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Immunogenicity Of DTaP-IPV-Hib And MenC Vaccines In The UK When Administered With a 13-valent Pneumococcal Conjugate Vaccine

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ABSTRACT

Background

Streptococcus pneumoniae is a leading cause of morbidity and mortality in children worldwide. Although the 7-valent pneumococcal conjugate vaccine (PCV7) has been successful in controlling pneumococcal disease, some disease-causing serotypes are not covered by this vaccine. We report the infant series results of a randomised, double-blind, active-controlled study of a 13-valent-pneumococcal vaccine (PCV13), containing polysaccharides from serotypes 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, 23F individually conjugated to CRM197.

Methods

278 healthy infants aged 6 -14 weeks were enrolled and randomised 1:1 to receive PCV13 or PCV7 at 2 and 4 months. Participants received serogroup C meningococcal (MenC) vaccine at 2 and 4 months and DTaP-IPV-Hib vaccine at age 2, 3, and 4 months. Concomitant antibody responses in both groups and PCV13 responses in the PCV13 group were assessed at 5 months.

Results

Concomitant antibody responses were comparable in the 2 groups. Anti-PRP IgG concentration ≥ 0.15 µg/ml was achieved by 96.5% of the PCV13 group and 98.1% of the PCV7 group. MenC SBA titres of ≥ 1:8 were achieved by 99.2% of participants in both. All participants in both groups achieved IgG concentrations ≥ 5 EU/mL for pertussis antigens PT, FHA and Pertactin. The proportion of participants in the PCV13 group with serotype specific IgG concentrations ≥0.35µg/mL ranged from 40.7% (serotype 6B) to 96.3% (serotype 1). PCV7 and PCV13 were well tolerated with comparable reactogenicity profiles.

Conclusions

Immunogenicity of concomitant antigens is comparable when administered with either PCV7 or PCV13 in a UK primary infant series.

INTRODUCTION

• The 7 valent pneumococcal conjugate vaccine (PCV7) has successfully reduced invasive pneumococcal disease in the countries where it has been introduced[1].

• Significant disease causing serotypes such as serotypes 1, 3 and 19A are not included in this vaccine, with a suboptimal coverage of the global pneumococcal disease burden[2].

• A novel 13 valent pneumococcal conjugate vaccine (PCV13) has been developed and was assessed in this multi-centred double blind randomised controlled trial

• The study was sponsored by Wyeth Vaccines

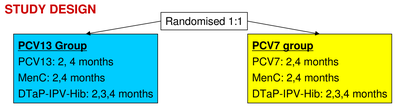
OBJECTIVES

• To evaluate the proportion of participants achieving predetermined thresholds for concomitant antigens 1 month after the infant series

• To evaluate the safety and reactogenicity of PCV13

• To assess the antibody response of participants receiving a 2 and 4 month course of PCV 13

STUDY DESIGN



• Pneumococcal serotype specific IgG was measured by standardised ELISA with a correlate of protection of ≥ 0.35 mcg/ml[3]

RESULTS

• 278 infants were enrolled; 139 to the PCV13 group (mean age 2.1 months, 56% male) and 139 to PCV7 group (mean age 2.1 months, 46% male)

• 135 (PCV13) and 132 (PCV7) completed the infant stage of the study

• Immunogenicity results for the concomitant vaccines are shown in Figure 1 (concomitant vaccines) and Figures 2 and 3 (PCV13), while PCV13 reactogenicity is shown in Figures 4 and 5

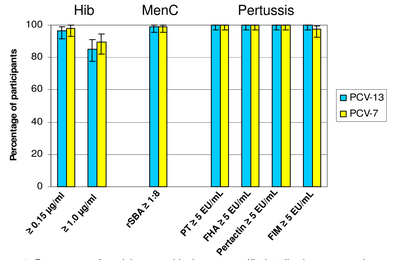


Figure 1: Percentage of participants achieving prespecified antibody concentrations after infant series of concomitant vaccines. Error bars represent 95%C.I.

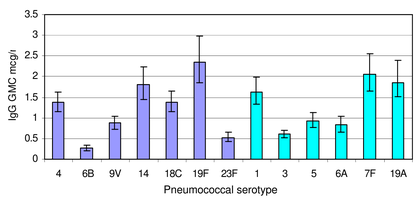


Figure 2: Pneumococcal immunogenicity for the PCV13 group after dose 2 of the infant series (IgG GMC)

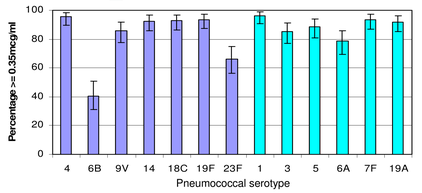


Figure 3: Percentage of participants in the PCV13 group achieving IgG ≥ 0.35 mcg/ml for each pneumococcal serotype

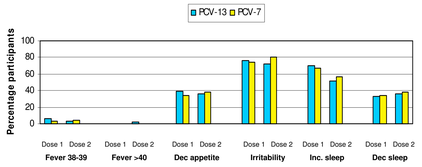


Figure 4: Systemic reactions within 4 days of vaccination

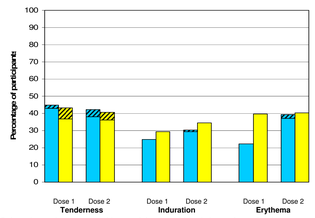


Figure 5: Local reactions reported by participants within 4 days of vaccination

CONCLUSIONS AND DISCUSSION

• PCV13 was immunogenic and well tolerated when given as part of the UK infant vaccine course.

• The percentages of participants achieving the thresholds of response for the concomitant antigens were comparable between the two groups.

• PCV13 vaccination at 2 and 4 months resulted in 78.5 - 96.3% of vaccinees achieving the correlate of protection for the 6 additional serotypes not contained in PCV7.

• 91% of PCV13 recipients achieved the threshold of protection against Serotype 19A, a predominant invasive pneumococcal serotype in the USA.

• PCV13 offers the potential to broaden the immune protection against invasive pneumococcal disease afforded by the currently licensed pneumococcal conjugate vaccine.

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