Anesthesia Quality Institute®
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Anesthesia Incident Reporting System (AIRS)

Case 2023-07: There's Food in the Operating Room?

A 10-year-old boy with a complex past medical history notable for neonatal stroke resulting in cortical blindness, tracheo-esophageal fistula that was repaired in infancy, and ASD/VSD repair requiring subsequent pacemaker placement and pacemaker dependence presented for iliac bone graft for correction of an alveolar maxillary cleft defect. Preoperatively, the pacemaker was converted to an asynchronous mode. During the procedure, the patient suddenly coughed with resulting desaturation and increased peak airway pressures followed by the development of profound hypotension. An intraoperative echocardiogram showed normal biventricular function, and pacemaker capture was confirmed. Treatment was started for presumed anaphylaxis despite an unclear inciting agent. After treatment with multiple vasopressors (which included early treatment with epinephrine), famotidine, steroid, diphenhydramine, and albuterol, the patient remained profoundly hypotensive. Ultimately, the Gelfoam® that had been placed in the iliac wound was considered the most likely candidate. The surgeon reopened the incision, applied copious irrigation, and removed it. Within a few hours after transport to the pediatric intensive care unit, the patient became hemodynamically stable, and he was extubated the following day. Detailed interview with the patient and his family afterward revealed that he had a history of "mouth tingling" when eating certain gummy candies. Further workup with allergy confirmed elevated intraoperative tryptase level, elevated porcine gelatin IgE, and positive skin prick test for porcine gelatin.

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Discussion

Topical hemostatic agents, such as Floseal®, SURGIFLO®, Gelfoam®, and GEL-FLOW® NT, are widely used to achieve hemostasis in surgical procedures. Allergic reactions to porcine and bovine gelatin have been extensively documented in the medical literature but mostly in relation to food and vaccine ingredients (*J Allergy Clin Immunol* 1999;103:321-5; *J Allergy Clin Immunol* 1996;98:1058-61). For this case, none of the perioperative team involved were aware of the presence of porcine gelatin in Gelfoam.

Perioperative anaphylaxis is an uncommon but potentially life-threatening complication that can occur under anesthesia. Type I hypersensitivity reactions are caused by IgE-mediated release of antibodies that cause mast cell degranulation, histamine release, and activate other inflammatory pathways (Type I Hypersensitivity Reaction. 2023). With type I hypersensitivity, an individual is asymptomatic on first exposure to an antigen. This patient had a prior dental procedure under anesthesia during which the dentist used Gelfoam to assist with hemostasis. On subsequent exposure, the anaphylactic reaction can occur within minutes, as it did in this case.

A 2021 review found 21 documented cases of intraoperative anaphylaxis with gelatin-containing hemostatic agents (*ANZ J Surg* 2021;91:2002-7). In the perioperative space, multiple drugs and chemicals are given to a patient in a short time frame, and it can be difficult to identify a single culprit as responsible for an anaphylactic reaction. This places patients at high risk for re-exposure and harm during a subsequent surgery. Moreover, when the culprit is a substance that remains in the body, then the anaphylactic reaction can continue until the substance is removed. Severe anaphylactic reactions to latex Foley catheters, for example, necessitate prompt removal of the catheter. Once anaphylaxis is suspected, early treatment with epinephrine is critical. Note that despite early treatment with epinephrine and the addition of other vasopressors, the patient remained hemodynamically unstable. It is likely not coincidence that this patient's hemodynamic status improved significantly once the gelatin-based agent was removed from the patient.

Topical hemostatic agents are widely used in many surgical operations and may even be preferred in situations where electrocautery or sutures may not be ideal or safe. However, alternative non-gelatin-containing hemostatic agents should be used in patients with allergy to gelatin. Some alternatives are fibrin sealants composed of human fibrinogen and thrombin (such as Evicel®), gelatin-free hemostatic agents composed of oxidized regenerated cellulose (such as Surgicel™), and cyanoacrylate adhesives (such as Dermabond®) (*ANZ J Surg* 2021;91:2002-7). Patients with allergies to red meat can have alpha-gal syndrome and potentially develop anaphylaxis to gelatin-containing products (*ANZ J Surg* 2021;91:2002-7). Unfortunately, most perioperative staff are unaware of the gelatin content in surgical hemostatic agents. Institutions and electronic medical record vendors should consider modifications to allergy alerts to better capture these hidden sources of known allergens in the procedural areas. ■

This entry was written by Dr. Patrick Guffey on behalf of the AIRS Committee. The committee thanks Dr. Young May Cha for her assistance in producing this case report.

Each month, the AQI-AIRS Steering Committee abstracts a patient history submitted to AIRS and authors a discussion of the safety and human factors challenges involved. Absence of commentary should not be construed as agreement with the clinical decisions described. Reader feedback can be sent to **airs@asahq.org**. Report incidents or download the AIRS mobile app at **www.aqiairs.org.**