

### LATEX ANAPHYLAXIS IN A MYASTHENIC CHILD UNDERGOING THYMECTOMY

Pierre Beaulieu, MSc, MD;\* Daniel Vischoff, MD;\* Salam Yazbeck, MD, FRCSC†

Anaphylactic shock occurred in a 9-year-old myasthenic boy after induction of anesthesia for thymectomy. Resuscitation was successful. Subsequent skin testing identified latex as the cause. Although the patient was not in a high-risk group for latex allergy, detailed questioning confirmed that sensitivity had developed during repeated exposures in previous anesthesia and dental care. Six months later, after taking steroids and antihistaminic drugs prophylactically and avoiding all latex-containing products, the boy underwent uncomplicated thymectomy.

The possibility of latex allergy should be borne in mind when dealing with patients previously exposed to repeated medical care. Adequate, latex-free equipment should be available in operating rooms to deal with patients who are allergic to latex.

Un jeune garçon myasthénique âgé de 9 ans a subi un choc anaphylactique après induction de l'anesthésie en vue d'une thymectomie. La réanimation a réussi. Des tests cutanés effectués par la suite ont permis d'établir que le choc avait été causé par le latex. Même si le patient ne faisait pas partie d'un groupe à risque élevé d'allergie au latex, une interrogation détaillée a confirmé que le sujet est devenu sensible à la suite d'expositions répétées au cours d'anesthésies antérieures et de soins dentaires. Six mois plus tard, après avoir pris des stéroïdes et des antihistaminiques comme traitement prophylactique et avoir évité tous les produits contenant du latex, le sujet a subi une thymectomie sans complication.

Il faut tenir compte de la possibilité d'allergie au latex lorsqu'on traite des patients qui ont déjà subi des soins médicaux répétés. Il faudrait disposer, dans les salles d'opération, de matériel adéquat sans latex pour traiter les patients allergiques au latex.

Natural rubber products contain latex from the rubber tree (*Hevea brasiliensis*) and chemical additives used during the manufacturing process. Natural latex products include balloons, catheters, surgical gloves and elastic adhesives. The first case of contact urticaria due to latex rubber was reported in 1979.<sup>1</sup> The first reports of intraoperative anaphylaxis associated with latex sensitivity appeared in the literature in 1989.<sup>2-4</sup>

We report a life-threatening anaphylactic reaction that occurred shortly after the induction of anesthesia in a myasthenic child.

#### CASE REPORT

A 9-year-old boy had severe myasthenia gravis (diagnosed 1 year earlier) that was unresponsive to anticholinesterase medication. His medical history consisted of resection of a left temporal gliosarcoma at 2 months of age, compli-

cated by secondary epilepsy, and intracranial hypertension, which had been treated by ventriculoperitoneal shunting. His treatment consisted of nitrazepam, carbamazepine and pyridostigmine (mg/d). Thymectomy was scheduled. He had no known allergy, and previous anesthetic notes made no mention of allergy. No preoperative medication was given. Monitoring consisted of a three-lead electrocardiogram, noninvasive blood pressure measurement, capnography and pulse oximetry.

From the \*Department of Anesthesia and the †Department of Surgery, Hôpital Sainte-Justine, Montreal, Que.

Accepted for publication Nov. 15, 1995

Correspondence to: Dr. Daniel Vischoff, Department of Anesthesia, Hôpital Sainte-Justine, 3175 Côte Sainte-Catherine, Montreal QC H3T 1C5

© 1996 Canadian Medical Association (text and abstract/résumé)

Intravenous induction was chosen using atropine 0.4 mg and thiopentone 400 mg. After loss of consciousness, anesthesia was deepened with halothane 3% in oxygen, and sufentanil 20 µg was given intravenously. No muscle relaxant was used. A 6.0-mm endotracheal tube was inserted and its position was confirmed by chest auscultation and the presence of an end-tidal carbon dioxide waveform on the capnograph; the child was then mechanically ventilated. A 20-gauge radial artery catheter, a urinary catheter and a subclavian line were all inserted under sterile conditions. Shortly after insertion of the subclavian line (50 minutes after induction of anesthesia and before the operative procedure began) the patient showed a sudden and unexplained tachycardia (130 beats/min) associated with a decrease in systolic blood pressure from 95 to 60 mm Hg, a transient drop in the oxygen saturation to 70% and flushing. Chest auscultation revealed severe bronchospasm with increased peak airway pressure from 20 to 32 cm H<sub>2</sub>O and a slight decrease in end-tidal carbon dioxide. Immediately the patient was given 20 mL/kg of lactated Ringer's solution, ephedrine 5 mg intravenously, adrenaline 0.2 mg subcutaneously, nebulized salbutamol, diphenhydramine 40 mg and hydrocortisone 200 mg intravenously. His condition improved rapidly, but the operation was postponed. The child was transferred to the intensive care unit where he was later extubated.

On further questioning, the parents revealed that the child had suffered from contact urticaria when blowing up rubber balloons and a small area of erythema had developed at the corner of the mouth when in contact with rubber gloves at the dentist. Subsequent investigation by skin tests ("scratch") showed positive reaction (++++) for latex.

The thymectomy was rescheduled. Every precaution was taken to avoid

contact with latex-containing objects in the perioperative period (gloves, face mask, blood-pressure cuff, multi-dose vials, etc.). The stopcock method and glass syringes were used for injection of drugs.

Preoperatively, 1 hour before induction of anesthesia, the child was given intravenous diphenhydramine (1 mg/kg), ranitidine (0.5 mg/kg) and hydrocortisone (6 mg/kg). The induction technique used was the same as for the original procedure. The operation and the postoperative period in the intensive care unit were uncomplicated, and the child was discharged from hospital 8 days postoperatively.

## DISCUSSION

The incidence of anaphylactic reactions during pediatric anesthesia has recently been estimated in a French-speaking population to be 1 in 7741, and anaphylaxis to latex was found to be the main cause in 76% of the cases.<sup>5</sup> An increased incidence of anaphylactic reactions to latex has been reported since 1989.<sup>2-4,6,7</sup> A survey of adults and children showed that anaphylactic shock involving latex accounted for 12.6% of intraoperative anaphylactic reactions between 1990 and 1991, whereas it was a rare event (0.5%) in 1989.<sup>6</sup>

Products made of natural rubber are found frequently in the hospital setting and are difficult to avoid. Those potentially at increased risk for latex allergy include patients with prolonged or frequent exposure to rubber products (patients with spina bifida or congenital urologic abnormalities), those requiring frequent enemas, health care workers and rubber industry personnel.<sup>7,8</sup> Most children with latex allergy reported in the literature suffered from myelodysplasia or genitourinary-tract abnormalities; our patient did not suf-

fer from any of these conditions, and his medical history did not suggest potential latex allergy. However, he had undergone repeated surgical procedures and had probably developed latex sensitivity before the episode of anaphylaxis. The delayed onset that distinguishes latex-induced anaphylactic reactions from most other anesthetic-induced reactions is characteristic.<sup>9</sup>

Direct immunoglobulin (Ig) E mediation appears to be the pathogenesis of the anaphylactic response to latex<sup>9</sup> and usually begins when the latex-containing objects are in contact with mucous membranes.<sup>10,11</sup> Specific testing for latex allergy can be done with the radioallergosorbed test (RAST) for latex-specific IgE or skin tests (prick, epicutaneous or scratch). The latter were used to diagnose latex allergy in our patient. The other drugs tested (thiopentone, atropine and sufentanil) showed a negative response. Epicutaneous skin testing with serial dilutions of latex has a high safety profile and demonstrates a dose-dependent sensitivity.<sup>12</sup> Intradermal tests are generally not needed and have provoked systemic reactions in some patients. The latex RAST may be negative in 20% to 45% of the patients with positive skin tests to latex.<sup>12</sup>

Preoperative treatment of latex-allergic patients with steroids and antihistaminic drugs has been suggested without any evidence of efficacy. Pharmacologic prophylaxis is mentioned in several case reports<sup>13,14</sup> but is not as effective as avoiding the allergen.<sup>9</sup> However, even with the knowledge that corticosteroids and antihistamines may only lessen the anaphylactic reaction but not prevent it,<sup>15</sup> the risk of severe intraoperative reactions outweighs the potential morbidity.<sup>16</sup> Avoidance of contact with or manipulation through latex devices is of paramount importance, and in this regard a checklist may be useful.<sup>9</sup> The major

problem for the anesthetist is to identify the latex-containing products and to find a substitution.<sup>17</sup> In most cases, latex found in medical equipment can be replaced by neoprene, polyvinyl chloride, polyethylene, silicone or vinyl. Pharmaceutical and medical equipment companies should be asked to document and label the latex content of their products. A designated trolley containing latex-free common anesthetic equipment should be available in every operating room, together with an updated list of safe and unsafe items. Prominent signs in the operating room could serve as reminders.<sup>9</sup> The increased incidence of latex sensitivity among patients (especially pediatric patients) and health care workers has led us to adopt such a policy in our hospital.

We recommend that all patients with a history of balloon or glove intolerance should be tested preoperatively for latex allergy. Proper questioning during the preoperative visit may identify such patients. Patients with latex allergy should wear appropriate identification, and a protocol for their safe management should be available.

## References

1. Nutter AF. Contact urticaria to rubber. *Br J Dermatol* 1979;101:597-8.
2. Gerber AC, Jorg W, Zbinden S, Seger RA, Dangel PH. Severe intraoperative anaphylaxis to surgical gloves: latex allergy, an unfamiliar condition. *Anesthesiology* 1989;71:800-2.
3. Leynadier F, Pecquet C, Dry J. Anaphylaxis to latex during surgery. *Anaesthesia* 1989;44:547-50.
4. Slater JE. Rubber anaphylaxis. *N Engl J Med* 1989;320:1126-30.
5. Murat I. Anaphylactic reactions during paediatric anaesthesia; results of the survey of the French Society of Paediatric Anaesthetists (ADARPEF) 1991-1992. *Paediatr Anaesth* 1993; 3:339-43.
6. Laxenaire MC, Moneret-Vautrin DA, Widmer S, Gueant JL. Substances anesthésiques responsables de chocs anaphylactiques. Enquête multicentrique française. *Ann Fr Anesth Réanim* 1990;9:501-6.
7. Laxenaire MC, Moneret-Vautrin DA, Gueant JL. Allergie aux agents anesthésiques. Quoi de neuf? In: *Société Française Anesthésie Réanimation: Conférences d'actualisation*. Paris: Masson, 1992:231-43.
8. Sussman GL, Tarlo S, Dolovich J. The spectrum of IgE-mediated responses to latex [see comment]. *JAMA* 1991; 265(21):2844-7. Comment in: *JAMA* 1992; 267(19):2603-4.
9. Holzman RS. Latex allergy: an emerging operating room problem. *Anesth Analg* 1993;76:635-41.
10. Gold M, Swartz JS, Braude BM, Dolovich J, Shandling B, Gilmour RF. Intraoperative anaphylaxis: an association with latex sensitivity. *J Allerg Clin Immunol* 1991;87:662-6.
11. D'Astous J, Drouin MA, Rhine E. Intraoperative anaphylaxis secondary to allergy to latex in children who have spina bifida. *J Bone Joint Surg [Am]* 1992;74:1084-6.
12. Weiss ME, Hirschman CA. Latex allergy [editorial]. *Can J Anaesth* 1992;39(6):528-32.
13. Merguerian PA, Klein RB, Graven MA, Rozycki AA. Intraoperative anaphylactic reaction due to latex hypersensitivity. *Urology* 1991;38:301-4.
14. Sockin SM, Young MC. Preoperative prophylaxis of latex anaphylaxis [abstract 520]. *J Allerg Clin Immunol* 1991;87:269.
15. Setlock MA, Kelly KJ. Anaphylaxis on induction of anesthesia associated with latex allergy. *Anesthesiology* 1991;75:A1043.
16. Nguyen DH, Burns MW, Shapiro GG, Mayo ME, Murrey M, Mitchell ME. Intraoperative cardiovascular collapse secondary to latex allergy. *J Urol* 1991;146:571-4.
17. Alessi R, Moss JA. clinician's guide to allergy and anesthesia. *Semin Anesth* 1993;12(4):211-21.