

## ANESTHESIOLOGY

■ Comparative Pharmacodynamic Modeling To Evaluate Potency of Volatile Anesthetics. Rehberg *et al.* (page 397)

Seeking to obtain a more complete concentration-response curve for volatile anesthetics than that provided by minimum alveolar concentration (MAC), Rehberg *et al.* used the spectral edge frequency at the 95th percentile of the power spectrum ( $SEF_{95}$ ) as a measure of cerebral effect after administration of isoflurane, sevoflurane, or desflurane in 39 study participants. They reasoned that MAC multiples or fractions of MAC do not represent equal levels of central nervous system depression for different anesthetics.

All patients received 7.5 mg midazolam 60 min before induction of anesthesia with propofol (2.5 mg/kg). Depending on randomization grouping, patients were maintained either with isoflurane ( $n = 13$ ), sevoflurane ( $n = 13$ ), or desflurane ( $n = 13$ ). After a 30-min waiting period, data collection began. The end-tidal anesthetic concentration of each respective anesthetic was varied according to a randomized sequence of monotonic increases and decreases between 0.6 and 1.3 MAC. Electroencephalogram signals were recorded continuously, digitized, and stored to hard disk for off-line analysis. Fast Fourier transformation was performed on 8-s intervals, and the  $SEF_{95}$  was calculated. The  $SEF_{95}$  was then used as a measure of drug effect in the pharmacodynamic model.

The population mean  $EC_{50}$  values of the final model for  $SEF_{95}$  suppression were  $0.66 \pm 0.08$  vol% for isoflurane,  $1.18 \pm 0.08$  vol% for sevoflurane, and  $3.48 \pm 0.66$  vol% for desflurane. When concentration data were converted into fractions of the respective MAC values, no significant difference of the  $C_{50}$  values for the three anesthetic agents was found. Because the concentration-response curves for spectral edge frequency slowing had the same slope, the researchers concluded that MAC and MAC multiples for the three anesthetics are valid representations of the concentration-response curve for anesthetic suppression of  $SEF_{95}$ .

■ Is Balance Affected by Low-dose Combined Spinal-Epidural Analgesia in Parturients? Pickering *et al.* (page 436)

The popularity of epidural analgesia during labor has been enhanced by the introduction of low-dose combined spinal-epidural techniques. As many as 66% of

parturients who receive low-dose epidural analgesia show clinically detectable dorsal column sensory deficits, allowing women to walk after analgesia, which raises safety concerns. Using computerized dynamic posturography, Pickering *et al.* examined balance function in 44 women in labor after institution of regional anesthesia.

Eighty-eight women between 36 and 42 weeks' gestation were recruited into the study; 44 were placed in a control group and 44 into a group to receive spinal-epidural analgesia. In the latter group, women received an intravenous preload of 500 ml 0-9% sodium chloride and intrathecal injection (between L2 and L4) of 2.5 mg plain bupivacaine plus 5  $\mu$ g fentanyl. Before ambulation and balance testing, the women underwent motor and sensory function tests (Medical Research Council scale was used for motor function, ethyl chloride spray for cold sensation, and a tuning fork for vibration sensitivity). In the absence of motor deficit, fetal monitors were then disconnected, the participants were asked to stand, and Romberg's tests were performed. Dynamic posturography, involving a series of sensory organization and motor coordination tests, began within 40 min of spinal insertion.

There was no significant difference in either sensory organization test or motor coordination test composite values between the control and spinal-epidural groups. Although the spinal-epidural group showed a small, statistically significant reduction in one of the six sensory organization tests, this difference was functionally minor. Two women who showed transient motor weakness were not allowed to walk. The authors indicate that a small improvement observed in sensory organization test scores after spinal-epidural analgesia may be attributed to the women's familiarity with the equipment after repeated tests.

■ Efficacy of Rectal Acetaminophen in Day-case Pediatric Surgery Evaluated. Korpela *et al.* (page 442)

Korpela *et al.* designed a randomized, double-blind placebo-controlled study to establish a clinically effective dose of acetaminophen for postoperative pain management in children. Ranging from 1-7 years of age, 120 children (42 boys and 78 girls) scheduled for elective day-case surgery were included in the study. After induction of anesthesia with either sevoflurane or thiopental,

children were randomized to receive either placebo or a single dose (20, 40, or 60 mg/kg) of acetaminophen rectally. In the postanesthesia care unit, heart rate,  $Sa_{O_2}$ , and spontaneous breathing rates were recorded, and pain levels were assessed by an observer who was unaware of the acetaminophen dose given intraoperatively. Rescue pain medication (intravenous morphine 0.1 mg/kg) was administered at the discretion of the nursing staff. Children were kept in the postanesthesia care unit for a minimum of 2 h or until they were comfortable and were discharged if they had no nausea or vomiting. An investigator interviewed parents by phone 24 h after their child's surgery to ascertain levels of pain and postoperative nausea and vomiting, if any. At home, rescue medication was rectal ibuprofen (10 mg/kg).

Results of the study showed that acetaminophen had a

clear dose-dependent morphine-sparing effect. Ninety percent of the children who received placebo required postoperative morphine, compared with only 23% of those who received 60 mg/kg acetaminophen. The need for rescue pain medication at home was also less in children who received either 40 or 60 mg/kg acetaminophen than in children who received 20 mg/kg acetaminophen or placebo. In addition, the children who had adequate analgesia experienced less postoperative nausea and vomiting than those who received lower doses or no dose of acetaminophen before surgery. For best postoperative pain management, the authors recommend a dose of 60 mg/kg because the  $ED_{50}$  of rectal acetaminophen is 35 mg/kg.

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