Clinical Reports

Anaesthesia and the patient with latex allergy

Lynn J. McKinstry MD, W. James Fenton MD,
Peter Barrett MD

Reports of severe life-threatening anaphylaxis to latex are increasing. A case of latex anaphylaxis occurring during surgery is reported. Sudden cardiorespiratory collapse 25 min after the start of surgery was treated with oxygen, fluid, epinephrine, hydrocortisone, and benadryl. Two months later, skin testing to latex was positive but intradermal testing to the drugs used during anaesthesia was negative. Anaesthetists should be aware of this clinical entity. Latex allergy should be considered in the differential diagnosis of intraoperative anaphylaxis. Fortunately, it is usually preventable by obtaining a positive history, recognising that it occurs in particular subsets of patients and by avoiding latex products. Skin testing to latex is available and may assist in the recognition of latex sensitivity.

Les cas d'anaphylaxie sévère secondaire au latex sont de plus en plus observés. Le présent article décrit une réaction anaphylactique au latex au cours d'une intervention chirurgicale. Un collapsus cardiorespiratoire s'est produit 25 min après le début de la chirurgie et fut traité avec de l'oxygène, de l'épinephrine, de l'hydrocortisone, du benadryl et l'administration intraveineuse de liquide. Deux mois après l'incident, des tests cutanés d'exposition au latex ont donné des résultats positifs, et l'injection intradermique de médicaments utilisés au cours de l'anesthésie n'a produit aucune réaction. L'allergie au latex est un problème que les anesthésistes doivent connaître et considérer dans le diagnostic différentiel des causes d'ana-

phylaxie peropératoire. Cette complication peut être prévenue en évitant l'utilisation de produit fait de latex chez les patients présentant une histoire antérieure de réaction à ce produit. Les tests cutanés d'exposition au latex sont disponibles et peuvent permettre de diagnostiquer une hypersensibilité au latex.

Over the past several years there has been an increasing number of case reports of intraoperative anaphylaxis due to latex allergy.¹⁻⁷ Such a case which occurred in our institution is described and followed by suggested guidelines which anaesthetists may use in their care of such patients.

Case report

A healthy six-year-old boy with no previous history of atopy or reaction to natural rubber or rubber products, but with multiple surgical procedures in the past was scheduled to undergo a three-hour augmentation cystoplasty. He was unpremedicated. After appropriate monitoring and oxygenation, anaesthesia was induced with thiopentone and after succinylcholine, the trachea was intubated easily with a 5.5 mm Portex uncuffed tracheal tube. Maintenance of anaesthesia consisted of incremental doses of sufentanil, halothane, nitrous oxide and oxygen. Vecuronium was used for muscle relaxation. Suddenly, 25 min after the start of the surgery, the child became very red, tachycardic, desaturated and developed increased airway pressure and severe hypotension. The heart rate increased from approximately 100 beats · min⁻¹ to 152 beats · min⁻¹, blood pressure which had been approximately 120/60 mmHg decreased rapidly to 40 mmHg, airway pressure increased from 15 to 50 cm. H₂O and oxygen saturation decreased immediately to <70%. The striking feature was the suddenness of onset and the rapidity with which the child decompensated. Surgery stopped, and after administration of 100% oxygen, one litre of crystalloid, epinephrine 25 µg *iv*, hydrocortisone 50 mg *iv*, and benadryl 25 mg *iv* the blood pressure, heart rate, colour, and oxygen saturation returned to normal. Anaesthesia and surgery then resumed

Key words

ALLERGY: anaphylaxis, latex;
COMPLICATIONS: anaphylaxis.

From the Departments of Anaesthesia, Internal Medicine and Surgery (Urology), University of Saskatchewan, Saskatoon.

Address correspondence to: Dr. McKinstry at the Department of Anaesthesia, Royal University Hospital, Saskatoon, Saskatchewan, S7N 0X0.

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using the same maintenance agents with vigilant monitoring for recrudescence of allergic manifestations during the remainder of the case. The remainder of the intraoperative course was uneventful. The child was taken to the paediatric intensive care unit and the trachea was extubated several hours later. He was discharged home after several days without further incident with an indwelling catheter and leg collection bag. He developed urticaria under one of the straps approximately one week later (the strap is made of latex – Uri-drain, Sherwood Medical, Markham, Ontario).

Two months later the child was seen for allergy consultation and skin testing. He was positive to histamine (histamine 1:200 Omega Laboratories, Toronto) and negative to the diluent (saline) controls. Skin-prick testing to natural raw latex was positive (wheal 4 mm), equal in strength to the histamine control (source of raw natural latex is Bencard Allergy Laboratories, Mississauga, Ontario). Intradermal tests according to the method of Fisher⁸ were negative to thiopentone ($0.25 \text{ mg} \cdot \text{mL}^{-1}$); succinylcholine ($0.0002 \text{ mg} \cdot \text{mL}^{-1}$); atropine ($0.0006 \text{ mg} \cdot \text{mL}^{-1}$); sufentanil ($0.5 \text{ mg} \cdot \text{mL}^{-1}$) and vecuronium ($0.002 \text{ mg} \cdot \text{mL}^{-1}$). It was suggested to his parents that he should:

- 1 avoid contact with rubber products (rubber balloons and toys; latex gloves; rubber dental dams),
- 2 wear a MedicAlert bracelet indicating allergy to latex,
- 3 purchase a supply of non-latex gloves (Appendix) that could be given to a dentist, emergency room staff, etc., should they need them urgently,
- 4 be prepared to treat an allergic reaction to latex. Antihistamines and injectable adrenalin must be available.

Discussion

The first case of contact urticaria to rubber was reported in 1979.⁹ Since then several cases of severe intraoperative anaphylaxis to latex have occurred¹⁻⁷ which have many similarities.

Often the patients are children with a history of spina bifida^{3,5} or congenital urological abnormalities¹⁰ who have undergone previous or multiple surgical procedures. Gold *et al.*¹⁰ postulated that repeated insertion of urinary catheters produces microscopic tears in rectal or urethral mucosa. This encourages sensitization to latex and the possibility of intraoperative anaphylactic reaction.

There may be a history of local reactions to latex (eczematous rashes, urticarial lesions or angioedema) when in contact with rubber balloons or playing with rubber toys. Leynadier *et al.*¹¹ described five women who underwent surgery and developed severe intraoperative anaphylaxis to latex. All of them had known urticaria to rubber glove contact. Further, Spaner *et al.*¹² described an operating room nurse who developed severe

eczema secondary to wearing surgical gloves. This raises the possibility of sensitization to latex of health care personnel through frequent exposure to latex during surgical procedures.¹³

Life-threatening intraoperative anaphylaxis to latex often occurs in a similar sequence.¹⁴ Following uneventful induction of anaesthesia and 20 to 45 min after the start of surgery there is sudden cardiorespiratory collapse with desaturation, tachycardia, erythema, increased airway pressure and profound hypotension. Cardiopulmonary resuscitation is performed with the administration of epinephrine, fluids, steroids, histamine blockers and in some cases the surgical procedure must be aborted. The patient may be maintained on resuscitative drugs and is observed in an intensive care unit for some time.

Allergy to latex has a number of important considerations:

For the anaesthetist

Latex allergy should always be considered in the differential diagnosis of intraoperative anaphylaxis. One child underwent three surgical procedures, all complicated by anaphylaxis, before his latex allergy was discovered.⁶ Investigation of anaphylaxis should include tests for sensitivity to latex.¹⁴

Preoperative assessment should include questioning of a history of allergy to rubber. When a positive history is obtained, consultation with an allergist for possible skin testing should be performed in all cases.

Tertiary care institutions should have the means to obtain and store the latex antigen for skin-prick testing. Other institutions should be able to consult with an allergist. Skin testing should be done by an experienced tester and include negative and positive controls. Resuscitation equipment should be available because of the risk of triggering anaphylaxis.

Patients with a positive history of rubber allergy may be "pre-treated" before surgery with a protocol suggested for the prevention of anaphylactoid reactions to radiocontrast media (prednisone 50 mg, *po* every six hours for one day, with the last dose given one hour prior to the procedure), an H₁ receptor antagonist (diphenhydramine 0.5–1.0 mg · kg⁻¹) and an H₂ receptor antagonist (cimetidine 4–6 mg · kg⁻¹) *po*.¹⁵

Routes of exposure should be avoided.¹⁶ The patient should be provided with an information letter, wear a MedicAlert bracelet, obtain non-latex surgical gloves for use in emergency situations, avoid contact with rubber products and be prepared to treat an allergic reaction with antihistamines and injectable adrenaline.

The institution

Non-latex anaesthetic equipment should be available.

This includes face masks, pharyngeal airways, ventilator hoses, ventilator bellows and some blood pressure cuffs. Similarly latex products should be avoided during surgery. These include latex gloves, adhesive tape, urinary catheters, drains, intestinal tubes and stomach tubes (although not all urinary catheters or intestinal or stomach tubes are made of latex). Alternatives of polyvinyl chloride or silastic are available. *Non-latex gloves manufactured of synthetic materials must be available for use by health care personnel in the emergency room, operating room and the obstetrical suite, but although non-latex gloves are available some surgeons may refuse to wear them.

Implications for the future

Latex allergy may represent the tip of the iceberg. Thus far, most reports have exposed latex surgical gloves as the offending agent in these cases; however, Silverman¹⁷ has raised the intriguing possibility that the use of multi-dose vials with rubber stoppers may contain enough antigen to produce such reactions.

Anaphylaxis to latex is probably more frequent than previously thought.³ This may be due to lack of awareness and attributing symptoms to other clinical diagnoses. Gold *et al.*¹⁰ suggested that all children with spina bifida and/or congenital urological abnormalities undergo allergic evaluation for latex before each surgical procedure since the allergic status may change with continuing exposure. Health care personnel, particularly nurses and physicians who work in operating room areas, are at risk for development of this life-threatening allergy.

*Surgical gloves that allergic subjects may be able to wear:

<i>Name</i>	<i>Manufacturer</i>
Elastyren (styrene butadiene block polymer)	Hermal Pharmaceutical Laboratories, Inc. Route 145, Oak Hill, NY 12460
Neolon (neoprene glove low in carbomates)	Deseret Medical Inc. 9450 S. State, Sandy, UT 84090
Dispo-A-Glove	Surgikos Co., 2155 Pie IX Blvd. Montreal, Canada

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