Pneumococcal Nasal Carriage in HIV-infected Adults in The Post-PCV-13 Era

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Abstract

Background

Pneumococcal disease is a leading cause of morbidity and mortality. HIV-infected adults have a 35-fold greater risk of invasive pneumococcal disease than the general population. As a result in 2012, the United States included the pneumococcal conjugate vaccine (PCV-13) in the HIV-infected adult vaccination schedule in the United States. The introduction of PCV-13 into the childhood vaccination schedule 2010 has reduced pneumococcal disease, but this impact on pneumococcal nasal carriage rates in adults needs to be determined.

Methods

We collected nasal swabs from 105 subjects just prior to PCV-13 receipt, 100 of whom returned nasal swabs 4-6 weeks after. 255 nasal swabs from 155 subjects were obtained and sent to a commercial lab for serotyping. Results

The same were then thawed in batches and plated for pneumococcal isolation per the World Health Organization protocol: plated at 37°C 5% CO₂. 5 of the isolates were serotypes not included in PCV7. Total subjects: 155 in 2 groups: 105 new PCV-13 vaccine recipients and 50 subjects with + carriage. Isolate was: Optichin positive, S. pneumoniae isolate (not serotypes 1-48). Isolate was: A non-vaccine serotype (not serotypes 1-48). Group II: 50 Subjects

Total nasal swabs from 155 subjects given pneumococcal vaccine, for a nasal carriage rate of 6.4%. The single pneumococcal isolate was from a subject who had received PCV-13 prior year and was a non-vaccine serotype. Our subjects were all on antiretroviral therapy, with median CD4 count of 800 cells/mm³.

Conclusions

Our study demonstrates, for the first time, pneumococcal nasal carriage rates in adults with well-controlled HIV infection 3 years after PCV-13 introduction in the childhood vaccination schedule in the United States. The need for pneumococcal vaccines for prevention of pneumococcal disease in this population has also been affected by PCV-13 introduction.

Introduction

Pneumococcal disease is a leading cause of illness and death in HIV-infected adults. The pneumococcal conjugate vaccine (PCV) has been shown to be effective in infants and young children, aiming to reduce the burden of pneumococcal disease in adults.

Pneumococcal nasal carriage in HIV-infected adults:

• Pneumococcal nasal carriage in thought to provide protection to pneumonia. Rate of S. pneumoniae colonization in the general population in 2006. (used PCV7): 3.4%, 52%

• HIV-infected adults with lower CD4 counts have higher rates of pneumococcal infection. Infection rate in HIV-infected individuals to asymptomatic pneumococcal carriage in comparison to non-CD4 patients: 17.9% vs 8.5%

• Pneumococcal schedule in US HIV adults:

PCV13 recipients n = 541 (36.1%), 7D (100%), 13v (54.5%), 14v (38.5%) is recommended in this population. In 2016, PCV13 was recommended for children on ART. In 2020, PCV13 was recommended for children on ART.

• In 2012, US ACIP and NIH recommended Prevenar 13 (PCV13) for HIV patients in addition to previously recommended PPV.

Knowledge gaps:


Results

255 nasal swabs from 155 subjects:

• Only one was positive for pneumococcus (0.64% of subjects with + carriage). Isolate was:

  - a non-vaccine serotype (not serotypes 1-48)
  - from a subject who had received PCV-13 one year prior

  All subjects were on ART (median CD4 count 606 cells/mm³)

Figure 1: BA plates: Plated at 37°C 5% CO₂. Optichin positive, S. pneumoniae isolate

Figure 2: Gentamicin plates: Alpha hemolytic colonies from nasal swabs

Conclusions

• Very low pneumococcal nasal carriage rates in adults with well-controlled HIV infection in the United States 3 years after PCV-13 introduction into childhood vaccination schedule amongst our subjects

• Further studies needed to determine if invasive pneumococcal disease in this population has also been affected by PCV-13 introduction.

References


