Occupational Airways

A quarterly newsletter of the Occupational Health Surveillance Program, Division of Environmental Epidemiology and Occupational Health (EEOH), Connecticut Department of Public Health, 410 Capitol Avenue, MS# 11OSP, P.O. Box 340308, Hartford, CT 06134-0308 (860)509-7744

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This issue:

LATEX HYPERSENSITIVITY IN HEALTH CARE WORKERS

CASE REVIEW: ASTHMA IN AN OPERATING ROOM TECHNICIAN

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A 26 year old male operating room (OR) technician, worker C, presented with contact urticaria, dypsnea, wheezing, and rhinorrhea over a three week period while working in the operating room of a medical center. Worker C, who has been employed as an OR technician for six years, has a past medical history significant for childhood atopic allergy. Worker C was treated for an eczematous hand dermatitis for six months preceding the respiratory complaints. Over several weeks, substitution of non-powdered/non-latex gloves and topical steroids improved the hand dermatitis. Serial pre- and post-shift peak flow measurements revealed a 15% decrement in peak flow. Laboratory testing for latex specific IgE by RAST using Pharmacia ImmunoCAP System revealed an elevated IgE count of 11,597 class 4 (normal count < 750, normal class 0). Skin prick testing with latex was withheld due to the risk of anaphylaxis. A diagnosis of occupational asthma was made. Worker C responded to medical management with inhaled beta agonists and steroids. As respiratory symptoms were temporally associated with the OR, he was removed from the OR and successfully placed in a latex-restricted environment within the medical center. Methacholine challenge test showed mild hyperresponsiveness four weeks following the transfer. The medical center is investigating complete elimination of powdered latex gloves and substitution of other latex medical products. Worker C has been unable to return to his previous position in the operating room.

Latex is the sap from the rubber tree *Hevea brasiliensis*. Many health care workers report allergic reactions to latex-containing medical products, particularly latex gloves. With the implementation of universal precautions, health care workers' exposure to latex has increased dramatically. Exposure can occur by direct contact with skin and mucus membranes, and by inhalation.[1]

The predominant immunologic response to natural latex rubber is type IV delayed hypersensitivity to rubber additives, which is often manifested by contact dermatitis. These additives include accelerators used during the manufacturing process to speed curing, namely mercaptobenzo-thiazole, tetramethylthiurams and dithio-carbamates.[2] Approximately seven days are required for the induction and sensitization process in type IV delayed reactions where T lymphocytes recognize the antigens. Following exposure the sensitized individual elicits the cutaneous reaction, which peaks in approximately 48 hours.[3] Contact dermatitis may be prevented with barrier creams and seamless nylon glove liners.

Type I hypersensitivity reactions to latex are serious and often life threatening. These reactions occur immediately with a different immunologic mechanism. They are manifested by massive local release of histamine by mast cells, as well as release

In case you missed our last issue....

WE MOVED!

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of tryptase and leukotrienes. Type I reactions, which include urticaria, angioedema, conjunctivitis, rhinitis, asthma, and anaphylaxis, are mediated by IgE antibody.[1,4] Between 1988 and 1992, the FDA reported more than 1000 systemic reactions to latex, of which 15 were fatal.[2] Some health care workers may develop Type I sensitization after regular exposure to latex.[5,6] Areas with significant airborne latex allergens (operating rooms, intensive care units, and dental suites) may sensitize workers who inhale allergenic proteins.[4,6,7,8]

The amount of antigen in latex gloves is highly variable from product to product. Powdered gloves have been found to aerosolize higher levels of latex allergen than nonpowdered and low allergen gloves. The powder used in latex gloves can absorb the latex proteins and become airborne when gloves are changed. Substitution of powder free gloves has been shown to reduce airborne levels of latex allergens.[9,10]

The prevalence of latex allergy in the general population is thought to be less than 1%. The prevalence in individuals with spina bifida, urogenital abnormalities, childhood atopy, eczema, and certain food allergies (banana, kiwi, chestnut, avocado) can range from 28% to 67%.[3] In health care workers the prevalence is estimated to be between 7 and 10%. Atopic health care workers are at even a greater risk. Other workers who are at risk include kitchen/dietary workers, maintenance personnel, workers involved in the manufacture of rubber or rubber products (toys, rubber bands, gloves), and any other workers with chronic latex exposure.[4,9]

To confirm diagnosis the physician generally relies on a patient history, skin testing and latex specific IgE by modified RAST, an in vitro test, which has a sensitivity of 70% to 80%. Two tests using diluted latex antigen that are best performed by allergists are the skin prick test and the intradermal skin test. The latter is more sensitive and also more likely to produce a serious allergic reaction. Diagnosis using skin testing in the physician's office has significant risk of anaphylaxis. Until the FDA approves a reliable latex skin test reagent, the safest option for physicians is the latex specific IgE by modified RAST.

The latex sensitized health care worker represents a challenge for physicians and health care facilities. Workers with occupational asthma due to latex may have permanent respiratory disability even after the exposure is discontinued.[11] The American Academy of Allergy and Immunology has published guidelines for providing care to persons with latex allergies.[12] Sensitized workers may be returned to a latex-restricted environment where there is no direct contact with latex products. Low allergen non-sterile latex gloves, vinyl, styrene, and neoprene alternatives are available for comparable price and are a viable alternative for the sensitive health care worker. Sterile alternatives are more expensive.

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Summary of Number of Reported Cases of Selected Respiratory Diseases
CT DPH Occupational Disease Surveillance Data

	11/91-12/93	1994	1995*	ODSS** Total
Asthma	40	13	33	86
RADS* **	6	1	1	8
Silicosis	2	4	1	7
Asbestosis	27	3	5	35
Asbestos-related pleural diseases	90	17	8	115
Total	165	38	48	251

* As of April 30, 1996
** Occupational Disease Surveillance System (ODSS)
*** Reactive Airways Dysfunction Syndrome

Please note: In the March 1996 issue, the data reported for 11/91-12/93 & 1994 for asthma in the **Summary of Number of Cases of Selected Respiratory Diseases** table were the number of reports instead of the number of cases (workers). Please note the changes in this issue. Thank you.

Overview of the American Academy of Allergy and Immunology Task Force on

Allergic Reactions to Latex Committee Report

According to the American Academy of Allergy and Immunology Task Force on Allergic Reaction to Latex, the following summarizes the protocol suggested for patients with likely latex exposure:

- **Patients in high risk groups should be identified.**

High risk populations include patients with spina bifida and urogenital abnormalities, health care workers, and workers employed in the manufacture of rubber products.

- **All patients, regardless of risk group status, should be questioned about a history of latex allergy.**

A history suggestive of reactivity to latex is local swelling or itching from contact with rubber products (balloons, condoms, diaphragms, rubber gloves). Other historical information that may suggest an increased risk of latex allergy includes hand eczema, previous unexplained anaphylaxis, oral itching after eating bananas, chestnuts, or avocados, and multiple surgical procedures in infancy.

- **All high risk patients should be offered testing for latex allergy.**

At present, there is no standard test for latex allergy. Skin testing with a latex extract or glove extract may constitute the best available rapid and accurate diagnostic procedure. However, anaphylaxis has occurred during epicutaneous skin testing of patients with spina bifida, as well as in patients with a history of latex-induced anaphylaxis. Appropriate care should be exercised in testing these patients. In vitro testing offers promise, especially in settings in which skin testing is not routinely performed or contraindicated. Unfortunately, in vitro tests may not be sensitive enough to detect all persons who may be at risk. At this time, there is no consensus on the best antigen to be used for in vitro or in vivo tests.

- **Procedures on all patients with spina bifida, regardless of history, should be performed in an environment free of latex.**

- **Procedures on all patients with positive history, regardless of risk group status, should be performed in an environment free of latex.**

A positive history includes any immediate hypersensitivity reaction associated with latex exposure. Patients with eczema associated with latex glove use should be considered to have a positive history. In health care workers, it may be a precursor to type I reactions. Because there is uncertainty about whether complete antigen avoidance can be achieved, pretreatment with antihistamines and corticosteriods may be advisable. However, these regimens have been devised and tested to prevent radiocontrast media reactions and not antigen-induced mast cell activation. Pretreatment is not a replacement for antigen avoidance. All procedures on patients with positive histories should be performed in a setting in which anaphylaxis can be treated.

- **An environment free of latex is one in which no latex gloves are used by any personnel. In addition, there should be no latex accessories (catheters, adhesives, tourniquets, anesthesia equipment) that come into direct contact with the patient.**

Some investigations have suggested that antigen exposure may occur through airborne particles and through intravenous fluids. Therefore, personnel should not wear latex gloves in the room where surgery is being performed on patients with prior anaphylaxis or a documented history of aerosol-induced reactions to latex. If available, intravenous solutions and tubing without latex injection ports should be used. If the only tubing available has latex ports, injections should be given through a stopcock system. Medication stored under latex closures should not be used if a nonlatex substitute is available. Personnel must wash their hands and change their scrubs if they have contact with latex products. Internal components of an anesthesia machine or high-pressure gas tubing may be lined with latex, therefore, it may be impossible to make an operating room 100% latex-free. A list of safe products to use should be prepared through contact with manufacturers who certify in writing that the product is latex-free.

- **At this time, routine testing is not recommended for low risk patients with negative histories.**

- **Patients identified as latex allergic by either history or testing should be advised to obtain a Medic Alert bracelet and self-injectable epinephrine. Medical records should be appropriately labeled.**

See the *Journal of Clinical Immunology* 1993; 92:16-18 for a copy of the complete report.

Latex Resources

Research to better understand latex hypersensitivity is ongoing. In spina bifida patients,

it is believed that sensitization may occur from early, intense and perpetual exposure to rubber products during multiple surgeries, examinations and diagnostic procedures, and bowel and bladder programs. The Spina Bifida Association of America produces materials to educate health professionals and their patients about latex allergies in this high risk population. The Spina Bifida Association literature includes a list of products that contain latex, and examples of latex-safe alternatives. This list is updated twice a year. They have also published a guidance document for establishing latex allergy precautions. To obtain the latex information packet call the Spina Bifida Association of America at (800)621-3141 or (202)944-3285.

Some institutions with large pediatric populations are moving towards becoming "latex-safe". This means minimizing the use of latex throughout the hospital. Nationally, the Shriners Hospitals network has banned certain latex-containing products from hospital floors. Shriners Hospitals care for children with spina bifida and other abnormalities requiring multiple surgeries who are at risk for developing latex allergies. Call Elli Meeropol, at Shriners Hospital, Springfield, MA at 413/787-2069 for further information.

Other resources:

- FDA MedWatch problem product reporting: (800) 332-1088
- FDA Latex Allergy Hotline: (301) 594-3060
- Latex Allergy Information Service (information & support for patients): (860) 482-6869

Turning Diagnosis into Prevention

A Conference for Occupational Medicine Providers

Wednesday, June 26, 1996
9am - 3:45 PM
Connecticut Hospital Association
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Information/Registration

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