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Sugammadex and rocuronium-induced anaphylaxis

Editor—We were interested to read about the use of sugammadex in the treatment of rocuronium-induced anaphylaxis,1 as our department recently had a similar case. A 50-yr-old lady presented for day-case breast reduction surgery. She had previously been treated medically and surgically for breast cancer but had no other medical co-morbidities. She was known to be allergic to penicillin. She had undergone several general anaesthetics in the past, at our hospital, and had received remifentanil, propofol, and ondansetron during three procedures but had never been given a neuromuscular blocking agent. Anaesthesia was induced with remifentanil and propofol target-controlled infusion total i.v. anaesthesia (TIVA), and bag-mask ventilation was attempted successfully before giving 40 mg of rocuronium and 4 mg of ondansetron. Ventilation was then noted to be difficult and the heart rate increased to 130 beats min⁻¹. It was initially assumed that the difficulty in ventilation was due to remifentanil-induced chest tightness, so the effector-site target concentration was reduced and the patient was intubated 40 s after giving rocuronium. The ventilation became increasingly difficult and the oxygen saturation decreased to 78% followed by loss of the trace. The non-invasive arterial pressure was 66/42 and only central pulses could be felt. Boluses of metaraminol did not change the arterial pressure. The tube position was rechecked and the TIVA was exchanged for sevoflurane, in case remifentanil-induced rigidity was worsening the clinical picture. An erythematous rash was also noted and a diagnosis of anaphylaxis was assumed. Boluses of epinephrine and steroids were administered and 18 min after the induction of anaesthesia, the patient suddenly and dramatically improved. The arterial pressure and the heart rate normalized and airway pressures decreased rapidly. The surgery was postponed and the patient was extubated after a further 15 min of normal ventilation. The patient showed no residual signs or symptoms in the recovery and was discharged home that afternoon. Since the only medication that the patient received, that she had not been given at least three times before, was rocuronium, and because anaaphylaxis to neuromuscular blocking agents account for between 58% and 69% of cases seen in anaesthesia,2 a tentative diagnosis of rocuronium allergy was made, although we are still awaiting results of skin-prick testing. We were struck by the similarity of our case with that described by McDonnell and colleagues3 with regard to

tongue met the soft palate. In these cases, the curve was drawn through this area as it corresponded to where the airway passage normally occurs. At all other sections, the curve was drawn in the middle of the airway, not the surface of the tongue. The computer software was programmed to measure the area bounded by the line of the airway curve and the line of sight. The outline of the tongue was not used in the calculation.

‘As demonstrated by their quoted pictures from Adnet and colleagues, the tongue does not always correlate with the primary curve. This confuses the explanation even further’. We do not feel that the tongue surface is the correct reference for the primary curve. The primary curve is in the middle of the airway passage.

‘The relationship between the alpha angle and ease of direct laryngoscopy is not directly intuitive’. We are sorry if angle alpha is not intuitive. It does, however, correlate with changes in the relationship of the supraglottic and tracheal axes which makes it important for intubation. It is therefore an important parameter for this reason.

‘The area posterior to the line of vision represents the amount of tongue that needs to be displaced during “direct laryngoscopy” in order to view the glottis. Head extension reduces the amount of tongue that needs to be displaced’. We agree and have shown this in our study.

‘The sniffing position enables more head extension on a flat table surface’. On a flat surface, head extension is maximal when upper thoracic/lower cervical spine is flexed. This may be achieved with shoulder bolster and no head lift (e.g. extension position used by ENT during laryngoscopy), ramped position in morbid obesity when shoulder bolster is used and two or more pillows under the head and the sniffing position in non-obese patients.

‘The sniffing position also facilitates ease of “intubation” by aligning the tracheo-laryngeal axis with the line of vision (via neck flexion)’. We agree and that has been shown in our study.

‘The theory of two curves does not clearly explain laryngoscopy and intubation’. We would disagree. In our opinion, the three-axes alignment theory needs to be modified by more contemporary data that will be applicable to all laryngoscopy devices, such as direct laryngoscopy, videolaryngoscopes, and fibreoptic intubation.

We hope this may clarify the concerns raised with this study.

Conflict of interest

None declared.

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timeframe of onset and recovery, although we did not use sugammadex. They posed the question of whether sugammadex had played a role in the recovery of their patient and we would like to suggest that perhaps a recovery could have occurred in a dramatic way after 15–20 min with traditional anaphylaxis treatment, as occurred in our patient. However, in our case, the cardiovascular collapse was not so severe, cardiopulmonary resuscitation was not initiated and less epinephrine was required. However, this potential use of sugammadex in anaphylaxis may help our department to get it onto our hospitals’ formulary! We were also interested to learn, on further investigation, the results from the study,2 which showed that only two out of 24 confirmed cases of rocuronium anaphylaxis had previously been exposed to rocuronium, as our patient had also never been exposed to neuromuscular blocking agents. In debating how the patient will be treated on her next anaesthetic presentation, we were also surprised to learn of the cross-reactivity with not only other aminosteroid neuromuscular blocking agents but also with benzylquinoliniums.

Conflict of interest

None declared.

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Prothrombin complex concentrate in the treatment of multitransfusion dilutional coagulopathy in a paediatric patient

Editor—Dilutional coagulopathy after multiple transfusion is a serious complication that increases mortality in trauma patients with major blood loss. This complication is rare in children, but can be life threatening. It requires treatment with fresh-frozen plasma (FFP), platelets, cryoprecipitate, packed red blood cells (RBCs), and vitamin K, but this is not always successful and can produce volume overload. Prothrombin complex concentrate (PCC) has been used in the treatment of bleeding in congenital or acquired vitamin K-dependent coagulation factors deficiency.1 However, there are no clinical studies on the use of PCC in treatment of severe uncontrollable bleeding in the infant. We describe the case of an infant with liver trauma-related multitransfusion dilutional coagulopathy with severe bleeding.

A 5-month-old infant (8 kg) was admitted to the paediatric intensive care unit (PICU) presenting hypovolaemic shock secondary to liver failure after abuse. On arrival, the patient was unconscious, unresponsive with generalized hypotonia, and mechanical ventilation was established. Arterial blood gases showed mixed acidosis (pH 6.67) and haemoglobin (Hb) level of 4 mg d l−1 with elevated liver enzymes (GOT/GPT 1882/998 units litre−1). Haemodynamic status was maintained after administration of volume expanders, blood, dopamine, and sodium bicarbonate. Abdominal ultrasound detected free intraperitoneal fluid, and an emergency abdominal laparotomy found a haemoperitoneum and tearing of liver segments IV and V. Surgical haemostasis by tamponade and suture of fractures were performed, avoiding liver resection, and drains placed in the liver bed. A few hours after surgery, the patient had an episode of hypotension and bradycardia that did not improve with administration of plasma expanders, packed RBCs (15 ml kg−1), platelets (1 unit 5 kg−1), and FFP (20 ml kg−1), and hence the patient required dopamine (15 μg kg−1 min−1). Hb was 6.2 mg d l−1, platelets 46 000 μ l−1, prothrombin activity of 34%, and aPTT of 51 s. Given the persistent drainage of blood, a further laparotomy found about 400 ml blood in the peritoneal cavity. Surgical haemostasis was achieved with resection of liver segment V and sub-hepatic drains were placed. After surgery, the patient continued bleeding through drain, despite the administration of FFP (200 ml), platelets (two pools), and packed RBCs (500 ml). It was decided to give PCC (Octaplex®, Octapharma GmbH, Langenfeld, Germany) 30 IU kg−1 along with vitamin K. This produced an almost immediate cessation in bleeding, and haemodynamic stability. Coagulation tests after PCC showed increased prothrombin activity from 19% (INR 2.9) to 54% (INR 1.5). The patient’s subsequent course was satisfactory, and the patient was discharged from PICU 12 days after admission.

Human PCC is obtained by ion exchange chromatography of the cryoprecipitate supernatant of a large amount of plasma after extraction of antithrombin and factor XI. Through this technique, it is possible to obtain concentrates of clotting factors II, VII, IX, and X in amounts ~25 times higher than in normal plasma.2 The main indication for PCC is in prophylaxis and treatment of bleeding caused by congenital or acquired vitamin K-dependent coagulation factors deficiency.3 However, currently, the main use of PCC is the urgent reversal of anticoagulation with oral coumarins in the bleeding patient, as it rapidly increases levels of vitamin K-dependent coagulation factors.3 PCC has been used in control or prevention of acute bleeding for vitamin K-dependent coagulation factors deficiency.4,5 It has also been shown that PCC not only corrects clotting factors deficiencies in a faster and more effective way than FFP, but it is associated with lower incidence of volume overload and minimal risk of viral transmission.6

In our case, due to the clinical situation of severe uncontrollable bleeding after multitransfusion dilutional