

Reported latex sensitivity in pediatric dental patients from hospital- and dental school-based populations

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Abstract

A number of intraoperative anaphylactic reactions to latex occur in pediatric patients. To determine the frequency and characteristics of latex reactions in pediatric dental patients, a 32-item survey was completed by consenting parental interview at three pediatric dental clinics. Two were hospital-based, specializing in dental care for chronically ill or disabled children. The other was a dental school clinic. A total of 290 surveys were completed, in approximately equal numbers from each of the three clinics. Of the total, 2.7% reported a history of adverse reactions to latex contact. All adverse reactions were reported from the two hospital-based clinics. The rate from the hospital-based clinic specializing in the care of orthopedic and neurologically compromised children (Texas Scottish Rite Hospital, Dallas, TX) was 5.7%. The rate reported from the hospital-based clinic for chronically ill children (Children's Medical Center, Dallas, TX) was 2.0%. A history of eczema, a familial history of allergies, and a history of multiple surgical procedures were significantly more common ($P < 0.05$) in the population reporting adverse reactions to latex. No adverse latex reactions were reported in the one-third of the pediatric population described as normal, healthy children. Adverse reactions were more common in medically compromised children, particularly those with histories of spina bifida and/or multiple surgical procedures. (Pediatr Dent 16:117-20, 1994)

Introduction

On March 29, 1991, the FDA issued a medical alert¹ in response to the increasing reports of latex-related allergic reactions. Although rubber has been implicated in contact sensitivity since the mid-1940s, in 1976 Malten, et al.² reported that the incidence of sensitivity appeared to be increasing. More recently, multiple episodes of angioedema and anaphylaxis in children exposed to rubber have been reported.³ Although spina bifida patients are not known to be particularly atopic, a number of intraoperative anaphylactic reactions to latex have been reported in pediatric spina bifida patients.^{4,5} Gerber, et al.⁶ reported two incidents of intraoperative anaphylaxis in children with a history of multiple surgical procedures.

Adverse reactions to latex occur in approximately 20% of clinical dental health care providers.⁷ Adverse reactions to latex products were reported in 3.8% of an adult dental patient population.⁸ In 1984, Blinkhorn and Leggate described angioneurotic edema in a 15-year-old boy as a reaction to dental rubber dam. Smart, et al.⁹ recently described three cases in which adult patients receiving dental treatment subsequently showed evidence of delayed hypersensitivity to rubber, which was substantiated by dermatologic testing.

Latex exposure in the normal, healthy child is not comparable to that of the dental health care worker or adult dental patient. Many pediatric dentists, however, regularly treat medically compromised children. The latex exposure history of the medically compromised child is also dissimilar to the groups studied to date. The purpose of the current study was to identify—by

history—pediatric dental patients who had experienced adverse reactions to latex products.

Methods and materials

A 32-item questionnaire was completed by consenting parents at three pediatric dental clinics. The questionnaire had IRB/human subjects approval from all institutions involved in the study. Two of the three clinics were hospital-based clinics and specialized in the care of chronically ill or disabled children. Information solicited included the patients' general history of airborne allergy, food allergy, contact allergy, asthma, eczema, and familial history of allergy. The questionnaire asked the parent to report any adverse reactions to a variety of latex products, including latex gloves, toy balloons, dental rubber dam, enema tips, and vaginal or rectal examination with latex gloves. If the response indicated a possible reaction to any latex product the parent was asked to identify the signs and symptoms the child experienced. The signs included were: dermatitis, urticaria, rhinitis, conjunctivitis, swollen lips, swollen eyelids, asthma, dizziness/light headedness, flushing, tachycardia, sweating, difficulty breathing, hypotension, other anaphylactoid reactions, and anaphylactic shock. Medical terminology was defined in lay terms for each sign listed. In the two hospital-based dental clinics, information was also obtained regarding the child's primary diagnosis, medical history and number of prior surgical procedures.

Following IRB/human subjects review and approval by all institutions involved in the study, 100 questionnaires were distributed to each of the three clinics. Data

collection was terminated after eight weeks. Only completed questionnaires with accompanying signed parental consent were included for data analysis.

Data were analyzed using the chi-square statistic (X^2) with continuity correction when appropriate. All variables were analyzed to identify any common characteristics of subgroups within the total population of pediatric dental patients reporting adverse reactions to any latex product.

Results

A total of 290 surveys were completed in approximately equal numbers from each of the three dental clinics (Fig 1). The gender distribution in the three clinics was not significantly different, with the average male:female ratio being 51:49. Age distribution of the patients in the three clinics did not differ significantly and was nearly equally distributed over the age span of 4 to 15 years (Fig 2). There was no significant difference in the number or nature of dental procedures scheduled at the time of interview in the three dental clinics. The majority of patients (53%) were scheduled for operative procedures.

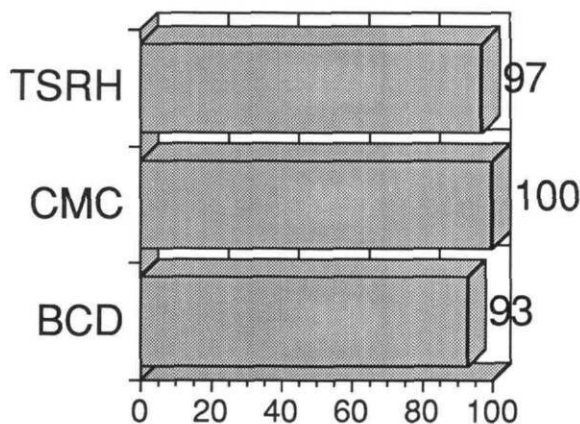


Fig 1. Population distribution by dental clinic.

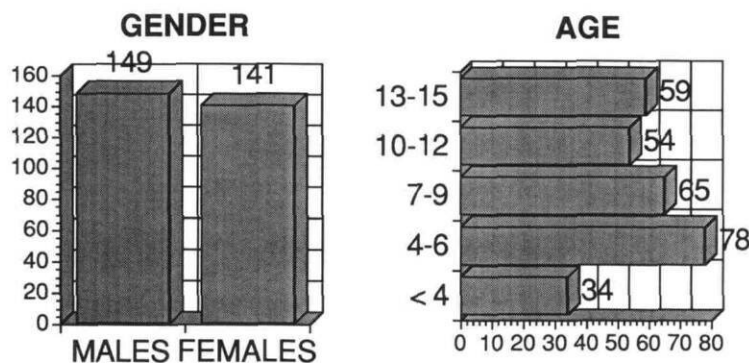


Fig 2. Demographics of the combined populations of three dental clinics.

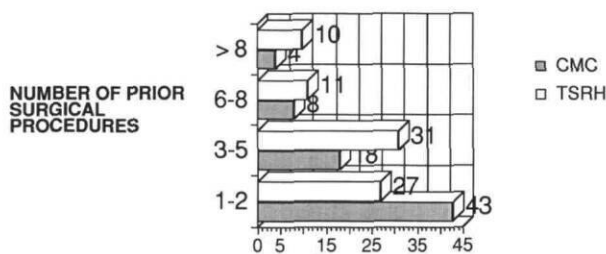


Fig 3. Distribution of major medical conditions in dental patient population of Texas Scottish Rite Hospital.

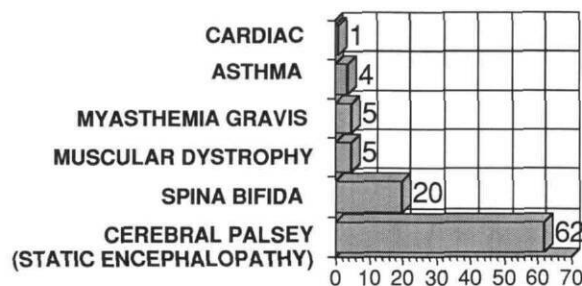


Fig 4. Number of prior major surgical procedures of patients from dental clinics of Texas Scottish Rite Hospital and Children's Medical Center.

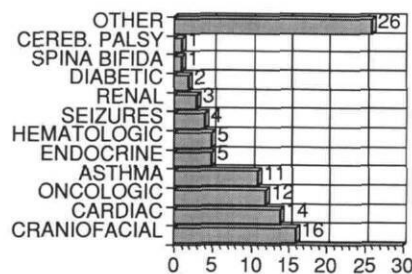


Fig 5. Distribution of major medical conditions of dental patient population of Children's Medical Center.

Only 2.4% of the total sample reported adverse reactions to latex contact. All adverse reactions to latex were reported among children in the two hospital-based clinics with no reported incidents in the pediatric dental clinic at Baylor College of Dentistry (BCD). The dental school patients had no history of major surgical procedures or significant medical history.

At Texas Scottish Rite Hospital (TSRH) the patient population is characterized by children with orthopedic and/or neurologic disorders. Distribution of the major medical conditions of these patients is described in Fig 3. The percentage of latex reactions in this population was 5.5%. All but one (four of five) of the patients identified as latex-sensitive in this clinic were

affected by spina bifida. In general, the TSRH population reported a larger number of prior surgical procedures than the other hospital-based dental clinic, Children's Medical Center (CMC) (Fig 4). Examination of the medical records of the spina bifida patients in this study revealed a variable number of prior major surgical procedures, but the majority of patients' records reflected a history of early and frequent clean, intermittent catheterization.

The medical diagnoses of the children being treated in the dental clinic at CMC were considerably more varied than those at TSRH (Fig 5). The percentage of children with reported latex sensitivity in the CMC population was 2.0% (N = 100). The surgical history of patients at CMC is described in Fig 4.

There were no significant differences in the age or gender distribution of the population reported as latex sensitive. In patients from both hospital-based clinics who were reported as latex sensitive, a positive history of eczema and a familial history of allergies were significantly more common ($P < 0.05$) than in the rest of the population. A history of multiple surgical procedures was also significantly more common ($P < 0.05$) in the latex reactive population. Of the seven reported cases of latex sensitivity, four patients had experienced more than eight prior major surgical procedures. Four of the seven spina bifida patients reported were latex sensitive.

Although information on sensitivity to a variety of latex products was solicited including: toy balloons, dental rubber dam material, and enema tips, the only latex product reported to elicit an adverse response was latex glove material. The most common reaction related to latex sensitivity was dermatitis (57%). There was, however, a comparatively high frequency of multiple systemic signs such as flushing (56%), swollen eyelids (42.8%) and respiratory depression (28.6%) in the population identified as latex sensitive.

Discussion

Most descriptions of latex allergies in pediatric patients are case reports. Although these serve to alert the clinician to the possibility of latex sensitivity, they do not provide adequate information for determining a pediatric patient's risk.

Data from this study support the hypothesis that the profile of latex sensitivity seen in the pediatric dental patient population differs from that observed in dental health care workers or adult dental patients. Reported latex sensitivity in the pediatric dental population is significantly related to the health and prior major surgical experience of the patients. Although this study does not provide definitive evidence as to why the spina bifida population shows a comparatively high incidence of latex sensitivity, the data are consistent with the relatively large number of case reports of latex allergy in this special population. A review of the medi-

cal records of the spina bifida population suggests this predisposition may be the result of early and repeated mucosal exposure to latex via urinary catheters.

In the latex-sensitive population from CMC and TSRH, histories of familial allergies and eczema were found to be significantly related to reports of sensitivity to latex gloves. The relevance of this finding is still unclear as this has not been substantiated by the previous case reports or by comparison to findings in other groups of latex-sensitive individuals.

There were no reported latex sensitivity reactions in the BCD population. The graduate pediatric dental clinic at Baylor College of Dentistry primarily treats children with extensive restorative needs or children who require sedation for behavior management. No children with histories of major medical conditions or major surgical experiences were found in this group. Although there were no adverse reactions reported in the BCD population, this does not imply that latex sensitivity cannot occur in children who are not medically compromised. This finding may be a function of the small sample size and a higher percentage of children in a younger age group at BCD.

Evidence suggests that immediate hypersensitivity to latex is an acquired allergy related to exposure, as well as the individual's response to exposure. An adequate latex history is indicated for all pediatric dental patients. A thorough history should include inquiry about the exposure and response to a variety of latex products, and a medical history including allergic history as well as surgical experiences. Latex is a common substance in our modern environment, and infection control efforts in both the medical and dental community may contribute to future increases in the frequency of latex sensitivity as the current pediatric population ages.

The medical/dental community must be aware of the possible implications of allergic reactions to latex. Pediatric dental patients generally have less history to review than adults. However, it's generally a simple matter to obtain a latex history. Every effort should be made to identify potentially latex-sensitive patients prior to treatment to prevent an untoward event.

Latex products should be avoided when there is any doubt as to the patient's ability to tolerate them. It is the policy of the Spina Bifida Clinic and the Dental Clinic at Texas Scottish Rite Hospital to avoid all latex products in the treatment of spina bifida patients. Hypoallergenic latex is not suitable for this purpose but, a number of suitable nonlatex gloves are on the market. Latex avoidance should include not only gloves; latex prophylactic cups and dental rubber dam material should be avoided as well.

Conclusions

- 1) There were no reports of latex reactions in a primary care pediatric dental clinic (BCD).

- 2) The total percentage reported from the two hospital-based pediatric dental clinics was 2.4%.
- 3) A greater percentage of reported latex sensitivity experiences (5.5%) was found in the hospital-based dental clinic (TSRH) with a spina bifida population of approximately 20%.
- 4) In the latex-sensitive population from CMC and TSRH, a history of familial allergies and eczema was found to be significantly related to reports of sensitivity to latex gloves.
- 5) The common findings of multiple systemic signs such as flushing (56%), swollen eyelids (42.8%), and respiratory depression (28.6%) in the latex sensitive population suggest that the reactions reported in the patients in this study were systemic.

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1. U.S. Department of Health, Education and Welfare, Food and Drug Administration. Medical Alert, Rockville, MD, 1991.
2. Malten KE, Nater JP, VanKetal WG: Patch Testing Guidelines. Journal 63, 1976.
3. Axelsson IG, Eriksson M, Wrangsjo K: Anaphylaxis and angioedema due to rubber allergy in children. Acta Paediatr Scand 77:314-16, 1988.
4. Moneret-Vautrin DA, Laxenaire MC, Bavoux F: Allergic shock to latex and ethylene oxide during surgery for spinal bifida. Anesthesiology 73:556-58, 1990.
5. Swartz J, Braude BM, Gilmour RF, Shandling B, Gold M: Intraoperative anaphylaxis to latex. Can J Anaesth 37:589-92, 1990.
6. Gerber AC, Jorg W, Zbinden S, Seger RA, Dangel PH: Severe intraoperative anaphylaxis to surgical gloves: latex allergy, an unfamiliar condition. Anesthesiology 71:800-2, 1989.
7. Rankin KV, Rees TD, Jones DL: Survey of latex reactions in faculty, staff and students of a dental school. J Dent Res 71:189 Abst 672, 1992.
8. Rankin KV, Jones DL, Rees TD: Incidence of latex reactions in an adult dental patient population. J Dent Res 72:202 Abst 786, 1993.
9. Smart ER, MacLeod RI, Lawrence CM: Allergic reactions to rubber gloves in dental patients: report of three cases. Br Dent J 172:445-47, 1992.

From the Archives

A unique dental misadventure

This journal reports the death of a young woman in London, to whom nitrous oxide gas was administered for the extraction of a tooth. At the inquest it was proven that the deceased wore corsets which were fully five inches too small for her, and that the death resulted from that cause, so the jury exonerated the dentist.

The Dental Record, 1895