

Vaccine Reactions



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INSTRUCTIONS

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Overall Purpose/Goal: To provide excellent case-based reviews on key aspects of allergic disease to those who research, treat, or manage allergic disease.

Target Audience: Physicians and researchers within the field of allergic disease.

Accreditation/Provider Statements and Credit Designation: The American Academy of Allergy, Asthma & Immunology (AAAAI) is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians. The AAAAI designates this journal-based CME activity for 1.00 AMA PRA Category 1 Credit™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

List of Design Committee Members: Ashwini P. Reddy, MD, and John M. Kelso, MD (authors); Michael Schatz, MD, MS (editor)

Learning objectives:

1. To evaluate allergic reactions to vaccines.
2. To perform testing for potentially allergenic vaccine constituents.
3. To administer vaccines in graded doses when appropriate.

Recognition of Commercial Support: This CME has not received external commercial support.

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The Difficult Cases Feature is based on the *Difficult Cases* Course presented at the AAAAI Annual Meeting and coordinated by the AAAAI New Allergist-Immunologist Assembly (NAIA). View the entire presentation and obtain CME or MOC credit by visiting the JACI: In Practice homepage www.jaci-inpractice.org.

Key words: Vaccine reaction; Anaphylaxis

CASE

An 8-year-old girl presented with a possible vaccine reaction. Within 15 minutes of receiving immunizations in her primary care provider's office for varicella and hepatitis A, she had shortness of breath, sneezing, rhinorrhea, and diffuse erythema. She received oral diphenhydramine and was sent to the emergency department where she received epinephrine. She was

discharged with oral corticosteroids and instructions to follow up with the allergy clinic.

Past vaccine history was significant for shortness of breath shortly after injectable influenza vaccine 2 years previously. Before subsequent influenza vaccination, she was pretreated with diphenhydramine without complication. Also, she had received

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TABLE I. Gelatin content of vaccines 2017

Vaccine	Gelatin content
Influenza (FluMist, MedImmune Vaccines)	2 mg per 0.2 mL dose
Measles, mumps, rubella (MMRII, Merck)	14.5 mg per 0.5 mL dose
Measles, mumps, rubella, varicella (ProQuad, Merck)	11 mg per 0.5 mL dose
Rabies (RabAvert, Novartis)	12 mg per 1.0 mL dose
Typhoid Vaccine Live Oral Ty21a (Vivotif, Crucell)	Capsule
Varicella (VARIVAX, Merck)	12.5 mg per 0.5 mL dose
Yellow fever (YF-VAX, Sanofi Pasteur)	7.5 mg per 0.5 mL dose
Zoster (ZOSTAVAX, Merck)	15.58 mg per 0.65 mL dose

TABLE II. Vaccine component testing

Vaccine	Component skin testing/serum specific IgE testing
DTaP, Td, Tdap	Milk
Hepatitis B	Yeast
Influenza	Egg, gelatin
MMR	Gelatin
Varicella or zoster	Gelatin
Yellow fever	Egg, gelatin

her first varicella vaccine 7 years previously without issue. This was her first hepatitis A vaccine. Her past medical history was significant for milk allergy and sickle cell disease. She consumes gelatin uneventfully. Subsequent skin testing was negative to hepatitis A and influenza vaccines and positive to gelatin. The positive gelatin skin test indicates that the varicella vaccine was the likely culprit.

DISCUSSION

Anaphylactic reactions to vaccines occur at the rate of approximately 1 per million doses.¹ Gelatin is added to many vaccines as a stabilizer (Table I). A history of gelatin allergy would warrant evaluation before the administration of gelatin-

TABLE III. Administration of vaccine in graded doses under observation

For a vaccine with a dose of 0.5 mL, give the following by the usual route at 15-min intervals as tolerated under observation:
0.05 mL of a 1:10 dilution
0.05 mL full strength
0.10 mL full strength
0.15 mL full strength
0.20 mL full strength

containing vaccines; however, the ability to ingest gelatin does not exclude the possibility of a reaction when gelatin is injected via a vaccine. Patients who react to gelatin on ingestion should first be tested for IgE to gelatin. If such testing is positive, gelatin-containing vaccines may be given in graded doses.¹

When approaching a patient with a vaccine reaction, the vaccine and all potentially allergenic components of the vaccine should be tested. The vaccine will first be tested full strength by the prick method, and if negative intradermally diluted 1:100. The component testing is determined by the type of vaccine (Table II).² Egg and yeast extracts for skin testing are commercially available. A crude latex skin test reagent can be prepared by soaking a latex glove or balloon in normal saline. A crude gelatin skin test reagent can be prepared by dissolving 1 tsp of a sugared gelatin powder in 5 mL of normal saline.¹ Serum specific IgE antibody assays are commercially available for gelatin, egg, latex, and yeast.

Negative vaccine testing indicates that the vaccine can be administered in the usual manner. However, if a previous reaction was suggestive of anaphylaxis, then administration under observation is prudent. If vaccine testing is positive, the vaccine may still be administered, but in graded doses under observation (Table III).¹

Further information can be obtained by viewing the original NAIA Difficult Cases presentation in this article's Online Repository at www.jaci-inpractice.org.

REFERENCES

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