

Clinical and Financial Risks and Implications of Latex Allergy in Critical Care Settings

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OVERVIEW

Allergy to natural rubber latex is a growing concern for both healthcare workers and patients.¹ Latex is composed of a variety of potentially irritating proteins and is used in many healthcare products, including gloves and catheters.^{2,3} Sensitivity to natural rubber latex affects an estimated 17% of healthcare workers and repeated exposure may increase this affliction.² In rare cases, undetected latex allergies can be fatal, with a 1% lethality occurring due to immediate Type I systemic reaction anaphylaxis, which can cause shock and permanent lung injury.⁴

In addition to the clinical implications, significant litigation costs and compensation for patient injury places an added burden on healthcare workers to recognize and eliminate the source of latex allergy wherever possible.

A reasonable level of suspicion can help alert healthcare workers to the possibility of their patients having a latex allergy. For example, any patient allergic to tropical fruits (avocados, kiwis, bananas), chestnuts, and poinsettias may have a serious latex allergy.^{5,6,7,8} A history of multiple surgeries in pediatric Spina Bifida patients is an independent factor to natural rubber latex allergy.^{9,10} However, since the best protective course is the elimination of latex from the clinical setting, latex-free patient rooms, emergency rooms, and operating rooms have become increasingly commonplace.³

TYPES AND STAGES OF LATEX ALLERGY

Latex allergy, or hypersensitivity, occurs when the body's immune system reacts to proteins found in natural rubber latex. A Type I systemic reaction is an immediate hypersensitivity reaction moderated by the development of IgE antibodies, causing a serious and potentially lethal event. Type I conditions are characterized by 5 stages:¹¹

- Stage 1 – Local urticaria in the area of contact
- Stage 2 – Generalized urticaria with angioedema
- Stage 3 – Urticaria with asthma, eye or nose itching, and gastrointestinal symptoms
- Stage 4 – Urticaria, anaphylaxis, and shock
- Stage 5 – Chronic asthma and permanent lung damage

An estimated 17% of healthcare workers and up to 37 million Americans exhibit latex sensitivity, and repeated exposure may increase this affliction.^{2, 13, 14}

Type IV latex reactions are less immediate and severe. These T-cell mediated and delayed response reactions typically occur 48 to 96 hours after exposure and are limited to redness and itching in the area of contact and various skin lesions at the exposure site.¹¹ Repeated exposures to latex may decrease tolerance and increase the likelihood of a Type I reaction.¹²

PREVALENCE AND UBIQUITY OF NATURAL RUBBER LATEX ALLERGY

A recent study of anti-latex IgE antibodies in blood donors has shown that the prevalence of latex sensitivity may be as high as 6–12% or up to 37 million people in the United States.^{13,14} Once sensitized, most individuals are asymptomatic and unaware of their antibody status;^{13,15} therefore, clinicians cannot assume that any patient is free of latex allergy.

Healthcare workers must be vigilant with latex products since a patient's medical history alone is inadequate to identify all patients at risk.¹⁶ Points of entry also occur through dermal contact (irritant contact dermatitis) and inhalation (latex glove powder).³ A partial list of products that may contain latex are included in Table 1.

TABLE 1. PARTIAL LIST OF CLINICAL PRODUCTS THAT MAY INCLUDE LATEX

- > Monitoring catheters
- > Urinary catheters
- > Oral and nasal airways
- > Endotracheal tubes
- > Intravenous tubing
- > Injection ports
- > Bungs/needle sheaths
- > Gloves, examination/surgical
- > Wound drains
- > Anesthesia masks
- > Syringes
- > Tourniquets
- > Stethoscopes
- > BP cuffs
- > Enema cuffs

To examine the occurrence of latex allergy in healthcare workers, one study interviewed and conducted skin-prick testing on 244 hospital employees.¹⁷ The study tested individual's reactions to six common allergens, in addition to one non-latex synthetic glove extract and a total of four different latex glove extracts. Results showed that all individuals tested negative for the non-latex, but 38 out of 244 (17%) tested positive for the latex extracts (Table 2).

CLINICAL IMPACT OF LATEX HYPERSENSITIVITY

Months or even years of exposure without symptoms may precede the onset of clinical symptoms of a Type I latex reaction. Serious

consequences can occur in clinical settings as evidenced by the following case report:

A pulmonary artery catheter was used in a 63-year-old patient undergoing surgical resection of an 11mm abdominal aortic aneurysm. After insertion of radial artery and pulmonary artery catheters and prior to induction of anesthesia, the anesthesiologist noted that the patient experienced a significant decrease in systolic arterial blood pressure from 120 to 70 mmHg.

To identify the cause of this apparent systemic allergic reaction, surgery was postponed to the following day in spite of the risk of rupture of the aneurysm. On the second day, the PA catheter was inserted when the patient immediately complained of dyspnea, the SaO₂ decreased from 93% to 79%, and pulmonary auscultation revealed bronchospasm. Tracheal

intubation was performed, the patient was treated with phenylephrine and epinephrine, and crystalloids were used for volume expansion to restore hemodynamic status.

This patient had not reported any previous history of sensitivity to latex.¹⁸ This and other reported cases suggest that latex allergy should be considered in any suspicious case presenting with these symptoms during surgery.¹⁹

Physicians, nurses, and hospitals can be held financially liable for injury sustained by a patient due to latex exposure and reaction.

LATEX ALLERGY: POTENTIAL COST TO THE HOSPITAL AND THE CLINICIAN

The costs of latex allergies extend beyond their clinical impact. These added financial costs occur in three areas: 1) to defend litigation, 2) financial judgment when a patient is injured due to latex exposure, and 3) to compensate healthcare workers who have developed latex hypersensitivity due to repeated exposure to latex products during employment.

In 1999, Phillips et al. reported on a study comparing latex-safe environments vs. the status quo in three healthcare institutions in Georgia, USA.²⁰ These institutions included a tertiary care hospital, a community hospital, and an outpatient internal medicine clinic. The cost of the worker with total disability due to latex hypersensitivity as a result of repeated exposure to latex was calculated as \$109,000, where the worker qualified as totally disabled and received two-thirds of the average weekly wage for 400 weeks.

The cost of the worker classified as partially disabled was calculated at \$62,000 in which the worker received wage replacement equal to two-thirds of their average weekly wage for 350 weeks.²⁰ In a population where as many as 17% of healthcare workers have some degree of latex sensitivity, compensation for loss of wages can represent a substantial financial risk for hospitals.

TABLE 2. TEST RESULTS FOR HEALTHCARE WORKER ALLERGY TO LATEX¹⁷

GROUP	% POSITIVE FOR LATEX
All Subjects	17
Nurses	18
Laboratory Technicians	21
Dental Personnel	38
Respiratory Therapists	17
Physicians	9
Housekeeping & Clerical	0

Physicians, nurses, and hospitals can be held financially liable for injury sustained by a patient due to latex exposure and reaction. In *Dunwoody v. Daniels*, in which Emory Hospital inserted a latex catheter into a patient causing a subsequent latex reaction, the Georgia Appellate Court found that “Emory breached the standard of care by using a latex catheter.”²¹

In 2005, the American Medical Association reported that while physicians prevail at trial in 83% of (malpractice) cases against them, the average cost of obtaining a defense verdict is nearly \$94,000.²² Moreover, the median medical liability jury award in medical liability claims increased in 2004 to \$439,000.²² According to one study of 186 plaintiffs’ verdicts in California, Florida, and Texas, juries awarded punitive damages with an average award of \$22.6 million each.²³

CONCLUSION

In recent decades, increasing clinical attention to the risks associated with the use of latex products has resulted in latex-free rooms in hospitals.³ This effort is not an adequate solution and will not eliminate the problem until latex products are completely removed from clinical settings.

The implementation of completely latex-free clinical environments may not be possible until the financial impact on the responsible parties is reduced. Consequently, it would behoove all clinicians to safeguard their patients by avoiding use of all-latex products whenever possible, including pulmonary artery catheters with non-latex balloons.

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