

## The Epinephrine Test Dose Revisited, Again

*To the Editor:*—We would like to comment on the recent clinical report by van Zundert *et al.*<sup>1</sup> concerning the epinephrine epidural anesthesia test dose in parturients. Their study design does not allow them to prove their hypothesis that iv injection of bupivacaine 12.5 mg and epinephrine 12.5  $\mu$ g “produces enough signs and symptoms to detect an accidental iv administration” in laboring women. The investigators injected bupivacaine 12.5 mg and epinephrine 12.5  $\mu$ g iv into 34 laboring women, 27 before and seven after institution of epidural anesthesia, and stated that they saw a “short-lived but unmistakable peak in the maternal heart rate” soon after injection in all patients. However, without a control group, with unblinded study design, and with no clear criteria for determining epinephrine injection, one cannot determine the role investigator bias played in their results. Maternal heart rate variability during labor is frequently greater than 30 beats per minute.<sup>2,3</sup> In a randomized, double blind study we found that we could not differentiate between iv injection of epinephrine 15  $\mu$ g and normal saline using a prospectively derived criterion (a maternal heart rate increase of  $\geq 25$  beats/min lasting  $\geq 15$  s).<sup>2</sup> A retrospectively derived criterion (an increase of  $\geq 10$  beats/min in the peak maternal heart rate after injection compared to the peak maternal heart rate before injection) did differentiate between the groups (missing only one patient who received epinephrine); however, even with this criterion, 5/20 patients had maternal heart rate changes within two beats/min of the cutoff point.<sup>2</sup>

We are also concerned about the safety of using a marker of iv injection that decreases uterine blood flow 13–45% for 1–5 min in pregnant sheep and guinea pigs.<sup>4,5</sup> The absence of fetal heart rate changes in this study does not prove that the injection of epinephrine 12.5  $\mu$ g iv into any parturient is safe, but merely that the healthy fetuses studied tolerated the injection well. The maternal cardiovascular changes seen after epinephrine 12.5  $\mu$ g iv might not be well tolerated by pre-eclamptic patients or by patients on beta-adrenergic agonist tocolytic therapy.

In addition, the first two parts of van Zundert *et al.*'s study involved non-obstetric patients.<sup>1</sup> Results obtained in non-pregnant patients may not apply to parturients, for the chronotropic response to the beta-adrenergic receptor agonist isoproterenol is reduced in pregnant

women.<sup>6</sup> Indeed, van Zundert *et al.* found a greater heart rate response to epinephrine 12.5  $\mu$ g iv in non-pregnant (study 1) than in pregnant (study 4) patients.

We agree that aspiration and fractionation of the local anesthetic dose will not detect inadvertent intravascular or subarachnoid epidural catheter placement in all parturients. However, we feel that parturients require a safer and more effective alternative to epinephrine as a marker of intravascular injection.

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