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Propofol during Cesarean Section

To the Editor:—We read with interest the recent publication by Dailland *et al.* on the use of propofol for cesarean section.[1] Our results describing placental transfer of propofol after an induction dose are generally similar, although propofol concentrations in our patients were higher because of shorter induction-to-delivery times.[2] Our findings after infusions of propofol also are similar.[3]

The incidence of awareness reported by Dailland *et al.* is very high. We have used propofol 2 $mg \cdot kg^{-1}$ (pregnant weight) for induction of anesthesia followed by either N_2O and enflurane 1% or infusions of propofol at 6 or 9 $mg \cdot kg^{-1} \cdot hr^{-1}$ in over 80 patients without patient awareness. Dailland *et al.* discontinued the anesthetic agents during the uterine incision-to-delivery interval and acknowledged that continuing the anesthetic would be more appropriate (especially since no evidence for improved neonatal outcome with their technique was presented). Although the authors suggested that a higher propofol dose would decrease the incidence of awareness, this approach is not without problems.[4-6]

Compared to a standard thiopental/enflurane technique for cesarean section, a propofol bolus and infusion at 6 $mg \cdot kg^{-1} \cdot hr^{-1}$ provided faster maternal recovery with comparable neonatal outcome.[5] However, an infusion of 9 $mg \cdot kg^{-1} \cdot hr^{-1}$ caused lower neonatal Neurologic and Adaptive Capacity Scores, which were inversely correlated to propofol concentrations.[6] Because of the rapid placental transfer of propofol, we believe that a high infusion rate of propofol with long induction-to-delivery times is not desirable for the neonate.

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Patient-controlled Epidural Anesthesia during Labor May Be Hazardous

To the Editor:—In a recent paper, the use of patient-controlled epidural analgesia (PCEA) during labor was demonstrated to establish effective analgesia in labor without complications directly related to PCEA.[1] Furthermore, PCEA was associated with a trend toward less total bupivacaine use, and the possibility of a decreased need for staffing in the busy obstetric anesthesia service was proposed.

However, regardless of apparently problem-free PCEA, there remains anxiety about development either of systemic toxicity from inadvertent intravascular injection or of subarachnoid block. This concern is heightened by the fact that over 50% of epidural catheters migrate inward or outward from the original position.[2] In the above-mentioned report, 2 of 100 epidural catheters migrated into an epidural vein and caused signs and symptoms of intravenous injection of local anesthetic.[2] Crawford[3] reported nine cases of potentially life-threatening complications after introduction of epidural anesthesia in labor: 3 of these were a consequence of catheter migration. A serious complication (such as prolonged hypotension) can occur after even a test dose (2 ml 0.5% lidocaine) injection.[3] The patient receiving PCEA is able to inject a 4-ml bolus.

Although anesthesia personnel were immediately available, it is possible that the time elapsed from the effect of catheter migration to its recognition may be prolonged, and consequently that the ability to manage this complication promptly and successfully may be impaired. Since life-threatening complications are quite rare (1:3,000),[3] it seems that further investigation involving a much larger population is required in order to establish the safety of PCEA use during labor.

As for the ability of PCEA to decrease the need for fully skilled anesthesia personnel in a busy obstetric anesthesia service, other alternatives to fully trained anesthesiologists are suggested in the literature and include family practitioners,[4] obstetricians,[5] and midwives trained to administer intermittent epidural doses of local anesthetic *via* the epidural catheter.

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In Reply:—We agree that epidural catheter migration into the intrathecal or intravascular space is a possibility and concern with epidural analgesia during labor. However, as discussed in our[1] and other's[2] work, patient-controlled epidural analgesia (PCEA) need not worsen and may lessen the consequences of such migration. In the event of intrathecal migration of the catheter, the low basal rate (6 ml/h, providing bupivacaine 7.5 mg/h) should not result in dangerously extensive spinal anesthesia, nor should a patient-administered dose of 4 ml (5 mg bupivacaine). This is in contrast to larger doses of bupivacaine typically administered by continuous infusion (12–15 bupivacaine mg/h) or intermittent bolus (25 mg bupivacaine), both of which may produce extensive or total spinal anesthesia. In the event of intravascular migration of the catheter, the maximum dose of bupivacaine available over 1 h (25 mg) is extremely unlikely to produce toxicity, and is much less than might be administered by intermittent boluses in an attempt to establish anesthesia.

We also agree, and state in the final sentence of our paper, that close patient monitoring is essential with PCEA as with any epidural analgesia technique during labor. However, we disagree with the suggestion that anesthetia staffing needs could appropriately be decreased by having family practitioners or obstetricians, who are poorly trained to manage the complications of regional anesthesia, administer epidural anesthesia during labor.

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Inappropriate Use of the *t*-test

To the Editor:—I read with interest the article[1] examining caffeine and halothane contracture testing in swine to detect malignant hyperthermia. However, I believe that the statistical methods and subsequent conclusions deserve comment.

A total of 108 muscle bundles from 11 swine were tested; 9 swine were tested twice, 4–6 weeks apart. Data then were analyzed with a two-tailed, unpaired *t*-test. In doing so, the investigators violated a critical assumption required by the *t*-test—that observations in each sample must be independent.[2] In general, multiple observations on the same subject cannot be considered independent. If all of the 108 observations were independent, a total of 108 observations from 11 swine would be equivalent to 108 observations from 108 swine. The data should be reanalyzed to determine whether the conclusions are warranted.

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