



ORIGINAL ARTICLE

Pneumococcal meningitis: epidemiological profile pre- and post-introduction of the pneumococcal 10-valent conjugate vaccine ☆,☆☆



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KEYWORDS

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Abstract

Objectives: To evaluate the possible effects of the introduction of the pneumococcal conjugate 10-valent vaccine schedule in the state of Paraná on pneumococcal meningitis cases and to assess the distribution of serotypes among cases.

Method: Cross-sectional study with retrospective data collection of cases of pneumococcal meningitis in the state of Paraná reported to Sistema de Informação de Agravos de Notificação (SINAN), from 1998 to 2011. A total of 1,339 cases of pneumococcal meningitis were analyzed; 1,205 cases from the pre-vaccine period (1998-2009) were compared to 134 cases from the post-vaccine period (2010-2011). Descriptive and comparative statistical analyses (chi-squared test and prevalence ratio) were performed using JMP 5.1.2 statistical software (JMP Statistical Discovery, North Carolina, USA) and EPI INFO 6 (Centers for Disease Control and Prevention, Georgia, EUA).

Results: There was a significant reduction in the mean rates of incidence and mortality in the general population. The analysis of cases in the pre- and post-vaccination periods in the age groups covered by vaccination (younger than 2 years) showed significant reductions in incidence rates (6.01 cases/100,000 to 2.49 cases/100,000 individuals) and mortality (1.85 cases/100,000 population to 0.47 cases/100,000 population), while the mean lethality rate did not change significantly. There was a significant reduction in cases whose serotypes are included in the vaccine (80.7% to 53.3%).

Conclusion: Even after a short time of use, the 10-valent pneumococcal conjugate vaccine has already had a significant impact in reducing the incidence and mortality of meningitis

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PALAVRAS-CHAVE

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cases among infants, as well as the reduction of cases whose serotypes are included in the vaccine.

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Meningite Pneumocócica: perfil epidemiológico pré e pós a introdução da vacina pneumocócica conjugada 10valente

Resumo

Objetivos: Avaliar os possíveis efeitos da introdução da vacina pneumocócica conjugada 10 valente no calendário vacinal no Paraná sobre os casos de meningite pneumocócica; avaliar a distribuição dos sorotipos dentre os casos.

Método: Estudo observacional, transversal, com coleta de dados retrospectiva dos casos de meningite pneumocócica no Estado do Paraná, notificados ao SINAN, no período de 1998 a 2011. Foram analisados 1339 casos de meningite pneumocócica e comparados os 1205 casos do período pré-vacina (1998 a 2009) com os 134 do período pós-vacina (2010 a 2011). A análise estatística descritiva e comparativa (teste qui-quadrado e razão de prevalência) foi realizada no software de estatística JMP 5.1.2 (JMP Statistical Discovery, Carolina do Norte, EUA) e no Programa EPI INFO 6.

Resultados: Observou-se redução significativa das taxas médias de incidência e mortalidade na população geral. A análise dos casos nos períodos pré e pós-vacina nas faixas etárias contempladas pela vacinação (menores de 2 anos) mostrou reduções significativas das taxas de incidência (6,01 casos/100.000 para 2,49 casos/100.000 habitantes), mortalidade (1,85 casos/100.000 habitantes para 0,47 casos/100.000 habitantes), enquanto que a letalidade média não apresentou variação significativa. Houve redução significativa dos casos cujos sorotipos estão incluídos na vacina (80,7% para 53,3%).

Conclusão: Mesmo com um tempo reduzido de uso, a vacina pneumocócica conjugada 10 valente já apresentou um impacto relevante na diminuição dos coeficientes de incidência e mortalidade dos casos de meningite entre os lactentes, além de redução de casos cujos sorotipos estão incluídos na vacina.

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Introduction

Streptococcus pneumoniae (pneumococcus) can be found in the nasopharynx and oropharynx mucosa of healthy humans, and is important due to its morbidity and mortality related to diseases such as meningitis, pneumonia, and septicemia, among others.¹ In Brazil, it is the second-leading causative agent of bacterial meningitis, following *Neisseria meningitidis*.²

Pneumococcal disease prevention is primarily based on active immunization. A total of 93 pneumococcus serotypes³ have been identified, according to the antigenicity and immunogenicity of the polysaccharide capsule, the main bacterial virulence factor. The polysaccharide antigens induce a serotype-specific immunological response, which is very useful for the composition of pneumococcal vaccines. The 23-valent vaccine consists of purified capsular polysaccharides of 23 serotypes of *Streptococcus pneumoniae*, produces thymus-independent immune response, and is therefore indicated only for children older than 2 years of age. When the polysaccharides are individually conjugated to protein carriers, there is immunogenicity improvement, as they are capable of triggering the immune memory response (thymus-dependent) and can be administered to children younger than 2 years of age, the main age group affected by invasive pneumococcal disease.^{1,4,5}

The pneumococcal conjugate vaccines released by regulatory agencies and currently marketed in Brazil are the 10-valent and 13-valent, which protect against ten and 13 pneumococcal serotypes, respectively. The 10-valent pneumococcal conjugate vaccine became part of the National Immunization Program (NIP) schedule from 2010 for children younger than 24 months. The 23-valent pneumococcal polysaccharide vaccine is available at the Special Immunobiological Reference Centers (Centros de Referências de Imunobiológicos Especiais—CRIE) to patients older than 2 years of age considered at risk for invasive pneumococcal disease, and institutionalized elderly patients older than 60 years.⁶

The objective of this study was to evaluate the effect of the introduction of the 10-valent pneumococcal conjugate vaccine into the NIP vaccination schedule on the epidemiological indicators and serotypes of pneumococcal meningitis in the state of Paraná, Brazil.

Methods

This was an observational, cross-sectional study with retrospective data collection of cases of meningitis caused by *Streptococcus pneumoniae*, demonstrated through laboratory tests, which occurred in the state of Paraná and were notified to the Notifiable Diseases Information System

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