THE PATIENT

25-year-old woman

SIGNS & SYMPTOMS

- Abdominal pain
- Urticarial rash
- Recent influenza immunization

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THE CASE

A 25-year-old woman presented to an infectious diseases (ID) physician with a 4-day history of symptoms following receipt of a quadrivalent influenza vaccine. Two hours after receiving the vaccine, the patient experienced abdominal pain. One hour later, she felt warm and developed diffuse urticaria and rigors. Because of her worsening condition, she presented to the emergency department, where she was given intravenous methylprednisolone 40 mg, ondansetron 8 mg, diphenhydramine 25 mg, and normal saline. Her urticarial rash resolved within 45 minutes, and she was discharged home.

Three days later, she sought additional medical care because of persistent chest tightness, new-onset bronchospasm, pleuritic chest pain, nausea, diarrhea, facial swelling, urticaria, and anorexia. The patient's vital signs were within normal limits. The oropharynx lacked erythema or obstruction. The lungs were clear to auscultation bilaterally, and heart sounds were regular, with no ectopy or murmurs. Her abdomen was soft, nontender, and nondistended. The patient demonstrated dermatographism on her back.

Historically, the patient had received the influenza vaccine without difficulty. She tolerated latex but had concerns about egg allergy due to vomiting with egg-yolk exposure.

THE DIAGNOSIS

The ID physician, suspecting anaphylaxis and sustained allergic response to the influenza vaccine, arranged for immediate follow-up with an allergist. Multiple tests were done. A negative result on epicutaneous testing to egg was inconsistent with an immunoglobulin (Ig) E-mediated food allergy.

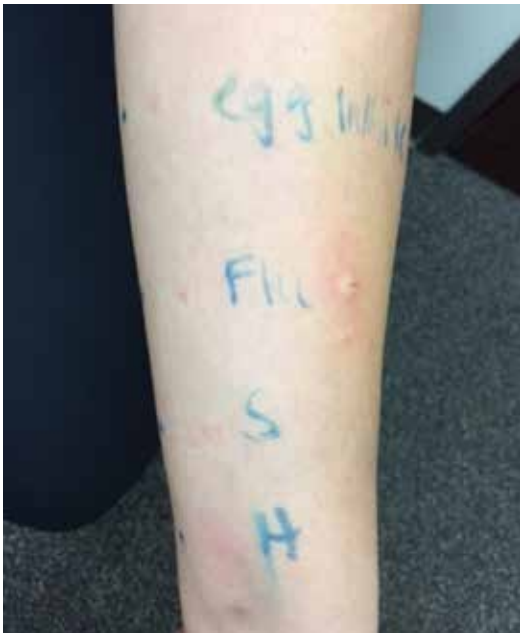
Intradermal testing with the flu vaccine (diluted 1:100) was subsequently performed with appropriate controls. A positive intradermal result is typically a wheal ≥ 5 mm larger than the control. The patient had a 5-mm/15-mm wheal-and-flare response to the flu vaccine, compared to a negative response to saline (**FIGURE**). (Since the vaccine did not contain gelatin, this was not tested.)

Based on the positive response to flu vaccine and negative response to egg, it was determined that the patient had experienced an anaphylactic reaction to the vaccine itself.

CONTINUED

FIGURE

Intradermal skin testing revealed a cause



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The patient developed a wheal in response to flu vaccine but not to egg, saline, or histamine.

DISCUSSION

In adults, the most common adverse reactions to quadrivalent flu vaccine include pain, headache, and fatigue. IgE-mediated reactions to the influenza vaccine, especially anaphylactic reactions, are rare. A Vaccine Safety Datalink study found 10 cases of anaphylaxis after more than 7.4 million doses of inactivated flu vaccine were given, for a rate of 1.35 per 1 million doses.[1]

Don't blame eggs. It was previously believed that reactions to the flu vaccine were due to egg allergies, because the vaccine may contain a tiny amount of ovalbumin, a protein found in egg. However, multiple studies have supported the safety of injectable influenza vaccine in patients with an egg allergy because the amount of ovalbumin contained in each dose is very low and thus not likely to evoke an allergic response.[2,3]

How and when to test for allergy. For patients who have a severe allergic reaction or anaphylaxis after immunization, immediate-type allergy skin testing should be performed by an allergist to establish whether the reaction was IgE mediated and to determine the causative agent.

It's best to wait 4 to 6 weeks after an anaphylactic reaction before doing skin testing, as earlier testing can lead to false-negative results.[4] The vaccine should first be tested by using the prick method. If this test is negative, an intradermal test with the vaccine diluted 1:100 should be performed with appropriate controls.[5]

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Should the patient receive future vaccinations?

If skin testing is positive, there are several ways to proceed. A vaccine to which the patient has previously had an allergic reaction and positive skin test can still be administered, with caution.[5] With emergency supplies, medication, and equipment immediately available, medical personnel can administer the influenza vaccine in titrated doses. If the full vaccine dose is normally a volume of 0.5 mL, the patient is first given 0.05 mL of a 1:10 dilution and then, at 15-minute intervals, given full-strength vaccine at doses of 0.05, 0.1, 0.15, and finally 0.2 mL, for a cumulative dose of 0.5 mL.[5]

Alternatively, the patient can forego the vaccination, although this decision has its own risks. In a patient who has previously had an anaphylactic reaction but has negative skin tests—meaning it is unlikely that the patient has IgE antibody to the vaccine—the vaccine can be administered and followed with an observation period of at least 30 minutes.[5]

Our patient was counseled on both options and decided to forego the vaccine.

THE TAKEAWAY

Anaphylaxis is a life-threatening allergic reaction requiring immediate treatment. Anaphylaxis after vaccine receipt is exceedingly rare.[6] Most IgE-mediated allergic reactions post vaccination are attributed to added or residual substances in the vaccine, rather than the immunizing agent itself.[6] While common local reactions and fever post vaccination do not contraindicate future vaccination, rare anaphylactic reactions need to be further evaluated, with a referral to an allergist to determine if the patient is, in fact, allergic to additive ingredients within the vaccine vs allergic to the vaccine itself. JFP

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