Clinical Reports

Latex anaphylaxis during tissue expander insertion in a healthy child

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Purpose: To report intraoperative latex anaphylaxis that occurred in an otherwise healthy child. Although latex anaphylaxis is seen in patients with myelodysplasia, genitourinary anomalies, sensitised healthcare workers, and patients with frequent exposure to latex, it has not been described in otherwise healthy children.

Clinical features: A nine-year-old girl developed intraoperative latex anaphylaxis manifested by increased airway pressure, expiratory wheezing, a decrease in oxygen saturation, severe hypotension and urticaria. The patient was treated with 5 $\mu g \cdot kg^{-1}$ epinephrine *iv* and 5 $mg \cdot kg^{-1}$ hydrocortisone *iv*. She required an epinephrine infusion of 0.4 $\mu g \cdot kg^{-1} \cdot min^{-1}$ and prolonged ICU admission. Her only previous latex exposure was during plastic surgical procedures. Latex allergy was confirmed weeks later using the prick method allergy testing.

Conclusion: Latex anaphylaxis can occur in otherwise healthy children whose only latex exposure occurred during a previous operation, including plastic surgery.

Objectif : Rapporter un cas d'anaphylaxie peropératoire au latex chez un enfant par ailleurs bien portant. Bien que l'anaphylaxie au latex se rencontre ordinairement chez les myélodysplasiques, les porteurs d'anomalies urinaires, les travailleurs de la santé sensibilisés et les patients fréquemment exposés au latex, elle n'a pas été décrite chez des enfants en bonne santé.

Éléments cliniques : Une fillette de neuf ans a présenté une anaphylaxie peropératoire au latex qui s'est manifestée par une augmentation de la pression des voies aériennes, du wheezing expiratoire, une baisse de la saturation en oxygène, de l'hypotension profonde et de l'urticaire. Un traitement à l'éphédrine 5 $\mu g \cdot kg^{-1}$ *iv* et à l'hydrocortisone 5 $mg \cdot kg^{-1}$ *iv* a été administré. La gravité de son état a nécessité une perfusion d'épinéphrine de 4 $\mu g \cdot kg^{-1} \cdot min^{-1}$ et un séjour prolongé à l'USI. Sa seule exposition antérieure au latex avait été pendant une chirurgie plastique. L'allergie au latex a été confirmée quelques semaines plus tard par intradermoréaction.

Conclusion : L'anaphylaxie au latex peut survenir chez des enfants bien portants chez qui la seule exposition au latex est survenue au cours d'une intervention antérieure, incluant la chirurgie plastique.

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LATEX anaphylaxis has become a well recognised phenomenon in patients with myelodysplasia, and genitourinary anomalies which require repeated urological surgery or bladder catheterisation.[1,2] It has also been described in patients with frequent skin or mucosal exposure to latex such as sensitised healthcare workers,[3,4] rubber industry workers,[5] and patients requiring frequent vaginal or rectal examinations.[6] However, this type of anaphylaxis has not been described in healthy patients who have not had frequent latex exposure. We describe a case of latex anaphylaxis in an otherwise healthy child.

Case report

A nine-year-old girl was scheduled for elective partial excision of a giant hairy nevus of the back with insertion of three tissue expanders. She was otherwise healthy, had no drug allergies and was not receiving any medication. She had undergone previous anaesthetics for removal of nevi. Her two most recent anaesthetics for insertion and removal of tissue expanders with partial excision of the giant hairy nevus of the back were performed the previous year and were uneventful.

Anaesthesia was induced with 5 $mg \cdot kg^{-1}$ thiopentone *iv*, followed by 0.15 $mg \cdot kg^{-1}$ pancuronium *iv*, and the trachea was intubated. Other medications including 0.2 mg glycopyrrolate *iv*, 0.15 $mg \cdot kg^{-1}$ diazepam *iv*, and 0.15 $mg \cdot kg^{-1}$ morphine *iv* were given shortly after induction. The patient was then turned to the prone position. One gram of cefazolin was given *iv* over the next 15 min. Standard ASA monitors were used. Anaesthesia was maintained with isoflurane 1%, nitrous oxide 70% and oxygen 30%. Surgery proceeded uneventfully as three large cavities were created under the dermis of her back for the insertion of tissue expanders. One and a half hours after induction of anaesthesia, and one hour after surgical incision, the patient suddenly developed increasing airway pressure, from 20 to 30 cm H_2O, inspiratory and expiratory wheezing and a decrease in oxygen saturation from 99% to 93%. The patient was given 100% oxygen, and evaluation of the airway revealed appropriate endotracheal tube position with equal breath sounds bilaterally and no secretions in the trachea. Three minutes after respiratory symptoms were noted, the systolic blood pressure decreased from 100 mmHg to 68 mmHg. Urticaria was noted over the trunk and extremities confirming the suspicion of anaphylaxis. The patient was treated with 5 $\mu g \cdot kg^{-1}$ epinephrine *iv* and 5 $mg \cdot kg^{-1}$ hydrocortisone *iv*. An epinephrine infusion of 0.05 $\mu g \cdot kg^{-1} \cdot min^{-1}$ was gradually increased to 0.4 $\mu g \cdot kg^{-1} \cdot min^{-1}$ to maintain systolic blood pressure >100 mmHg. The surgical procedure was completed using latex-free equipment and the silicone-based tissue expanders were secured in position. The patient was turned to the supine position and a chest roentgenogram revealed good endotracheal tube placement and clear lung fields. An arterial line was placed for invasive blood pressure monitoring. The patient was then transported to the intensive care unit with an epinephrine infusion, trachea intubated and lungs ventilated.

In the ICU, the patient remained epinephrine dependent. Septicaemia was ruled out with negative blood cultures. Echocardiographic evaluation the next day revealed left ventricular (LV) dysfunction with an ejection fraction (EF) of 35%, mild tricuspid regurgitation and mitral regurgitation. A dopamine infusion of 5 $\mu g \cdot kg^{-1} \cdot min^{-1}$ was started with 10 mg furosemide *iv* tid, and 6.25 mg captopril *po* tid. The trachea was intubated, the lungs were ventilated for 36 hr. As clinical status improved on the second postoperative day, the trachea was extubated. Pressor support was weaned and finally discontinued by the fourth postoperative day. Repeat echocardiography at that time revealed normal LV function with an EF of 63%. A few days later, the patient was discharged home receiving no medications.

The patient was seen in follow-up in the allergy clinic where allergy testing was performed using the prick method, with normal saline as a negative control and histamine as a positive control. The tests revealed strongly positive reactions to latex and to histamine with a 10 × 15 cm wheal on repeated testing and no reaction to the other intravenous agents (thiopentone, pancuronium, morphine, atracurium, cefazolin).

Discussion

This report describes our first documented episode of latex anaphylaxis in an otherwise healthy child. Traditionally, latex sensitivity has been seen in children with genitourinary anomalies with frequent exposure to latex.[6] Patients with allergic reactions to fruits, such as bananas,[7] and patients who have had extensive visceral procedures[8] also seem to be at increased risk. Patients with atopy (allergic rhinitis, asthma or atopic dermatitis) are also more likely to develop latex reactions.[9,10] This child had none of these risk factors but had undergone two subcutaneous operations, one for tissue expander placement and one for tissue expander removal. During tissue expander placement, the surgeon dissects under the dermis to create a pocket for the expander. This surgical exposure proved to be extensive enough to result in latex sensitisation in this patient.

Anaphylaxis was suspected soon after cardiovascular collapse and the diagnosis was based on the increased airway pressure, inspiratory and expiratory wheezing, decreased oxygen saturation, severe hypotension and marked urticaria. Although there was no temporal relationship between the drug administration and anaphylaxis, we considered a drug-related aetiology. However, because of our past experience, and the time course of the anaphylaxis, latex sensitisation was also suspected although not confirmed until weeks later.

The patient has since returned for removal of her tissue expanders using a latex-free general anaesthetic that was uneventful. She received our standard prophylaxis for latex allergy. This includes:

- 1 $mg \cdot kg^{-1}$ ranitidine *iv* every 12 hr × 2 doses
- 5 $mg \cdot kg^{-1}$ hydrocortisone *iv* every 6 hr × 3 doses
- 1 $mg \cdot kg^{-1}$ diphenhydramine *iv* every 6 hr × 3 doses

The last dose of each drug is given one hour before surgery. If surgery lasts for greater than four hours, repeat doses of hydrocortisone and diphenhydramine are given every four hours.

This patient represents a new category of patient in whom latex sensitisation should be suspected: patients who have undergone subcutaneous exposure to latex during past surgical procedures.[11] A detailed history of reaction to latex products such as gloves, catheters, rubber balloons or dental cofferdams is very suggestive, but not always elicited. Our patient had none. The time course of onset of anaphylaxis is often but not always seen 45 min after routine induction of anaesthesia, and within minutes of contact between exposed tissues and rubber gloves. Allergic reactions to latex may have life-threatening consequences and successful management depends upon early recognition.

Conclusion

Latex sensitivity is a well recognised cause of intraoperative anaphylaxis. To date, patients at risk have included children with myelodysplasia, genitourinary anomalies, patients requiring frequent vaginal or rectal examinations or extensive visceral procedures, sensitised health-care personnel, and rubber factory workers. A new category of patients at risk includes patients such as ours who have undergone subcutaneous exposure to latex during a past surgical procedure.

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