



Correspondence

A suspected case of coronary vasospasm induced by anaphylactic shock caused by rocuronium-sugammadex complex



ARTICLE INFO

Keywords:

Rocuronium-sugammadex complex

Kounis syndrome

Coronary vasospasm

Anaphylactic shock

To the Editor:

The cause of anaphylaxis during general anaesthesia is often related to muscle relaxants, and anaphylaxis due to rocuronium has often been reported [1]. Sugammadex reverses the effects of steroidal neuromuscular blocking agents, and perioperative anaphylaxis associated with sugammadex has also recently been reported [2]. However, anaphylaxis associated with the rocuronium-sugammadex complex has only been reported in two cases to date [3,4]. On the other side, Kounis syndrome is an acute coronary syndrome associated with allergic response, classified as type I (coronary spasm) and as type II (coronary thrombosis) [5].

We report here the case of a patient who developed shock on two occasions after receiving sugammadex. Although coronary vasospasm was initially diagnosed, the patient had Kounis syndrome associated with anaphylaxis due to the rocuronium-sugammadex complex.

Written informed consent for publication was obtained from the patient. A 46-year-old man had undergone laparoscopic partial nephrectomy for renal carcinoma 2 years previously. Anaesthesia was induced with propofol, remifentanyl, and rocuronium. Anaesthesia was maintained with propofol, remifentanyl, and supplemental bolus fentanyl and rocuronium. After surgery ended, the patient had received sugammadex (4 mg/kg) and had then been extubated. About 2 min later, he had developed tachycardia (heart rate, 130 beats/min) and hypotension (systolic blood pressure, 50 mmHg). An electrocardiogram (ECG) had shown ST elevation in leads II, III, and aVf. No cutaneous manifestations had been noted. He was diagnosed coronary vasospasm.

About 2 years later, open gastrectomy for gastric body cancer was performed. Continuous infusion of nicorandil at 2 mg/h was started before inducing anaesthesia. Additional rocuronium was given intraoperatively as needed, surgery was completed without complications, then sugammadex (4 mg/kg) was administered. Generalized erythema developed, so anaphylactic shock due to sugammadex was suspected. Oxygen at 100%, fluid bolus therapy, and adrenaline at 100 µg intravenously followed by a 0.03-µg/kg/min continuous infusion, were given. After 20 min, hemodynamic status stabilized. Blood tests showed a significantly increased serum tryptase level of 22.2 µg/l (normal: 1–15 µg/l) at 1 h post-event. Serum histamine level also increased significantly to 1.74 ng/ml (normal: 0.15–1.23 ng/ml) at 1 h post-event. Skin-prick tests for rocuronium, sugammadex, and the

rocuronium-sugammadex complex were performed 12 weeks after surgery. First, a skin-prick test with histamine as a positive control showed a positive reaction with a large wheal (6 × 6 mm) and itching paresthesia. Next, testing was performed with rocuronium and sugammadex (each at 1:100 dilution, 1:10 dilution, and undiluted), with all yielding negative results. Surprisingly, however, although testing for the rocuronium-sugammadex complex was negative at the 1:100 dilution, results were positive with a 6 × 6 mm wheal and itching paresthesia at a 1:10 dilution.

The timing of the reaction initially suggested sugammadex as the causative agent. Surprisingly, our patient developed anaphylactic reaction associated with the rocuronium-sugammadex complex. How exactly rocuronium-sugammadex complex formation can give rise to immunological changes and allergenic behaviour thus remains controversial [4]. On the other side, Kounis syndrome is an acute coronary syndrome associated with allergic response, classified as type I (coronary spasm) and as type II (coronary thrombosis) [5]. Mast cells play a role in acute coronary syndrome associated with allergic response. We concluded that the rocuronium-sugammadex complex caused the anaphylactic reaction. The coronary vasospasm that had occurred 2 years previously had therefore probably been Kounis syndrome associated with the rocuronium-sugammadex complex.

References

- [1] Brozovic G, Kvolik S. Anaphylactic reaction after rocuronium. *Eur J Anaesthesiol* 2005;22:72–3.
- [2] Menéndez-Ozcoidi L, Ortiz-Gómez JR, Olaguibel-Ribero JM, et al. Allergy to low dose sugammadex. *Anaesthesia* 2001;66:217–9.
- [3] Ho G, Clarke RC, Sadleir PH, Platt PR. The first case report of anaphylaxis caused by the inclusion complex of rocuronium and sugammadex. *A & A case reports*. 7. 2016. p. 190–2.
- [4] Yamaoka M, Deguchi M, Ninomiya K, et al. A suspected case of rocuronium-sugammadex complex-induced anaphylactic shock after cesarean section. *J Anesth* 2017;31:148–51.
- [5] Biteker M. Current understanding of Kounis syndrome. *Expert Rev Clin Immunol* 2010;6:777–88.

Ayako Okuno, M.D., Yuka Matsuki, M.D.*, Mari Tabata, M.D.,
Kenji Shigemi

Department of Anesthesiology & Reanimatology, Faculty of Medical
Sciences, University of Fukui, Fukui, Japan
E-mail address: ymatsuki@u-fukui.ac.jp