Intermittent Epidural Beats Continuous Infusion

Programmed epidural boluses decreased total anesthesia use and variability in response.

BY MIRIAM E. TUCKER

FROM THE ANNUAL MEETING OF THE SOCIETY FOR OBSTETRIC ANESTHESIA AND PERINATOLOGY

SAN ANTONIO — Providing epidural anesthesia in programmed boluses of higher volume with a longer duration between doses decreased total anesthetic consumption and variability without decreasing patient satisfaction in a randomized, controlled, double-blinded study of 180 laboring women.

VITALS

Major Finding: Total bupivacaine consumption per hour of analgesia was significantly lower among patients who received 10 mL over 60 minutes (10.3 mg/hour), compared with 11.3 mg/hour for those receiving 2.5 mL/15 minutes and 11.1 mg/hour for 5 mL/30 minutes.

Data Source: Randomized, controlled, double-blinded trial of 180 laboring women.

Disclosures: Dr. Wong said she had no financial conflicts of interest.

Increasing evidence suggests that delivery of epidural anesthesia via intermittent bolus provides more effective anesthesia than does continuous infusion, said Dr. Cynthia A. Wong of Northwestern University, Chicago.

In a previous study, Dr. Wong and her colleagues reported that the currently available pumps used for patient-controlled epidural anesthesia (PCEA) also can be programmed to automatically deliver boluses at regular intervals, and that this "programmed intermittent epidural bolus" (PIEB) resulted in similar analgesia but with a smaller bupivacaine dose and better patient satisfaction, compared with continuous epidural infusion (CEI) for maintenance of epidural labor analgesia (Anesth. Analg. 2006;102:904-9).

As a follow-up, the current study investigated the effect of specific combinations of bolus volumes and time intervals to determine which is optimal. The subjects were healthy nulliparas with cervical dilation 2-5 cm. All received combined spinal-epidural anesthesia comprising intrathecal bupivacaine 1.25 mg/fentanyl 15 mcg and a test dose of epidural lidocaine 45 mg/epinephrine 15 mcg. The epidural maintenance solution consisted of bupivacaine 0.0625% with fentanyl 2 mcg/mL. Breakthrough pain was treated with PCEA and if needed, a manual bolus dose by the anesthesiologist.

The maintenance epidural technique was initiated 15 minutes after the intrathecal injection. Patients were randomized to one of three groups: 66 received 2.5 mL by the pump every 15 minutes (2.5/15), 60 received 5 mL every 30 minutes (5/30), and 54 got 10 mL every 60 minutes (10/60). Thus, all patients received the same total volume of drug but it was distributed differently, Dr. Wong noted.

All of the women had successful analgesia, and there were no differences in maximum oxytocin dose or mode of delivery among the groups.

The primary outcome, total bupivacaine consumption per hour of analgesia, was significantly lower in the 10/60 group compared with the other two, with a mean of 10.3 mg/hr versus 11.3 mg/hr for the 2.5/15 patients and 11.1 mg/hr with 5/30. There was also less variability in dosing from hour to hour in the 10/60 group, she noted.

There were no significant differences in any secondary variable, including Visual Analog Pain score, motor block (Bromage greater than 0), number of PCEA requests, time to first request for manual bolus, number of subjects requiring manual bolus, patient satisfaction score, or extent of sensory blockade, as measured by both cold stimulus and von Frey hair threshold tests.

The mechanism isn't entirely clear. All studies of PIEB have shown that the technique provides equal or better analgesia than does CIE with a lower dose of drug. But, if as hypothesized, the reason is that boluses provides better spread in the epidural space, then it is "interesting" that this study found no difference in the extent of sensory blockade among the three groups. Indeed, data on the extent of sensory blockade in other studies of PIEB have been inconsistent, she said.

There is currently no commercially available pump that delivers both PCEA and PIEB.

DR. WONG

Other variables, such as differences in catheter design or patient demographics, might also contribute to the variability in extent of analgesia, she added.

In response to a question from the audience about whether these findings have changed her clinical practice, Dr. Wong noted that there is currently no commercially available pump that delivers both PCEA and PIEB.

However, her institution has "considerably backed off using continuous infusion rate" and now relies more on patient-controlled bolusing, resulting in a lower manual re-bolus rate. "There's very solid evidence that giving the drug as a bolus, by whatever means—by the patient, the machine, or the anesthesiologist—is a more efficient technique. ■

Combined Spinal-Epidural Anesthesia Bests Epidural Alone

BY MIRIAM E. TUCKER

FROM THE ANNUAL MEETING OF THE SOCIETY FOR OBSTETRIC ANESTHESIA AND PERINATOLOGY

SAN ANTONIO — Combined spinal-epidural anesthesia was superior to traditional epidural for first-stage anesthesia but there were no differences in second stage or in delivery pain in a randomized, controlled comparison of the two methods among 800 women.

VITALS

Major Finding: During the first stage of labor, mean verbal analog scale pain score was significantly less in the SE group compared with EA (1.36 vs. 1.89), but the difference was not significant by the end of the second stage.

Data Source: A randomized, controlled trial of 800 women.

Disclosures: Dr. Gambling said he had no financial disclosures to report.

The Epidural Analgesia and Spinal Epidural Analgesia (EASE) study also showed that concerns about epidurals failing with combined spinal-epidural (SE) because of the inability to provide a test dose are unfounded, Dr. David R. Gambling reported.

Previous studies comparing the techniques have had mixed results. A Cochrane review showed that CSE had less rescue analgesia and less urinary retention but more pruritis (Cochrane Database Syst. Rev. 2007 [doi:10.1002/14651858.CD003401.pub2]). Compared with low-dose epidural anesthesia (EA), combined SE had faster-onset analgesia, more pruritis, and lower umbilical cord artery pH, but there was no mention of progress of cervical dilation, noted Dr. Gambling of the Sharp Mary Birch Hospital for Women and Newborns and the University of California, San Diego.

In EASE, 398 women received EA, consisting of 10 mL 0.125% bupivacaine with 2 mcg/mL fentanyl in two 5-mL doses via epidural needle, followed by 5 mL of the same solution via epidural catheter (total dose 15 mL). The 402 in the SE group were given 2.5 mL 0.125% isobaric bupivacaine plus 2 mcg/mL fentanyl via 26-g GM spinal needle prior to epidural catheter placement.

In both groups, medications were administered at first request for neuraxial anesthesia. Labor was managed by registered nurses and obstetricians who were blinded to group assignment.

There were no significant differences between the groups in age, height, weight, body mass index, estimated gestational age, cervical dilation at epidural insertion, or pre-epidural verbal analog scale (VAS) pain scores. However, the time to complete analgesia (from initial EA and SE injection until patient reported VAS scores of 0 or 1 was significantly less with the SE group, 11 vs. 22 minutes.

The second stage of labor was statistically significantly shorter with EA (68 vs. 78 minutes), but the difference may not be clinically significant. There were no significant differences in time from epidural induction until cervical dilation reached 10 cm, duration of pushing, or rate of cervical dilation. There were also no differences in the use of instrumentation with vaginal delivery or need for cesarean section.

During the first stage of labor, the mean VAS pain score was significantly less in the SE group. compared with EA (1.36 vs. 1.89) and also at 1 hour of labor (0.26 vs. 0.72), despite a slightly lower rate of patient-controlled analgesia use during the first stage (10 vs. 11 mL/hr). The proportion of women with mean VAS scores of zero at the end of stage 1 was significantly higher with SE (42% vs. 31% with EA), but the difference was not significant by the end of the second stage, he said.

Patient satisfaction with their mode of analgesia did not differ between the two groups.

DR. GAMBLING

Need for epidural top-up was greater in the EA group (26% vs. 16%), as was the need for more than one top-up (21% vs. 9%). Only a small proportion of each group (2% EA and 1.2% SE) required replacement of the epidural catheter, suggesting that there should not be concern about epidurals failing with SE because of inability to provide a test dose, he commented.

Fetal heart rate decelerations within 30 minutes of analgesic induction were more common in the SE group (8.5% vs. 4.5%), but none required emergency c-section. The proportions with Apgar scores below 7 at 1 and 5 minutes were less than 5% and less than 0.5%, respectively, in both groups.

Patient satisfaction with their mode of analgesia did not differ, at 98% for SE and 96% for EA, Dr. Gambling reported. ■