Investigators Compare Outcomes of Liberal versus Restricted Intraoperative Fluid Regimens. Nisanevich et al. (page 25)

To address debates over recommended perioperative fluid management, Nisanevich et al. designed a randomized prospective study to compare liberal versus restricted fluid administration during intraabdominal surgery. The team enrolled 152 patients scheduled to undergo intraabdominal surgery, and randomly assigned half of them (n = 75) to receive liberal amounts of lactated Ringer’s solution (bolus of 10 ml/kg followed by 12 ml · kg⁻¹ · hr⁻¹) during surgery. A total of 77 were patients assigned to the restrictive fluids group, consisting of 4 ml · kg⁻¹ · hr⁻¹.

Besides the primary endpoint of death or development of complications, the investigators’ secondary outcomes for the study included time to initial passage of flatus and feces, length of hospital stay, changes in body weight, and hematocrit and albumin serum concentration during the first three postoperative days.

Procedures included in the study ranged from small bowel resections, to partial pancreas resections to gastrectomy. All patients received identical bowel preparations prior to surgery and were fasted after midnight. Standard anesthesia management included induction with thiopental, fentanyl, and vecuronium and maintenance with isoflurane, nitrous oxide, and oxygen. Epidural administration of bupivacaine and methadone were given for postoperative pain until postoperative day three.

Study fluid regimens were continued until admission to the recovery room, and surgery and postsurgery personnel were blinded as to study group assignment. Investigators established transfusion guidelines for administration of fresh frozen plasma, cryoprecipitate, and platelets if bleeding became uncontrolled. Blood loss, urine output, and doses of drugs given during the surgical procedure were recorded.

None of the patients in the study died during the perioperative period. Those in the restricted fluids group had fewer complications than those in the liberal fluids group, although there were 20 in the restricted fluids group who suffered episodes of hypotension. Patients in the liberal fluids group passed flatus and feces an average of 1 day later than those in the restricted fluids group, and their hospital stays were longer. Hematocrit and albumin concentrations, however, were higher in the restricted fluids group during the first 3 postoperative days. Although additional studies are needed to establish optimum volumes of fluid to be infused during and after intraabdominal surgery, these findings do suggest that intraoperative use of restrictive fluid management might be advantageous for reducing postoperative morbidity and shortening hospital stays.

Patterns of Managing Difficult Airway Examined. Peterson et al. (page 33)

Adverse events involving the respiratory system comprise the leading cause of anesthesia malpractice claims. To identify patterns of liability associated with claims arising from management of the difficult airway, Peterson et al. used the American Society of Anesthesiologists Closed Claims database to analyze claims from two time periods: 1985–1992 and 1993–1999. Practicing anesthesiologists reviewed a total of 179 claims from 1985–1999, which included hospital and medical records, deposition summaries, outcomes reports, and cost of settlements or jury awards. The reviewers also focused on airway management supplemental data, including airway emergencies, ventilation techniques, and outcomes.

Of the 179 claims for difficult airway management, 48% were from 1985–1992 and 52% were from 1993–1999. Death or brain damage occurred in more than half of perioperative claims and all of the outside location claims. Emergency procedures were associated with more severe outcomes than were elective procedures. In two-thirds of the cases where an airway emergency occurred, a surgical airway was obtained but was not instituted early enough to avoid a poor outcome.

Two-thirds of difficult airway cases during the perioperative period were encountered during induction. The remaining one-third of those claims occurred during surgery, extubation, or recovery. Death or brain damage in claims from difficult airway management associated with induction of anesthesia decreased in 1993–1999 compared to the 1985–1992 time period. The authors suggest this difference may reflect adoption of the 1993 Difficult Airway Guidelines. Death or brain damage associated with maintenance, extubation, or recovery was not significantly different in the two time periods.

Closed claims analysis is limited by its retrospective nature, nonrandomized data collection, and the lack of denominator data. Nevertheless, the findings of this comparison support the need for a preformulated airway management strategy in order to improve patient safety.
Possible to Prevent Remifentanil-induced Hyperalgesia? Joly et al. (page 147)

Hyperalgesia resulting from acute opioid tolerance has been demonstrated in animals and in humans during controlled experiments. Joly et al. examined remifentanil-induced hyperalgesia in the clinical setting. In 75 patients set to undergo major abdominal surgery, one-third were randomized to receive a small dose of intraoperative remifentanil (0.05 \( \mu \text{g} \cdot \text{kg}^{-1} \cdot \text{min}^{-1} \)), one-third to receive a large dose of intraoperative remifentanil (0.40 \( \mu \text{g} \cdot \text{kg}^{-1} \cdot \text{min}^{-1} \)), and one-third to receive a large dose of remifentanil in combination with 0.5 mg/kg ketamine just after induction.

Prior to their surgeries, study participants were instructed on the use of quantitative sensory tests, patient-controlled analgesia, the peak flow monitor, four-point verbal rating scales for pain, and the 100-mm visual analog scales for both pain and anxiety. Anesthesiologists followed standard protocols during surgery for management of hypotension, bradycardia, or insufficient anesthesia. Values from all routine anesthetic monitors, including bispectral index monitoring, were recorded at 5-min intervals during surgery. Thirty minutes before the anticipated end of surgery, a 0.15 mg/kg bolus dose of morphine was given intravenously. Patients were transferred to the postanesthetic care unit within 5 min of tracheal extubation, and remained there for at least 4 h.

Postoperative pain was initially treated with morphine, titrated as required by nursing personnel blinded to patients’ group assignment. Pressure pain thresholds tested by algometer, and VAS pain scores at rest and during peak flow were comparable in all three groups. Although mean time to first morphine administration and cumulative amount of intravenous morphine given by nurses in the postanesthetic care unit did not differ between the groups, those in the large-dose remifentanil group did consume more morphine in the 48-h postoperative period. Tactile pain thresholds adjacent to the incision were significantly less at 24 and 48 h postsurgery in the large-dose remifentanil group than in either the small-dose remifentanil or the remifentanil/ketamine group. Because a small dose of ketamine prevented hyperalgesia in the patients receiving the combination drugs, the authors believe that remifentanil-induced hyperalgesia may be facilitated by N-methyl-D-aspartate receptors.

Influences of Gender and Age on Postoperative Morphine Requirements. Aubrun et al. (page 156)

Aubrun et al. analyzed data from 4,317 patients treated for pain in the immediate postoperative period to assess whether gender affected morphine requirements. Nurses in their institution have been trained to assess pain using unidimensional scales and to perform morphine titration. In this series, intravenous morphine was titrated every 5 min by 3 mg increments and pain was assessed every 5 min until pain relief, defined as a visual analog pain scale score \( \leq 30 \), was attained. Morphine titration was stopped if the patient had a respiratory rate lower than 12 breaths/min or an oxygen saturation by pulse oximetry lower than 95% or experienced a serious adverse event related to administration of morphine (such as rash, hypotension, vomiting, pruritus).

Women had higher initial pain scores than men and required greater doses of morphine (\(+11\)% than men. This observed gender-related difference in postoperative morphine requirement disappeared in elderly patients. The authors suggest that gonadal steroid hormone production may influence sensitivity to opioid analgesia. Further studies including morphine and morphine metabolite dosages will be required to better understand the different morphine requirements and measurement of pain in men and women.