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## Intraoperative anaphylaxis

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### Abstract

A 24 years lady was scheduled for tonsillectomy for recurrent tonsillitis had anaphylaxis and asystole before extubation, she was revived successfully. She had no known history of allergy and exposure to anesthetic agents and was classified as an American Society of Anesthesiologists, ASA I. In the operating theatre, her baseline vitals were unremarkable and remained hemodynamically stable on receiving antibiotic and anesthetic drugs. The anesthetic course remained uneventful throughout the surgery. Upon removal of surgical drapes, upper eyelid swelling was noted, that rapidly progressed to facial area within minutes, and she developed cardiac arrest which was managed with standard protocol and resuscitated successfully.

**Keywords:** anaphylaxis, anesthetic agents, cardiac arrest

## Introductions

Perioperative anaphylaxis may have serious consequences when encountered and not managed correctly. It can occur as a result of exposure to any substance used in the perioperative period including drugs, blood products, latex, etc.<sup>1</sup> Subjective symptoms of anaphylaxis are masked during unconsciousness or sedation of anesthesia and analgesia. Cutaneous signs and symptoms are not recognized immediately as the patients are covered with surgical drapes until the crisis is severe enough to cause rapid cardiovascular and respiratory compromise.<sup>1</sup>

## Case Report

A 24 years lady was scheduled for tonsillectomy for recurrent tonsillitis had anaphylaxis and asystole before extubation, she was revived successfully.

She had no known allergy to food, drugs, clothes or metal, and no exposure to anesthetic agents. After pre-anesthetic evaluation, she was classified as an American Society of Anesthesiologists, ASA I physical status and planned for tonsillectomy under general anesthesia. Written informed consent was taken. On the day of surgery, in the operating theatre, her baseline vitals were: pulse 74/minute, blood pressure (BP) 116/64 mmHg, SpO<sub>2</sub> 97% in room air. Peripheral vein was accessed with an 18G intravenous cannula and premedicated with injection (inj) midazolam 2 mg, inj dexamethasone 4 mg intravenous (IV), and Inj ceftriaxone 1 gm IV, slowly after a test dose. After 10 minutes, preoxygenation was started. Fentanyl 80 mcg, propofol 100 mg and vecuronium 5 mg was given and then intubated with 7.0 mm flexometallic endotracheal cuff tube (ETCT). Controlled mechanical ventilation was commenced. Anesthesia was maintained with O<sub>2</sub>, isoflurane, fentanyl and vecuronium. Patient was stable throughout the 60 minutes of surgery. Estimated blood loss was 100 ml.

Upon completion of the surgery, during removal of surgical drapes, upper eyelid swelling was noted, which rapidly progressed to whole facial swelling. Within minutes of this, patient went into asystole before extubation. Immediately, inj adrenaline 1 mg was given IV bolus and chest compression started. Return of spontaneous circulation (ROSC) was achieved within two minutes. Heart rate increased up to 90 bpm and systolic BP came up to 80 mmHg and SpO<sub>2</sub> of 95-97% with 100% Oxygen. Concomitantly, adrenaline infusion was started. Bolus IV crystalloids were given. The ETCT position reconfirmed with laryngoscopy, which revealed gross laryngeal edema. However, no bronchospasm or skin rashes were noted. Patient maintained hemodynamics after initial dose of adrenaline.

Cause of edema was suspected as anaphylactic reaction among other causes sought for. Again, unstable bradycardia noted which progressed to asystole, second bolus of adrenaline 1 mg was given and cardiopulmonary resuscitation (CPR) started. The ROSC was achieved. Swelling of face and whole body was noted which was suspected as a case of anaphylaxis due to either ceftriaxone, or muscle relaxant. chlorpheniramine 22.75 mg and hydrocortisone 200 mg were given IV. Oxygen saturation of 95%, heart rate 100-120/minute and systolic BP 80-90 mmHg was maintained after the resuscitation. Patient was then shifted to intensive care unit with ETCT in situ and kept on mechanical ventilator in synchronized intermittent mandatory ventilation mode. Patient was started on fentanyl and adrenaline infusion, which was tapered gradually overnight and stopped as the patient's vital parameters improved. Chest X-ray antero-posterior (AP) did not reveal any abnormality. On first postoperative day, patient's body swelling decreased significantly. She was extubated on 2<sup>nd</sup> postoperative day and transferred to general ward on 4<sup>th</sup> post operative day.

## Discussions

We recognized anaphylaxis after completion of surgery. Patient went into asystole before extubation and again during resuscitation. The initial diagnosis of anaphylaxis is presumptive which may progress rapidly to become life-threatening as in this patient.

Anaphylaxis is a serious allergic reaction which is rapid in onset and may cause death.<sup>2</sup> It is classified as a type I hypersensitivity reaction that may be IgE-mediated or non IgE-mediated.<sup>3</sup> The overall incidence of perioperative anaphylaxis is estimated at 1/10,000-20,000 anesthetic procedures<sup>4</sup> and the estimated frequency varies considerably between epidemiological studies from different countries.<sup>5</sup>

Muscle relaxants cause about 60% of immediate hypersensitivity reactions,<sup>6</sup> mostly due to succinylcholine followed by others. Most common antibiotics to cause reactions are penicillins - about 70% in general and 10-20% in the perioperative period. Unlike penicillins, skin testing for cephalosporins is not standardized and there is no skin test that can reliably predict an allergic reaction to ceftriaxone.<sup>8</sup> There are reports of intraoperative anaphylaxis to ceftriaxone despite the negative intradermal skin testing done one day preoperatively.<sup>7</sup> Administration of ceftriaxone was done without skin testing in this patient. Latex, natural rubber can cause 20% of all anaphylactic reactions in the perioperative period. Anaphylaxis has been reported with all other anesthetic drugs, but their incidence is very low.

Anaphylaxis usually occurs shortly after induction, with muscle relaxants or antibiotics primarily, but anaphylaxis may occur any time with all potentially allergenic agents.<sup>6</sup> Thus it is really difficult to predict anaphylaxis and strict vigilance and preparedness is mandatory.

The clinical features are described according to the Ring and Messmer four-step grading scale.<sup>9</sup>

Grade I involves cutaneous–mucous signs and grade II corresponds to grade I associated with cardiovascular and/or respiratory signs. The grade III is cardiovascular collapse that may be associated with grade I signs and/or bronchospasm, and grade IV is cardiac arrest. The signs and symptoms were not recognized immediately in our patient as she was under general anesthesia, covered with surgical drapes and was already in the Ring and Messmer grade III/IV when detected.

Serum tryptase level is used in acute anaphylaxis to evaluate patients.<sup>5,10</sup> British guidelines recommends serial serum tryptase measurements soon after the onset of symptoms, at 1 to 2 hours and at 24 hours after the episode for baseline value. The half-life of tryptase, a serine protease released from mast cells during an acute allergic reaction, is 2 hours, peaks at 1 to 2 hours after onset and returns to baseline in 6 to 8 hours. The tryptase has limited role in initial evaluation, as results are not immediately available and therefore it is mostly useful in the follow-up. Also, severe episodes of anaphylaxis do not correlate with elevated level and there is lack of agreed international criteria of a “cut-off” or a “percentage change” from a baseline. The ‘acute serum tryptase’ in emergency setting may be useful and a level of more than 12.4 ng/mL has high positive predictive value and specificity, but poor sensitivity and negative predictive value.<sup>10</sup>

Anaphylaxis is a medical emergency requiring prompt active resuscitative measures. Precipitating agents should be removed if possible. Immediate institution of advanced life support, breathing support with 100% oxygen and early administration of adrenaline with large volume of IV fluids are the cornerstone of treatment. Steroids and antihistamines are indicated as adjunctive therapy.

## Conclusions

A tonsillectomy patient had anaphylaxis and asystole before extubation, she was revived successfully.

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