Brazilian Journal of Anesthesiology 71 (2021) 76–78

Sociedade Brasileira de Anestesiologia

Brazilian Journal of ANESTHESIOLOGY

CASE REPORTS

Latex anaphylaxis in a recipient child during kidney transplant performed in a latex-free environment: case report☆

Magda Lourenço Fernandes [a,b,*], **Daniel Werneck Pessoa** [a], **Isadora Del'Asta** [a], **Mirella Pereira Oliveira** [a], **Lúcio Lourenço Moreira** [c]

[a] *Santa Casa de Belo Horizonte, Belo Horizonte, MG, Brazil*
[b] *Universidade Federal de Minas Gerais (UFMG), Hospital das Clínicas, Belo Horizonte, MG, Brazil*
[c] *Hospital Governador Israel Pinheiro (IPSEMG), Belo Horizonte, MG, Brazil*

Received 2 October 2019; accepted 18 October 2020
Available online 28 December 2020

KEYWORDS
Hypersensitivity to latex;
Anaphylaxis;
Kidney transplantation;
Organ donor;
Case report

Abstract Latex responds for most allergic reactions in children, and repeated exposure to the agent is the main cause of sensitization. We report the case of a child allergic to latex who developed anaphylaxis during kidney transplantation performed in a latex-free environment. After immediate treatment with epinephrine the patient gradually improved. Subsequent investigation revealed that kidney harvesting was performed without latex allergy precautions, suggesting graft contamination by the antigen. We conclude that, for preventing this type of anaphylaxis, it is essential to implement latex-free procedures during donor organ harvesting.

Introduction and objectives

Latex represents the leading cause of anaphylaxis in the pediatric population, and repeated exposure to latex products is the main cause of sensitization to this antigen.[1] Therefore a past medical history with multiple procedures, such as of patients with urological malformations, is more prone to present this condition. Latex sensitization refers to the presence of circulating IgE antibodies against latex, while allergy refers to any immune-mediated reaction to latex.[2] In sensitized patients, a latex-free environment is mandatory at all steps of perioperative management. Even though it seems obvious that for patients being submitted to transplant surgery, this tenet should also be extended to the donor, there is little information highlighting the importance of this routine, which now and then is overlooked. The present report aims

☆ Institution: Santa Casa de Belo Horizonte.
* Corresponding author.
E-mail: fernandesmagda@yahoo.com.br (M.L. Fernandes).

https://doi.org/10.1016/j.bjane.2020.12.010

to discuss the management of a kidney transplant recipient with a past medical history of latex allergy and the implications for donor management considering this aspect.

Case report

The patient was a male, eight-year old, 28 kg, with chronic renal failure secondary to obstructive nephropathy due to posterior urethral valve with bilateral vesicoureteral reflux. Past medical history revealed continuing moderate bronchial asthma, several urinary tract surgical procedures, and during a previous surgery, an episode of severe allergic latex-related reaction as revealed by a positive test performed at the time. The child was admitted to our hospital to be submitted to a deceased-donor kidney transplant. The operating room was prepared abiding latex allergy precautions. The patient was monitored with electrocardiography, capnography and gas analyzer, pulse oximetry, invasive arterial pressure, and central venous pressure. Then, 1 g of cefazolin was administered, and anesthetic induction was performed with 75 μg of fentanyl, 4.2 mg of cisatracurium and sevoflurane. Anesthesia was maintained with sevoflurane inhalation and no other anesthetic or adjuvant drug was administered. Anesthesia progressed with patient showing no respiratory changes and with hemodynamic stability, with mean blood pressure kept around 75 mmHg, and heart rate around 90 beats per minute just to the beginning of the kidney graft implant. During vascular anastomosis, a low dose of norepinephrine (0.05 $\mu g^{-1}. kg^{-1}. min^{-1}$) was initiated to ensure higher blood pressure levels during graft reperfusion. Roughly five minutes after transplanted kidney reperfusion, the patient developed severe bronchospasm, low peripheral oxygen saturation, rhonchi and wheezing on pulmonary auscultation, tachycardia and hypotension. The dose of norepinephrine was increased, with no response. Then, administration of 200 μg bolus of epinephrine started, with partial respiratory improvement and increase in blood pressure, therefore a continuous infusion of epinephrine (0.2 to 0.6 $\mu g^{-1} kg^{-1}. min^{-1}$) was maintained. The patient persisted with moderate bronchospasm and 30 mg of ketamine was associated. Then he underwent gradual clinical improvement, and, at the end of the surgery, was referred to the intensive care center intubated, sedated, receiving continuous infusion of epinephrine (0.4 $\mu g^{-1} kg^{-1} min^{-1}$), with no diuresis. The patient remained hemodynamically dependent of epinephrine support, and infusion discontinuation was possible only after 48 hours. He presented progressive clinical improvement and hemodynamic stability. A new laboratory test for latex specific IgE was performed on the first postoperative day and showed high levels (8.2 $kUA.L^{-1}$). The patient began to present diuresis from the third postoperative day, with gradual improvement in renal function. He was extubated on the seventh postoperative day and was discharged three days later. Serum creatinine reached levels of 0.78 $mg.dL^{-1}$ in the third month after surgery. After more than one-year regular follow-up at our hospital, the patient remains with adequate renal function. The child's guardian signed a consent form agreeing with the anonymous case report.

Discussion

Although rare, latex reaction can lead to death even when properly managed. It is crucial to implement preventive measures for such events. Nonetheless, adopting a latex-free environment, the key recommendation for managing sensitized patients, was not enough to avert the severe anaphylaxis reported here.

The diagnosis of anaphylaxis is mostly clinical and based on the classic triad of cardiovascular collapse, wheezing and skin rash, but symptoms can vary from simple skin manifestations to cardiorespiratory arrest. If the causal agent has been administered intravenously, clinical signs start within 5 to 10 minutes, or within seconds in the most severe cases. On the other hand, when resulting from latex exposure, anaphylaxis usually starts later, as it follows a cutaneous-mucous contact.[3] In the case reported, the patient presented hemodynamic and respiratory signs consistent with the diagnosis of anaphylaxis, and the reaction started immediately after reperfusion, suggesting more direct contact of the antigen with circulation than with a cutaneous-mucous surface. This information, associated with the fact that patient care was being performed in a latex-free environment, could pose a disadvantage to the hypothesis of latex as the causal agent. But examination into donor organ harvesting found lack of latex allergy precautions. Thus, the organ was contaminated by the antigen, which reached the circulation at the time of reperfusion. A similar event was described by Jacqmarcq et al.[4] They reported an adult patient who developed anaphylactic shock during a kidney transplant performed in a latex-free environment and discussed contamination of the graft, which was removed without latex allergy precautions. Given the recipient population comprises a group of patients undergoing various medical procedures and frequent hospitalizations, we could infer that a considerable number of them is at higher risk of latex allergy. Conversely, there seems to be no special concern with this aspect in Brazil, as no investigation into latex allergy is routinely carried out for receptors. Likewise, there is no special regulation in the donor-recipient processes of management when a recipient has latex allergy. Therefore, based on the experience presented here and the discussion above, we suggest the implementation of a latex-free environment during the harvesting and handling of organs intended for transplantation. In addition, latex sensitization, using skin and serological tests, should be recommended for recipients. In the case of sensitized recipients, the professionals involved in the process need to be alerted to ensure that latex-free care is extended to the donor.

In the diagnostic investigation of anaphylactic reactions to latex, some laboratory tests are useful. The chief immune mechanism of anaphylaxis is mediated by specific IgE class antibodies, which results in mast cell and basophil activation, and in the rapid release of pre-formed mediators, such as tryptase and histamine. Thus, measuring IgE and the mediators can help confirm the diagnosis. Tryptase peaks in approximately 30 minutes, then gradually decreases. It has a half-life of two hours, which is the ideal time for its measurement, although it can persist for several hours, or even days, depending on the intensity of reaction. Histamine is not routinely measured because of its short half-life, and ideally should be collected from blood in the first minutes of

the reaction, and from urine within 24 hours after reaction.[2] In the case in question, the patient had a previous diagnosis of latex allergy and, due to the unavailability of other tests, only IgE specific for latex was measured. This test has high specificity, but low sensitivity,[2] which certainly represented a limiting factor for diagnosis confirmation and, therefore, in the implications of the case.

Thus, it is important to highlight the differential diagnoses that were considered. The first, allergy to other drugs. This suspicion was considered unlikely, given that no drugs, including antibiotics and muscle relaxants, were administered in the moments preceding the reaction. Asthma attack would be another hypothesis; however, bronchospasm was not seen during anesthesia until that moment, and the symptoms of the patient were not only respiratory. Finally, the most relevant differential diagnosis would be post-reperfusion syndrome. This is classically characterized by bradycardia, hypotension and increased cardiac filling pressures. Criteria for its diagnosis include reduction in blood pressure to values less than 30% from baseline, with a minimum duration of one minute, occurring within the first five minutes after reperfusion.[5] Although such hemodynamic instability was observed, other cardiovascular changes were also observed, such as tachycardia and bronchospasm, which favor the diagnosis of latex allergy more. Moreover, post-reperfusion syndrome during kidney transplant is rare, estimated at 4%.[5]

In the treatment of anaphylaxis, fast intervention is essential for a favorable outcome. Epinephrine is the recommended drug because it has inotropic and chronotropic effects. It also prevents or reduces mucosal edema, promotes bronchodilation, and suppresses the release of mast cell and basophil mediators. Intravenous doses of 5 to 10 $\mu g.kg^{-1}$ are recommended in cases of mild to moderate hypotension, titrated according to results. Larger doses or continuous infusion (0.1 to 1.0 $\mu g^{-1} kg^{-1} min^{-1}$) may be required in the face of cardiovascular collapse.[1,2] In the case reported, high doses were necessary and the infusion had to be maintained for 48 hours, period of time for likely elimination of the causal antigen.

Conclusion

Special care is requested when managing donor/recipient regarding latex-related risks. The correct approach seeks to avert allergic reactions during surgery, including anaphylaxis, to improve outcomes. As to the recipient, it is essential to identify individuals sensitized to implement latex-free care. As for the donor, we recommend routine harvesting and handling of organs intended for transplant in a latex-free environment.

Conflicts of interest

The authors declare no conflicts of interest.

References

1. Provinciael S, Saldien V, Hans G, Vercauteren M. Perioperative allergy and anaphylaxis in children: a review. Acta Anaesth Belg. 2018;69:13–24.
2. Hepner DL, Castells MC. Latex allergy: an update. Anesth Analg. 2003;96:1219–29.
3. Hepner DL, Castells MC. Anaphylaxis during the perioperative period. Anesth Analg. 2003;97:1381–95.
4. Jacqmarcq O, Karila C, Carli P. Latex-induced anaphylactic shock following graft reperfusion during renal transplantation. Ann Fr Anesth Reanim. 2005;24:547–50.
5. Bruhl SR, Vetteth S, Rees M, Grubb BP, Khouri SJ. Post-reperfusion syndrome during renal transplantation: a retrospective study. Int J Med Sci. 2012;9:391–6.