Intraoperative anaphylaxis–highlighting the dilemmas in living donor nephrectomy

INTRODUCTION

Perioperative anaphylactic reactions increase the risk of mortality and morbidity significantly. There are no guidelines on how to proceed following an incident of drug-induced intraoperative anaphylaxis during living donor nephrectomy. We hereby present a case of perioperative anaphylaxis to atracurium in a patient posted for living donor nephrectomy, the successful resuscitation, followed by the successful management of the case at a later date. This case report brings to the fore the dilemmas faced by the anaesthesia team in this situation regarding whether to proceed, how to proceed, whether this patient is fit to be a donor and risks to the recipient.

CASE

A 52-year-old female posted for living donor nephrectomy was donating her kidney to her son. A thorough preoperative anaesthesia workup was done, the patient was found to be American Society of Anesthesiologists physical status 1, had no history of previous surgical or anaesthesia exposure. The eosinophilic count was normal and she had no known drug allergies. General anaesthesia was induced with fentanyl and propofol, mask ventilation was checked, and then atracurium was administered. After about 1 min of giving atracurium, the mask ventilation became difficult. At about 2 min, the patient couldn't be mask-ventilated and intubation was tried with a 7.5 size endotracheal tube (ETT). There was laryngeal oedema which prevented passage of 7.5 and 7.0 size ETT. The trachea was intubated with a 6.5 size ETT with difficulty. On auscultation, air entry was absent bilaterally, end-tidal carbon dioxide (etCO2) was absent, and the patient had severe hypotension (systolic blood pressure of 50 mm Hg). At this point, anaphylaxis to atracurium was suspected, and intravenous adrenaline 0.1 mg was administered. After one dose, the $etCO_2$ started appearing, and the airway pressure decreased significantly. Another dose of adrenaline was repeated, and the blood pressure came up after this. To treat the hypotension, 1 L of crystalloid was also given as a bolus. After about 10 min, rashes were noted on the abdomen. By this time, the patient had become haemodynamically stable, and the surgical team were keen on proceeding with the surgery. The surgical team were made aware of the risks involved as this was a grade 3 anaphylactic reaction, and it was decided to postpone the surgery for a week. After about 1 h, the patient started breathing spontaneously, was haemodynamically stable, airway oedema had subsided, and there was no bronchospasm. Reversal from neuromuscular blockade was done with neostigmine and glycopyrrolate, and the trachea was extubated when she was fully awake. She was shifted to the surgical intensive care unit (ICU) for overnight monitoring and was discharged next evening after proper counselling of the patient and the family. One day after discharge, the patient again came to the emergency department with complaints of generalised itching, was admitted for overnight monitoring, and discharged the next day. Serum tryptase levels and *in vitro* immunoglobulin E (IgE) testing are investigations of choice in cases of anaphylaxis, but couldn't be done as our institution didn't have the facilities for those tests.

The patient was again admitted and taken up for donor nephrectomy after 7 days. The patient was premedicated with H2 blockers, and 100 mg of hydrocortisone hemisuccinate was also given preinduction. This time patient was induced with propofol and pethidine, and vecuronium which was the relaxant of choice. The anaesthesia and surgery were uneventful. Morphine was avoided to prevent histamine release and analgesia was taken care of with pethidine and paracetamol. The patient was monitored in the ICU for 2 days and was discharged home after 5 days. At discharge, the patient was adequately counselled again and given a card stating her allergy to atracurium.

DISCUSSION

Promotion of donor safety is the golden rule of living-donor transplantation programs across the world. Perioperative anaphylaxis is a life-threatening condition and places the donor at significant risk of morbidity and mortality.

Anaphylactic reactions are described according to the Ring and Messmer scale. Grade I involve cutaneous–mucous signs, grade II corresponds to mild cutaneous–mucous features that may be associated with cardiovascular or respiratory signs, grade III is cardiovascular collapse (severe hypotension) associated with cutaneous–mucous signs or bronchospasm, and

grade IV is cardiac arrest. Our case had a grade III reaction as it consisted of hypotension, bronchospasm, airway oedema and rash. Immediate management of anaphylaxis and resuscitation guidelines are to be implemented, but the one question which has no fixed answers is how to proceed with the surgery after perioperative anaphylaxis. The major questions faced in this situation are 1) Should we proceed with the surgery, 2) Is the patient fit to be a donor and 3) How and when do we proceed with the same patient?

Literature suggests against proceeding for surgery immediately after stabilisation, as inflammatory mediators are present in the blood until about 48 h after anaphylaxis. In the case of life-saving surgeries or in other critical patients, we can proceed with the surgery if the patient stabilises and stays haemodynamically stable after resuscitation. A report shows that proceeding with planned surgery after grade 1 or 2 reactions is not associated with a high risk of major acute hypersensitivity-related sequelae or death, although the rate in grade 3 and 4 hypersensitivity was significant.[1] However, there is no clear consensus or guidelines about whether to proceed with the surgery in living donors.

Transplant acquired food allergy (TAFA)[2] was first noticed in bone marrow transplant, and then also seen in some cases of liver, heart and renal transplant. With increasing experience in solid organ transplant, physicians have realised that it is not only food allergies which can be transferred, but other allergies of the donor can also be transferred to the recipient, and thus TAFA nomenclature was changed to transplant-acquired allergies (TAA)[3] to cater to all allergies. A consequence of organ transfer from a donor with a life-threatening allergy can immediately cause a life-threatening reaction intraoperatively in the recipient. This has been discussed in detail in a case report on living donor liver transplantation, which showed the dangerous consequences of continuing with the surgery after resuscitation, and in their case, the patient was refused as a donor for later surgery.[4]

CONCLUSION

This case shows that in elective surgeries such as donor nephrectomy with grade 3 anaphylaxis, the surgery should be abandoned and rescheduled at a later date with meticulous planning, change of drugs and adequate prophylaxis. Our case brings forward the challenges and dilemmas faced in the management of anaphylaxis in living donors.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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