

doi: <http://dx.doi.org/10.18203/2319-2003.ijbcp20150395>**Case Report****Atracurium-induced anaphylaxis and angioedema: a case report****Jyoti Sharma\*, Savita Verma, M. C. Gupta**

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**ABSTRACT**

Drug-induced anaphylaxis has increased in frequency with the more widespread use of pharmaceutical agents. Neuromuscular blocking agents (NMBAs) are one of the most common causes of anaphylaxis during general anesthesia. However, the incidence of anaphylaxis due to atracurium is very rare (<1/10,000) according to UK Summary of Product Characteristics. NMBAs can induce two types of reactions: one is immune mediated - immunoglobulin E dependent and the second one is associated with non-specific stimulation of mast cells. Systemic manifestations of anaphylaxis can be in the form of hypotension, difficulty in breathing. Rarely, it can be associated with cutaneous manifestations such as urticaria, angioedema, and flushing. If it is not promptly diagnosed and treated, it can be fatal. In the present case, the patient was posted for submandibular gland surgery. She was well-stabilized after general anesthesia and within the seconds of giving injection atracurium; she had difficulty in breathing and marked decrease in blood pressure that was soon followed by periorbital swelling and swelling of lips. The patient was diagnosed with anaphylaxis with angioedema due to atracurium and was promptly managed in operation theater. She was kept under observation for 2 days. Anaphylaxis along with angioedema with atracurium is a very rare event, and hence it is being reported here.

**Keywords:** Anaphylaxis, Angioedema, Atracurium, Neuromuscular blocking agents

**INTRODUCTION**

Drug-induced anaphylaxis has increased in frequency with the more widespread use of pharmaceutical agents. It can range from a mild reaction to severe anaphylactic shock. Many anesthetic drugs, antibiotics, and analgesics can induce life-threatening hypersensitivity reactions. The incidence of anaphylaxis during general anesthesia is between 1 in 4000 and 1 in 25,000.<sup>1</sup>

During general anesthesia, patients are given wide range of medicines such as anesthetic agents, neuromuscular blocking agents (NMBAs), antibiotics, fluids, etc. NMBAs are one of the most common causes of anaphylaxis during general anaesthesia.<sup>2</sup> Among the NMBAs, suxamethonium and rocuronium are associated with higher risk of anaphylaxis whereas pancuronium and atracurium are associated with the lowest incidence of anaphylaxis. According to UK Summary of Product Characteristics, the incidence of anaphylaxis due

to atracurium is very rare (<1/10,000).<sup>3</sup> The diagnosis of anaphylaxis is mainly clinical and systemic manifestations such as hypotension, difficulty in breathing, etc., and are usually present. Rarely, cutaneous manifestations such as urticaria, angioedema, and flushing may also be presented. If anaphylaxis is not promptly diagnosed and treated, it can be fatal. In the present case, as per the literature, atracurium-induced anaphylaxis along with cutaneous manifestations is a rare event, and hence it is being reported here.

**CASE REPORT**

An 18-year-old female, weighing 54 kg, presented with a painful swelling in submandibular gland region. A diagnosis of submandibular sialadenitis was made. There was no significant history of medical illness, allergy, or previous surgery under general anesthesia. Her general clinical examination and laboratory investigations were normal. So, the submandibular gland surgery under general

anesthesia was planned. Pre-anesthetic evaluation was done 1-day before surgery. In the operating room, before inducing general anesthesia, her vital signs were checked and found to be within normal limits. General anesthesia was induced with injection thiopental 250 mg and injection succinylcholine 100 mg, intravenously. Endotracheal intubation was done, and anesthesia was maintained with oxygen, nitrous oxide, and isoflurane. After about 15 min of giving thiopental and succinylcholine, the patient was given injection atracurium 25 mg, intravenously. Within 30 sec of giving injection atracurium, there was a sudden fall in blood pressure (BP) to 60/40 mmHg, heart rate rose to 130-150 beats/min, peak airway pressure was 40 cm of water and the saturation of peripheral O<sub>2</sub> (SpO<sub>2</sub>) dropped drastically to 50%. Manual ventilation of lungs became difficult and on auscultation, chest was silent. Periorbital swelling and swelling of lips also appeared (Figures 1 and 2). A presumptive diagnosis of anaphylactic reaction with angioedema to atracurium was made. Lungs were ventilated with 100% O<sub>2</sub> through endotracheal tube; nitrous oxide and isoflurane were discontinued, injection adrenaline 1 ml of 1:10,000 was given intravenously, foot end was raised and rapid infusion of ringer lactate was given. After about 1 min, her BP was 70/40 mmHg, peak airway pressure was 45 cm of water and SpO<sub>2</sub> was 70%, pulse rate was 130 beats/min. The same dose of adrenaline was repeated intravenously 2 mins later. After the second dose of adrenaline, her BP improved to 90/60 mmHg, and pulse rate was 110 beats/min. Hydrocortisone 100 mg and chlorpheniramine 10 mg was administered by slow intravenous injection. The surgery was postponed for the day. After about 30 mins, patient attained hemodynamic stability with spontaneous breathing activity. Residual neuromuscular blockade was reversed with injection neostigmine; 25 mg. Endotracheal extubation was done 1 hr after the incident, and the patient was shifted to intensive care unit and kept on O<sub>2</sub> via face mask. Periorbital swelling and swelling of lips still persisted. She was maintained on injection hydrocortisone and injection chlorpheniramine for 2 days. Periorbital swelling and swelling of lips resolved after 24 hrs and the patient was discharged after 2 days.

## DISCUSSION

Anaphylaxis is characterized by a wide range of signs and symptoms such as urticaria, flushing, angioedema, hypotension, tachycardia, severe bronchospasm.<sup>4</sup> The most common cause of anaphylaxis during general anesthesia is NMBAs which are responsible for 50-70% of episodes of anaphylaxis during this period.<sup>5</sup> NMBAs can induce two types of reactions. One is immune mediated - immunoglobulin E (IgE) dependent and the second one is associated with non-specific stimulation of mast cells (particularly with benzylisoquinolinium type NMBAs such as atracurium, mivacurium).<sup>6,7</sup>

In the present case, the diagnosis of anaphylaxis with angioedema due to atracurium was made as the events



**Figure 1: Angioedema of face.**



**Figure 2: Periorbital and lip swelling.**

occurred within seconds of giving injection atracurium, and the patient responded to injection adrenaline. The causality assessment was done, and association of event with atracurium was probable with both WHO causality assessment and Naranjo's scale (score of +6).

A few case reports of hypersensitivity reaction with atracurium have been reported from various countries in the past in which patients had cardiovascular collapse and difficulty in breathing after injection atracurium.<sup>8</sup> These anaphylactic reactions due to NMBAs are usually immune mediated i.e., IgE dependent.<sup>6</sup> Anaphylactic reactions along with cutaneous manifestations are still rarer. The present case had cutaneous manifestations in the form of angioedema of the face apart from systemic manifestations of cardiovascular collapse and bronchospasm. Similar to present case, Gupta et al. have reported a case of anaphylactic shock associated with cutaneous manifestations in form of generalized erythema.<sup>9</sup>

## CONCLUSION

Anaphylaxis is a life-threatening, unexpected and idiosyncratic reaction that can be associated with cutaneous manifestations. These reactions can be caused by muscle relaxants especially NMBAs including atracurium. So, healthcare professionals must take care of the drugs likely to cause anaphylaxis. In the advent of such case, prompt withdrawal of the offending agent and treatment can save the life of the patient.

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