



Correspondence

Cardiac arrest following anaphylaxis induced by sugammadex in a regional hospital☆☆

To the Editor,

Sugammadex triggers anaphylactic reaction [1–3]. We describe a case of patient who developed severe sugammadex-induced anaphylaxis and received cardio pulmonary resuscitation (CPR). Written informed consent for publication was obtained from the patient. The case was a 73-year-old male (178 cm, 77 kg) who underwent osteosynthesis in a regional hospital without intensive care unit. He was on a medication of bisoprolol and pilsicainide hydrochloride for chronic paroxysmal atrial fibrillation. The patient's baseline blood pressure was 108/59 mm Hg and heart rate was 49 beats·min⁻¹. General anesthesia was induced with propofol 60 mg, remifentanyl 0.2 µg·kg⁻¹·min⁻¹, and rocuronium 40 mg. After the tracheal intubation, anesthesia was maintained with sevoflurane 1%–1.5%, remifentanyl 0.15–0.2 µg·kg⁻¹·min⁻¹, and fentanyl 100 µg. The surgery was completed uneventfully in 48 min. After the recovery of consciousness, 200 mg of sugammadex was administered to antagonize residual neuromuscular blockade, and 1 min later, the patient's trachea was extubated. Six minutes after the sugammadex administration, patient's systolic blood pressure fell below measurable level. First, fluid and phenylephrine 0.1 mg were administered. Subsequently, ST depression and polymorphic ventricular premature contraction were observed in electrocardiogram. Additional phenylephrine (0.1 mg) and epinephrine (0.1 mg) were administered. Suspecting primary cardiac ischemia, lidocaine (100 mg over 2 min) and nicorandil (2 mg·h⁻¹) were also administered to prevent further progression of cardiac ischemia and arrhythmia. However, we were still unable to measure blood pressure. Fourteen minutes after the sugammadex administration, he was found unconscious and flushed on entire body trunk and lower limbs; reintubation was performed, and chest compression was started due to cardiac arrest. Intravenous boluses of epinephrine (1 × 3 mg) were administered, and two electronic defibrillations were performed for ventricular fibrillation. Suspecting an allergic reaction, 1 g methylprednisolone, 50 mg hydroxyzine hydrochloride, and a large volume of fluids were also administered. After 10 min of CPR, he recovered his systolic blood pressure (70 mm Hg) and sinus heart rhythm (approximately 110 beats·min⁻¹). Then, he was transported by an ambulance to the university hospital to receive intensive care. The transfer took 25 min. He recovered his consciousness approximately 1 h after the occurrence of shock. The serum tryptase level 3 h after the event was elevated to 9.6 µg·l⁻¹ (normal range, 1.2–5.7), followed by a gradual decrease. He required 3 days to wean from vasopressor and inotropic supports. Ten weeks after the cardiac arrest event, the intradermal reaction test was

performed using histamine 10 mg·ml⁻¹ (positive control); 0.9% saline (negative control); 1:1000, 1:100, 1:10, and 1:1 dilutions of both rocuronium 10 mg·ml⁻¹ and sugammadex 100 mg·ml⁻¹; and complexes of sugammadex and rocuronium [4] (rocuronium, 0.05 mg·ml⁻¹ with sugammadex 5 mg·ml⁻¹ and rocuronium, 0.005 mg·ml⁻¹ with sugammadex 0.5 mg·ml⁻¹). A positive reaction was observed with 1:1 sugammadex, showing a 12-mm flare when measured at 20 min. According to the distinguishing clinical course and the results of blood tests and intradermal reaction tests, we finally concluded that sugammadex was the cause of anaphylactic reaction. The preoperative intake of beta-blocker may have potentially delayed the stabilization of blood pressure [5]. This is the first case report of sugammadex-induced anaphylaxis causing cardiac arrest. We need to be aware of sugammadex-induced severe anaphylaxis, which may result in cardiac arrest.

Funding

Departmental funding only.

Disclosures and conflict of interest

Name: Shinju Obara.

Contribution: This author treated the patient and wrote the manuscript.

Attestation: Shinju Obara approved the final manuscript and is the author responsible for archiving the case files.

Conflict of interest: None.

Name: Shin Kurosawa.

Contribution: This author helped treat the patient and write the manuscript.

Attestation: Shin Kurosawa has approved the final manuscript.

Conflict of interest: None.

Name: Jun Honda.

Contribution: This author helped treat the patient and write the manuscript.

Attestation: Jun Honda has approved the final manuscript.

Conflict of interest: None.

Name: Rieko Oishi.

Contribution: This author helped treat the patient and write the manuscript.

Attestation: Rieko Oishi has approved the final manuscript.

Conflict of interest: None.

Name: Yuzo Iseki.

Contribution: This author helped treat the patient and write the manuscript.

Attestation: Yuzo Iseki has approved the final manuscript.

Conflict of interest: None.

Name: Masahiro Murakawa.

Contribution: This author helped write the manuscript.

Attestation: Masahiro Murakawa has approved the final manuscript.

☆ Written informed consent for publication was obtained from the patient.

☆☆ This work was carried out at: Fukushima Medical University Hospital, 1 Hikarigaoka, Fukushima, Fukushima, JAPAN 960-1295.

Conflict of interest: None.

Acknowledgment

We thank Dr. Tomonori Takazawa and Dr. Tatsuo Horiuchi of the Department of Anesthesiology, Gunma University Graduate School of Medicine for their kind advice regarding the interpretation of skin tests.

References

- [1] O'Donnell R, Hammond J, Soltanifar S. A confirmed case of sugammadex-induced anaphylaxis in a UK hospital. *BMJ Case Rep* 2017;2017.
- [2] Nakanishi T, Ishida K, Utada K, Yamaguchi M, Matsumoto M. Anaphylaxis to sugammadex diagnosed by skin prick testing using both sugammadex and a sugammadex-rocuronium mixture. *Anaesth Intensive Care* 2016;44:122–4.
- [3] Takazawa T, Tomita Y, Yoshida N, Tomioka A, Horiuchi T, Nagata C, et al. Three suspected cases of sugammadex-induced anaphylactic shock. *BMC Anesthesiol* 2014;14:92.
- [4] 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 Rep* 2016;7:190–2.
- [5] Mertes PM, Malinovsky JM, Jouffroy L, Aberer W, Terreehorst I, Brockow K, et al. Reducing the risk of anaphylaxis during anesthesia: 2011 updated guidelines for clinical practice. *J Investig Allergol Clin Immunol* 2011;21:442–53.

Shinju Obara MD., Associate Professor*
Surgical Operation Department, Fukushima Medical University Hospital, 1 Hikarigaoka, Fukushima, Fukushima 960-1295, Japan
 Corresponding author.
 E-mail address: shinjn@fmu.ac.jp.

Shin Kurosawa MD., PhD., Professor
Department of Anesthesiology, Fukushima Medical University, School of Medicine, 1 Hikarigaoka, Fukushima, Fukushima 960-1295, Japan

Jun Honda MD., Teaching Assistant
 Rieko Oishi MD., Teaching Assistant
Department of Anesthesiology, Fukushima Medical University Hospital, 1 Hikarigaoka, Fukushima, Fukushima 960-1295, Japan

Yuzo Iseki MD., Teaching Assistant
Department of Intensive Care Medicine, Fukushima Medical University Hospital, 1 Hikarigaoka, Fukushima, Fukushima 960-1295, Japan

Masahiro Murakawa MD., PhD., Professor and Chair
Department of Anesthesiology, Fukushima Medical University, School of Medicine, 1 Hikarigaoka, Fukushima, Fukushima 960-1295, Japan

12 October 2017