

small doses of NMBA is acceptable in conscious patients, the diagnostic value of these provocation tests is still unclear. In our small population of 11 patients, only one patient possibly reacted positive to the doses we used for provocation testing, and for some patients the culprit for the perioperative allergic reaction could not be found (Table 1). This could suggest that i.v. provocation testing in the dosages we used is of limited value. Therefore, we also recommend to take the possibility of the provocation test being a false negative into account when the culprit for the perioperative allergy cannot be found.

Future prospective studies in a larger population are required to further assess the diagnostic value of intravenous NMBA provocation tests. For clinical practice, because i.v. NMBA provocation tests are a high-risk procedure, consideration has to be made of whether the benefits of the tests outweigh the risks. This is especially the case in patients with comorbidities and patients at increased risk during emergency treatment (e.g. patients with a history of difficult intubation). Our final recommendation is that these provocations should only be performed in specialised centres under supervision, with a disciplinary team including an allergist, anaesthesiologist, and specialised nurses able to perform emergency rescue procedures if necessary.

Authors' contributions

Data collection: VRC

Writing of the initial draft of the paper: VRC

Conduct of the research process: JH, EB, FK, IT

Supervision: MWH

Critical review of the paper: JH, EB, MWH, FK, IT

Declaration of interest

The authors declare that they have no conflict of interest.

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Sugammadex-induced bronchospasm during desflurane anaesthesia

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Editor—We read the article by McDonnell and colleagues¹ with great interest; although sugammadex has been reported as a treatment of rocuronium-induced anaphylaxis, we believe that further research is needed to demonstrate the safety profile of sugammadex. Here, we report a rare but potentially life-threatening adverse effect that can occur after administration of sugammadex for antagonism of neuromuscular block with rocuronium during general anaesthesia with desflurane maintenance.

A previously healthy 31-yr-old female with no history of pulmonary disease underwent laparoscopic cholecystectomy. She was premedicated with midazolam and anaesthesia was induced with i.v. fentanyl, lidocaine, and propofol. Paralysis was facilitated with a single dose of rocuronium 40 mg i.v. at

induction, and anaesthesia was maintained with inhaled desflurane. Sugammadex 4 mg kg⁻¹ i.v. was used to antagonise neuromuscular block 35 min after rocuronium administration (0 train-of-four twitches at ulnar nerve, SunStim™ peripheral nerve stimulator, SunMed, 2710 Northridge Dr. NW, Suite A Grand Rapids, MI, 49544, USA). Shortly after administration of sugammadex, peak inspiratory pressures increased from 21 to 40 cm H₂O, with associated elevation of end-tidal CO₂ (EtCO₂), reduced tidal volumes, prolonged phase II capnogram segment, and bilateral wheezes on auscultation. Treatment for bronchospasm was initiated with deepening of desflurane anaesthesia, albuterol administered with a metered-dose inhaler, and dexamethasone 10 mg i.v., with resolution of wheezing, improvement in tidal volume, and

normalisation of peak inspiratory pressures and EtCO₂. The patient was extubated successfully, and had an uneventful course in the PACU with no need for further treatment. The patient recovered completely and was discharged home after being observed at the hospital for 1 day.

There are limited published data on the incidence of bronchospasm in patients receiving sugammadex. Eskander and colleagues² reported three cases of bronchospasm after sugammadex administration in patients with no pre-existing pulmonary disease who received general anaesthesia with desflurane and rocuronium. These authors hypothesised that the irritant properties of desflurane, and the interaction of sugammadex with circulating rocuronium molecules, is the probable aetiology for an increased incidence of bronchospasm in patients in whom all these agents are administered together. In a recent case report,³ the sugammadex–rocuronium complex, rather than sugammadex or rocuronium alone, was confirmed by intradermal allergy testing as the causative agent for anaphylaxis during a Caesarean section. Amao and colleagues⁴ reported two patients with pre-existing pulmonary disease receiving sugammadex, rocuronium, and desflurane who developed bronchospasm. Based on these reports and our clinical experience, we advise caution when using sugammadex in patients receiving both desflurane and rocuronium,

irrespective of pre-existing pulmonary disease. Of note, there have been no reports of bronchospasm with sugammadex during isoflurane or sevoflurane anaesthesia.

Declaration of interest

The authors declare that they have no conflicts of interest.

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