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Case Report

Severe anaphylactoid reaction to thymoglobulin in a pediatric renal transplant recipient

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Abstract Intraoperative administration of thymoglobulin is an integral part of the anti-rejection regimen during organ transplantation. However, its administration may be associated with complications. An anaphylactoid reaction that occurred in a pediatric recipient of a living-related renal transplant, on initiating an intravenous infusion of thymoglobulin, is presented.
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1. Introduction

Intraoperative anaphylaxis represents great challenges to the anesthesiologist. A variety of agents have been identified as the cause of these reactions, with latex and neuromuscular blocking agents being the ones most reported in the literature [1,2]. An anaphylactoid reaction to thymoglobulin during living-related renal transplantation in a pediatric patient is presented.

2. Case report

A 13-year-old, 68 kg, 147.3 cm Caucasian girl, whose body mass index was 31.5 kg/m^2, presented for a renal transplant from her father. Her past medical history included rapidly progressive microscopic polyangiitis-induced renal impairment, which to date had not required dialysis. Baseline laboratory values were K 5.1 mEq/L and creatinine 6.7 mg/dL. She had renal failure-induced anemia [baseline preoperative hematocrit (Hct) 27%] and controlled hypertension treated with amlodipine and losartan. No known allergies to medications or food were reported.

General anesthesia was induced smoothly using a single vital capacity breath of sevoflurane, nitrous oxide (N_2O), and oxygen (O_2). Following intravenous (IV) administration of cisatracurium, the trachea was easily intubated with a 6.5 mm endotracheal tube (ETT). Anesthesia was maintained with desflurane/air/O_2, cisatracurium for neuromuscular blockade, and fentanyl for analgesia as needed. Hemodynamic parameters and arterial blood gas (ABG) analysis results during the surgery are summarized in Fig. 1 and Table 1. In accordance with our institutional protocol for renal transplantation, cefazolin 1.0 g was infused as antibiotic prophylaxis and IV methylprednisolone 500 mg was administered prior to surgical incision.

The surgery proceeded uneventfully and, per protocol, one hour after administration of methylprednisolone and 45

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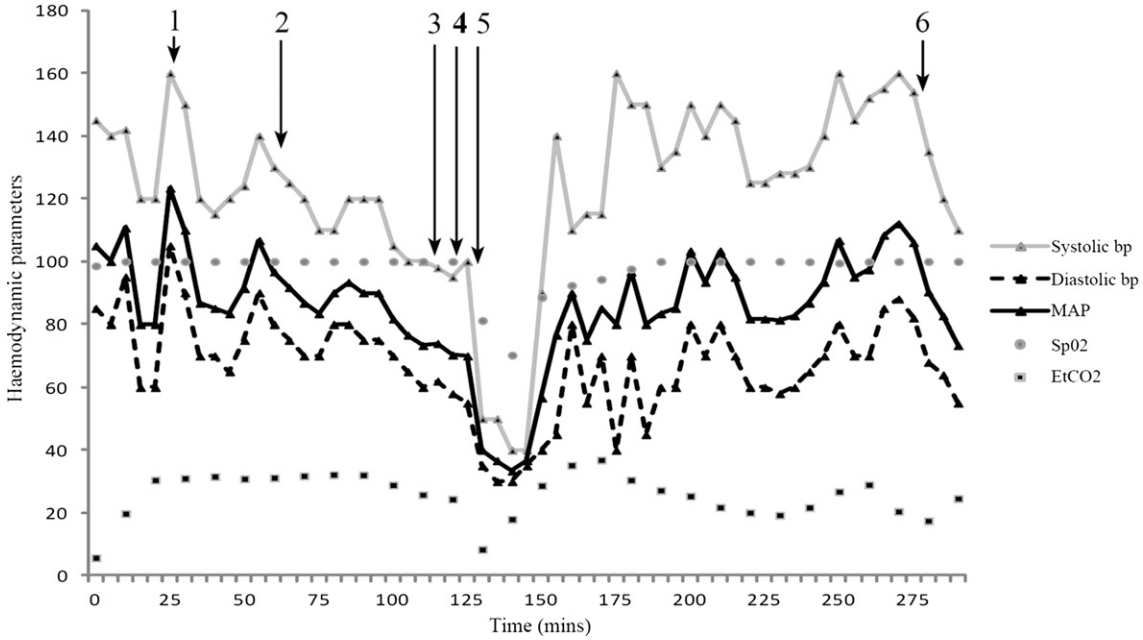

Fig. 1 Time course of changes in hemodynamic parameters during the event, showing systolic and diastolic blood pressures (mmHg), mean arterial pressure (MAP, mmHg), hemoglobin oxygen saturation (SpO_2, percentage), and end-tidal CO_2 ($ETCO_2$, mmHg) during the case. 1 = anesthesia induction; 2 = methylprednisolone given and surgical incision; 3 = donor kidney ready on the side table; 4 = thymoglobin infusion started; 5 = sudden decrease in MAP, $ETCO_2$, and SpO_2 after the start of the thymoglobulin infusion, resuscitation initiated; and 6 = patient weaned from vasoactive agents.

minutes after the start of surgery, an IV thymoglobulin infusion was started at a rate of 42 mL/hr (0.7 mL/min). By this time, the surgeons had mobilized the external iliac artery and vein and the donated kidney was being prepared on a side table. Within 4 minutes of the start of the thymoglobulin infusion (1.52 mg had been infused), end-tidal CO_2 ($ETCO_2$) suddenly decreased from 29 mmHg to 8 mmHg, tidal volume (V_T) decreased from 380 mL to 138 mL, mean arterial pressure (MAP) decreased from the 80 mmHg range to the 30 mmHg range, and heart rate (HR) increased from 80 to 120 beats per minute (bpm). Ventilation of the lungs became increasingly difficult, with peak inspiratory pressure increasing to more than 40 cm H_2O. Direct laryngoscopy confirmed placement of the ETT through the glottis, but breath sounds were inaudible. The lips and tongue appeared greatly swollen and oxygen saturation via pulse oximetry (SpO_2) decreased to 70%. An anaphylactic or anaphylactoid reaction was suspected and the thymoglobulin infusion was stopped immediately. Desflurane was discontinued and the inspired O_2 concentration (FIO_2) was increased to 1 at a flow of 12 L/min. The carotid pulse was barely detectable and resuscitation was commenced with chest compressions. During this time, multiple IV medications were administered, including 1 mg of epinephrine, 500 mg of methylprednisolone sodium, 40 units of vasopressin, and a second 1 mg bolus of epinephrine. The pulse became palpable with confirmed sinus tachycardia on the electrocardiogram, and lung compliance improved enough to deliver V_Ts greater than 200 mL. Transesophageal echocardiographic (TEE) examination showed hyperdynamic right and left ventricles (LVs), a very small LV end-diastolic volume (LVEDV), a small pericardial effusion but no evidence of pulmonary embolism. In accordance with these findings, 2 L of crystalloid and two units of crossmatched irradiated leukocyte-depleted packed red blood cells was infused. As anesthetic agents had been turned off for some time now and normal hemodynamics were reestablished, the patient began to move. A bolus of IV scopolamine 0.4 mg

Table 1 Hemodynamic parameters during the operative period. Levels are shown at the critical times during the case

Hemodynamic parameter	Event		
	Induction	Post-rATG anaphylaxis	End of case (post-resuscitation)
MAP (mmHg)	86	30	80
HR (bpm)	80	120	90
SpO_2 (mmHg)	100	70	100
$ETCO_2$ (mmHg)	31	8	37
pH	7.31	7.0	7.25
$PaCO_2$ (mmHg)	37	65	35
PaO_2 (mmHg)	282	78	302
HCO_3 (mEq/L)	20	16	16
K (mEq/L)	4.2	3.8	4.0

rATG = rabbit anti-thymocyte globulin (ie, thymoglobulin), MAP = mean arterial pressure, HR = heart rate, SpO_2 = oxygen saturation, $ETCO_2$ = end-tidal CO_2, $PaCO_2$ = partial pressure of CO_2, PaO_2 = partial pressure of O_2, HCO_3 = bicarbonate, K = potassium.

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