

Latex Allergy

Latex Products

Latex is a substance consisting of multiple proteins derived from the milky sap of the rubber tree, *Hevea brasiliensis*. These latex proteins are responsible for provoking immediate-type (Type I IgE-mediated) allergic reactions in sensitive subjects. Whereas natural rubber is derived from latex, synthetic rubber is produced from petrochemicals, and does not contain allergenic latex proteins. During manufacturing, latex is rendered elastic and heat-stable by vulcanisation (heating in presence of sulphur), and further chemicals are added for strength and durability. These chemicals include mercaptobenzothiazole, thiurams, and carbamates which are relevant in some cases of delayed-type (type IV) contact allergy related to latex products. Latex is a ubiquitous substance found in a variety of products including balloons, condoms, gloves, shoe soles, sphygmomanometer cuffs, catheters, masks, stethoscopes, motorcycle handles, elevator handrails, and vial tops.

Latex Allergy

A major contributor to the rising problem of latex allergy has been the adoption of universal precautions since 1987. While latex allergy only affects about 1% of the general population, its prevalence in health care workers is estimated to be at least 10%. It has been suggested that, in addition to the increased use of gloves, changes in the antigenicity of latex products have occurred due to changes in manufacturing processes forced by rising demands for latex products. The rising prevalence of latex allergy also mirrors the unexplained general increase in all atopic diseases witnessed over the last few decades, particularly in developed nations.

Types of Latex Reaction

There are three major types of reaction to latex products:

1. Irritant Dermatitis

The majority of such reactions are non-immunological contact reactions causing an irritant dermatitis characterised by dry crusty papulo-ulcerative lesions exacerbated by sweating and friction. While these cases do not represent true latex allergy, their recognition and treatment is critical because it is through such damaged skin that sensitisation occurs, ultimately leading to true allergy in predisposed individuals.

2. Allergic Contact Dermatitis

The commonest immunological adverse reaction to latex products represents a delayed (type IV) contact allergy, which may be clinically indistinguishable from an irritant dermatitis. The agents responsible for such reactions are a variety of chemicals added to latex products to improve their durability and strength, such as mercaptobenzothiazole, thiurams, carbamates. These people are not truly latex allergic, although, as is the case in irritant reactions, these dermatitis lesions may allow true sensitisation to occur through damaged skin.

3. Immediate-Type Latex Allergy

In genetically predisposed individuals, allergen sensitisation occurs when minute amounts of allergen are delivered across the skin or transmucosally, stimulating the production of IgE antibodies which bind to the surface of mast cells. Secondary exposure to the sensitising agent provokes mast cell degranulation, with the release of allergic mediators such as histamine, tryptase and leucotrienes which cause the classic features of IgE-mediated (type I) immediate-type allergy (urticaria, wheeze, rhinoconjunctivitis, hypotension and anaphylaxis). This sensitisation is most likely to occur when there is pre-existing irritant or contact dermatitis, although sensitisation across respiratory and gut mucosae may also be important in certain patient populations. For example, respiratory sensitisation may occur in health care workers exposed to aerosolised latex produced by glove "snapping", and spina bifida patients may be sensitised by recurrent urinary and bowel instrumentation and manipulation. Health care workers typically develop a progression of occupational symptoms, with skin reactions followed by rhinoconjunctivitis, then bronchospasm, and finally, in some cases, anaphylaxis. The prevalence of latex-related occupational asthma may be as high as 2.5%.

High-Risk Categories for Immediate-Type Latex Allergy

The prevalence of latex allergy is elevated in a number of populations, and so the index of suspicion for latex allergy should rise in subjects falling into any of these categories:

- Atopic individuals have a genetic predisposition to produce IgE antibodies in response to a variety of innocuous environmental agents, including latex. Atopic diseases are seen in up to 57% of patients with latex allergy.
- Patients undergoing recurrent operations or instrumentations. Spina bifida patients have a demonstrably higher prevalence of latex allergy (28%-67%). This is believed to occur through multiple factors, including multiple mucosal or visceral exposures to latex, frequent urinary catheterisation, multiple surgery, and the insertion of ventriculo-peritoneal shunts. Other patients who are regularly exposed to such interventions (e.g. patients with congenital urinary tract abnormalities, cerebral palsy, quadriplegia), particularly if this occurs upon an atopic background, are also at risk for latex sensitisation and the development of latex allergy.
- Latex allergy should be considered in any patient who develops peri-operative anaphylaxis.
- Workers in the latex industry
- Latex allergy in health workers have risen dramatically since the adoption of universal precautions.
- People with allergies to unusual foods, such as avocado, banana, chestnut, and kiwifruit.

Cross-Reactive Food Allergy in Latex-Allergic Patients

Up to 52% of latex-allergic patients have food allergies due to cross-reactivity between latex and food antigens. Foods commonly implicated include avocado, banana, chestnut, and kiwifruit, and symptoms may range from local oral tingling, through to rhinoconjunctivitis and bronchospasm and rarely, anaphylaxis.

Typical Examples of Latex Allergy

Some scenarios where latex allergy should be considered include:

- a dishwasher with chronic dermatitis in a glove-like distribution
- a clinic nurse with rhinoconjunctivitis which improves on days off
- a renal dialysis technician with new onset of asthma, with worsening of symptoms at work
- an atopic child with anaphylaxis while under a general anaesthetic
- a hospital ward clerk with hives on entering theatres, and throat tightness on eating bananas

Diagnosis of Latex Allergy

1. Allergic (Type IV) Contact Dermatitis

Glove-related dermatitis may be irritant or immunologically mediated. Patch-testing using the accelerators and other additives implicated in delayed immunological reactions to latex products is used. Erythema and induration appears under the patch after 48 hours in allergic individuals.

2. Immediate (Type I) Latex Allergy

Two diagnostic modalities are available for detecting immediate allergic reactions to latex proteins. Because skin-prick testing carries a small risk of anaphylaxis in allergic subjects, testing should begin with in-vitro methods for the detection of latex-specific IgE in the blood. However, in-vitro tests have a false negative rate of 10 to 20%. A negative blood test result should be followed with skin-prick testing where latex allergy is clinically suspected. Latex skin testing should only be performed in experienced centres, such as the Immunology and Allergy Clinic at John Hunter Hospital, and resuscitative facilities must be available.

Management of Latex Allergy

The most important step in managing the burgeoning problem of latex allergy is to prevent its further escalation by appropriate management steps. This will involve the progressive replacement of latex-containing items in the health care system with non-latex products. This ultimate aim is still far off, and in the interim a culture of awareness of the problem must be fostered through educational initiatives. This will involve informing medical staff, nurses, operating theatre personnel, kitchen staff, and administrators. More attention needs to be paid to the skin condition of staff members, as irritant and allergic dermatitis increases the risk of sensitisation to latex. Non-powdered gloves should be universally adopted to prevent respiratory sensitisation.

People with established latex allergy must avoid all latex products. For health care workers, this may mean retraining and redeployment, particularly if they work in operating theatres. Specialist rehabilitation services will become involved. Latex-allergic staff should carry their own supply of latex-free gloves, as these are not readily available in all situations. It is crucial that work colleagues avoid the use of powdered gloves, which may create dangerous aerosols for latex-allergic individuals. All latex-allergic patients should wear "Medic Alert" discs and carry a self-injectable adrenalin syringe, and the relatives and colleagues of latex-allergic individuals should be familiar with cardiopulmonary resuscitation procedures and the use of the self-injectable adrenaline syringe.

For patients about to undergo surgical procedures, careful planning of elective surgery must occur. Special preparation of the theatre is required to make it latex-free, and inclusion of the patient as the first on the list reduces their risk of latex exposure. Peri-operative antihistamines and corticosteroids may be considered in patients with a history of life-threatening latex reactions.

References

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