

## ANESTHESIOLOGY

### ■ Investigating Upper Airway Caliber during Sevoflurane Anesthesia in Children. Crawford *et al.* (page 1147)

To shed light on the mechanisms of pharyngeal airway maintenance in children, Crawford *et al.* administered increasing doses of sevoflurane to 15 children undergoing elective magnetic resonance imaging of the brain. Children with sleep apnea, pathology of the upper airway, and obesity were excluded from the study.

General anesthesia was induced with 8% sevoflurane in oxygen and maintained with sevoflurane in an oxygen-air mixture administered *via* face mask. All participants (aged 2–8 yr) were studied in the supine position. Magnetic resonance images of the upper airway were obtained at each of three inspired concentrations of sevoflurane: 1.25%, 2.50%, or 3.75%, administered in random sequence. Researchers allowed 15 min for equilibration of inspired and alveolar partial pressures before acquiring the airway images, although diagnostic imaging of the brain continued during these periods. All airway images were stored on computer and subsequently analyzed by an investigator blinded as to sevoflurane concentration at the time the image was obtained.

At each anatomic level (soft palate, base of tongue, tip of epiglottis, etc.) pharyngeal cross-sectional area progressively decreased with increasing depth of sevoflurane anesthesia. This reduction in cross-sectional area was predominantly due to a decrease in anteroposterior dimension. Although the authors did not obtain control measurements of airway caliber while the children were in the awake state, the study nonetheless suggests, the authors say, that the upper airway's vulnerability to collapse increases in a dose-dependent manner with increasing depth of sevoflurane anesthesia in children.

### ■ Effects of Heme Oxygenase-1 Induction Studied in Murine Macrophages. Tsai *et al.* (page 1201)

Inflammatory responses by macrophages play an important role in sepsis and atherosclerosis, in part mediated by nitric oxide generation. This deleterious effect can be reduced by heme oxygenase 1 (HO-1), and Tsai *et al.* examined HO-1 induction on type 2 cationic amino acid transporter expression and L-arginine transport in murine macrophages. The team also investigated the effects of HO-1 induction on nuclear factor- $\kappa$ B-related factor 2 and nuclear factor  $\kappa$ B. Macrophage cultures were randomized

to receive lipopolysaccharide; lipopolysaccharide plus hemin, an HO-1 inducer, in three different concentrations of 5, 50, or 500  $\mu$ M; lipopolysaccharide and hemin (again, in three concentrations) plus tin protoporphyrin; or lipopolysaccharide and hemin, in three concentrations, plus hemoglobin (a carbon monoxide scavenger). After exposure to each of the various preparations, the cells were harvested and analyzed.

Among the results observed by the team was that lipopolysaccharide significantly induced nuclear factor-E2-related factor 2 activation and HO-1 expression, nuclear factor  $\kappa$ B activation, type 2 cationic amino acid transporter expression, and L-arginine transport. Adding hemin to the preparations, they found, enhanced the lipopolysaccharide-induced nuclear factor-E2-related factor 2 activation and HO-1 expression, in a dose-dependent manner. The effects of hemin were significantly reversed by the addition of both tin protoporphyrin and hemoglobin. HO-1 induction significantly inhibited type 2 cationic amino acid transporter expression and L-arginine transport in macrophages stimulated by lipopolysaccharide. The mechanism for this inhibitory effect might be involved with activation of nuclear factor-E2-related factor 2 and inhibition of nuclear factor  $\kappa$ B. Carbon monoxide, they noted, partially mediated the effects of HO-1 induction on type 2 cationic amino acid transporter expression and L-arginine transport.

### ■ Retropharyngeal Hematoma: A Rare but Serious Complication of Stellate Ganglion Block. Higa *et al.* (page 1238)

Retropharyngeal hematoma may occur after stellate ganglion block (SGB) and recognition of initial symptoms is important for successful management of this rare but serious complication. To clarify initial signs and symptoms of retropharyngeal hematoma and emphasize the urgency of proper airway management, Higa *et al.* searched both Medline and Japana Centra Revuo Medicina for reports of this complication after SGB. They found reports of 27 patients who developed retropharyngeal hematoma after SGB in a 40-yr time period, the majority of whom were Japanese. Review of these reports revealed wide variance in the speed with which airway compromise worsened. One patient developed dyspnea and neck swelling 1 h and 35 min after SGB, whereas another complained of a feeling of suffocation and chest oppression 3 h after the procedure. The most common initial symptoms of retropharyngeal hematoma included pain in the head, neck, and chest,

dyspnea, neck swelling, and abnormal sensations in the upper airway. In almost half of these patients, initial symptoms of retropharyngeal hematoma occurred 2 h or more after SGB. In 21 patients, emergency airway management was required, and orotracheal intubation was extremely difficult in some. Failed airway management caused one death. Physicians who perform SGB should be aware that retropharyngeal hematoma may have a delayed onset and be able to recognize its early signs. Lateral neck x-ray is one simple and useful method for detecting the possible presence of retropharyngeal hematoma. When the distance from the anterior cervical line to the retrotracheal wall is greater than 22 mm at C5, 20 mm at C6, and 21 mm at C7 after SGB, retropharyngeal hematoma should be suspected. If retropharyngeal hematoma develops, physicians should be prepared to perform emergency airway management.

■ **Effect of Preoperative Evaluation Clinics on Operating Room Efficiency. Correll *et al.* (page 1254)**

Correll *et al.* conducted a retrospective study of charts for all patients evaluated preoperatively at their institution from November 1, 2003 through January 31, 2004. Their aim was to identify the causes and impacts of missing patient information on medical management,

including delays or cancellations of surgeries. At their preoperative evaluation clinic, an attending anesthesiologist reviews all cases, regardless of who performs initial assessments, to ensure that each patient is ready for surgery, and to determine if further information is required.

The authors collected data on a total of 5,083 patients seen at the preoperative evaluation clinic over the 3-month period. Of that number, a total of 647 patients had 680 medical issues requiring further information or management before they could proceed to surgery. Of those issues, 565 were related to known medical problems and 115 were new medical problems identified for the first time in the clinic. Most of the new problems required new tests or consultations, whereas existing problems usually required retrieval of information from outside medical centers. New problems were more likely to cause delay or cancellation of surgery than were existing medical problems. Although limited by its retrospective design and lack of control group, the study nonetheless did identify the types of medical issues most likely to cause delay or cancellation of surgery cases because of incomplete information. The cost savings of preoperative evaluation clinics can be significant.

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