

Prolonged Cardiovascular Collapse Due to Unrecognized Latex Anaphylaxis

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We present a case of a prolonged anaphylactic reaction that occurred in temporal relationship to the administration of cefazolin. Subsequent allergy testing was positive for latex and negative for cefazolin—both unexpected results. Our case illustrates that medications administered before the onset of anaphylaxis should not be assumed to be the causative allergen and that a

latex allergy should be considered in the differential diagnosis. Because the etiology of an anaphylactic reaction cannot be immediately determined, patients experiencing intraoperative cardiovascular collapse should be treated in a latex-free environment.

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Sudden onset of hypotension during anesthesia may have numerous etiologies. However, drug hypersensitivity and allergic reactions must always be considered in the differential diagnosis. Latex is the second most common cause of intraoperative anaphylaxis, preceded only by muscle relaxants. Additional culprits include antibiotics and anesthesia induction drugs (1,2). The diagnosis of anaphylaxis during anesthesia may be difficult, because clinical manifestations often differ from those in nonanesthetized patients—namely, cutaneous and respiratory manifestations are less common during general anesthesia. Several reports have illustrated that when intraoperative cardiovascular collapse is the presenting sign, the diagnosis of anaphylaxis may be difficult. Obenhaus (3) described anaphylaxis to latex in a patient who experienced severe hypotension that was initially attributed to either aortocaval compression or the acute release of histamine and intestinal prostacyclin during mesenteric traction (4). Another report described a life-threatening anaphylaxis that was initially attributed to bupivacaine toxicity but was later confirmed to be latex anaphylaxis (5). Therefore, there is a possibility that a patient may develop anaphylaxis during the administration of one medication but another substance is in fact the responsible offender. Our

patient developed latex anaphylaxis, which manifested during the administration of cefazolin. However, our assumption that the causative allergen was the last medication administered before the onset of anaphylaxis (i.e., cefazolin) was erroneous. Latex sensitivity must always be considered a “silent culprit.”

Case Report

A 60-yr-old woman (152 cm tall; 62-kg weight) with a 17-yr history of rheumatoid arthritis and upper-extremity deformities was admitted for elbow arthroplasty revision. The initial surgery was performed 8 yr earlier under general anesthesia without complications. Pertinent medications included hydroxychloroquine 200 mg daily and albuterol 4 mg daily by mouth. She had a history of bronchial asthma, but her preoperative spirometry was normal. She had seasonal allergic rhinitis secondary to ragweed, dust, and pollen. Her drug allergies or intolerances included morphine, hydromorphone, and indomethacin (pruritus and rash), as well as povidone-iodine (rash). Previous surgeries included numerous uneventful orthopedic procedures (several hip and knee arthroplasties), as well as the removal of an infected elbow prosthesis 5 mo previously.

Preoperative vital signs included an arterial blood pressure of 122/78 mm Hg and a heart rate of 114 bpm. After noninvasive monitors were applied, general anesthesia was induced with IV propofol 120 mg, lidocaine 60 mg, succinylcholine 120 mg, and fentanyl 250 µg. A mixture of isoflurane and N₂O/oxygen was administered for maintenance. After recovery from the succinylcholine, vecuronium 6 mg was given IV. Her arterial blood pressure remained at 100/60 mm Hg and her heart rate at 120 bpm. The patient was placed into the lateral decubitus position. No urinary catheter was placed. Approximately 15 min after endotracheal intubation, cefazolin was administered via continuous infusion. Ten minutes later, and just minutes after the initiation

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of surgery, arterial blood pressure decreased precipitously to 50/30 mm Hg, oxyhemoglobin saturation (SpO_2) decreased to 81%, heart rate increased to 140 bpm, and peak inspiratory pressure increased to 60 cm H_2O . Lung auscultation revealed diffuse wheezing, and end-tidal CO_2 decreased acutely to 18 mm Hg. Volatile anesthetics were immediately discontinued, and the lungs were ventilated with 100% oxygen. Midazolam 2 mg was administered in an attempt to prevent recall. The cefazolin infusion was discontinued because an allergic reaction to cefazolin was suspected, and the surgical team was asked to expedite closure. Because the heart rate was 150 bpm, phenylephrine (200 μg) was chosen as a first drug to restore perfusion and avoid a further increase in heart rate. This was followed by IV methylprednisolone 40 mg, diphenhydramine 50 mg, and ephedrine 20 mg. Resuscitation efforts continued with IV fluids, phenylephrine (total 2.2 mg), and ephedrine (total 120 mg). Secondary to profound tachycardia and questionable ST segment depression, epinephrine was deferred. During the resuscitative efforts, we unsuccessfully attempted to insert a radial arterial catheter. After surgical wound closure and removal of the drapes, a diffuse rash/urticaria was noticed. A right internal jugular central line was placed, and the initial central venous pressure was 3 mm Hg. A left femoral arterial line was subsequently placed with some difficulty. Throughout the resuscitative efforts, all anesthesia care providers continued to wear latex gloves. During this period, the systolic arterial blood pressure was 75–80 mm Hg, and the heart rate was 140–150 bpm. Wheezing persisted but ultimately resolved with repeated albuterol treatments. The SpO_2 increased to 98%.

Twenty minutes after the completion of line placement, the arterial blood pressure stabilized to 112/50 mm Hg, with a heart rate of 120 beats/min. Serum tryptase and histamine levels were drawn before transfer to the intensive care unit (ICU). Serum tryptase was 36.9 ng/mL (reference <11.5 ng/mL), whereas plasma histamine levels were negative. Her trachea was extubated later that day, and no additional vasopressors were required during her ICU stay. She was discharged home on postoperative Day 3 without neurologic or cardiac sequelae. Two months later, the patient was evaluated by an allergist. She demonstrated a strongly positive skin wheal and flare reaction to latex allergens. Skin testing results for penicillin, cephalosporins, succinylcholine, lidocaine, and vecuronium were all negative.

Discussion

We present a case of a prolonged anaphylactic reaction in an atopic individual that occurred in temporal relation to the administration of cefazolin. However, subsequent allergen testing yielded positive results to latex only. The patient's heart rate before the induction of anesthesia was 114 bpm, which was initially attributed to anxiety. In retrospect, this tachycardia may have been a preliminary sign of histamine release in a patient who was treated in a latex environment. The classic triad of cardiovascular collapse, wheezing, and skin rash allowed an immediate diagnosis of anaphylaxis. However, the offending allergen was erroneously assumed to be cefazolin. The concurrent administration of cefazolin with the onset of anaphylaxis

made this antibiotic a prime suspect in the cause of hemodynamic instability. Interestingly, this assumption was made despite the fact that other medications—namely, vecuronium, propofol, and fentanyl—were also administered and preceded the hypotensive event. Our case clearly illustrates that attributing anaphylaxis to the most recently administered medication may be incorrect.

Several risk factors have been identified that place patients at increased risk for latex sensitivity. For example, patients with a genetic predisposition, those with frequent exposures to latex (i.e., patients who require chronic bladder catheterization), health care workers, and patients who have undergone multiple surgical procedures may be at increased risk (2). In the pediatric population, those with spina bifida or congenital urologic abnormalities (6,7) are at highest risk for allergic latex reactions. Occasionally, severe latex anaphylactic reactions during anesthesia may occur without obvious risk factors (8). In addition, the reverse scenario has also been known to occur. For example, McCormack et al. (9) reported a patient with meningocele—a condition at increased risk for latex anaphylaxis—who experienced intraoperative hemodynamic collapse. The patient was assumed to be experiencing latex anaphylaxis because of her “disease marker.” However, subsequent testing demonstrated that the cause of anaphylaxis was the vecuronium used during anesthetic induction. Finally, simultaneous anaphylaxis to several allergens may be rarely encountered. Goeters et al. (10) described an anaphylactic reaction in a child after anesthetic induction caused by the combined allergens of latex and ethylene oxide. All these reports, as well as our own, illustrate the need to consider numerous antigens when evaluating the etiology of intraoperative anaphylaxis. Rarely, a hypersensitivity reaction may be occurring to more than one substance. Unfortunately, the primary allergen may not always be readily identified.

In our case, we did not suspect latex anaphylaxis. The patient had been exposed to latex in the past without difficulty, and anaphylaxis occurred in temporal relation to antibiotic administration. As a result, the patient was unintentionally exposed to the offending allergen for an extended period of time (resuscitation, surgical wound closure, and invasive line placements), resulting in protracted hemodynamic instability. In a case similar to our own, Hodgson and Andersen (11) described a prolonged intraoperative resuscitation of an 8-year-old girl with unsuspected latex allergy. This patient, like ours, was continuously exposed to latex allergen during resuscitation, which likely contributed to her extended hemodynamic instability. These cases both illustrate the importance of

converting to a latex-free environment during the resuscitation of patients with sudden intraoperative cardiovascular collapse of unknown etiology. Latex must always be considered as a potential culprit—even in patients without obvious risk factors or when other medications are administered in temporal relation to the event.

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