injected at each level for postoperative analgesia. The quality of sensory block was assessed by bilateral application of ice over the lower thorax and abdomen at 30 min post-procedure once the patient was alert and oriented in the recovery room. Bilateral assessments were done to rule out epidural spread. Sensory level of analgesia was recorded and patient satisfaction with analgesia documented. Ten patients (Table 1) underwent real-time lower TPVB for analgesic block before PCNL. A real-time view of the extrapolated needle position advancing into the paravertebral space was obtained in eight out of 10 patients (three patients had in-plane blocks and five patients had out-of-plane blocks for a total of 24 PVB injections). Pleural displacement during local anaesthetic injection was visible in all cases. No complications such as vascular or pleural puncture occurred during the procedure in these cases. Postoperative assessment with ice confirmed successful sensory block in eight cases and there was no evidence of epidural spread in any patient. Time for block placement, extent of dermatome block, and block success or failure is summarized for each patient in Table 1. All eight patients with successful PVB were satisfied with the procedure and quality of analgesia. In one patient, the TPVB was abandoned because of hypoxaemia after turning the patient prone because of morbid obesity (Patient 9, Table 1). In Patient 7, the needle bent while puncturing the skin for the TPVB and irreparably damaged the needle sensor. These were included as failures on an ‘intention to treat’ basis.

In conclusion, with the ultrasound needle guidance positioning system, real-time TPVBs were performed accurately and without clinical complications such as pleural puncture using in-plane and out-of-plane approaches. This novel needle guidance technology provides an additional margin of certainty of needle and needle tip position during performance of TPVB.

Declaration of interest

R.T. has received equipment support and travel support for being a speaker at Canadian Anesthesia Society Meeting 2012, both from Ultrasonix. A.S. has received equipment and travel support from Ultrasonix.

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Use of cricothyroidotomy training video to improve equipment familiarity

Editor—The Fourth National Audit Project (NAP4) of the Royal College of Anaesthetists found that narrow-bore cannula cricothyroidotomy as a rescue technique in ‘can’t intubate can’t ventilate’ (CICV) scenarios had a failure rate of 63%. Reasons cited for the likelihood of failure of the technique include inadequate training and lack of familiarity with emergency equipment.1

We recently evaluated the ability of anaesthetic trainees to perform cannula cricothyroidotomy in a simulated CICV scenario, using a cricothyroidotomy trainer (Pharmabiotics, UK) and the Cook ENK flow modulator (Cook Medical, USA). The scenario given was an out-of-hours anaesthetic induction which progresses into a CICV scenario. The use of rescue airway techniques is included in our Trust induction programme.

Of the 19 trainees evaluated, 58% (11 trainees) successfully inserted a cannula cricothyroidotomy which was judged by two trained observers to be adequate for oxygenation. The mean time to commence oxygen insufflation for this cohort was 2:06 min. Common reasons for failure included unfamiliarity with equipment and insufficient experience with the technique.

Interestingly, the more senior trainees were less likely to be successful at achieving an adequate cannula cricothyroidotomy, which might reflect the more recent airway training that the junior trainees had received. This exercise has emphasized for us the importance of ongoing training and familiarity with locally available cricothyroidotomy equipment.

In response to this, we have produced a 3 min video (http://www.youtube.com/watch?v=kDL1Y3XlFaQ) detailing the

Fig 1 Screenshot from instructional cricothyroidotomy video.
relevant anatomy and cricothyroidotomy technique for our trainees to view (Fig. 1). Although not a substitute for formal teaching with simulation and feedback, educational videos can improve technique retention after teaching.2 3 With widespread Internet access via portable devices, we wonder if instructional videos could be useful adjuncts for helping anaesthetists refresh their knowledge of rarely performed procedures, maintain equipment familiarity, and improve performance in the pressurized CICV situation.

**Declaration of interest**

None declared.

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**Fade of train-of-four ratio despite administration of more than 12 mg kg⁻¹ sugammadex in a myasthenia gravis patient receiving rocuronium**

Editor—A 25-yr-old obese female patient (BMI 32.0) with autoimmune myasthenia gravis (MG) (Osserman–Jenkins score IIIa, myasthenic muscle score 62%) was undergoing thymectomy. Treatment included oral pyridostigmine, prednisolone, azathioprine, potassium supplements, alendronic acid with colecaciferol, and a course of i.v. immunoglobulins.

Anaesthetic check-up and blood chemistry were normal.

Before operation, the patient received orally 60 mg of pyridostigmine and 20 mg of prednisolone without sedative or anxiolytic premedication.

In addition to standard monitoring, an air-warming device, and entropy, a neuromuscular stimulator (NMS) (Datex Ohmeda M-NMT module® as part of Datex Ohmeda Aisys ventilator, Helsinki, Finland) with output 70 mA, impulse duration 200 μs, and an interval of 1 min was applied at the right ulnar nerve near the wrist and measured isotonic contractions of the adductor pollicis muscle.

Force of head lift and hand grip before induction were described as normal by the patient. Anaesthesia management consisted of preoxygenation, induction with sufentanil 30 μg, propofol [total i.v. anaesthesia (TIVA) initially 5.5 μg ml⁻¹ plasma concentration then 2.9–6.0 μg ml⁻¹] and repeated boluses of sufentanil. After loss of consciousness, NMS was calibrated [reference values: train-of-four (TOF) ratio (TOFr) 0.97, TOF count (TOFc) 4/4]. After manual test ventilation, rocuronium 30 mg was given and TOFr went down to 0. After intubation (Carlens double-lumen tracheal tube, Ch 37, Cormack 1) hydrocortisone 100 mg and cefamandole 1500 mg were given. Perioperatively, TOFc returned three times to 4 and two rocuronium boluses of 10 mg were administered. Paracetamol 1000 mg and tramadol 100 mg were given i.v. during wound closure. Intraoperatively, surgery (duration: 120 min) was uneventful and the patient remained haemodynamically stable (rectal body temperature 37–37.6°C). At the end, TOFr was 0.36, and sugammadex bolus 4.28 mg ml⁻¹ was administered. Afterwards, TOFr increased to 0.43, peaking to 0.54 after 8 min. Another 4.76 mg kg⁻¹ sugammadex bolus was given. TOFr increased to 0.60 and another bolus of sugammadex 8.3 mg kg⁻¹ was administered. The correct positioning of the NMS-MechanoSensor® was confirmed, and pyridostigmine 60 mg in 10 ml normal saline was administered via a nasogastric tube. With TOFr remaining at 0.67, a portable NMS (ORGANON Teknika Microstim Plus, Neurotechnology Houston, TX, USA, output 70 mA) was used to elicit muscle contractions of the left adductor pollicis and long flexor of the right big toe. TOF and tetanus were maintained without fading during a 5 s stimulus of 50 Hz. TIVA propofol was stopped and during the 4 min weaning time from ventilation TOFr of the right thumb increased from 0.36 to 0.71 till the moment of tracheal extubation on a fully reactive and conscious patient reporting no complaints of residual muscle weakness.

In the literature, there are no reports on reversal of rocuronium with sugammadex in MG patients with persistence of low TOFr values in spite of a maximum reversal dose of sugammadex exceeding 16 mg kg⁻¹. Reversal of rocuronium in MG patients after spontaneous recovery of a TOF of 2 was successfully managed with doses of sugammadex starting from 2 mg kg⁻¹ but not exceeding 4.0 mg kg⁻¹.1–8

Persisting low TOFr after reversal of rocuronium with sugammadex could be explained by redistribution of unbound neuromuscular blocking agent molecules from peripheral back into central compartment leading to ‘muscle relaxation rebound’ necessitating sugammadex doses larger than the recommended,9 or due to the fact that commercially available accelerometry10 and electromyography11 are not artifact free. Therefore, the use of a 5 s ± 50 Hz tetanic stimuli applied to different muscles should be part of the decision-making process to assess residual paralysis in MG patients.