Latex allergy in association with tissue expansion

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RM Zucker, M Sapijaszko. Latex allergy in association with tissue expansion. Can J Plast Surg 1995;3(3):163-165. This case report outlines the sequence of events in an intraoperative anaphylactic reaction as the pockets for tissue expanders were being developed. Previous expansion had been carried out uneventfully suggesting previous sensitization. Subsequent testing revealed significant latex allergy. Latex avoidance during repeated tissue expansion is recommended.

Key Words: *Giant hairy nevi, Latex, Tissue expansion*

Allergie au latex en association avec une expansion tissulaire

RÉSUMÉ : Ce rapport de cas souligne la séquence d'événements ayant trait à une réaction anaphylactique peropératoire au moment où les poches destinées à une expansion tissulaire étaient en cours d'élaboration. Une expansion précédente avait été effectuée sans problème, ce qui suggère une sensibilisation préalable. L'épreuve subséquente a révélé une importante allergie au latex. Il est recommandé d'éviter le latex lors d'expansions tissulaires répétées.

Anaphylactic reactions during surgery are rare events. When they do occur, however, all members of the surgical team must work quickly and in concert to avert a catastrophe. Most cases can be related to drug administration. However, latex products may produce such reactions and these are being reported with increased frequency (1-11). In this case study, we report on a young girl who suffered an anaphylactic reaction at the time of tissue expander insertion. We will discuss her management as well as the factors that contributed to the problem and how such factors may be controlled in the future.

CASE REPORT

On April 19, 1993 a nine-year-old girl was admitted for insertion of tissue expanders to the back and shoulders. This was designed to expand normal skin adjacent to her giant hairy nevus and facilitate reconstruction following excision. She had previously undergone 11 surgeries, four in Hong Kong (Figure 1) and seven in Toronto (Figure 2) for this condition (Table 1). She had no known allergies and was on no medication. Her preoperative blood pressure was 110/60 mmHg and her hemoglobin was 136 g/L. All procedures noted in Table 1 were well tolerated with no systemic

complications. The histopathology of the excised tissue had consistently demonstrated a congenital intradermal hairy nevus with no evidence of malignancy.

Figure 1) *Appearance of patient upon arrival in Canada*

Figure 2) *Appearance of patient part way through reconstructive process (January 1991)*

TABLE 1: Surgical history of patient

Prior to 1990	Four surgeries in Hong Kong with excision of nevi and primary closure on excision of nevi with meshed split thickness skin grafts
13 February 1990	Excision of back nevus with skin grafting and insertion of three tissue expanders
27 April 1990	Excision of large hairy nevus and tissue expanded flap reconstruction
11 January 1991	Insertion of three tissue expanders to the back.
25 January 1991	Removal of infected tissue expander from the upper back
6 May 1991	Removal of tissue expanders from the back, partial excision of nevus from the back, rotational and advancement flaps
24 April 1992	Insertion of three tissue expanders to the back
24 July 1992	Removal of tissue expanders with rotational and advancement flaps

General anaesthesia was induced, she was placed in the prone position and cefazolin 500 mg given intravenously (iv). The incisions were outlined and infiltrated with 24.5 mL of 0.25% bupivacaine with 1:200,000 adrenaline. Sixty-six minutes after the time of induction, her oxygen saturation dropped to 93% and her airway pressures rose. With chest auscultation, widespread and severe wheezing could be heard. Her blood pressure dropped to 68 mmHg and a generalized maculopapular rash was noted, especially in the operative field (Figure 3). At that time, the large pockets of undermined skin and subcutaneous fat had been created but the tissue expanders themselves had not been removed from their sealed containers. The child was immediately resuscitated with a bolus of lactated Ringers, adrenaline and hydrocortisone. After she was stabilized, the expanders were inserted, the wounds were closed and she was transferred to the intensive care unit. She required ventilatory support and vasopressors including dopamine for just over 48 h and then was gradually weaned from these and transferred to the hospital ward on the fifth postoperative day. Once on the ward she recovered quickly and, after some preliminary investigations as to the cause of the reaction, was discharged home.

Figure 3) *Intraoperative maculopapular rash in operative site*

Two weeks later the weekly injection of the expanders began. Assuming latex to be a possible cause, all injections were carried out with a latex-free technique, ie, latex-free gloves and immediate injection of saline from the bag to the patient with no delay. Thus, saline did not stay in the syringe (the stopper has latex) for any length of time. Allergy testing was carried out which confirmed latex allergy, thus absolving any of the anaesthetic agents (Table 2). Expander inflation continued uneventfully and on July 27, 1993, surgery for removal of the expander, excision of the residual nevus and reconstruction with the expanded skin was performed. A latex free environment was used. The child was premedicated with hydrocortisone 5 mg/kg iv, q6h x 3, diphenhydramine 1 mg/kg iv q6h x 3 and ranitidine 1 mg/kg iv q12h x 2. There were no intraoperative problems. She remained on bed rest and careful observation postoperatively and was discharged home on the sixth day (Figure 4).

TABLE 2: Results of allergy testing

Substance	Concentration	Result	Concentration	Result
Histamine	-	Weal of 5x10 mm	-	-
Saline	-	Negative	-	-
Latex	-	Weal of 5x10 mm	-	-
RAST	-	Positive	-	-
Atracurium	1:100	Negative	1:1000	Negative
Morphine	1:10,000	Negative	1:1000,000	Negative
Pancuronium	1:100	Negative	1:1000	Negative
Thiopentol	1:10	Negative	1:100	Negative

RAST Radioallergosorbent test

Figure 4) *Final result after expander removal and reconstruction*

DISCUSSION

Latex or natural rubber is a product obtained from the sap of the rubber tree, *Hevea brasiliensis*. After purification, processing and the addition of certain additives, a synthetic rubber is formed that is used in the production of surgical gloves, condoms, urinary catheters, adhesives, etc. Allergy to these products may take the form of contact dermatitis (common in surgeons and anaesthetists, patients with spina bifida or others requiring frequent catheterization) or IgE mediated anaphylaxis. Our patient had no previous history of atopy and no known condition which would predispose her to latex allergy. However, she did have numerous previous surgeries. In fact, she had had 11

operations with three previous tissue expander procedures. At these times, large pockets were created beneath normal skin. Thus, tremendous areas were opened up and in contact with latex containing surgical gloves. This repeated heavy exposure was possibly instrumental in the production of her allergy. It went unrecognized until the anaphylactic reaction occurred.

Latex antigens are absorbed through mucosal membranes and possibly tissue expander capsules. They bind to human immunoglobulin (Ig)E and set the stage for the IgE-mediated hypersensitivity response seen in latex allergy. Patients at risk should be screened by simple skin tests, specific IgE antibodies or, when indicated, by specific immunological techniques (eg, radioallergosorbent test -- RAST). Precautions to latex allergy would seem wise in patients requiring multiple tissue expander procedures, such as in giant congenital hairy nevi.

Appropriate precautions should at least begin with the use of latex free surgical gloves. This has now become standard practice at our institution.

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