Latex-Induced Anaphylactic Reaction in a Patient Undergoing Open Appendectomy. Case Report

Jean Abreu Machado, TSA 1, Romilton Crozetta da Cunha 2, Benhur Heleno de Oliveira 3, Jane da Silva 4


Background and objective: Despite the increase of latex allergy in general population, severe anaphylactic events during some surgical procedures are still rare; however, they are associated with increased morbidity and mortality. Prevention, diagnosis, treatment, and follow-up of patients affected by this event represent a challenge for anesthesiologists. The objective of this report was to describe a case of severe latex-induced anaphylactic reaction and discuss its diagnosis and treatment.

Case report: This is a 39-year-old Caucasian female patient, with a diagnostic suspicion of appendicitis, who underwent an emergency surgery under spinal anesthesia. Approximately 30 minutes after beginning the surgery, the patient developed an anaphylactic reaction with cardiorespiratory arrest, which was reversed after treatment. Possible causative agents were isolated and, posteriorly, the patient was transferred to the intensive care unit, evolving without sequelae. Latex-specific IgE-RAST (Radioallergosorbent Test) was positive. The patient was referred to an allergist for follow-up.

Conclusions: Anesthesiologists should focus on patient's history, even in urgent procedures, being aware of the limitations arising on these situations. The prognosis of anaphylaxis depends on prompt initiation of adequate treatment; diagnosis is not limited to the event occasion, but to the determination of the causative factor. Creating the means of following-up these patients, similar to other international centers, seems to be the example to be followed.

Keywords: Latex Hypersensitivity; Radioallergosorbent Test; Anesthesia, Spinal; Appendectomy; Heart Arrest.
LATEX-INDUCED ANAPHYLACTIC REACTION IN A PATIENT UNDERGOING OPEN APPENDECTOMY. CASE REPORT

The patient was referred to an allergist for follow-up and differential diagnosis with a complete list of medications and substances used during the anesthesia/surgery. One of the late findings was worsening of symptoms when in daily contact with latex, especially bronchospasm and urticaria. In addition to verbal explanations, she was given a report of her hospitalization with details of what had happened and a medical information card about her clinical condition to be carried along with her documents, in case of an emergency.

DISCUSSION

In the case presented here, as it was an emergency surgery, the anamnesis was performed by the anesthesiologist on his first contact with the patient in the operating room. This is not the ideal environment for a clinical investigation. The anesthesiologist should be as clear as possible when questioning patients about their health. Factors, such as stress, pain, or communication difficulties may hide relevant factors. Data from admission are often enough to provide information about the patient’s occupation, therefore alerting the physician to a possible risk group.

The clinical manifestations of latex exposure range from contact dermatitis, which is not mediated by the immune system, to late hypersensitivity reaction type IV mediated by T cells and immediate hypersensitivity reaction type I, also known as anaphylactic or IgE-mediated reaction 3.

Regarding the degree of severity, type I reactions can be divided into: I) cutaneous-mucous signs; II) moderate multi-visceral signs; III) life-threatening with mono- or multi-visceral signs; IV) cardiorespiratory arrest; V) death due to inadequate response to cardiorespiratory resuscitation maneuvers 6.

The patient described here, according to the classification of severity, was initially stage III, but she rapidly evolved to stage IV.

As mentioned before, peculiarities of patient who will undergo surgical procedures may mask initial cutaneous signs, which are not always present. This is the main challenge for the medical team when facing an anaphylactic reaction, in which an institution of effective treatment as soon as possible determines a reduction of morbimortality of these patients.

Using the case presented here as an example, based on the initial treatment, the first clinical suspicion was not anaphylaxis. More common complications inherent to the anesthetic technique or patient, such as extensive sympathetic blockade and bronchospasm, among others, are part of the differential diagnosis 9 and are the first diagnostic option, delaying the treatment of anaphylaxis. Measures to reduce the time between the development of signs and symptoms of a complication and the adequate management should be adopted. Suspecting of an incorrect diagnosis whenever the proposed treatment is unsuccessful and remaining alert throughout the process is important for a favorable outcome.

Even with a strong suspicion of a specific etiological factor, i.e., a substance that had caused it during the anesthetic/surgical procedure, achieving an early conclusion may induce
treatment errors. A good example would be imputing blame to antibiotic, therefore neglecting others, such as latex, local anesthetics, and neuromuscular blockers, among others, hindering the adequate conduction of the case, as discussed below.

Epinephrine and fluid resuscitation seem to be the cornerstone in treatment of anaphylaxis, especially in grades of severity III and IV. The following steps should be applied as soon as possible:

(a) discontinue, whenever possible, all substances suspected to be the etiological factor;
(b) maintain airway with 100% oxygen;
(c) discontinue anesthetic drugs when the event occurs during induction;
(d) administer epinephrine as soon as possible (grade III–IV reactions);
(e) call for help;
(f) place the patient in Trendelenburg position;
(g) whenever possible, abbreviate the surgical procedure.

Due to its α-agonist action, epinephrine reverses vasodilation and edema, while its β-agonist action dilates airway, increases myocardial contraction, and suppresses the release of inflammatory mediators. In adults, mild to moderate reactions usually respond to doses of 0.01–0.05 mg IV. In extreme cases, there may be a need for up to 5 mg in one hour. Patients who need repeated doses can benefit from continuous infusion. In refractory cases, one might consider the administration of vasopressin. Patients on β-blockers might require the administration of glucagon, which might have been an alternative for the case presented here, as it was evident that the patient (who was on atenolol) showed a poor response to epinephrine and required continuous infusion of this drug.

Regarding the administration of fluids, infusion of more than 20 mL·kg⁻¹ might be necessary due to the loss from the intravascular to the interstitial space and, although both crystalloids and colloids can be used, there is no evidence that the second is better than the first one. Considering that colloids can cause anaphylaxis, it would be prudent to avoid them. Corticoids and anti-histamines have a secondary role in the treatment of anaphylaxis, helping to prevent edema, cutaneous symptoms, and recurrence of reaction up to 24 hours later.

The etiological diagnosis of anaphylaxis is based on three distinct points that include clinical, biological, and allergic evidence.

The clinical evidence in the case presented here was bronchospasm, hypotension, tachycardia, and cardiorespiratory arrest. Patients with clinical severity grade between II and IV should undergo further investigation. Historical findings, when present, are important markers of latex-related complications. A history of atopy when handling rubber-containing products and food allergies, such as nuts, tomatoes, kiwi, banana, mango, avocado, among others, may show cross-reaction with latex. Furthermore, patients with a history of prolonged exposure to latex, such as children with myelomeningocele, lumbo-sacral agenesis, congenital bladder alterations, orthopedic disorders secondary to trauma, spina bifida, and multiple surgeries are also at risk.

In general, when we take into consideration the associated symptoms of latex contact in health care professionals, we can find prevalence above 17%. Approximately 70% of latex adverse events reported to the Food and Drug Administration (FDA) involve these professionals.

Biological evidence of latex proteins can be accessed by non-specific serological tests, such as tryptase, and specific, such as IgE antibodies. In the case of tryptase, a natural proteolytic enzyme found almost exclusively in mastocytes, along with histamine, are markers that reveal mastocytes activation. The ideal moment for collection of serum tryptase is from 1 to 4 hours after the allergic reaction onset. A control sample should be measured in the preoperative period or, at least, 24 hours after the allergic reaction onset. Increased serum levels, compared to control, is a highly sensitive indicator of anaphylactic reaction during anesthesia, but patients without increased levels with suggestive clinical presentation require investigation of a possible false negative. If the value of serum tryptase in control is higher than the reference, investigations should take into account the possibility of mastocytosis. Specific IgE antibodies against latex can be investigated through RAST (radioallergosorbent test) or CAP (fluoroimmunoassay – System, Phadia AB, Uppsala, Sweden). The ideal window for its determination ranges from the reaction onset up to six months later.

Follow-up of patients with allergic evidence completes the investigation regarding IgE-mediated anaphylaxis. It is important to make the differential diagnosis among the substances that have no specific biological tests, since anesthetized patients rarely come into contact with only one substance or drug. The tests used for this purpose include: cutaneous tests (prick and intradermal tests); basophilic sensitization test; and direct provocation with the drug.

Follow-up of patients is aimed at confirming the cause and to give the etiological diagnosis for future procedures. A patient who had an anaphylaxis should leave with documentation of what occurred. There is a great possibility of him/her getting in touch with the etiological factor in the future. In the case of latex, the possibility of a new contact includes a new surgical procedure, contact with rubber in an odontological or medical office, and individual protection material in his/her own house or job.

Some countries like Scandinavia, Great Britain, France, and Australia already have follow-up of cases occurring during anesthetic/surgical procedures through specific diagnostic guidelines that are aimed at improving detection practices of these cases. Implanting the same procedure in our country would most certainly bring a significant epidemiologic contribution because the cases still are rare and under notified, although increasingly in frequency. Furthermore, the direct benefit to institutions by reducing costs with complications would be a tool for anesthesiologists, being a guide for these cases management and, finally, to all of us, contributing to the main objective of guaranteeing patient safety.
El anestesiólogo debe concentrar sus esfuerzos en la anamnesis, aunque en los procedimientos de urgencia, sea consciente de las limitaciones que se presentan en esas ocasiones. El pronóstico de anafilaxia depende del rápido inicio del tratamiento adecuado, y el diagnóstico no se restringe al momento del evento, sino a la determinación del factor causal. Crear un medio de seguimiento para esos pacientes, como lo hacen otros centros internacionales, parece ser el camino que debe ser seguido.

Descriptores: ANESTESIA: Regional, raquianestesia; CIRUGÍA: Abdominal; COMPLICACIONES, Alergia, Parada cardiorespiratoria.