Differentiation of Latex Allergy From Irritant Contact Dermatitis

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PRACTICE **POINTS**

- The term *latex allergy* often is used as a general diagnosis to describe 3 types of reactions to natural rubber latex, including irritant contact dermatitis, allergic contact dermatitis (type IV hypersensitivity reaction), and true latex allergy (type I hypersensitivity reaction).
- The latex skin prick test is considered the gold standard for diagnosis of true latex allergy, but this method is not available in the United States. In vitro assay for latex-specific immunoglobulin E antibodies is the best alternative.

The term latex allergy *refers to a hypersensitivity to products containing natural rubber latex. Individuals with true latex allergy have developed type I (immediate) hypersensitivity due to previous sensitization and production of immunoglobulin E antibodies. Other forms of adverse reactions to latex-containing products may develop, including irritant contact dermatitis and type IV (delayed) hypersensitivity reactions, although they do not indicate true latex allergy. Several diagnostic tests are available to differentiate true latex allergy from irritant contact dermatitis and allergic contact dermatitis. It is crucial to determine the type of hypersensitivity in patients labeled with "latex allergy" in order to establish the most effective treatment regimen.*

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Latex allergy is an all-encompassing term used to describe hypersensitivity reactions to products containing natural rubber latex from the *Hevea brasiliensis* tree and affects approximately 1% to 2% of the general population.[1] Although latex gloves are the most widely known culprits, several other commonly used products can contain natural rubber latex, including adhesive tape, balloons, condoms, rubber bands, paint, tourniquets, electrode pads, and Foley catheters.[2] The term *latex allergy* often is used as a general diagnosis, but there are in fact 3 distinct mechanisms by which individuals may develop an adverse reaction to latex-containing products: irritant contact dermatitis, allergic contact dermatitis (type IV hypersensitivity) and true latex allergy (type I hypersensitivity).

Irritant Contact Dermatitis

Irritant contact dermatitis, a nonimmunologic reaction, occurs due to mechanical factors (eg, friction) or contact with chemicals, which can have irritating and dehydrating effects. Individuals with irritant contact dermatitis do not have true latex allergy and will not necessarily develop a reaction to products containing natural rubber latex. Incorrectly attributing these irritant contact dermatitis reactions to latex allergy and simply advising patients to avoid all latex products (eg, use nitrile gloves rather than latex gloves) will not address the underlying problem. Rather, these patients must be informed that the dermatitis is a result of a disruption to the natural, protective skin barrier and not an allergic reaction.

Allergic Contact Dermatitis

Allergic contact dermatitis to rubber is caused by a type IV (delayed) hypersensitivity reaction and is the result of exposure to the accelerators present in rubber products in sensitive individuals. Individuals experiencing this type of reaction typically develop localized erythema, pruritus, and urticarial lesions 48 hours after exposure.[3] Incorrectly labeling this problem as latex allergy and recommending nonlatex rubber substitutes (eg, hypoallergenic gloves) likely will not be effective, as these nonlatex replacement products contain the same accelerators as do latex gloves.

True Latex Allergy

The most severe form of latex allergy, often referred to as true latex allergy, is caused by a type I (immediate) hypersensitivity reaction mediated by immunoglobulin E (IgE) antibodies. Individuals experiencing this type of reaction have a systemic response to latex proteins that may result in fulminant anaphylaxis. Individuals with true latex allergy must absolutely avoid latex products, and substituting nonlatex products is the most effective approach.

Latex Reactions in Medical Practice

The varying propensity of certain populations to develop latex allergy has been well documented; for example, the prevalence of hypersensitivity in patients with spina bifida ranges from 20% to 65%, figures that are much higher than those reported in the general population.[3] This hypersensitivity in patients with spina bifida most likely results from repeated exposure to latex products during corrective surgeries and diagnostic procedures early in life. Atopic individuals, such as those with allergic rhinitis, eczema, and asthma, have a 4-fold increased risk for developing latex allergy compared to nonatopic individuals.[4] The risk of latex allergy among health care workers is increased due to increased exposure to rubber products. One study found that the risk of latex sensitization among health care workers exposed to products containing latex was 4.3%, while the risk in the general population was only 1.37%.[1] Those at highest risk for sensitization include dental assistants, operating room personnel, hospital housekeeping staff, and paramedics or emergency medical technicians.[3] However, sensitization documented on laboratory assessment does not reliably correlate with symptomatic allergy, as many patients with a positive IgE test do not show clinical symptoms. Schmid et al[4] demonstrated that a 1.3% prevalence of clinically symptomatic latex allergy among health care workers may approximate the prevalence of latex allergy in the general population. In a study by Brown et al,[5] although 12.5% of anesthesiologists were found to be sensitized to latex, only 2.4% had clinically symptomatic allergic reactions.

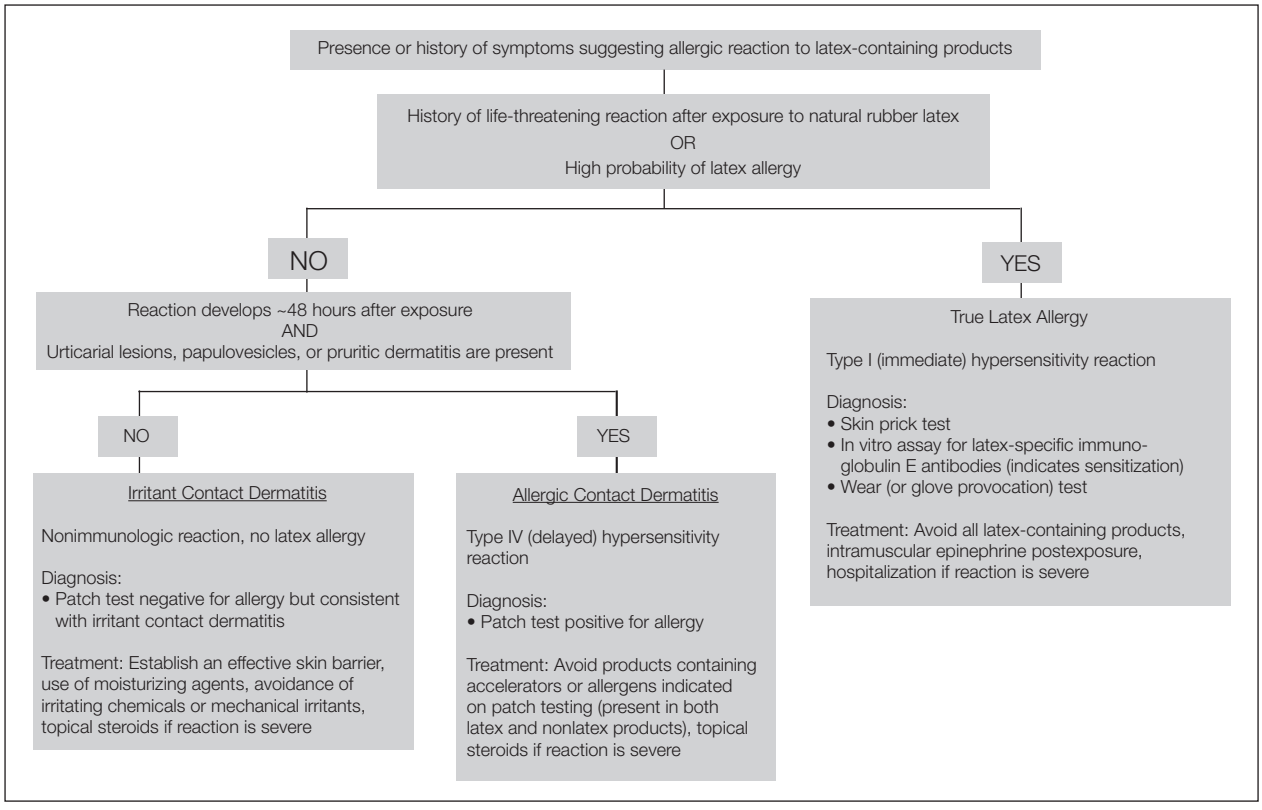
Testing for Latex Allergy

Several diagnostic tests are available to establish a diagnosis of type I sensitization or true latex allergy. Skin prick testing is an in vivo assay and is the gold standard for diagnosing IgE-mediated type I hypersensitivity to latex. The test involves pricking the skin of the forearm and applying a commercial extract of nonammoniated latex to monitor for development of a wheal within several minutes. The skin prick test should be performed in a health care setting equipped with oxygen, epinephrine, and latex-free resuscitation equipment in case of anaphylaxis following exposure. Although latex skin prick testing is the gold standard, it is rarely performed in the United States because there is no US Food and Drug Administration–approved natural rubber latex reagent.[3] Consequently, physicians who wish to perform skin prick testing for latex allergy are forced to develop improvised reagents from the *H brasiliensis* tree itself or from highly allergenic latex gloves. Standardized latex allergens are commercially available in Europe.

The most noninvasive method of latex allergy testing is an in vitro assay for latex-specific IgE antibodies, which can be detected by either a radioallergosorbent test (RAST) or enzyme-linked immunosorbent assay (ELISA). The presence of antilatex IgE antibodies confirms sensitization but does not necessarily mean the patient will develop a symptomatic reaction following exposure. Due to the unavailability of a standardized reagent for the skin prick test in the United States, evaluation of latex-specific serum IgE levels may be the best alternative. While the skin prick test has the highest sensitivity, the sensitivity and specificity of latex-specific serum IgE testing are 50% to 90% and 80% to 87%, respectively.[6]

The wear test (also known as the use or glove provocation test), can be used to diagnose clinically symptomatic latex allergy when there is a discrepancy between the patient's clinical history and results from skin prick or serum IgE antibody testing. To perform the wear test, place a natural rubber latex glove on one of the patient's fingers for 15 minutes and monitor the area for development of urticaria. If there is no evidence of allergic reaction within 15 minutes, place the glove on the whole hand for an additional 15 minutes. The patient is said to be nonreactive if a latex glove can be placed on the entire hand for 15 minutes without evidence of reaction.[3]

Lastly, patch testing can differentiate between irritant contact and allergic contact (type IV hypersensitivity) dermatitis. Apply a small amount of each substance of interest onto a separate disc and



Differentiation of true latex allergy from irritant contact dermatitis and allergic contact dermatitis.

place the discs in direct contact with the skin using hypoallergenic tape. With type IV latex hypersensitivity, the skin underneath the disc will become erythematous with developing papulovesicles, starting between 2 and 5 days after exposure. The Figure outlines the differentiation of true latex allergy from irritant and allergic contact dermatitis and identifies methods for making these diagnoses.

General Medical Protocol With Latex Reactions

To reduce the incidence of latex allergic reactions among health care workers and patients, Kumar[2] recommends putting a protocol in place to document steps in preventing, diagnosing, and treating latex allergy. This protocol includes employee and patient education about the risks for developing latex allergy and the signs and symptoms of a reaction; available diagnostic testing; and alternative products (eg, hypoallergenic gloves) that are available to individuals with a known or suspected allergy. At-risk health care workers who have not been sensitized should be advised to avoid latex-containing products.[3] Routine questioning and diagnostic testing may be necessary as part of every preoperative assessment, as there have been reported cases of anaphylaxis in patients with undocumented allergies.[7] Anaphylaxis caused by latex allergy is the second leading cause of perioperative anaphylaxis, accounting for as many as 20% of cases.[8] With the use of preventative measures and early identification of at-risk patients, the incidence of latex-related anaphylaxis is decreasing.[8] Ascertaining valuable information about the patient's medical history, such as known allergies to foods that have cross-reactivity to latex (eg, bananas, mango, kiwi, avocado), is one simple way of identifying a patient who should be tested for possible underlying latex allergy.[8] Total avoidance of latex-containing products (eg, in the workplace) can further reduce the incidence of allergic reactions by decreasing primary sensitization and risk of exposure.

Conclusion

Patients claiming to be allergic to latex without documentation should be tested. The diagnostic testing available in the United States includes patch testing, wear (or glove provocation) testing, or assessment of IgE antibody titer. Accurate differentiation

CONTINUED ON PAGE 401

CONTINUED FROM PAGE 371

among irritant contact dermatitis, allergic contact dermatitis, and true latex allergy is paramount for properly educating patients and effectively treating these conditions. Additionally, distinguishing patients with true latex allergy from those who have been misdiagnosed can save resources and reduce health care costs.

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