References


Intraoperative Anaphylactic Shock from Bacitracin Nasal Packing after Septorhinoplasty

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ANAPHYLAXIS is a life-threatening immunologically mediated reaction related to the administration of a sub-
stance that causes mast cell degranulation. We report a case of life-threatening anaphylaxis after topical application of bacitracin to the nasal mucosa at the conclusion of an anesthetic.

Case Report

A 48-year-old man with a history of traumatic nasal deformity and nasal obstruction was scheduled to undergo septorhinoplasty as a same-day admission. He had a history of hypertension but had not taken his prescribed dose of hydrochlorothiazide the morning of surgery. He was otherwise healthy, reported no allergies, and weighed 98 kg.

In the operating room, electrocardiogram, pulse oximetry, and non invasive blood pressure monitoring were established. Midazolam 2 mg was administered intravenously, and induction proceeded with propofol 200 mg, sufentanil 25 µg, rocuronium 4 mg, and succinylcholine 130 mg. Anesthesia was maintained with isoflurane and nitrous oxide.

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during controlled ventilation. Cefazolin 1 g was administered intra- 

The septorhinoplasty proceeded uneventfully over the next 85 min. 

No foreign graft material was used intraoperatively. As the procedure finished, isoflurane was stopped with continued administration of 70% nitrous oxide and 30% oxygen. The patient's right nostril was packed with 6 ft of Vaseline gauze (Sherwood Medical, St. Louis, MO) placed within the finger of a latex glove coated with bacitracin ointment. Within seconds of insertion of the nasal packing, oxygen saturation decreased from 97% to 94%. No change in ventilator pressure was noted, and auscultation revealed equal bilateral breath sounds with no adventitia. Nitrous oxide was stopped, and 100% oxygen was administered. The arterial oxygen saturation increased to 97%. Blood pressure and heart rate were unchanged. The left nostril was then packed, and the arterial oxygen saturation again decreased, this time to 89%, and then no pulse wave registered. The electrocardiogram showed a heart rate of 39 beats/min with a first-degree atrioventricular block, and blood pressure could not be obtained by the noninvasive monitoring. The airway and respiratory system were re-examined, and 0.6 mg atropine was administered intravenously. Heart rate remained at 39 beats/min, but no pulse could be palpated. Chest compressions were started, and 1 mg epinephrine was administered intravenously.

As additional staff arrived in the operating room, 2 l normal saline was administered. Chest compressions were discontinued within 60 s of epinephrine administration, and the heart rate increased to 160 beats/min with marked ST segment depression on the electrocardiogram monitor. Blood pressure increased initially but began to decrease again. Arterial and central venous pressure lines were placed, and volume resuscitation was continued.

The use of a latex glove as part of the packing material resulted in concern about latex allergy. The nasal packing was promptly removed and all operating-room staff adopted latex precautions. Diphenhydramine, ranitidine, and hydrocortisone were administered. A transesophageal echocardiogram was performed while the patient was undergoing volume resuscitation and epinephrine infusion. The echocardiogram showed no regional wall motion abnormalities, an estimated ejection fraction in excess of 70%, and reduced end diastolic volume.

After administration of 5.5 l crystalloid, 1,000 ml pentaspan, and a low-dose epinephrine infusion, the patient stabilized. He had a diffuse red rash and marked facial edema. His airway pressure was elevated, but no wheeze was audible. He received salbutamol via a metered dose inhaler. He started to awaken and received additional doses of salbutamol, propofol, and low-dose isoflurane to allow mechanical ventilation. He was transferred to the intensive care unit.

In the intensive care unit, the patient awoke and was neurologically intact. He remained intubated for 2 days because of concerns about facial and upper airway edema. Repeat neurologic examinations were within normal limits, and serial electrocardiogram and cardiac enzymes showed no evidence of myocardial infarction. He was evaluated in consultation by the allergy service and was discharged from the hospital with arrangements to be monitored by the Allergy and Clinical Immunology Service as an outpatient.

At follow-up evaluation, the patient gave a history of an episode 2-3 weeks before surgery of irritation and swelling after nasal application of Polysporin ointment (polymyxin B sulfate and bacitracin; Glaxo Wellcome, Research Triangle Park, NC). This reaction resolved when the ointment was removed. Epicutaneous skin prick testing was conducted on the arm. A negative isotonic saline diluent control was used along with a positive control containing 1 mg/ml histamine. A small amount of 500 United States Pharmacopeia/gram bacitracin (Glaxo Laboratories) in white petroleum and mineral oil was placed on the skin, and the skin was pricked through the drops. Reactions were measured at 10-12 min. A positive response was a wheal 3 mm greater than saline control. The patient developed an 8 x 5 mm wheal with flare to the bacitracin, but did not react to latex, polymyxin, cefazolin, or saline control. Latex testing was performed using a 60% aqueous preparation of raw ammoniated latex (Benecard Laboratories, Mississauga, Ontario, Canada). Results of subsequent prick tests with bacitracin in six healthy volunteers were negative, excluding an irritant effect or direct histamine release with bacitracin. Based on the history and results of skin testing, bacitracin was believed to be the cause of the patient's anaphylaxis.

Discussion

This case emphasizes that life-threatening anaphylactic reactions can occur anytime during an operation, and that attention must be paid to the substances surgeons administer when dressing wounds. Case reports of anaphylaxis to bacitracin first appeared in 1967,1 and there have been several similar reports.2-11 A common mechanism in the case reports is application of bacitracin to areas of damaged skin or mucosa. Despite reports in the literature, few anesthesiologists are aware of the possibility of anaphylaxis with topical bacitracin. There are two case reports of intraoperative anaphylaxis from bacitracin. The first was reported in 1987 after bacitracin was used in an irrigating solution during lumbar laminectomy.6 The second was reported in 1990 during a nephrectomy when the peritoneal cavity was irrigated with 2 l bacitracin-containing solution before fascial closure.6 Both cases required cardiopulmonary resuscitation and the administration of vasoactive drugs and volume. No allergy testing was conducted in either of these cases. Our case occurred at the end of a surgical procedure, when anesthetic agents had been discontinued, and was triggered by bacitracin ointment in the surgical dressing. This has not been reported previously, and our case represents the first of intraoperative anaphylaxis to bacitracin documented with allergy testing.

Bacitracin is widely used in operating rooms. In our institution, bacitracin is used to soak implants (penile prosthesis, ventriculoperitoneal shunts) before insertion and to irrigate compound fractures, and is used routinely during laminectomy by one neurosurgeon. Topical bacitracin is used after septorhinoplasty and is applied to surgical incisions after head and neck surgery. This widespread use is occurring with little supporting clinical data. Recent data indicate that bacitrac-
cin is the seventh most common chemical that causes contact dermatitis and suggest that a fivefold increase in the odds of observing a positive result for a patch test to bacitracin has occurred over the 1985–1994 period. A randomized controlled trial comparing white petroleum ointment to bacitracin ointment after dermatologic surgery found that white petroleum was a safe effective wound-care ointment that possesses minimal potential for selection of resistant organisms, no risk of local or systemic allergic reactions, and impressively lower costs.

There have been suggestions that patients previously exposed to bacitracin wound irrigation should not be re-exposed. Given the current widespread use of bacitracin in operating rooms, this is difficult to accomplish because information about previous exposure is often not available. Because both systemic and local allergic reactions to bacitracin have been documented, physicians using bacitracin should consider the risk/benefit ratio of routine use. Physicians should definitely consider alternatives if bacitracin is to be applied to wounds, mucosal surfaces, or abnormal skin; all reported cases of cardiac arrest associated with bacitracin allergy have occurred in these circumstances. In addition to a reduction in allergic reactions, Smack et al. speculated that substituting white petroleum jelly for bacitracin in post-surgical wound care could result in cost savings in the order of hundreds of millions of dollars annually in the United States.

In summary, we report a case of severe anaphylaxis during emergence from anesthesia triggered by the application of bacitracin to the nasal mucosa. Although this is an uncommon reaction, we suggest that the widespread use of bacitracin ointment should be reconsidered and appropriate clinical trials performed to see if this substance is beneficial.

References