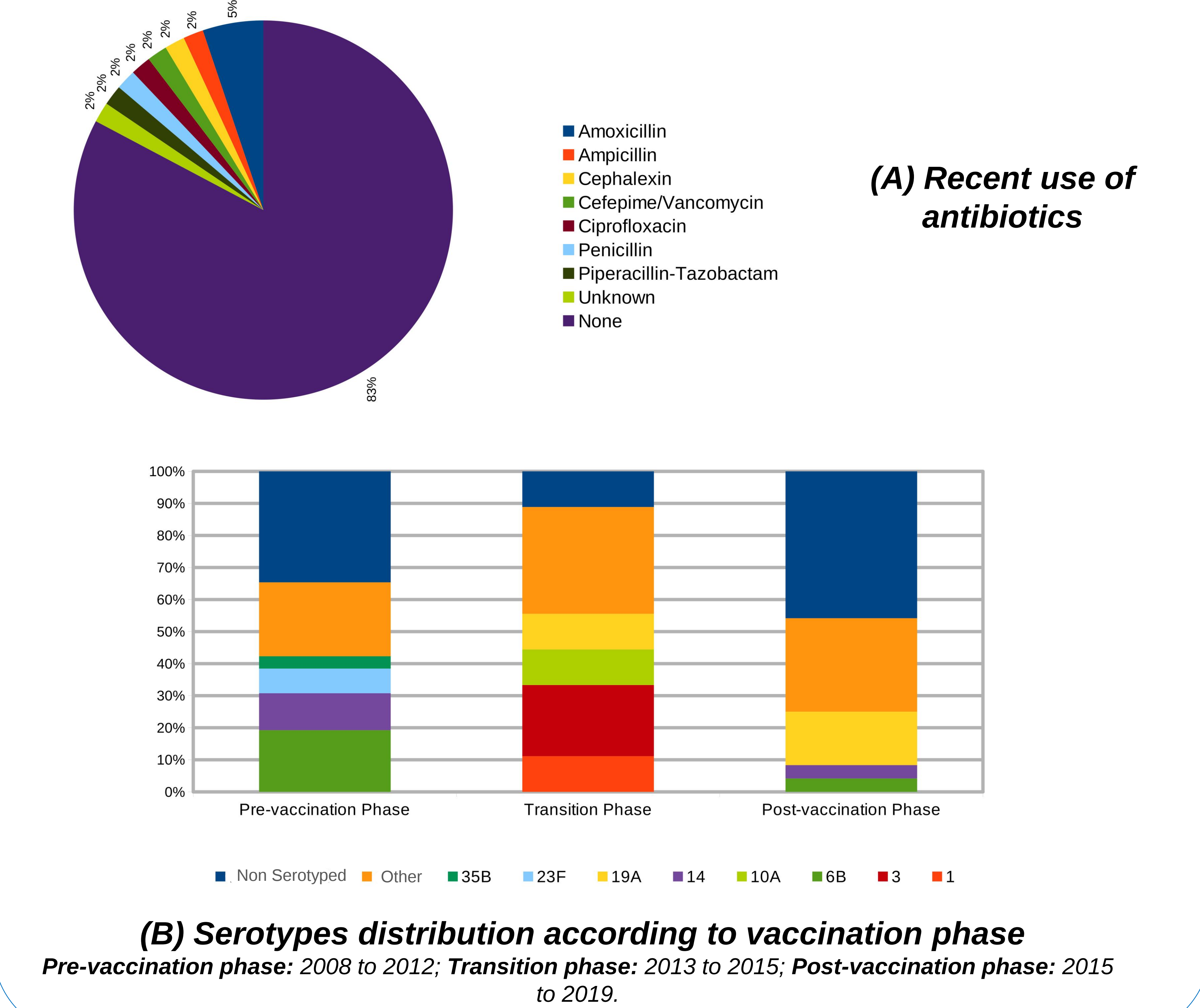
OBJECTIVE

To perform a clinical, epidemiological and microbiological characterization of patients with acute bacterial meningitis caused by *Streptococcus pneumoniae* in 10 hospitals of Bogotá, Colombia.

METHODOLOGY

Ambispective cohort study conducted on patients between 0 and 18 years of age, with acute bacterial meningitis, and *S. pneumoniae* isolated from CSF or blood in 10 hospitals of Bogotá D.C., from January 2008 to July 2019. Descriptive analysis, including frequencies and percentages, medians and interquartile ranges, or means and standard deviations. Subsequently, bivariate analysis with parametric tests or non-parametric tests (T-tests, chi-square/Fisher's exact test).

Outcomes			
Cognitive dysfunction			73.33%
Sensorineural hearing loss			57.89%
Epilepsy			42.86%
Motor disorder			37.71%
Conductive hearing loss			23.53%
Blindness			13.04%
Bivariate analysis			
Variables	p	OR	CI95%
Complications vs Age < 19 mo	0.022	1.81	1.08-3.06
Motor disorder vs Age < 19 mo	0.012	2.95	1.04-8.14
Cognitive dysfunction vs Age < 19 mo	0.026	3.67	1.40-9.62
Sensorineural hearing loss vs Age < 19 mo	0.024	4.14	1.11-15.38
Variables associated with higher lethality			
CSF Glucose < 20 mg/gl	0.036	1.74	1.24-2.44
CDF red cell count > 70/mm3	0.039	1.91	1.20-3.06
Blood leukocytes count < 12,000/mm3	0.004	3.26	1.61-6.61
Blood Neutrophils < 10.000/mm3	0.007	2.54	1.45-4.45
Hemoglobin < 11 g/dl	0.04	2.33	1.16-4.70
C reactive protein > 100 mg/l	0.001	3	1.64-5.49



RESULTS

Data from a total of 58 cases of acute bacterial meningitis caused by *S. pneumoniae* were analyzed. The median age was 19 months (range between 0 to 211 months), 65.52% were males, and 86.21% from Bogotá D.C. 15.52% previously used antibiotics (Figure A). Vaccination data was available from 67.24% of patients, of which 41.01% received at least 1 dose of pneumococcal vaccine and 3 patients received the complete vaccine PCV10 schedule. The most important symptom was CSF fistula, observed in 22.41% of the cases. The diagnosis of invasive pneumococcal disease most frequently associated with meningitis was pneumonia (15.52%). In 63.79% of the cases, the admission diagnosis was neuroinfection. Serotyping was successful in 37 isolates. Figure B shows the distribution of serotypes based on the vaccination phase. Non-serotypes correspond to samples that did not reach the surveillance system. The most frequent symptoms at the moment of diagnosis include fever (94.83%), hyporexia (82.76%), drowsiness (67.24%), irritability (58.62%), vomiting (59.9%) and seizures (50%). The latter were more common in the 4 to 12 months age group, or 85.7% of the cases, making it the second most frequent symptom in these patients. Mortality was 20.69%. 55.17% of the patients had at least 1 complication. Ventilatory failure occurred in 48.28% of the cases, severe shock in 44.83%, comma in 36.21%, status epilepticus in 24.14%, vasculitis/stroke in 15.52%, brain abscess in 10.34%, and hygroma in 10.34% of the patients. Figure C shows how sensitivity evolves thanks to the main antibiotics in the cohort. The table also shows the consequences associated with pneumococcal meningitis, as well as the statistically significant association between them and patients younger than 19 months (other variables were not statistically significant). Variables associated with increased mortality are also shown.

CONCLUSIONS

The symptoms of bacterial meningitis vary with patients' age. Age is the main factor associated with complications and sequelae. The inflammatory response is the main factor associated with mortality. Reduced sensitivity to antibiotics has varied over time, increasing to 29.41% for third-generation cephalosporins. The disease has high morbidity and mortality rates. Strategies that allow the prevention of this pathology and reduce sequelae must be strengthened.

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