

This Month in

ANESTHESIOLOGY

■ Reducing Respiratory Distress

In previous clinical studies, nitric oxide has been effective in decreasing pulmonary artery hypertension and improving arterial oxygenation in patients with adult respiratory distress syndrome (ARDS). Extending the work of investigators at the University of Berlin, Germany, Bigatello *et al.* (page 761) studied long-term nitric oxide inhalation at low concentrations in 13 critically ill patients with severe ARDS. Nitric oxide was delivered at increasing inhaled concentrations of 5, 10, 20, and 40 ppm after a 20-min baseline equilibration. Inhalation of 5–40 ppm nitric oxide decreased MPAP in a dose-related fashion without changing systemic arterial pressure. Seven of the 13 patients continued to breathe 2–20 ppm nitric oxide for an average of 14 days (range 2–27 days). The 2–40 ppm nitric oxide selectively decreased pulmonary artery pressure and improved arterial oxygenation. These effects rapidly reversed upon discontinuation of nitric oxide. There was no evidence of toxicity at the low doses used in this study. However, investigators urge a controlled, randomized trial (investigating, among other issues, effects of inhaled nitric oxide on platelet function, bacterial defenses, and cytokine release) before nitric oxide inhalation becomes standard therapy for ARDS.

■ Can Susceptibility to Malignant Hyperthermia Be Predicted?

Diagnosing acute malignant hyperthermia (MH) is complicated by the nonspecific nature and variable incidence of many of the clinical signs and laboratory findings. No standard means exists for predicting the likelihood of MH in patients. To improve MH-susceptibility prediction, Larach *et al.* (page 771) used the Delphi consensus method to create a multifactor MH clinical grading scale. This scale is not currently recommended as a sole clinical diagnostic tool. However, combined with further investigations of family history, a patient sustaining various adverse anesthetic reactions as outlined by the methods in this study might be diagnosed as MH-susceptible.

■ Male-Female Differences in Thermoregulation

The interthreshold range, or the range of core temperatures that does not trigger thermoregulatory responses,

has not been determined in humans. Using an isolated core cooling technique in unanesthetized subjects, Lopez *et al.* (page 780) attempt to quantify the sweating-to-vasoconstriction interthreshold range. The magnitude of the interthreshold range—temperatures between sweating and vasoconstriction threshold—for eight men and eight women studied was approximately 0.2°C. Vasoconstriction occurred after only a small amount of cooling, but shivering occurred after a much larger change in core temperature, suggesting that initiation of shivering is less well controlled than vasoconstriction. Both men and women tolerated a similar range of temperatures without triggering autonomic responses. However, women have higher thresholds of thermoregulation, with a response threshold of about 0.3°C greater than that in men. The rate of core cooling, from 0.7 to 1.7°C/h, does not appear to alter thermoregulatory responses.

■ Burns Blamed on Intravenous Bags and Bottles

In preventing intraoperative hypothermia, anesthesiologists must be alert to the risks of possible cutaneous burns from warming devices. In an effort to determine any common causes of injury from intraoperative warming devices, Cheney *et al.* (page 806) reviewed the American Society of Anesthesiologists Closed Claims Project data base. A review of 3,000 closed claim files revealed that, of 54 burns, 28 cases resulted from heated materials or warming equipment. Of these, 18 cases involved burns caused by a heated intravenous bag or bottle. Other causes of cutaneous burns included defective circulating-water mattresses, tubing from a heated humidifier, and a warming light used to treat hypothermia in a 2-day-old infant. Reviewers judged the standard of care as less than appropriate in all but one of the cases. The injuries from intravenous bags and bottles used for hypothermia are easily preventable. Treating hypothermia is safer and more efficacious when using devices specifically designed for this purpose.

■ Sevoflurane's Role in Pediatric Anesthesia

Properties of low blood and tissue solubility, nonpungency, nonflammability, and limited cardiorespiratory

depression make sevoflurane a good candidate for anesthesia in infants and children. Lerman *et al.* (page 814) studied minimum alveolar concentration, induction, emergence characteristics, and hemodynamic responses to sevoflurane in six groups of subjects: full-term neonates, infants aged 1–6 months and 6–12 months, and children aged 1–3, 3–5, and 5–12 yr. Except for the infants, all subjects had anesthesia induced by inhalation of sevoflurane in oxygen. Sevoflurane concentration was increased in stepwise increments of 1.5% every three breaths to a maximum of 7%. Baseline measurements of systolic, diastolic, and mean arterial blood pressures, heart rate, SpO₂, and temperature were recorded during awake states, at steady-state end-tidal concentration of sevoflurane before skin incision, and 1 min after skin incision. The minimum alveolar concentration of sevoflurane in neonates and infants aged 1–6 months was 3.2–3.3%, whereas in infants aged 6 months to children aged 12 yr it was 2.5–2.6%. Circulatory stability was maintained at about 1 MAC sevoflurane in all age groups.

■ Recovery of Rat Bowel Motility

Mediated through the nervous system, gastrointestinal motility can be adversely influenced by stimulations during and after abdominal trauma, laparotomy, and exploration of the intestine. Udassin *et al.* (page 832) performed postischemic gut motility studies in rats to measure recovery time after epidural anesthesia. A 30-min period of bowel ischemia was achieved by pulling upon a nylon thread placed earlier around the superior mesenteric artery. Marker meals were given, and their

transit through the intestine was measured when autopsy was performed. The animal model used here enabled the separation of ischemic insult from the surgical insult usually required to cause ischemia. Epidural lidocaine aided the recovery of gastrointestinal motility in rats after the 30-min period of bowel ischemia better than did epidural saline.

■ Investigating Cauda Equina Syndrome

After reports of several cases of cauda equina syndrome associated with the use of small-bore catheters in continuous spinal anesthesia, the Food and Drug Administration issued a Safety Alert on May 19, 1992. Drasner *et al.* (page 847) investigated possible etiologies of the syndrome in an experiment performed on four groups of Sprague-Dawley rats. Eight rats each received 5% lidocaine with 7.5% dextrose, 0.75% bupivacaine with 8.25% dextrose, 0.5% tetracaine with 5% dextrose, or normal saline. Sensory function was assessed using the tail-flick test every 10 min for 1 h and every 30 min thereafter for the remainder of the infusion. No significant differences in baseline tail-flick latencies were revealed between the four groups. However, infusion of lidocaine solution was associated with a persistent increase in tail-flick latency when compared to the bupivacaine, tetracaine, and saline solutions. Findings from these experiments suggest local anesthetic neurotoxicity may be responsible for recent injuries after continuous spinal anesthesia.

Gretchen Henkel