Researchers Track Complication Rates for HIV-Positive Women Delivering via C-Section. Avidan et al. (page 320)

Avidan et al. conducted a 3-year case control study of 45 HIV-1-infected women on retroviral therapy and 45 HIV-negative women, all of whom underwent cesarean sections with spinal anesthesia. Women were admitted to the hospital at 38 weeks gestation for elective cesarean section. Spinal anesthesia consisted of intrathecal bupivacaine and fentanyl. Ephedrine was administered as necessary in 3 mg increments to support blood pressure. Women were given intravenous cefuroxime and metronidazole after delivery as antimicrobial prophylaxis. The control group had equivalent levels of consultant-led surgical and anesthetic care.

Blood samples were collected to measure HIV-1 viral load and lymphocyte subsets both before and after delivery. HIV antibody, p24 antigen, and HIV proviral DNA tests were performed on the blood samples of infants up to 18 months post-delivery. Spinal anesthesia was successful in all patients, with no one requiring conversion to general anesthesia. There were no significant differences between the HIV-1 positive and control groups regarding blood loss, intraoperative hemodynamic stability, or ephedrine requirements. The babies’ birth weights and Apgar scores were similar in both groups. In a subset of 24 HIV-1 positive women, the CD4T lymphocyte count increased 2 days after surgery, but there were no significant changes in the CD8T lymphocyte count, the ratio of CD4T to CD8T, or the plasma HIV-1 viral load. The vertical transmission rate was low, with only two out of 45 babies becoming infected. And despite an increased time to discharge noted in the HIV-1 group, there were no intraoperative or post-operative complications seen in these women.

Regional Cerebral Blood Flow Changes Assessed during Propofol Infusion. Veselis et al. (page 329)

To assess the extent of episodic memory impairment during propofol anesthesia, Veselis et al. recruited 11 healthy right-handed volunteers to participate in their brain imaging study. Participants spent an average of 3 h in the positron emission tomography (PET) scanner, during which time they performed three experimental tasks twice, before and after propofol infusion. During the Resting Baseline task, subjects were asked to remember as many words as possible from a list of 30 words played through headphones at a rate of one word every 4 s. The Nonsense Stimuli condition consisted of the same words played backwards at the same rate; volunteers were asked not to try to make sense of the words.

Volunteers were randomly assigned to receive propofol infusion by computer assisted continuous infusion (CACI) to target either low (600 ng/ml) or high (1000 ng/ml) concentrations, associated with a 50% and 90% decrement, respectively, in auditory verbal memory. Two PET scans were obtained during each task condition, before and after propofol infusion, for a total of 12 scans per volunteer. (The three tasks were conducted in random order, then repeated.) PET images were analyzed using statistical parametric mapping (SPM), and SPM contrasts were constructed to identify regions of the brain demonstrating relative regional cerebral blood flow (rCBF) changes. Comparing rCBF increases during memory versus resting tasks identified brain regions activated by the task.

The group of volunteers receiving low propofol concentrations (n = 4) exhibited primarily left-sided rCBF changes. These changes were more widespread over prefrontal, posterior parietal–temporal, and cerebellar regions as propofol effect increased. The right dorsolateral prefrontal cortex (DLPFC) was affected by increases in propofol effect and was activated during the Memory Task. Medial temporal lobe (MTL) structures were resistant to the global rCBF decreases associated with propofol sedation. The authors hypothesize that propofol interferes with episodic memory function by inhibiting the working memory processes rather than by isolated impairment of MTL function. Further research into the interaction of amnesic drugs and working memory processes, especially in relation to electroencephalogram changes occurring during task conditions, may further explain the effect.

Cardiac Troponin I Concentrations Evaluated after Cardiovascular Surgery. Lasocki et al. (page 405)

Because of their high sensitivity and specificity for the heart (they are never expressed in skeletal muscle), cardiac troponins are appropriate markers for the diagnosis of perioperative myocardial infarction (PMI). To determine whether cTnI concentrations can indepen-
dently predict outcomes after cardiac surgery, Lasocki et al. conducted a 1-yr prospective study of 502 patients undergoing coronary artery bypass or valve surgery at their institution.

Standardized anesthesia (midazolam, high doses of fentanyl, and pancuronium bromide) and monitoring techniques (electrocardiography, arterial, and pulmonary pressure monitoring) were used in all patients. Cardiopulmonary bypass was conducted under normothermic conditions. To detect PMI, electrocardiograms were performed at arrival in the intensive care unit and daily for 4 days. Both electrocardiograms and postoperative echocardiographs (performed on hemodynamically unstable patients) were analyzed by two clinicians blinded to patient information and diagnoses. Blood samples were collected at 20 hours postsurgery and cTnI concentrations were measured.

In-hospital mortality was defined as death occurring any time from day 1 after surgery until hospital discharge. Causes of death were classified as cardiac (heart failure, ventricular arrhythmia, without sepsis) or non-cardiac (hemorrhage, respiratory failure, sepsis, or other causes). Patients who died were separated into two groups—cTnI concentrations less than, or more than, 13 ng/ml—to assess the linkage between causes of death and cTnI concentration.

Analysis of procedure type and cTnI concentrations revealed that combined surgery and mitral valvuloplasty were associated with the highest postoperative cTnI concentrations. Patients scheduled for elective surgery had lower cardiac troponin concentrations than did those undergoing urgent or emergent procedures. There were 28 in-hospital deaths. The authors found that cTnI concentration 20 hours postsurgery was an independent predictor of in-hospital mortality. Diabetes, altered preoperative cardiac function, emergent surgery, cardiopulmonary bypass duration, postoperative PaO₂ level, and total chest drainage volume were also associated with risk of in-hospital death.

Direct CNS and Indirect Cardiac Effects of Bupivacaine, Levobupivacaine, and Ropivacaine in Sheep. Ladd et al. (page 418)

Ladd et al. investigated whether selective CNS delivery of three local anesthetics, with minimal systemic recirculation of the drugs, would result in drug-related cardiotoxicity in sheep. The team first studied cerebral vascular anatomy using dissection and brachiocephalic arterial erosion cast techniques in dead sheep to facilitate planning of probe placement. Nonpregnant Merino cross-bred ewes underwent a left thoracotomy under general anesthesia for placement of probes for hemodynamic and electrocardiographic measurements, and another procedure 7–10 days later for placement of infusion and sampling cannulae in the carotid arteries and superior sagittal sinus, a blood flow probe, and electroencephalogram electrodes.

After pilot studies to validate the procedures and drug dosages, equimolar doses (24–96 μM, ≈7.5–30 mg) of levobupivacaine, bupivacaine, or ropivacaine were infused directly into the carotid artery over a 3 min period using a crossover design. The authors monitored and recorded the animals’ behavioral CNS signs, quantitative electroencephalogram, cardiovascular, and electrocardiographic effects. Drug blood concentrations in superior sagittal sinus and aorta were measured serially. The blood drug concentrations in the superior sagittal sinus were 5–10 times those in the aorta, thus confirming highly selective CNS delivery. At doses of 24 μM, all three drugs caused mild overt CNS excitation, along with nonfatal cardiac arrhythmias. At doses higher than 24 μM, all three drugs caused marked convulsive behavior. Overall, bupivacaine was more potent in causing direct CNS toxicity and indirect cardiac toxicity than either levobupivacaine or ropivacaine. There were no differences between the three agents in nonfatal cardiac arrhythmias, and no fatal arrhythmias were caused from CNS site-directed carotid arterial infusions.

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