

# Latex Hypersensitivity in a Child With Diabetes

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**Background:** A 6-year-old girl who was diagnosed with diabetes mellitus 20 months previously developed erythematous, raised lesions at the site of her insulin injections. The reactions occurred when isophane and lispro insulin were administered individually or combined but not when insulin was obtained from the bottle after the septum had been removed.

**Objectives:** To describe latex hypersensitivity in a child with diabetes and to review the literature.

**Design:** Case report.

**Results:** Findings from intradermal testing confirmed latex hypersensitivity. A change to insulin administration by insulin pen decreased the frequency of the reactions.

**Conclusion:** Latex hypersensitivity should be considered in children with type 1 diabetes who develop local reactions to insulin injections.

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**Editor's Note:** This cause of latex hypersensitivity really stretches the imagination.

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**L**ATEX HYPERSENSITIVITY reactions can cause serious problems for children with spina bifida because of recurrent exposure to latex in various medical procedures.<sup>1</sup> Children with insulin-dependent diabetes mellitus are constantly exposed to small amounts of latex through the plungers in insulin syringes and the stoppers in insulin vials. I describe a child who was seen in the pediatric diabetes clinic of the Children's Hospital of Iowa, Iowa City, and was found to have latex hypersensitivity owing to her insulin injections.

## PATIENT REPORT

The patient was first seen in the pediatric diabetes clinic at age 5 years. Insulin-dependent diabetes mellitus had been diagnosed 2 weeks earlier, and she was referred for diabetes education and insulin-dose adjustment. At that time she was receiving 2 shots of mixed isophane (NPH) insulin and regular human insulin (Humulin; Eli Lilly Co, Indianapolis, Ind). She had no physical reaction to the shots but was frightened and tearful prior to injections.

She was hospitalized for 2 days and evaluated by a pediatric psychologist who recommended behavioral techniques to help her adjust to the injections. During the next 17 months, she was followed up regularly in the clinic and continued receiving human NPH and regular insulin. Her hemoglobin A<sub>1c</sub> levels were consistently between 8.0% and 8.5% (reference, <6.5%).

At age 6 years, the regular insulin was changed to lispro insulin (Humalog; Eli Lilly Co). The lispro insulin was again mixed with human NPH in a 2-injection-per-day dosing regimen. Two months later in January 1997, the family began noticing skin reactions at the site of the injections that occurred after most but not all injections. The reactions were described as red and blotchy and were said to be between the size of a dime and nickel (1-1.5 cm). They were swollen and pruritic for about 2 to 3 hours after the injection. The reactions lasted up to 24 hours. In March 1997, she was seen in the clinic for her routine visit, and medication was switched back to human NPH and regular insulin. The reactions continued to occur. Her hemoglobin A<sub>1c</sub> level was 7.9%. The family was then asked to administer the NPH and regular insulin as separate injections, and reactions were noted at both injection sites. Her mother at this time also began noting a similar type of reaction with the use of adhesive bandages.

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In April 1997, she was seen in the pediatric allergy and pulmonary clinic at the Children's Hospital of Iowa. Findings from physical examination were unremarkable except for the presence of an erythematous, boggy, nickel-sized (1.5-cm) papular lesion on the right thigh at the site of that morning's insulin injection. Intradermal testing for latex hypersensitivity was performed and revealed a markedly positive reaction at a 1:10 dilution but not at dilutions of 1:100 or 1:1000. She had no reaction to the diluent itself and positive findings from a histamine control test.

A call was placed to Eli Lilly Co, and it was learned that the septum in the insulin vial was made of hardened natural rubber made from harvested liquid latex. To determine whether the septum was the source of the injection reaction, the septum was removed from 2 new vials of NPH and lispro insulin, and her evening insulin doses were drawn directly from the vial. She did not react to either injection.

After much discussion regarding how to avoid future latex exposure, it was determined that she should switch to using the insulin pen and administer separate injections of NPH and lispro insulin using insulin cartridges. In this way the needle entering the skin would not penetrate the septum though the needle entering the insulin cartridge would. She was also given hydroxyzine for use as needed for itching and an epinephrine autoinjector in case she developed a more severe reaction. With this arrangement the frequency of the reactions decreased to one every week, and she has done well.

#### COMMENT

Local skin reactions owing to insulin injections have been described before and have generally been assumed to be caused by animal insulins.<sup>2,3</sup> Two previous reports of latex allergy in patients with type 1 diabetes have been reported. One was a 23-year-old man who had occupational exposure to latex as a laboratory technician.<sup>4</sup> The other was a 13-year-old boy with new-onset diabetes who had had multiple medical exposures owing to urologic surgery.<sup>5</sup> To our knowledge, this is the first report of a patient with latex hypersensitivity without other known occupational or medical exposures.

Latex hypersensitivity can lead to life-threatening anaphylactic reactions in medical personnel and children with spina bifida who are exposed to large amounts of latex.<sup>6</sup> No anaphylactic reactions have been reported secondary to insulin injections, but the previously mentioned 23-year-old man had a similar adverse reaction with mucosal exposure caused by a condom.<sup>4</sup> In our

patient, the development of latex hypersensitivity did not affect glycemic control.

Children with insulin-dependent diabetes mellitus are exposed to small amounts of latex on a regular basis through syringes and the septums on the insulin vials. No insulin stopper is made without latex. The stopper manufactured by Novo Nordisk (Bagsvaerd, Denmark) is made from liquid latex,<sup>4</sup> while the stopper manufactured by Eli Lilly Co contains 10% dry natural rubber.<sup>5,7</sup> Since children with diabetes cannot refrain from insulin injections, attempts must be made to decrease latex exposure. In the reported cases, one patient was able to reduce the frequency of reactions by switching from insulin manufactured by Novo Nordisk to insulin from Eli Lilly Co.<sup>4</sup> In the second case, the boy was already receiving insulin from Eli Lilly Co and required a 2-syringe method for administering insulin to eliminate the reactions.<sup>5</sup> The patient drew the insulin into 1 syringe and transferred it to a second syringe for injection. In my patient, I was able to eliminate the reactions by switching to an insulin pen so that the needle entering the skin did not pass through the stopper on an insulin vial.

In conclusion, a diagnosis of latex hypersensitivity should be considered in children with insulin-dependent diabetes mellitus who develop local reactions to insulin injections. In children found to have latex hypersensitivity, an effort should be made to decrease the amount of latex exposure since no completely latex-free insulin delivery system is currently available.

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