

REPORT OF A SCIENTIFIC MEETING

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The Section on Anesthesiology of the American Academy of Pediatrics held its annual meeting April 10–12, 1992, in New York. The scientific session consisted of 37 abstracts, 16 posters, and 1 panel discussion addressing a variety of topics related to pediatric anesthesiology. A selection of the abstracts and other events of importance are described here.

On Friday evening, abstracts were presented on preparation for anesthesia and pharmacologic induction techniques, several of which concerned the effects of preoperative medication. Bean (Scott and White Memorial Hospital, Temple, Texas) performed a randomized, double-blind, age-stratified study to compare induction after 0.5 mg/kg oral midazolam, placebo, or extensive preoperative instruction. Instruction included an hour-long hospital tour, a video tape, and play therapy. In this study, preoperative instruction alone provided inadequate anxiolysis regardless of age between 15 and 72 months. Midazolam was effective and well tolerated. The quality of induction was not associated with postoperative behavior changes. Other drugs claimed to be efficacious included nasal midazolam, ketamine, and sufentanil; sublingual triazolam; oral valium; and rectal brexital, midazolam, and ketamine. Complications were noted after the administration of nasal sufentanil (hemoglobin oxygen desaturation) and rectal methohexital (airway compromise). Audenaert *et al.* (University of Louisville, Kentucky) noted that sleep was induced in 85% of toddlers and young children following 539 rectal administrations of 30 mg/kg of 10% methohexital. Defecation and hiccups were common, and airway problems occurred in 13 cases. Two patients required positive-pressure ventilation to overcome laryngospasm.

During the Saturday session, several abstracts addressed aspects of anesthetic induction, including techniques of airway management and several effects of general anesthetic agents. Moynihan *et al.* (Stanford University, California) characterized the gastric insufflation threshold point in 60 patients, 2 weeks to 8 yr of age, to determine the efficacy of cricoid pressure application in preventing the insufflation of gas into the stomach. During positive-pressure ventilation, cricoid pressure was applied, and an observer auscultated the upper abdomen with a stethoscope to determine air entry. Without neuromuscular blockade, the airway was pressurized by gradually closing the pop-off valve on the anesthesia machine until gas was heard entering the stomach or until the peak inspiratory pressure reached 40 cm H₂O. The same was done

after neuromuscular blockade. Cricoid pressure was 100% effective in preventing gas insufflation to the stomach, with or without paralysis. Techniques for fiberoptic intubation and use of a laryngeal mask airway were presented by others.

In chloralose-anesthetized kittens Morray *et al.* (University of Washington, Seattle) found that halothane reduced the ability to sustain a ventilatory response to hypoxia. Lerman *et al.* (Hospital for Sick Children, Toronto, Ontario) found that the sevoflurane metabolism in children yielded peak plasma fluoride concentrations similar to those produced by enflurane metabolism. The concentrations in children exposed to 0.7–1.1 MAC·hours sevoflurane failed to impair renal function.

Rosen *et al.* (University of Michigan, Ann Arbor) found that a dose of 1.8 mg/kg propofol with 13.7 µg/kg alfentanil was associated with eye closure in 95% of the patients. This technique allowed children to breath spontaneously in the prone position without nausea or vomiting. Verghese *et al.* (Children's National Medical Center, Washington, D.C.) found that propofol was more effective in blunting the hypertensive response to intubation than was pentothal and also resulted in a more prompt awakening.

A large number of abstracts concerned the use of analgesics in children. Maunuksela *et al.* (Helsinki Eye Hospital, Kuopio, Finland), in a double-blind multiple-dose study, found the analgesic effect of ketorolac equal to that of morphine. The only adverse effect was injection site pain with ketorolac. Bean *et al.* found the analgesic effect of ketorolac (0.75 mg/kg) to be similar to that of 1 mg/kg meperidine. Ketorolac significantly lowered narcotic requirements compared with placebo. Bleeding times were increased but were still within the normal range in the ketorolac group. Similarly, Richter *et al.* (University of North Carolina, Chapel Hill) found that ketorolac was comparable to morphine and better than saline placebo in pediatric patients.

The "Oucher" pain scoring system was used by Rosen *et al.* was used to show that morphine administered through a caudal epidural catheter resulted in lower pain scores than did intravenous opioids. Vetter *et al.* (Children's Hospital, Akron, Ohio) found that morphine achieved better pain relief than meperidine during patient-controlled analgesia after orthopedic surgery with no significant side effects. Postoperative epidural analgesia was the subject of papers by Soliman *et al.* (Georgetown University, Washington, D.C.) and Lawhorn *et al.* (Arkansas Children's Hospital). Soliman's group used lower thoracic or lumbar epidural catheters to provide fentanyl infusions (2-µg/ml solution with a mean infusion rate of $0.6 \pm 0.2 \mu\text{g} \cdot \text{kg}^{-1} \cdot \text{h}^{-1}$) after abdominal or urologic procedures in children aged 6 months to 15 yr. Analgesia was uniformly satisfactory; major side effects included somnolence

REPORT OF A SCIENTIFIC MEETING

in two patients and nausea/vomiting in three. Lawhorn's group studied epidural infusion of $5 \mu\text{g} \cdot \text{kg}^{-1} \cdot \text{h}^{-1}$ morphine and $1.2 \mu\text{g} \cdot \text{kg}^{-1} \cdot \text{h}^{-1}$ butorphanol, after an initial bolus of 60–80 $\mu\text{g}/\text{kg}$ morphine and 20–40 $\mu\text{g}/\text{kg}$ butorphanol after thoracic or abdominal procedures in patients aged 3 months to 17 yr. This regimen appeared to be effective and well tolerated. Miller (Minneapolis Children's Medical Center, Minnesota) reviewed his institution's experience with the use of caudal or epidural catheters to administer fentanyl and bupivacaine or fentanyl alone. They had a high success rate, and incidences of nausea, vomiting, pruritus, and urinary retention in both children and adults were similar to other reports. Supplemental oxygen was required for desaturation in 12 patients, 8 of whom had chronic respiratory disease and/or were undergoing thoracotomies.

The Resident Research Award finalists presented their papers. Charlton, (Children's Hospital, Denver, Colorado), who received first honors, presented a study of age-related cardiovascular sensitivity to halothane. The study exposed pediatric patients to both multiples of age-specific MAC values and identical end-tidal concentrations of halothane to determine whether cardiovascular sensitivity was age related. One hundred sixty-four children from birth to 12 yr of age were studied using noninvasive measurements of heart rate and blood pressure. The results demonstrated that preterm neonates, term neonates, and infants 1–6 months of age experienced greater cardiovascular depression than did older children when identical end-tidal concentrations of halothane were used. The other finalists included Kleinman (Hospital for Sick Children), who documented that sevoflurane provided a smooth and rapid induction of anesthesia in children, and Dryden (Texas Tech University, Lubbock), who investigated the effects of hypoxemia on the toxicity of bupivacaine in young pigs. Doses of bupivacaine producing seizures, iso-electric electroencephalogram, and asystole were significantly less in the hypoxic group, suggesting that hypoxemia may be a preventable factor that worsens bupivacaine toxicity.

The day's events culminated with the presentation of the Robert M. Smith Award for outstanding contribution to the field of pediatric anesthesiology to Joseph H. Marcy (Children's Hospital, Pittsburgh, Pennsylvania). Marcy is one of the early clinician educators who pioneered the beginnings of pediatric anesthesia more than 30 yr ago. A reception followed at the Boat House in Central Park.

The Sunday session began with three panel discussions. In the first, Keon (University of Pennsylvania, Philadelphia) summarized the diagnostic and anesthetic approaches to anterior mediastinal masses, which may compress the airways, pulmonary artery, superior vena cava, or right atrium. He emphasized searching for evidence of respiratory and cardiovascular effects of the mass. Inability to tolerate a given position is an ominous sign. Useful preoperative diagnostic tests

include chest tomography and echocardiography. Respiratory flow-volume loops with the patient upright and supine may reveal dynamic airway compression in asymptomatic patients. In patients with airway or cardiac compression, obtaining a tissue biopsy from a peripheral site (*e.g.*, lymph node) with local anesthetic infiltration and minimal sedation may be the least risky method of diagnosis. Treatment with radiation or chemotherapy may reduce the mass before surgery; however, this approach precludes an optimal tissue biopsy. If general anesthesia is necessary, recommended steps include placing the patient in the most comfortable position, performing an inhalation induction, maintaining spontaneous ventilation, having intravenous access in the lower extremities, and avoiding muscle relaxation. Acute respiratory decompensation may be managed by repositioning the patient or passing a rigid ventilating bronchoscope distal to the presumed site of tracheal compression; hemodynamic compromise also can be managed by repositioning the patient, in addition to providing standard circulatory support.

Baker (Children's National Medical Center) presented the state-of-the-art in the diagnosis and management of upper respiratory tract infections (URI). She emphasized the need to differentiate allergic, infectious, or vasomotor causes of rhinorrhea, the most common presenting symptom. Approximately 40% of patients with an atopic history have increased airway reactivity. Recent studies of viral URI have demonstrated increased small airway dysfunction and reactivity, decreased forced vital capacity and airway flow rates, and decreased mucociliary clearance. These effects may last 6–8 weeks. The pathophysiology includes increased efferent vagal output with decreased muscarinic M_2 receptor function (leading to unopposed M_3 constrictor activity), epithelial damage, decreased β -adrenergic function, increased immunoglobulin production, and increased concentrations of neuropeptides such as substances P, VIP, and tachykinins. Despite recent evidence suggesting that general anesthesia in children with URI poses increased risk, the frequency of URI makes it difficult to avoid. Suggested important risk factors for the complications of URI included age younger than 5 yr, a family or patient history of reactive airway disease, infection with respiratory syncytial virus or parainfluenzae virus, high fever, and severe cough. Recommendations for anesthetic management included general anesthesia by mask (if possible), humidification of inspired gases, atropine, and inhaled β -agonist if needed. Future therapies may include inhaled recombinant neutral endopeptidase and specific M_3 antagonists.

The morning ended with a lively discussion by Hillier (Indianapolis Children's Hospital, Indiana), Forestner (Cook-Fort Worth Children's Hospital, Texas), and Spear (San Diego Children's Hospital, California) on tracheal extubation. Issues pertaining to safety, efficiency, and postoperative analgesia were discussed as rationales for extubating children in the

REPORT OF A SCIENTIFIC MEETING

operating room while they are either deeply anesthetized or awake in the recovery room after complete emergence.

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