Hypersensitivity to Covid-19 Vaccine Confirmed by a Positive Skin Test Result: A Case Report

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We present the case of a 30-year-old woman who experienced an immediate reaction after the first dose of the Pfizer SARS-CoV2 vaccine. The reaction was confirmed by skin prick test (SPT).

The patient had a previous history of childhood hepatitis B virus infection treated with interferon and spontaneous chronic urticaria (onset in 2019), which was well controlled with antihistamine treatment (levocetirizine 5 mg every 6 hours). She had never experienced reactions with other drugs.

On January 14 (2021), she received the first dose of the Pfizer SARS-CoV-2 vaccine. After 5 minutes, she developed pruritic edematous lesions on the trunk, dyspnea, and dizziness. She received 1 dose of 0.3 mL of epinephrine 1/1000, with complete remission after 30 minutes. Eighteen hours later, she developed extensive edema in the injected arm (from shoulder to hand). She was treated in the emergency room with methylprednisolone and dexchlorpheniramine, and her condition resolved completely in 2 hours.

One week later, in our allergy unit, we performed SPTs with the following: polyethylene glycol (PEG, also known as macrogol) 1500 g/mol (0.5 g/mL); PEG 3350 (0.5 g/mL); PEG 4000 (0.5 g/mL); polysorbate 80 (1 g/mL); and polysorbate 20 (pure). The result for polysorbate 80 was positive after 45 minutes (wheal 5 mm, Figure), while those for every other excipient remained negative (1 mm). We performed SPT with the Pfizer SARS-CoV-2 vaccine, which was positive after 45 minutes (wheal 5 mm, Figure), while those for every other excipient remained negative (1 mm). We performed SPT with the Pfizer SARS-CoV-2 vaccine, which was positive after 45 minutes (wheal 5 mm, Figure), while those for every other excipient remained negative (1 mm). We performed SPT with the Pfizer SARS-CoV-2 vaccine, which was positive after 45 minutes (wheal 5 mm, Figure), while those for every other excipient remained negative (1 mm). 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waiting at least 30 minutes before progressing to the following step. To our knowledge, this is the first reported case of hypersensitivity to COVID-19 vaccine confirmed by a positive SPT result, probably owing to cross-reactivity of the shared chemical moieties in both polysorbate 80 and PEG. Given the presence of polysorbate 80 in many products (eg, shampoos and sunscreens) [6] and treatments (eg, interferon alfa-2b) [7], the patient may have become sensitized because of previous exposure to these products. She was receiving levocetirizine (which contains macrogol [PEG] 400) for chronic urticaria. Hypersensitivity to high-molecular-weight (HMW) macrogol with tolerance to low-molecular-weight (LMW) PEG has been described. Wenande et al [8] reported the case of a patient with SPT-confirmed hypersensitivity to PEG 3350 and 6000 who tolerated an oral challenge to an antihistamine with PEG 400 only in the tablet coating. Some authors have hypothesized that HMW PEGs could require lower concentrations to produce hypersensitivity reactions than LMW PEGs [2]. The patient has never received the influenza, hepatitis A, or human papillomavirus vaccines and has never experienced reactions with other drugs.

Other currently approved COVID-19 vaccines containing polysorbate 80 include the following: Anhui Zhifei Longcom (RBD-Dimer), Cansino (Ad5-nCoV), Gamaleya (Sputnik V), Janssen (Ad26.COV2.S), Vaxzevria (aka Oxford/AstraZeneca) (AZD1222), and Serum Institute of India (Covishield). Preparations currently in phase 3 include Novavax (NVX-CoV2373), Clover (SCB-2019), Sanofi/GSK (Recombinant Protein) [9], Medicago (Plant-based VLP), and ReiThera (GRAd-COV2). As for vaccines containing PEG, Moderna mRNA-1273 contains another variant of PEG 2000, namely, 1,2-dimyristoyl-rac-glycero-3-methoxypolyethylene glycol-2000 (DMG-PEG 2000), and Curevac (CVnCoV) is currently in phase 3. For this reason, and with the aim of providing complete immunization to SAR-CoV-2, we proposed an allergy study with one of the other available vaccines, which the patient rejected.

It is necessary to understand patterns of cross-reactivity between inactive ingredients in COVID-19 vaccines so that we can provide safe options for patients allergic to polysorbates and/or PEG.

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Conflicts of Interest

The authors declare that they have no conflicts of interest.

References


