seemed highly unlikely that the spinal/epidural caused the spinal hematoma because the location of the catheter was lumbar and at surgical exploration the spinal hematoma was clearly confined to the thoracic region of the spine. It would take a lot of imagination to assume the catheter had migrated to the thoracic region and then migrated back to the lumbar area. The spinal/epidural was performed by me and was nontraumatic.

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A Comparison of the Vasotrac with Invasive Arterial Blood Pressure Monitoring

To the Editor:

We read with great interest the article by Cua et al. (1). They evaluated the compliance of Vasotrac (Medwave, Arden Hills, MN) with invasive arterial monitoring in pediatric patients. The research design and statistical analysis were sound. However, some readers may misunderstand that the two measurements have the same target. Invasive blood pressure measurement and noninvasive blood pressure measurement have intrinsic differences because they measure different quantities. Invasive blood pressure has more value because it records the sum of the lateral pressure (measured by noninvasive blood pressure) and the converted kinetic energy. The pressure converted from blood flow could be more than 15 mm Hg depending on the blood density and velocity (2). Furthermore, invasive blood pressure using fluid-filled catheters can distort the original pressure waveforms. They may result in phase delay and an overestimation of pressure. If the exact invasive blood pressure value is needed as in Cua et al.'s study, the micromanometer-tipped catheter should be used or correction of the results by fluid-filled catheters should be performed (3).

It is more reasonable to consider the correctness of invasive blood pressure value and the original differences between invasive blood pressure and noninvasive blood pressure for the compatibility of two measurements.

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Dr. Lanssen does not wish to respond.

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Remifentanil Patient-Controlled Analgesia in Labor

To the Editor:

We have several concerns regarding the study design and results of the Evron et al. (1) article. Our primary concern is the use of an IV infusion of meperidine as the active control. Meperidine infusions are uncommon practice, and the authors' failure to use a patient-controlled IV analgesic (PCIA) modality for the meperidine group, as used by two previous labor remifentanil versus meperidine studies (2,3), limits direct group comparisons. Does the observed difference in analgesic efficacy between the two study groups instead reflect the different modes of administration and non-equianalgesic doses used?

Second, we were surprised that the authors used escalating doses of remifentanil up to a maximum bolus dose of 70 μg (0.93 μg/kg). Previous studies (4,5) have shown that PCIA doses of 0.4–0.5 μg/kg are effective in reducing labor pain scores. Indeed, the authors in this study reported that most parturients had satisfactory analgesia with boluses of 25–40 μg (equivalent to a PCIA bolus dose of 0.3–0.5 μg/kg based on the study's reported mean weight). Standardizing PCIA boluses would adjust for differences in body weight and allow more rigorous comparisons to be made between study groups. Moreover, failure to calculate doses according to body weight may have resulted in dangerously large doses (1.2–1.6 μg/kg) in the subjects 1–2 SD (16 kg) from the study group's mean weight (75 kg) when receiving the 70 μg dose. Transient respiratory depression is commonly reported in remifentanil PCIA labor studies, even with doses $<$0.5 μg/kg (4–6). With the higher doses used in this study, we would have expected a higher incidence of respiratory depression. We would be interested to know if any respiratory depression occurred among the three specific time points reported.

Third, we are unsure why the time to epidural analgesia cross-over was so much longer in the meperidine group (by almost 2 h) even though the remifentanil group had better pain control and a lower overall cross-over rate.

Lastly, it is unclear why the authors found a statistically significant difference in baseline VAS pain scores (P value $<$0.001). Is this an error in Table 2? If this is a true difference, we feel that the difference in pain scores before analgesia between the groups would invalidate further comparative data interpretation.

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In Response:

We agree with Drs. Bradwick and Carvalho that a comparison with pethidine by PCIA rather than by IV infusion would be more appropriate. However, this kind of comparison has already been done by Volikas et al. (1), who demonstrated that meperidine PCIA consumption was extremely large (up to 420 mg) and the study had to be prematurely terminated as a result of very low Apgar scores.

Second, we preferred to use escalating doses of remifentanil because of individual differences in response and in pain intensity depending on the stage of labor.

The longer (yet not significantly) time to epidural cross-over with meperidine may be explained by the longer analgesic effect of meperidine, compared with remifentanil.

Finally, the initial baseline visual analog scale value was mistakenly described as significantly different between the groups. In reality, there was no significant difference between the baseline visual analog scale scores of the two groups.

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