

Successful Sugammadex Reversal of An Inadvertent Massive Overdose of Rocuronium in an Adult Patient

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Abstract

Introduction: Rocuronium is a non-depolarizing muscle relaxant frequently used during general anesthesia. One of its advantages is its antagonist drug, sugammadex.

Case Presentation: A previously healthy 55-year old patient, weighing 50 kg, accidentally received a rocuronium overdose, 450 mg, during 1 hour of general anesthesia. Fifteen minutes later 200mg Sugammadex was administered i.v. and the patient began breathing spontaneously.

Conclusions: Our case shows that Sugammadex is effective in the reversal of rocuronium overdose. This case emphasizes the importance of developing strategies for preventing the occurrence of errors during drug preparation and administration and demonstrates how the availability of a drug antidote increases safety in the occurrence of an erroneous drug dosage.

Introduction

Rocuronium is an amino steroid non-depolarizing muscle relaxant frequently used during general anesthesia [1]. One of its advantages is its antagonist drug, sugammadex, which binds to rocuronium and rapidly reverse its action [2]. The efficacy of sugammadex for the reversal of profound, rocuronium-induced neuromuscular blockade was evaluated in dose as high as 1.2 mg/kg ideal body mass [3]. The availability of drug antidote increases safety and offers a rapid resolution in case of rocuronium overdose.

Case Presentation

A previously healthy 55-year old patient, weighing 50 kg, was severely injured in a motor vehicle accident and admitted to our hospital for surgical treatment. The patient underwent several operations and remained in the Intensive Care Unit (ICU) for three weeks, during which she was mechanically ventilated for several days and then extubated. A few days after discharge from the ICU, when the patient was in the ward, stridor started. CT scan and fiberoptic bronchoscopy revealed a tracheal stricture, 1.5cm long, 2cm distal to the vocal cords. She was scheduled for tracheal surgery for removal of the stricture. The anesthesiologists planned to give total intravenous anesthesia and intended to extubate the patient at the end of that procedure.

On the day of the surgery, anesthesia was induced with propofol 150mg IV and fentanyl 100µg. Muscle relaxation was achieved with rocuronium 50mg. Following tracheal intubation, a continuous drip

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of propofol 300mg/hour, and remifentanyl 250µg/hour was started. For continuous muscle relaxation a syringe of rocuronium 400mg was prepared, since a long operation was anticipated. It was set to give 300mg/hour instead of 30mg/hour and started about 10 minutes after tracheal intubation.

The surgical procedure was uneventful and took about 1 hour and 35 minutes. About 1 hour and 20 minutes after the beginning of the surgery, the rocuronium pump alert started warning that the syringe was emptied. Only at that point did the anesthesiologist recognize the dosage mistake. The procedure was ended about 15 minutes later, and a nerve stimulator was attached (TOF-Watch® SX, Organon Ltd., Swords, Co. Dublin, Ireland), showing 1 response out of 4 stimulations. Sugammadex 200mg IV was administered and the patient began breathing spontaneously soon afterward. The nerve stimulator showed 4 full responses for 4 stimulations. The patient was extubated and transferred to the Post-Anesthesia Care Unit. The rest of her hospitalization was uneventful. The patient signed an informed consent to publish this case report before her discharge from the hospital.

Discussion

Sugammadex is a modified gamma cyclodextrin that, through the encapsulation process, terminates the effects of rocuronium and vecuronium (amino steroid muscle relaxants). The benefits of having an effective antidote for muscle relaxation were demonstrated in several scenarios, mainly in the management of a difficult airway [4,5].

However, sugammadex enables the anesthesiologists to rapidly reverse profound neuromuscular blockade induced by rocuronium or vecuronium also in cases of inadvertent overdose. It has been shown to reverse muscular blockade, even when administered 3 minutes following a 1.2mg/kg dose of rocuronium [2].

Our case emphasizes the importance of developing strategies for preventing the occurrence of errors during drug preparation and administration. It also demonstrates how the availability of a drug antidote increases safety in the occurrence of an erroneous drug dosage.

Competing Interests

No external funding and no competing interests declared.

References

1. Bevan DR (1994) Newer neuromuscular blocking agents. *Pharmacology & Toxicology* 74: 3-9.
2. Partownavid P, Romito BT, Ching W, Berry AA, Barkulis CT, et al. (2015) Sugammadex: A comprehensive review of the published human science, including renal studies. *American Journal of Therapeutics* 22: 298-317.
3. Pühringer FK, Rex C, Sielenkämper AW, Claudius C, Larsen PB, et al. (2008) Reversal of profound, high-dose rocuronium-induced neuromuscular blockade by sugammadex at two different time points: an international, multicenter, randomized, dose-finding, safety assessor-blinded, phase II trial. *Anesthesiology* 109: 188-197.
4. Caldwell JE, Miller RD (2009) Clinical implications of sugammadex. *Anaesthesia* 64(Suppl 1): 66-72.
5. Bisschops MM, Holleman C, Huitink JM (2010) Can sugammadex save a patient in a simulated 'cannot intubate, cannot ventilate' situation? *Anaesthesia* 65: 936-941.