

Latex Allergy in Health Care Workers: A Brief Review

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Abstract

Latex allergy is an occupational hazard in healthcare workers. This review is aimed at highlighting reaction types, clinical presentation, diagnosis, and management of latex allergy in healthcare workers (HCWs).

Keywords: Latex Hypersensitivity, Healthcare Workers (HCWs), Natural Rubber, Occupational allergy, Latex Allergy, IgE-Mediated Hypersensitivity.

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INTRODUCTION

Natural rubber is from the *Hevea brasiliensis* tree [1]. Depending on the population studied, latex allergy prevalence is between 3% to 64% [2]. Adverse latex reactions may occur from repeated contact with or prolonged exposure to latex containing products [3].

Natural Rubber Latex (NRL) may contain more than 240 protein peptides. Fifteen allergens (Hev b1 to Hev b15) have been well characterized. It is designated by the World Health Organization (WHO)/International Union of Immunologic Societies (IUIS) allergen nomenclature committee. The major allergens found in most healthcare workers (HCWs) with latex allergy is Hev b5 [4] and Hev b6 [5].

During the 1980s and 1990s, there was an elevated risk of NRL sensitization for HCWs [6-10]. The development of transmissible infectious diseases between humans for example, hepatitis C virus and Human Immunodeficiency virus (HIV); lead to increased universal precaution measures to protect those who work from getting the disease [11]. Therefore, HCWs increased using latex gloves.

HCWs such as physicians, dentists, nurses, and clinical laboratory workers are the most affected occupational group for latex allergy [12-14]. The frequent use of latex gloves to prevent transmissible infections is a major contributing factor. Introducing powder free low-protein (PFLP) latex gloves and synthetic gloves (latex-free) have effectively halted occupational hazards from latex allergy in HCWs [15].

Latex allergy precautions promoted by the American Academy of Allergy, Asthma & Immunology (AAAAI), the American College of Allergy, Asthma & Immunology (ACAAI), and the Association of Operating Room Nurses (AORN) lead to increased patient safety [16]. In January 2017, the Food and Drug Administration (FDA) banned the sale of powdered surgical gloves, powdered examination gloves, and absorbable powder for lubrication of surgeon's gloves to keep this condition under control [17].

This review will briefly highlight the reaction types to latex, clinical presentation, diagnosis, and management of latex allergy in HCWs.

Prevalence, Routes of exposure, and Risk Factors

Approximately 10 to 20 percent of HCWs are sensitized to latex [3]. Data published in the early 21st century showed that latex allergy was diagnosed in 10% to 17% of HCWs [18-20]. However, the risk remains high, especially in countries lacking resources [15].

In the healthcare setting, exposure occurs by different rubber containing objects. This may include gloves, catheters, oxygen masks, endotracheal tubes, and nasogastric tubes. Latex exposure routes include skin, mucosa, parenteral, intravascular, and inhalation. Besides frequent exposure to latex, risk factors for latex allergy include age, predisposing skin injuries, atopy, spina bifida, and employment [2].

Reactions to Latex and Clinical Presentation Non-Immunologic

Irritant contact dermatitis presents with signs and symptoms of pruritus, erythema, and scaling appearance on the posterior aspect of the hands and

fingers. This reaction is provoked by skin mechanical irritation or gloves with high pH (alkaline) [21]. It is not related to glove chemical components.

Immunologic

Immunoglobulin E (IgE)-mediated hypersensitivity reactions (Type I Hypersensitivity)

- *Contact urticaria* presents with signs and symptoms of erythematous, pruritic patches and hives after minutes of exposure.
- Generalized urticaria.
- Conjunctivitis.
- Rhinitis.
- Asthma.
- Anaphylaxis.

Cell-mediated hypersensitivity reactions (Type IV Hypersensitivity)

Allergic contact dermatitis presents with signs and symptoms of eczematous rash, usually on the posterior aspects of the hands which occur 24 to 48 hours after contact with the offending agent. Patients with chronic allergic contact dermatitis present with erythematous, lichenified, and scaly plaques on the posterior aspect of the hands.

This is a delayed hypersensitivity reaction and is usually triggered by allergens, which are additives during rubber production. These triggering agents include thiurams, benzothiazoles, thiocarbamate, and phenylenediamines [22].

Diagnosis and Investigations

It requires a thorough medical history, physical examination, and supplemental testing [23]. For these patients, clinical avoidance and referral to an allergist is recommended for further assessment.

Skin Prick Testing (SPT)/puncture test

The extracts for SPT is prepared with Hevea latex B and C serum proteins, which are used in Canada and Europe [24]. SPT is a safe and effective diagnostic technique, when extracts are standardized for allergen content and stability [24-27]. In the United States, skin testing materials are not commercially available due to concerns for anaphylaxis risk [28, 29].

Serology Testing

In the United States, latex-specific IgE antibody serology with the ImmunoCAP or Immulite system is the choice for diagnostic testing with Food and Drug Administration (FDA)-cleared reagents [30]. In other parts of the world, SPT/puncture test can be performed first; followed by latex specific IgE antibody serology assay, if the skin test result is inconsistent with the clinical history.

Provocation Testing

This test is often discouraged due to anaphylaxis risk [31]. It can be performed with caution,

when there is inconsistency in the patient's history, latex specific IgE antibody serologic test, and SPT results.

Patch testing

It is used to differentiate dermatitis caused by IgE-mediated hypersensitivity reactions (Type I Hypersensitivity) from cell-mediated hypersensitivity reactions (Type IV Hypersensitivity) reactions to latex components in Hev b [32] and chemicals added to rubber [33].

Management and Precautions

- Avoidance of latex containing objects.
- Alternatives by using non-powdered airborne, non-latex gloves such as vinyl, nitrile, and synthetic gloves.
- Acute management depends on the clinical presentation. Some examples include, topical corticosteroids for allergic contact dermatitis and epinephrine for anaphylaxis.
- Precaution measures for the patient include carrying an epinephrine Auto-Injector, learning the indication, and proper way to use it; wearing an allergy identification (e.g. MedicAlert bracelet) to document latex allergy, documentation of latex allergy in the hospital chart by the primary care physician or allergist ; and letter to family physician to indicate clearly the patient's allergy to latex.
- The patient should request a latex safe environment for medical, surgical, gynecological and dental procedures.

CONCLUSION

Latex allergy remains to pose an occupational risk for healthcare workers. For HCWs, a proper systematic approach for diagnosis, management, and prevention is essential.

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