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Case Report

Xylometazoline nasal drops induced anaphylaxis: An atypical perioperative complication

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Abstract

Xylometazoline nasal drops used for nasal decongestion can have side-effect in the form of palpitation, hypertension, headache, and tremors. Anaphylaxis to xylometazoline nasal drops is a relatively unrecognized complication. We encountered a patient posted for tonsillectomy who developed serious anaphylaxis upon administration of a commercially available preparation of xylometazoline nasal drops and required aggressive management for stabilization. Further evaluation and literature search indicated toward the preservative (benzylalkonium chloride) as the cause of this adverse event.

Keywords: Anaphylaxis, benzylalkonium chloride, immunoglobulin E, xylometazoline nasal drops

Introduction

Nasotracheal intubation is a commonly employed technique in intraoral, maxillofacial and dental surgeries. This entails prophylactic decongestion and lubrication (lignocaine or water soluble jelly) of the nasal mucosa so as to avoid bleeding from the capillaries following abrasion of the nasal mucosa. Commonly used decongestants include cocaine, oxymetazoline, xylometazoline, phenylephrine and in some cases cotton pledgets soaked in weak adrenaline solution. Xylometazoline is an alpha-adrenergic agonist which causes vasoconstriction of the nasal mucosa. Adverse effects of xylometazoline nasal drops include tremors, palpitations, hypertension, headache and light-headedness. We report a rare case where a patient developed anaphylaxis during preparation of the nasal mucosa with xylometazoline nasal drops most probably due to the preservative used in the drops.

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Case Report

A 23-year-old, previously healthy male patient was posted for tonsillectomy. Preanesthetic history revealed no known allergies. On arrival to the theater, the following monitors were connected-noninvasive blood pressure, pulse oxymetry and electrocardiograph. Baseline readings taken and intravenous access was secured. The patient was then administered xylometazoline nasal drops in the dosage of two drops in each nostril for nasal decongestion. Within 1 min as the preparations to administer premedicants were underway, the patient started complaining of generalized itching all over the body. Rashes started appearing over the chest, upper limbs [Figure 1] and abdomen [Figure 2] and the patient became dyspneic. This was followed by hypotension (96/56 mmHg), tachycardia (135 beats/min) and fall in oxygen saturation (92% on room air). Auscultation of the chest revealed bilateral wheeze.

A presumptive diagnosis of anaphylaxis was made, and supportive measures were immediately instituted. Oxygen was administered with face mask and injection hydrocortisone

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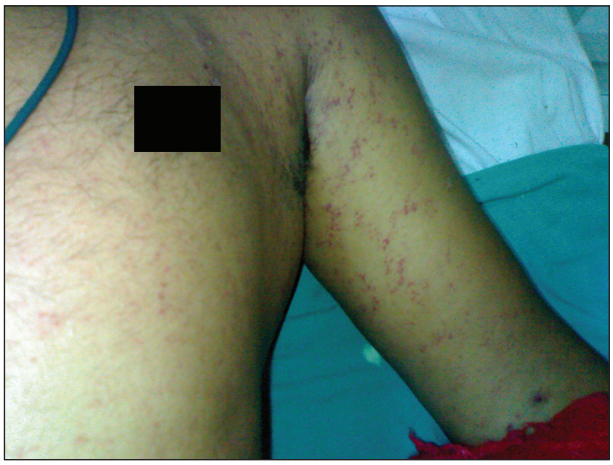

Figure 1: Rashes over chest and upper limb

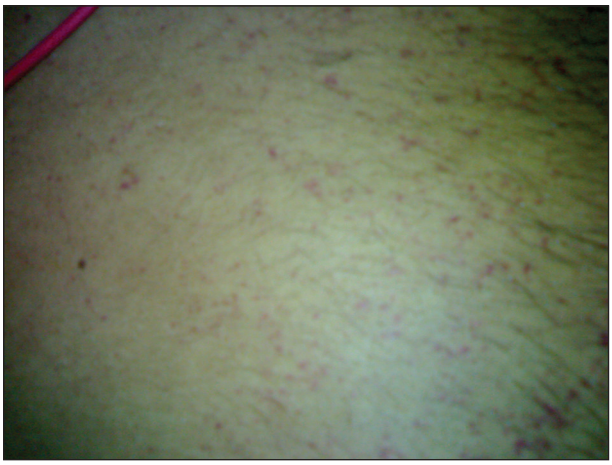

Figure 2: Rashes over the abdomen

(100 mg), injection diphenhydramine (20 mg) and injection ranitidine (50 mg) were administered intravenously. Intravenous fluid (1 L normal saline) and phenylephrine (200 mcg) were given for persistent hypotension. This was followed by intravenous bolus of epinephrine (100 mcg) and continued with epinephrine infusion 0.2 mcg/kg/min. Patient was nebulized with a solution of salbutamol and steroid (budesonide) mixture and the preparations for intubation were undertaken. However, the patient started to respond favorably to the above conservative measures and saturation improved (97–98%) on face mask. Bronchospasm was significantly relieved in the next 10 min. Thus intubation was put on hold.

Surgery was deferred and the patient was shifted to the intensive care unit (ICU). Nebulization and fluid resuscitation continued in the ICU and the patient required epinephrine infusion (0.2 mcg/kg/min) for maintenance of hemodynamics. The epinephrine infusion was gradually tapered off in the next 8 h. A close watch on the patients clinical status was maintained especially for events like airway edema or recurrence (delayed "second wave") of symptoms.[1] Samples for serum tryptase and immunoglobulin E (IgE) levels were sent from ICU and were found elevated (20 mcg/L) and within normal limits (145 IU/ml) respectively. After one day of uneventful ICU stay, the patient was shifted out to the ward. After 5 days, the patient was again posted for surgery and this time, nasal intubation was facilitated only by water based jelly and the anesthetic and perioperative course was unremarkable.

Six weeks after the event the patient was scheduled for skin testing (scratch and intradermal)[2] keeping resuscitative measures and drugs ready. A positive wheal and flare were noted with skin testing with the nasal decongestant (0.0001% solution) suggesting the presence of IgE antibodies. The patient was counseled regarding his condition and was advised to avoid drugs with similar compositions in the future.

Discussion

Anaphylaxis is a fulminant, life-threatening, unexpected IgE-mediated allergic reaction with an incidence ranging from 1 in 3500 to 1 in 20,000 anesthetics[3] and involves multiple systems (cardiovascular, cutaneous and respiratory). A wide variety of agents has been implicated in the genesis of perioperative anaphylaxis such as antibiotics, muscle relaxants, colloids, latex, opioids, contrast, local anesthetics and aprotinine.[4]

The nasal drops which we used contained xylometazoline hydrochloride (0.1%) as the active ingredient and benzalkonium chloride (BAC) (0.011%) as the preservative. BAC is a quaternary ammonium compound, which is used as a preservative and bactericidal agent in medicinal drops (ophthalmic and nasal), nebulizers, gargles and cosmetics. BAC is notorious for unfavorable effects like contact sensitivity, bronchoconstriction,[5] anaphylaxis and angioneurotic edema.[6] Literature search revealed instances where BAC used in eye drops,[4] nebulizer solutions[7] and central venous catheters[7] have triggered anaphylaxis in susceptible individuals. Anaphylaxis initiated by BAC in nasal drops has been once reported previously during a mucosal detumescence (diagnostic) procedure.[8] However in this case the presentation was relatively less dramatic and the patient did not require ICU care or ionotropic support. Other adverse effects attributed to BAC include squamous metaplasia[8] aggravation of rhinitis medicamentosa, inhibition of neutrophil function[10] and ciliary toxicity.[11]

Anaphylaxis involves the binding of the allergen to the IgE present on the surface of the mast cells and basophils aided by receptor cross linkages. Ensuing cellular activation leads to release of vasoactive mediators such as histamine, leukotrienes, kinins and eosinophils which mediate bronchoconstriction, vasodilatation and increased capillary permeability. Sensitization caused by

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BAC is mediated commonly by TH2 lymphocytes which increases IgE and IgG1 in blood.[12] Nevertheless nonspecific histamine release from mast cells by surface activation is another presumed mechanism of this phenomenon.[4] In our case, based on the temporal clinical association of the event along with a positive skin test and elevated levels of serum tryptase, we concluded that the event was an anaphylactic reaction to the nasal drop preparation. Tryptase, a protease secreted by mast cells can be used as a marker of immune activation. A raised serum tryptase level signifies anaphylaxis even though a normal level does not excludes the diagnosis. Moreover, it cannot differentiate between anaphylaxis and anaphylactoid reactions.[13,14] A normal IgG level in the patient indicated an absence of atopy. The diagnosis could have been concretely established with additional investigations like radioallergosorbent test [6] and basophil stimulation test and lymphocyte transformation test.[8] However, due to the technical limitations of our institution they could not be performed. Identifying antibodies (total IgE and specific IgE) is done for diagnosis of allergy. However, this method is not feasible in case of BAC as specific IgE to BAC is not available.[8]

In spite of its rarity perioperative anaphylaxis caused by BAC in nasal drops remains a potential possibility. Anesthesiologists should, therefore, be aware of this probable complication and should enquire regarding allergy to similar drugs and preparations during the preoperative assessment. As a safe dose of BAC for skin testing has not been established, in cases with a high propensity to develop anaphylaxis preservative, or additive free nasal drops should be used.

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Conflict of interest

There are no conflicts of interest.

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