

## ANESTHESIOLOGY

### ■ Two Emergency Cricothyroidotomy Techniques Compared. Schaumann *et al.* (page 7)

Due to its infrequent utilization, emergency cricothyroidotomy can be difficult to perform even for experienced physicians. How much training, then, is essential to master the technique? Schaumann *et al.* recruited 20 emergency physicians to participate in their study comparing the training effects of performing standard surgical *versus* Seldinger cricothyroidotomy techniques. Over a period of 14 months, each study participant performed 10 cricothyroidotomies (five of each technique) in adult human cadavers within 24 h of death. Training sessions, consisting of lectures and explanations of anatomical landmarks, lasted 30 min and were given to volunteers prior to the start of the study period.

During the procedures, investigators recorded the ease of instrumentation use, each cadaver's anatomic neck structure, time interval from start to location of the cricothyroid membrane, time to tracheal puncture, and time to first ventilation by rebreathing bag. Each participant was allowed as many attempts per day on different cadavers as were available, and an independent pathologist inspected the cadavers for accuracy of catheter and tubing placement, as well as any complications incurred.

The time intervals from start to location of the cricothyroid membrane were not significantly different between volunteers using the Seldinger *versus* the standard surgical technique. Times to tracheal puncture, as well as times to first ventilation, were significantly longer when participants were using the standard surgical cricothyroidotomy technique. Seven attempts at trachea placement had to be aborted in those using the Seldinger technique due to kinking of the guidewire, whereas six attempts had to be aborted in the group using standard surgical placement technique. Subsequent anatomic dissection revealed that the airway was accurately placed into the trachea through the cricothyroid membrane in 88.2% of the Seldinger technique attempts and in 84.0% of the standard surgical attempts. Six punctures of the thyroid vessels were observed in the cadavers receiving the standard surgical technique. Although the study in cadavers does not reflect real clinical situations, the shorter time to first ventilation and the absence of injuries appear to favor the Seldinger technique.

### ■ Does Reducing Succinylcholine Dose Decrease the Incidence of Oxygen Saturation? Naguib *et al.* (page 35)

To test whether smaller doses of succinylcholine would reduce the incidence of hypoxemia in difficult-to-intubate situations, Naguib *et al.* simulated upper airway obstruction in 60 patients. After preoxygenation to an end-tidal concentration  $\geq 90\%$ , participants were anesthetized with fentanyl and propofol. Following loss of consciousness, patients were randomly assigned to receive either 0.56 or 1.0 mg/kg succinylcholine, or saline. When patients became apneic, their face masks were removed and the patients' airways were left unsupported. If oxygen saturation decreased to 90%, face masks were reapplied and ventilation assistance was given until patients were awake. The investigators noted times from injection of the study drug to first visible spontaneous diaphragmatic movements.

In 45% of patients receiving 0.56 mg/kg succinylcholine, oxygen saturation decreased  $< 90\%$ ; 65% of patients receiving 1.0 mg/kg succinylcholine experienced oxygen saturation decreases of  $< 90\%$ , whereas 85% of those in the control group experienced oxygen saturation decreases of  $< 90\%$ . Despite producing improved rates of oxygen saturation, the lower dose of succinylcholine did not shorten the time to recovery of spontaneous ventilation. Given these results, a significant fraction of patients would still be at risk of decreased hemoglobin saturation if there were a failure to intubate and ventilate after induction of anesthesia.

### ■ Investigators Evaluate Noninvasive Method of Monitoring Cerebral Blood Oxygenation in Sheep. Petrov *et al.* (page 69)

To develop alternatives to invasive brain oxygenation monitoring methods, Petrov *et al.* previously combined optical tomography and ultrasound imaging to assess cerebral oxygenation in sheep. In other experiments, the team tested their optoacoustic system *in vitro* in sheep. In this issue, they report on *in vivo* testing of the same system, comprised of a compact pulsed Nd:YAG laser operating at 1064-nm wavelength with a pulse duration of 10 nanoseconds, an optoacoustic probe that combines a light delivery system and an acoustic detector with a preamplifier, and a registration system (an oscilloscope and laptop computer). The laser pulses generate acoustic signals, the amplitudes and slopes of

which are proportional to oxyhemoglobin saturation in the sheep's superior sagittal sinus.

Optoacoustic signals from the superior sagittal sinus, measured through the scalp and cranium, were compared with directly measured oxyhemoglobin saturation in blood withdrawn from the cannulated superior sagittal sinus. In the feasibility experiments,  $F_{iO_2}$  changes produced rapid corresponding changes in optoacoustic signals and arterial oxygen saturation. In the validation experiments, optoacoustic signals showed tight temporal association and good linear correlation with measured oxyhemoglobin saturation. The authors believe that their data suggest this optoacoustic technique merits clinical evaluation.

### ■ Impact of Body Mass Index on Ambulatory Regional Anesthesia Outcomes Assessed. Nielsen *et al.* (page 181)

To examine the efficacy, complication rate, and potential benefits of regional anesthesia used during ambulatory surgery in patients with varying body mass indices

(BMI), Nielsen *et al.* (page 000) prospectively collected data on 9,038 regional anesthesia blocks performed on 6,920 patients from a single ambulatory surgery center. The investigators categorized patients into three groups according to their BMI.

The study's primary outcome was block failure. Of the 6,920 patients, 4,891 received one block, 1,942 received two blocks, 85 received three blocks, and two received four blocks. The overall block failure rate was 10.9%. The failure rate differed according to BMI category: in those with a BMI <25, the failure rate was 9.5%; in those with a BMI of 25–29, there was a 10.7% failure rate; and in those with a BMI  $\geq$ 30, the failure rate was 12.7%. In a subset of patients with a BMI  $\geq$ 35, the failure rate was 12.9%. The rate of acute complications was higher in obese patients, but overall patient satisfaction remained high even in those who were obese. The authors argue that overweight and obese patients should not be excluded from regional anesthesia procedures in the ambulatory setting.

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