

ANESTHESIOLOGY

■ Canadian Anesthesiologists and Surgeons Polled on Transfusion Threshold Decisions. Shehata *et al.* (page 19)

Shehata *et al.* developed a questionnaire, comprising eight case scenarios simulating patient encounters, and sent it to 399 anesthesiologists and 146 surgeons experienced in coronary artery bypass procedures. The aim of the survey was to assess factors that influence physicians' decision making regarding perioperative erythrocyte transfusions.

The questionnaire was generated from parameters based on a comprehensive search of the medical literature. Four of the case scenarios revolved around 55-yr-old patients, whereas the other four related to 75-yr-old patients. Within each scenario, the authors listed six variations of patient factors, based on presence or absence of clinical myocardial ischemia and three categories of the cardiac index ($< 2.1 \text{ l} \cdot \text{min}^{-1} \cdot \text{m}^{-2}$, $2\text{--}2.5 \text{ l} \cdot \text{min}^{-1} \cdot \text{m}^{-2}$, and $> 2.5 \text{ l} \cdot \text{min}^{-1} \cdot \text{m}^{-2}$). The case vignettes deleted additional patient comorbidities beyond coronary artery disease to ensure that transfusion decisions would not be confounded by these variables. Questionnaires were mailed between April and July 2004, and authors had a total of five contacts with each study participant.

Response rates were 70% for intraoperative case scenarios and 61% for postoperative case scenarios. The mean hemoglobin concentrations for transfusion decisions were 7.0 g/dl for the intraoperative cases and 7.2 g/dl for the postoperative case scenarios. Factors which increased physicians' decisions to transfuse erythrocytes included older age of patients, presence of myocardial ischemia, and a low cardiac index. It is hoped that future studies will delineate whether decisions based on these variables have an impact on patient morbidity and mortality.

■ Effects of Propofol Anesthesia on Upper Airway Size and Configuration in Infants Studied. Crawford *et al.* (page 45)

Infants are often prone to upper airway obstruction during general anesthesia, and how these effects are modified by application of continuous positive airway pressure (CPAP) is not fully understood. Using magnetic resonance imaging, Crawford *et al.* documented the effects of propofol anesthesia and CPAP on infants' airways. In nine infants, the study team first gave

nitrous oxide and induced anesthesia using 2.0 mg/kg propofol and 10 $\mu\text{g/kg}$ glycopyrrolate. Acquisition of upper airway images began after infants were motionless on the magnetic resonance imaging table for approximately 5 min.

The team acquired four sets of sequential images of each infant's airway: during light propofol anesthesia, after increasing anesthesia depth by administering a bolus dose, during application of CPAP and continued propofol infusion, and after removing CPAP while still continuing the propofol infusion. The interval between acquisitions of each set of airway images was 3–5 min. All images were stored on a computer and later analyzed by an investigator blinded to the depth of anesthesia and the timing of CPAP application. The researchers found that increasing the depth of propofol anesthesia decreased airway caliber at each anatomical level in a relatively uniform manner. This was due primarily to anteroposterior narrowing. However, CPAP increased the transverse dimension in the infants and completely reversed the propofol-induced decrease in airway caliber. This study also demonstrated that infants are more prone to anesthesia-induced airway obstruction than are older children, the authors found.

■ Randomized Trial Tests Ability of Ketamine to Reduce Postthoracotomy Pain. Suzuki *et al.* (page 111)

Intercostal nerve damage during thoracic surgery induces severe postoperative pain. Suzuki *et al.* hypothesized that continuous ketamine infusion at a low dose might potentiate epidural morphine and ropivacaine-induced analgesia and improve long-term postoperative pain.

For their randomized trial, the team enrolled 50 patients scheduled to undergo open thoracotomy (one patient was later withdrawn from the trial). The authors had previously determined the plasma concentration of ketamine that potentiates epidural morphine and bupivacaine analgesia for postthoracotomy pain. Patients were randomized to receive either study drug, an intravenous infusion of ketamine ($0.05 \text{ mg} \cdot \text{kg}^{-1} \cdot \text{h}^{-1}$) (study drug) or saline solution (placebo) in addition to the epidural morphine and ropivacaine received by all patients.

After the surgery, all patients received a continuous epidural infusion of 0.05 mg/ml morphine and 0.15% ropivacaine at an initial rate of 3 ml/h or by an infusion

pump. The rate of epidural infusion was adjusted according to pain scores, which were assessed at 6, 12, 24, and 48 h after surgery. Infusion of either ketamine or saline was continued for 3 days. Visual analog scale scores for pain at rest and on coughing 24 and 48 h after surgery were lower in the group of patients who received low-dose ketamine infusion than in control group patients. In addition, when patients were assessed for pain at 1 and 3 months postsurgery, the rating scores were significantly lower in the ketamine group. Three months after surgery, a higher number of patients from the control group were still taking pain medication. The authors report that asking patients to verbally describe the sensation around their wounds represents a potential study limitation. In future studies, they note, quantifying the level of chronic pain would be better accomplished using a validated instrument such as the McGill Pain Questionnaire. More studies on the safety and efficacy of higher doses of ketamine during surgical manipulation are warranted.

■ ASA Task Force Updates Practice Guidelines on Perioperative Blood Transfusions and Adjuvant Therapies. ASA Task Force (page 198)

In this issue, the American Society of Anesthesiologists Task Force on Perioperative Blood Transfusion and Adjuvant Therapies releases an update on their evaluation of data published since the ASA adopted practice guidelines for blood transfusions in 1995. The Guidelines apply to both inpatient and outpatient surgical settings and address perioperative management of patients undergoing surgery or other invasive procedures in which significant blood loss occurs or is expected.

The 10-member task force used a seven-step process to develop the Guidelines. The process entailed reaching consensus about the criteria for evidence of effective blood transfusion and adjuvant therapies, and then proceeded to a review of available literature, soliciting com-

ment from a panel of experts. Input into the Guidelines was also solicited at major national meetings. More than 3,000 literature citations were initially identified, covering a 12-yr period from 1994 through 2005. After a review of the articles, 312 were found to contain direct linkage-related evidence. Scientific evidence was rated according to the strength of findings. Recommendations were then generated, taking into account both the strength of the evidence and the degree of agreement or disagreement of Guidelines contributors.

The Guidelines recommend that preoperative evaluation should include interviews with the patient or family to identify risk factors for organ ischemia, which may influence the ultimate transfusion trigger for erythrocytes (hemoglobin level), and coagulopathy (use of warfarin, clopidogrel, aspirin), which may influence transfusion of nonerythrocyte components. Clinicians should also check for the presence of congenital or acquired blood disorders, the use of vitamins or herbal supplements that affect coagulation, or prior exposure to drugs such as aprotinin that can cause an allergic reaction. Guidelines consultants and ASA members strongly agree that anticoagulation drugs should be discontinued before elective or nonemergent surgery, and that surgery should be delayed until the anticoagulation effects wear off. When significant blood loss is expected, antifibrinolytics should be administered. The Guidelines contain extensive recommendations for perioperative monitoring—for blood loss, for inadequate perfusion and oxygenation of vital organs, and for transfusion indications. Erythrocytes are usually unnecessary when the hemoglobin concentration is more than 10 g/dl. Decisions to transfuse when hemoglobin concentrations are in the intermediate range (6–10 g/dl) should take into account various other risk factors, including the rate and magnitude of any ongoing bleeding. The Guidelines also make recommendations regarding transfusion of platelets, fresh frozen plasma, and cryoprecipitate.

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