

Unexpected outcome (positive or negative) including adverse drug reactions

Cardiac arrest following an anaphylactic reaction to atracurium

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Summary

This report describes a life-threatening anaphylactic reaction in a 58-year-old woman who was scheduled for subacromial decompression of right shoulder joint. She had a modified rapid sequence induction using fentanyl 100 µg, propofol 150 mg and suxamethonium 100 mg. Following induction her blood pressure and pulse were stable. On return of spontaneous ventilation, she had intravenous administration of 30 mg of atracurium. Soon after, she developed profound bradycardia followed by a cardiac arrest. Cardiopulmonary resuscitation (CPR) commenced with 100% oxygen and intravenous administration of atropine 3 mg and epinephrine 1 mg. After 1 min of CPR she had the return of spontaneous circulation with a blood pressure of 160/100 mm Hg. Her sedation was maintained using minimal isoflurane until the return of spontaneous ventilation to avoid awareness. Surgery was postponed. Later she made an uneventful recovery. Her serum tryptase level was raised and a positive intradermal reaction to atracurium confirmed atracurium anaphylaxis.

BACKGROUND

Muscle relaxants are the most common agents causing anaphylaxis during anaesthesia accounting for 60–70% of reactions,¹ followed by latex and antibiotics; other causes include administration of colloids, protamine and analgesics.² Rocuronium and succinylcholine are the most common muscle relaxants causing this reaction.³ In this case, we used both succinylcholine and atracurium but had anaphylaxis to atracurium.

Common signs of anaphylaxis include flushing, urticaria, hypotension, increased ventilatory pressure and, in severe cases, inability to ventilate because of severe bronchospasm. Anaphylaxis always should be considered if immediate hypotension develops with or without bronchospasm following administration of a therapeutic agent.⁴ In our case, the sole presentation of anaphylaxis was bradycardia followed by cardiac arrest; we did not experience any bronchospasm, difficulty in ventilation and no rash over the body.

CASE PRESENTATION

After intravenous administration of atracurium, the patient developed profound bradycardia followed by cardiac arrest. Spontaneous circulation was restored after 1 min of cardiopulmonary resuscitation (CPR), intravenous administration of epinephrine 1 mg and atropine 3 mg.

She was known to have a latex allergy and essential hypertension was controlled well with angiotensin-converting enzyme inhibitors. There was no significant social and family history.

INVESTIGATIONS

Serum tryptase level

- ▶ Sample 1: 8.9 µg/l; time 45 min post-anaphylaxis.
- Sample 2: 23.4 µg/l; time 3 h post-anaphylaxis.
- Sample 3: 26.6 µg/l; time 24 h post-anaphylaxis. Positive intradermal reaction to atracurium.

DIFFERENTIAL DIAGNOSIS

Arrhythmia, myocardial infarction, pulmonary embolism, vasovagal reaction, venous air embolism, tension pneumothorax, angio-oedema, intracranial catastrophe and mastocytosis.

TREATMENT

As this patient had cardiac arrest we followed the advanced life support protocol for management of cardiac arrest, which included CPR, and intravenous administration of epinephrine 1 mg and atropine 3 mg. For anaphylaxis she had intravenous administration of hydrocortisone 250 mg and chlorpheniramine 10 mg.

OUTCOME AND FOLLOW-UP

The patient was successfully resuscitated and transferred to the high dependency unit for further management. She had a full recovery with no cerebrovascular insult and normal 12 lead ECG. Her serum tryptase level was sent at 45 min, 3 h and 24 h. She was referred to an allergy clinic to be tested for all agents used in her anaesthetics. She had a positive intradermal testing for atracurium.

DISCUSSION

Anaphylaxis is the umbrella term for an acute, severe, life-threatening systemic hypersensitivity reaction. Anaphylaxis can be immunoglobulin E (IgE) mediated, complement mediated or due to direct mast cell activation.⁵ Immediate management remains the same for anaphylaxis due to any agent. Timely diagnosis and treatment is life saving.⁶ There are a few reported cases of anaphylaxis to atracurium with different modes of presentation. In our case we had cardiovascular collapse and at no time did we face any bronchospasm. Our timely action saved the life of the patient with no morbidity in the post-anaphylaxis period. The Association of Anaesthetists of Great Britain and Ireland recom-

mendations for timing and storing of serum tryptase samples are to take blood samples (5–10 ml clotted blood) for mast cell tryptase and initial sample as soon as feasible after resuscitation has been started and not to delay resuscitation to take the sample. A second sample should be taken 1–2 h after the start of symptoms. A third sample should be taken either at 24 h or in convalescence (eg, in a follow-up allergy clinic). This is a measure of baseline tryptase levels as some individuals have a higher baseline level. Serum tryptase level is the most commonly used test to diagnose the anaphylaxis due to any allergen. In our case, the diagnosis of anaphylaxis was confirmed by a raised serum tryptase level. Positive intradermal reaction to atracurium confirmed the diagnosis of causative agent⁷ and any cross-sensitivity. The specificity and sensitivity of the skin tests to muscle relaxant are greater than 95% but carry a small risk of anaphylaxis.⁸ We did not perform any IgE level, which is another test to confirm the diagnosis of anaphylaxis. The further use of muscle relaxant selected by negative intradermal test has been proved to be safe. The excellent overall performance of skin tests makes them the gold standard for the diagnosis of anaphylactic reactions.⁸

Learning points

- ▶ Muscle relaxants are the most common cause of perioperative reactions.
- ▶ Anaphylaxis should always be considered if immediate profound hypotension develops, with or without bronchospasm, following parenteral administration of a therapeutic agent.
- ▶ Always send serum tryptase level post-episode and follow-up in allergy centre to diagnose the causative agent.
- ▶ A patient can have anaphylactic reaction to more than one agent as our patient had hypersensitivity to both atracurium and latex (latex allergy was known to us at the time of anaesthetic induction and necessary precautions were taken).
- ▶ Time is of the essence in a critical situation and a timely and systematic approach is life saving for the patient.

Competing interests None.

Patient consent Obtained.

REFERENCES

1. **Birnbaum J**, Porri F, Pradal M, *et al*. Allergy during anaesthesia. *Clin Exp Allergy* 1994;**24**:915–21.
2. **Lieberman P**, Kemp S, Oppenheimer J, *et al*. The diagnosis and management of anaphylaxis: an updated practice parameter. *J Allergy Clin Immunol* 2005;**115**:S483–523.
3. **Mertes PM**, Laxenaire MC, Alla F, *et al*. Groupe d'Etudes des Réactions Anaphylactiques des Peranesthésiques. Anaphylactic and anaphylactoid reactions occurring during anaesthesia in France in 1999–2000. *Anesthesiology* 2003;**99**:536–45.
4. **Jacobsen J**, Secher NH. Slowing of the heart during anaphylactic shock. A report of five cases. *Acta Anaesthesiol Scand* 1988;**32**:401–3.
5. **Currie M**, Webb RK, Williamson JA, *et al*. The Australian Incident Monitoring Study. Clinical anaphylaxis: an analysis of 2000 incident reports. *Anaesth Intensive Care* 1993;**21**:621–5.
6. **Levy J**. General approach to anaphylactic reactions. In: Levy J, ed. *Anaphylactic Reactions in Anesthesia and Intensive Care*. Boston, MA: Butterworth-Heinemann 1992: 135.
7. **Mertes PM**, Laxenaire MC. Anaphylactic and anaphylactoid reactions occurring during anaesthesia in France. Seventh epidemiologic survey (January 2001–December 2002). *Ann Fr Anesth Reanim* 2004;**23**:1133–43.
8. **Moneret-Vautrin DA**, Kanny G. Anaphylaxis to muscle relaxants: rational for skin tests. *Allerg Immunol (Paris)* 2002;**34**:233–40.

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