

◇ This Month in

ANESTHESIOLOGY

■ Myocardial Ischemia in Young Parturients with Hemorrhagic Shock. Karpati *et al.* (page 30)

To identify risk factors for postdelivery myocardial ischemia in young parturients, Karpati *et al.* analyzed the cases of 55 patients with severe postpartum hemorrhage admitted to their tertiary care center for treatment. A team of specialists composed of an obstetrician, radiologist, and anesthesiologist-intensivist managed all of the patients, who had all delivered infants in another primary institution.

Ventilation, transfusion, catecholamines, surgery, or angiography with uterine embolization were provided as clinically indicated. Blood pressure, heart rate, hemoglobin, prothrombin time, and other hemodynamic variables were recorded. Plasma cardiac troponin I (cTnI) was used as the marker for acute myocardial injury. Patients with high cTnI levels were given transthoracic echocardiography examinations within 24 h of admission to the intensive care unit. Electrocardiogram tracings were analyzed by two separate cardiologists blinded to the patients' participation in the study. Ischemic scores were assigned according to four predefined categories.

The median time between infant delivery and admission to the authors' intensive care unit was 5 h, 30 min. All patients were in severe postpartum hemorrhage on admission, with systolic and diastolic hypotension, tachycardia, and lactic acidosis. The median hemoglobin level was 6.7, despite extensive homologous red blood cell transfusions received by 44 of the participants prior to their transfer. Conservative medical management resulted in hemodynamic stabilization in 27 patients. Two had hysterectomies immediately after assessment in the intensive care unit. In the remaining 26 cases, bleeding through the vagina persisted despite the administration of sulprostone. Embolization was successful in 25 of these patients; one woman later died because of uncontrolled bleeding and resultant multiple organ failure.

Twenty-eight of the 55 parturients had elevated serum levels of cTnI. The authors found several factors associated with elevated cTnI: hemoglobin \leq 6.0 g/dl on admission; systolic blood pressure \leq 88 mmHg and diastolic blood pressure \leq 50 mmHg; increased heart rate (over 115/min); or \geq 9 units of red blood cells trans-

fused during the first 24 h postdelivery. The use of uterotronics, such as sulprostone or oxytocin, did not influence the incidence of myocardial injury. In view of these observations, the authors recommend that clinicians focus on early simultaneous restoration of blood pressure and hemoglobin levels, as well as reduction of tachycardia, in postdelivery parturients. Early initiation of sulprostone infusion to control hemorrhage is also desirable, they believe.

■ Does Response to Preoperative Burn Injury Predict Postoperative Pain Intensity? Werner *et al.* (page 115)

Seeking to understand how preoperative pain response might predict postoperative pain ratings by patients, Werner *et al.* subjected 20 volunteers to a first-degree burn injury prior to arthroscopic knee surgery. All patients were healthy and scheduled for repair of the anterior cruciate ligament on an outpatient basis. Participants underwent a 30-min training session 2 to 3 weeks before their procedure, in which they learned about reporting pain intensity using the visual analog scale.

Two days before the burn injury, all were given 800 mg ibuprofen and paracetamol. Sensory testing, performed before and 1 h after the injury, was accomplished by burning the contralateral calf with a contact thermode (12.5 cm² for 7 min at 47°C). Pain intensity was assessed during the burn period for the primary injury area and for the area of secondary hyperalgesia around the burn area. Following surgery, standard postoperative pain management with oral ibuprofen and paracetamol was initiated. Patients were discharged 4–6 h after surgery and continued with these pain medications for 7 days. They were instructed to use a cooling device at least four times a day. The patients completed pain questionnaires 2 days before the burn injury and for 10 days after surgery (three times a day on the first and second postoperative days; daily thereafter).

The burn injury was associated with significant hyperalgesia. There was a correlation between preoperative pain ratings during the burn injury and postoperative pain ratings during limb movement. These results may help to stratify before surgery those patients who may be at risk of developing chronic pain from postoperative hyperalgesia. Larger studies with broader patient populations, however, will be necessary before these results can be generalized to all presurgical patients.

■ Is Epidural Analgesia Linked to Increased Risk of Cesarean Deliveries? Sharma *et al.* (page 142)

To address the controversy regarding a possible relationship between epidural analgesia and rate of cesarean delivery, Sharma *et al.* performed a meta-analysis of five previous studies comparing epidural analgesia with intravenous meperidine analgesia. A combined total of 4,465 multiparous and nulliparous women in labor at term had been enrolled in studies from November 1993 through November 2000. For the purposes of their analysis, the authors focused on the 2,703 nulliparous participants in those studies who had been randomized to receive either epidural analgesia with bupivacaine or sufentanil ($n = 1,339$) or intravenous meperidine ($n = 1,364$). The study samples included women with uncomplicated pregnancies as well as those with pregnancy-induced hypertension.

Women randomized to epidural analgesia received an intravenous bolus of 500 ml of lactated Ringer's solution

prior to analgesia, which was initiated with either epidural bupivacaine or intrathecal sufentanil. Inadequate progress during the second stage of labor precipitated either a reduction or discontinuation of the epidural infusion to restore expulsive efforts. Additional boluses of fentanyl and/or bupivacaine were given for breakthrough pain. Women randomized to meperidine analgesia received an initial bolus of 50 mg of meperidine and 25 mg of promethazine hydrochloride intravenously.

Epidural analgesia was significantly associated with prolongation of the first and second stages of labor, the need for augmentation of labor with oxytocin, and maternal fever. Women receiving epidural analgesia had more forceps deliveries (13%) compared to those receiving meperidine analgesia (7%). However, cesarean deliveries did not increase because of epidural analgesia, and women in this group reported lower pain scores during labor and delivery compared to those in the intravenous meperidine analgesia group.

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