

ANESTHESIOLOGY

■ Comparison of Success Rates with Three Lung Isolation Devices. Campos *et al.* (page 261)

Most previous studies comparing lung isolation methods and devices have been performed by anesthesiologists who had extensive experience in thoracic anesthesia. With the increasing demand for one-lung ventilation, it is also important to define which device can be used most effectively by occasional users. In this issue, Campos *et al.* report on a study comparing the success rates of three different lung isolation methods used by a group of anesthesiologists not practiced in thoracic anesthesia.

Anesthesiologists enrolled in the study were required to have some familiarity with the three lung isolation devices (a double-lumen endotracheal tube; a torque control blocker; and an endobronchial blocker with a spherical-shaped balloon) but not to have performed a lung-isolation procedure more than twice in the preceding month. Each was given a standardized tutorial on the three devices the day before the study. Patients aged 21–82 yr undergoing elective thoracic or esophageal surgical procedures were included in the study and assigned to one of the three device management groups.

Under supervision of the faculty anesthesiologist responsible for the care of all the patients, participating anesthesiologists attempted placement of the lung devices. Time to complete placement, number of reinsertions of the fiberoptic bronchoscope during placement, and malpositions were all recorded. In addition, the time required for the experienced thoracic anesthesiologist to correctly reposition the device was also recorded.

The failure rate to position their assigned device was 39% among faculty and 36% among senior residents. The failure rate did not differ among the three devices. The median time to complete placement procedures was 6.1 min for the double-lumen tube, 6.7 min for the torque control blocker, and 8.6 min for the wire-guided endobronchial blocker. After device malpositions were identified, it took 1 min or less for the investigating anesthesiologist to achieve optimal position. The most critical factor in successful placement was the anesthesiologist's knowledge of endoscopic bronchial anatomy.

■ Relationship of Cerebral Blood Flow Changes to Dose Requirements of Intracarotid Propofol. Joshi *et al.* (page 290)

Joshi *et al.* designed a set of laboratory experiments to explore whether changes in cerebral blood flow would

alter the dose of intraarterial propofol required to induce electrocerebral silence. The authors used three methods to alter cerebral blood flow: changes in ventilation, treatment with intraarterial verapamil, or severe occlusion. In the first group, the dose requirement of propofol to produce electrocerebral silence during normocapnia, hypercapnia, and hypocapnia was determined. The second group received intracarotid propofol with or without concurrent intraarterial verapamil. A third group received bolus injections of propofol during normotension, during severe cerebral hypoperfusion, and after hemodynamic recovery. Local cerebral blood flow was measured with laser Doppler, and propofol dose to produce electroencephalographic silence was measured. The authors observed a linear relationship between cerebral blood flow and the dose of propofol required to maintain electrocerebral silence, and they conclude that increase in cerebral blood flow decreases uptake of drug into the brain and increases washout, which in turn increases the dose of intracarotid drug delivery required. They suggest that manipulation of cerebral blood flow might be a useful tool for altering delivery of drugs to the brain when administered by the intraarterial route.

■ Can Ultrasound Be Used to Guide Needle Placement for Sciatic Nerve Blocks? Chan *et al.* (page 309)

Chan *et al.* posited that the consistent anatomical relationship between the sciatic nerve and neighboring bony structures might provide valuable anatomical landmarks for ultrasound localization of the sciatic nerve. In 15 healthy male volunteers, the sciatic nerve was scanned using a low frequency curved 7-cm ultrasound probe in the 2–5 MHz range. Each subject was scanned at three anatomic locations: gluteal, infragluteal, and proximal thigh levels. The goal was to localize the sciatic nerve at the level of the ischial spine, ischial tuberosity, and the lesser trochanter. At each of the scanning locations, the authors assessed the quality of the ultrasound sciatic nerve images. Ability to recognize the nerve within 10 s by two independent observers was deemed a “good image.” A poor image was one in which the nerve could not be identified by one or both investigators.

After scanning, a needle was inserted and advanced under real-time ultrasound imaging guidance until it made contact with the target nerve. When investigators judged that the needle was in satisfactory position, a nerve stimulator with a 100- μ s pulse duration was

turned on to elicit foot plantar or dorsiflexion using a maximum of 1.5 mA. After electrical stimulation, 10–20 ml dextrose 5% solution was injected incrementally in 2- to 3-ml aliquots, also under ultrasound observation, to mimic a local anesthetic injection. The authors recorded the ease of needle to nerve contact, threshold stimulating currents, and resultant motor responses.

The sciatic nerve was successfully identified in the transverse view as a solitary predominantly hyperechoic structure on ultrasound in all of the three regions scanned. The target nerve was easily visualized in 87% of participants, and localized within two needle attempts. Nerve stimulation was 100% successful after two attempts, with a threshold current of 0.42 ± 0.12 , eliciting foot plantar or dorsiflexion. From their success achieving good quality sciatic nerve imaging in the gluteal, infraglutal, and proximal thigh locations, the authors suggest that ultrasound-assisted sciatic nerve localization may be valuable for delivering clinical sciatic nerve blocks.

■ Expanding Role for Ultrasound-guided Regional Anesthesia. Gray (page 368)

As evidenced by Chan *et al.*, high resolution ultrasound can provide direct real-time imaging of peripheral nerves, and may become a valuable addition to regional block placement. Nerves are not static structures, and peripheral nerves can also be displaced by patient positioning, an advancing block needle, or local anesthetic

injection. In his review of state of the art ultrasound regional anesthesia, Gray points out that thorough knowledge of relevant cross-sectional anatomy is crucial for the safe use of this imaging technology to guide regional blockade.

Drawing from a review of existing literature, Gray summarizes the critical techniques of nerve imaging with ultrasound, including the role of anesthetic solutions to help visualize and reposition the needle. He also delineates the advantages and problems of short- and long-axis imaging, as well as the out-of-plane and in-plane needle approaches. Critics of the out-of-plane approach, for instance, point to the fact that lack of needle tip visibility during the procedure can lead to complications. According to critics of the in-plane approach, which requires longer needle insertion paths than the out-of-plane approach, this procedure is time-consuming and partial lineups of the needle and probe can create a false sense of security.

Gray then presents a brief review of clinical studies that have examined block characteristics with ultrasound guidance, and he surveys some recent developments in ultrasound imaging. Because imaging plays an increasing role in vascular access, transesophageal echocardiography, and regional blockade, ultrasound may become an important tool for anesthesiologists in the future.

Gretchen Henkel