



Short communication

Anaphylaxis to the 23-valent pneumococcal vaccine: A second explored case by means of immediate-reading skin tests with pneumococcal vaccines

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ABSTRACT

Anaphylaxis to pneumococcal vaccines is rare. In the only one child with anaphylaxis to a first injection of the 23-valent pneumococcal vaccine that has been explored, skin tests and specific IgE determination diagnosed immediate-type hypersensitivity to pneumococcal antigens.

We report the case of a child who tolerated three injections of the 7-valent pneumococcal vaccine, but experienced anaphylaxis to a fourth injection of the 23-valent vaccine. Immediate responses in skin tests diagnosed immediate-type hypersensitivity to the two vaccines.

Immunizations with the 7-valent pneumococcal vaccine may induce IgE-dependent sensitization to pneumococcal antigens, responsible for anaphylaxis to subsequent injections of pneumococcal vaccines.

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1. Introduction

Pneumo-23®/Pneumovax-23® (PPV-23) consists of non-conjugated purified capsular polysaccharides from the 23 most prevalent types of *Streptococcus pneumoniae*, and phenol as a preservative. Prevenar-7® (PCV-7) contains 7 capsular polysaccharides, also included in PPV-23, conjugated to a protein (CRM₁₉₇), and adsorbed on aluminium phosphate. The common components of PCV-7 and PPV-23 are pneumococcal polysides. Reactions at the injection site of pneumococcal vaccines and fever are quite common, but anaphylactic reactions are exceedingly rare [1–6]. Only one case has been explored [7].

We report the case of a child who tolerated three injections of PCV-7, but reported anaphylaxis to a booster injection of PPV-23.

2. Subjects and methods

2.1. Patient

A 3.5-year-old healthy French girl had tolerated three injections of Prevenar-7® before age 1 year. For unknown reasons, Pneumo-23® was injected, at age 3 years. Severe anaphylaxis occurred within 1–2 min. The symptoms resolved within 1–2 h with IM injec-

tions of epinephrine, corticosteroids, and bronchodilator aerosols. Skin tests with Pneumo-23® and Prevenar-7® were performed 6 months later.

2.2. Control children

Skin tests with Pneumo-23® and phenol preservative had been previously performed in 10 children [7]. Skin tests with Prevenar-7® were performed in 3 non-vaccinated children, 7 children who had tolerated the vaccine, and 7 children with suspected allergy to the vaccine, but who tolerated booster injections after negative allergological work-up.

2.3. Skin tests

Serial dilutions of the vaccines were performed with sterile 0.9% NaCl. Prick-tests were performed with the undiluted vaccines and phenol on the skin of the inner forearm. If prick-tests were negative, 0.02 ml of a 1/100-dilution of the vaccines and phenol were injected intradermally (ID) into the external surface of the arm. Responses were assessed according to the EAACI/ENDA guidelines [8].

3. Results

3.1. Patient

Prick-tests were negative. Immediate responses in ID tests were observed with Pneumo-23® (mean diameter of the wheal/erythema: 12/22 mm) and Prevenar-7® (8/17 mm).

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3.2. Control children

A slightly positive response was observed in ID (7/11 mm) with Pnemo-23® in one non-vaccinated child only [7].

4. Discussion

In our previous study [7], negative responses in skin and in vitro tests with phenol, but positive responses in skin tests with the vaccine and detection of serum specific IgE antibodies diagnosed immediate-type hypersensitivity to pneumococcal antigens. A positive response in ID tests with the vaccine in one non-vaccinated child suggested that sensitizations to pneumococcal polysides may occur, due to occult carriage or infection with *S. pneumoniae*. IgE-dependent sensitizations to carbohydrate/polyside are reported in healthy subjects, and are frequent in patients with pollen/vegetable and hymenoptera venom allergy, and in patients with anaphylaxis to red meat and/or a first infusion of cetuximab [9–12].

In the present patient, immediate responses in skin tests with PCV-7 and PPV-23 strongly suggest that Prevenar-7® induced sensitization to one or several pneumococcal polysaccharides included in the two vaccines. The sensitization may have been induced by pneumococcal polysides conjugated with the CRM₁₉₇ protein included in Prevenar-7®.

Although basophil activation test (BAT) may be useful for diagnosis of immediate-type drug allergy [13–16], BAT was not performed in patients with suspected (pneumococcal) vaccine allergy, and skin tests were usually far more sensitive than BAT.

In practice, although vaccine-induced anaphylaxis is rare, any physician or nurse should keep recipients of vaccines under supervision for at least 15–30 min post-immunization, and provide treatment, including epinephrine, if an anaphylactic reaction occurs [17,18].

5. Conclusion

Immunizations with the 7-valent pneumococcal vaccine may induce IgE-dependent sensitizations to pneumococcal polysides/polysaccharides, potentially responsible for anaphylaxis to subsequent injections of pneumococcal vaccines. Immediate-reading skin tests have a good diagnostic value in patients with severe immediate allergic reactions to pneumococcal vaccines.

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