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Center

# LATEX ALLERGY

by Mark Boguniewicz, M.D. and Kevin Fennelly, M.D..

The prevalence of latex allergy has increased dramatically in recent years. Physicians must be aware of and vigilant for the appearance of latex allergy in all their patients, and also realize that health care workers are particularly at risk. Prevalence estimates for latex allergy are less than 1% for the general nonatopic population, and 7-10% or higher among health care work-

ers. In one recent study, latex allergy affected more than 2% of all hospital employees. The recent increase in cases seems to have begun

soon after universal precautions were adopted in 1987. Although use of latex gloves decreased the exposure to blood-borne pathogens, it produced a reciprocal increase in exposure to latex allergens.

In 1987, 1 billion latex gloves were imported into the U.S.; a year later, this figure increased eightfold. The rising clinical demand for gloves in the 1980s may have led to changes in the manufacturing process that resulted in increased amounts of latex allergens. Primary care physicians should consider latex allergy in any patient who develops allergic symptoms, especially if the patient belongs to a high risk group (see Table 1).

## Latex exposure

Latex is natural rubber, the milky fluid that is obtained by tapping rubber trees. It undergoes a series of treatments to prevent deterioration before being formed into a variety of products. These treatments create a complex mixture that includes several potential allergens in addition to latex. Latex is ubiquitous in our

society. Table 2 contains a partial list of household and health care exposures. As a group, dipped latex products pose a greater danger than does molded latex because

proteins are more apt to leech out. Dipped latex materials include products such as balloons, condoms, and gloves.

Genetics clearly plays a role in the development of atopy, including latex allergy, but the environment and exposure history also plays a key role. For example, there is an increased risk for patients with a history of spina bifida, who stand out as having an extremely high incidence of latex allergy (Table 1). Although we may hypothesize that this is related to multiple, early surgical procedures, other patients who also undergo frequent early surgery—such as patients with congenital

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UPDATE

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heart disease—do not develop the same degree of latex allergy. The evidence suggests that surgery of the spine or genitourinary tract carries a particularly high risk for latex sensitization, possibly related to altered neuroimmune mechanisms.

Nevertheless, any individual with perioperative anaphylaxis should be suspected of having latex allergy.

An interesting aspect of latex allergy is that latex allergens have been reported to cross react with allergens from a number of different foods including avocado, apricot, banana, chestnut, grape, kiwi, passion fruit, papaya, pear, and pineapple. Although we have identified cross reactivity to banana more frequently than to the other foods, taking a thorough history regarding symptoms after the ingestion of all foods reported to cross react with latex is indicated.

## Diagnosing latex allergy

Latex allergy can present as either immediate or delayed hypersensitivity. An immediate, Type I reaction is mediated by specific IgE antibodies, and may produce conjunctivitis, rhinitis, or contact urticaria. When more severe, this reaction can cause asthma or anaphylaxis. Indeed, some cases of unexplained or perioperative anaphylaxis have been found to occur as the result of latex allergy. Type I reactions are diagnosed by skin prick testing to latex glove extracts or by serum immunoassays.

The delayed form of latex allergy is a type IV hypersensitivity reaction that results in contact dermatitis mediated by T cells. This type of allergy is usually more commonly a reaction to other components of rubber products rather than to latex itself.

These include rubber accelerators, preservatives, and antioxidants. Type IV hypersensitivity is diagnosed by skin patch testing.

If a patient is suspected of having latex allergy and serum testing is negative, skin testing should be performed. Immuno-

assays are highly specific but are less sensitive. Unfortunately, skin testing carries the risk of an anaphylactic reaction and should only be done in a setting where both the immediate and delayed reactions can be anticipated and treated. Skin testing is also com-

plicated by the lack of a standardized latex extract. Currently, latex extracts are usually prepared by soaking latex glove sections in an appropriate diluent. Standardized patch test allergens are available for many of the most common preservatives and rubber accelerators.

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Specific Inhalation Challenge Chamber at National Jewish; patient being tested for latex allergy.

Photo: Barry Silverstein

## Occupational Issues

Even patients with severe occupational latex allergy can successfully return to work under appropriate conditions. Two steps are essential: the latex allergic worker must use nonlatex gloves and products, and coworkers must use either non-powdered latex or non-latex gloves.

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The role of powder in gloves is important. Latex proteins adhere to powder particles and become airborne and dispersed, especially when gloves are removed or "snapped".

A study by Tarlo and colleagues in 1994 showed that the use of powder-free gloves made a substantial difference in workplace levels of airborne latex allergen. In the latex-allergic patients whom we have exposed to powder-free latex gloves in a controlled setting, we have observed no significant clinical reactions.

We recommend that administrators and managers of health care settings consider switching to nonlatex or powder-free gloves before allergy develops among their staff. The elimination of powdered latex gloves may help decrease the rate of primary sensitization to latex.

## Management

As with any allergy, avoidance is the cornerstone of management. Extensive education of latex-allergic patients about avoidance of exposure and self-management is critical. Successful education requires time and repetition to drive home the message of avoidance to most patients. Avoiding latex exposure will allow patients to live a relatively normal life. Unfortunately, latex is a complex biological compound and the

## Clinical Examples of Latex Allergy

1. A clinic nurse with rhinitis and conjunctivitis that is worse when the nurse is at work and improves on days off.
2. A renal dialysis technician who develops new onset asthma.
3. A child who anaphylaxis while under general anesthesia during surgery.
4. A dishwasher with chronic dermatitis that has a glove-like distribution.
5. A hospital ward-clerk who gets hives when he enters the emergency room, and has throat tightness when eating bananas.

specific proteins that cause allergic reactions have not been definitively identified. At this time, therefore, desensitization is not an option for treating latex allergy.

We recommend that patients with latex allergy have a personal supply of latex-free gloves that they can use as needed. They can also provide them for their health care providers to use in their care. We also

recommend that latex-allergic patients wear a medical alert bracelet. This may be a life-saving measure in medical emergencies. We also prescribe auto-injectable epinephrine and educate our patients regarding appropriate indications and techniques of use.

National Jewish can offer patients with

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suspected latex allergy a comprehensive and integrated approach to diagnosis and treatment. To help assure the safety of latex allergy patients at National Jewish we have a policy that no powdered latex gloves be used in clinical areas, thereby preventing inadvertent inhalation exposure. Non-latex gloves are used in areas where latex-allergic patients are evaluated and treated. If necessary, inhalation challenges can be done in an exposure chamber to evaluate for occupational asthma. Patch testing for type IV reactions can be done through our Atopic Dermatitis Clinic. Skin tests are done in our skin test lab and immunoassays through our immunodiagnostic laboratory. Our occupational envi-

ronmental physicians work with patients and their employers to develop practical approaches to protecting the patient and other employees.

**Latex allergy will likely remain a significant occupational hazard in the health care industry until a practical substitute for latex is found.**

Latex allergy will likely remain a significant occupational hazard in the health care industry until a practical substitute for latex is found. Until then, physicians must have a high index of suspicion in diagnosing latex allergy. Eliminating exposure can allow patients with latex allergy to continue with their careers. Future research endeavors

need to be directed at identification of relevant allergens, development of strategies to prevent sensitization, as well as specific therapies.

Table 1

**People at High Risk of Developing Latex Allergy**

- patients with spina bifida
- health care workers
- atopic patients
- people who need frequent surgery
- workers in the latex industry
- preterm infants
- patients with:
  - urogenital anomalies
  - imperforate anus
  - tracheoesophageal fistula
  - VATER association
  - ventriculoperitoneal shunt
  - mental retardation
  - cerebral palsy
  - quadriplegia

Table 2

**Latex-Containing Products in Household and Health Care Settings**

- balloons
- condoms
- dish-washing gloves
- sports equipment
- rubber bands
- shoe soles
- erasers
- health care gloves
- blood pressure cuffs
- catheters
- face masks
- rubber stoppers
- bandages
- stethoscope tubing

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