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REPLY

Thank you for giving us the opportunity to respond to Drs. Foster and Marx's letter.

Lidocaine 1.5% with epinephrine, as used by us in the patient in question[1] is reported to be "isobaric" by the manufacturers. We agree that this solution would become hypobaric at body temperature. Some of the signs and symptoms in our patient can be explained by this phenomenon.

We also agree with these authors recommending that epidural test doses should not be administered with the patient in a sitting position when the administration of the block is difficult.

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REFERENCE
1 *Palkar NV, Boudreaux RC, Mankad AV.* Accidental total spinal block: a complication of an epidural test dose. Can J Anaesth 1992; 39: 1058–60.

Accidental total spinal block (3)

To the Editor:

I would like to challenge the statement by Palkar *et al.*[1] that 15 μg epinephrine must be added to epidural test solutions to rule out intravascular injection. Although this may well be true for young, calm or premedicated adult surgical patients not receiving β-blockers, this cannot be extrapolated to other patient groups such as pregnant, in particular, labouring women.

In order to be clinically useful, an intravascular injection of an epinephrine containing test dose must consistently produce tachycardia in a patient who has an otherwise stable heart rate. Chestnut[2] found that 50% of labouring women had at least one spontaneous heart rate acceleration during the period of epidural placement. Injecting either saline or 15 μg epinephrine *iv* into labouring women Leighton[3] found the heart rate response to be neither specific nor sensitive. In the group receiving saline, 20% had an increase in heart rate, yet only 50% of those actually given epinephrine showed an increase.

In addition, the test dose must be safe, both for the mother and fetus. Hood[4] showed intravenous solutions containing 10–20 μ injected into pregnant ewes consistently decreased uterine blood flow to 55–65% of control, but without evidence of fetal compromise. However, Leighton[3] demonstrated signs of fetal distress in two of ten patients receiving *iv* epinephrine. In addition, she questioned the safety of epinephrine in pre-eclamptic patients.

Clearly the role of epinephrine in the obstetric epidural is controversial. Many centres, ours included, do not routinely use an epinephrine containing test dose in pregnant patients. The alternatives to test for intravascular catheter placement are either to use an air test dose with a precordial Doppler monitor, or a plain local anaesthetic test dose sufficient to have a reasonable probability of eliciting mild systemic symptoms should *iv* injection occur, without leading to too high a block in the average patient in the event of an unintentional subarachnoid injection. Such a test dose would be 3 ml of 1.5 or 2% lidocaine.

However, as this case report showed, high spinal blockade can occur with as little as 45 mg subarachnoid lidocaine. This illustrates that even the most conscientiously planned test dose does not replace a high index of suspicion regarding catheter placement, slow titration of epidural local anaesthetic, vigilance, and preparedness of the unexpected.

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2 *Chestnut DH, Owen CL, Brown CF, Vandewalker GE, Weiner CP.* Does labour effect the variability of maternal heart rate during induction of epidural anesthesia? Anesthesiology 1988; 68: 622–5.
3 *Leighton BL, Norris MC, Sosis M, Epstein R, Chayen B, Larijani GE.* Limitations of epinephrine as marker of intravascular injection in labouring women. Anesthesiology 1987; 66: 688–91.
4 *Hood DD, Dewan DM, James FM.* Maternal and fetal effects of epinephrine in gravid ewes. Anesthesiology 1986; 64: 610–3.

REPLY

We thank Dr. Lucy for showing interest in our Case Report recently published in your Journal.[1] There is no "ideal" test-dose and the controversy over it's volume and composition still continues.[2–6] We agree with Dr. Lucy that even the most conscientiously planned test dose does not replace a high index of suspicion regarding the catheter placement, vigilance and preparedness of the unexpected. In fact, Chestnut et al.[6] put

it very appropriately: every dose should be a test dose in labouring women.

A test dose should rapidly and reliably indicate if the needle or the catheter through which it is injected has entered a blood vessel or the subarachnoid space. An intravenous injection should produce mild and transient systemic effects. Although epinephrine containing test doses are neither specific nor sensitive, they cause very little harm. Here, we agree with Chestnut et al.[6] that the adverse consequences to the mother and fetus of unrecognized intravenous injection of a therapeutic dose of local anaesthetic are likely to be more severe, and there is no published report of an adverse neonatal outcome after an intravascular injection of an epinephrine containing test dose.

There is, however, a concern regarding the haemodynamic response to intravascular injection of epinephrine in hypertensive and pre-eclamptic parturients. We do not use epinephrine containing test doses in such patients.

The study reported by Hood et al.[7] describes the decreases in uterine blood flow following iv epinephrine test doses. These decreases were transient, were not accompanied by any changes in fetal heart rates or blood pressures and none actually developed fetal distress. Transient decreases in uterine perfusion undoubtedly occur during normal uterine contractions.

In the excellent study reported by Leighton et al.[8] on the maternal haemodynamic response to 15 μg iv epinephrine (versus placebo), epinephrine proved to be neither a specific nor sensitive indicator of an intravenous injection based on their base-to-peak criteria, but both the sensitivity and specificity increased by using the peak-to-peak criteria. Even more interesting, however, is that their data collecting investigator, who observed maternal symptoms and heart rate and blood pressure changes, correctly guessed the treatment group of all patients. Two out of ten patients in the epinephrine group developed fetal distress, but both were subsequently delivered vaginally with good Apgar scores.

Dr. Lucy mentions the use of air test dose. We have no personal experience with this technique. Addition of epinephrine to the lidocaine test dose, in our opinion, is safe and increases the probability of detecting an intravenous catheter placement or migration and the benefits outweigh the risks, even in the obstetric population.

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Esmolol

To the Editor:

I read with interest the recent editorial and original paper on the cardioselective beta blocker, esmolol.[1,2] Chung's conclusion that esmolol 2 $mg \cdot kg^{-1}$ is effective in obtunding the haemodynamic response to laryngoscopy and intubation concurs with our findings in another stressful situation, electroconvulsive therapy.[3] As Chung's study involved the use of a rapid-sequence induction technique with high dosages of succinylcholine (1.5 $mg \cdot kg^{-1}$), it is important to consider the possible theoretical drug interaction. Both esmolol and succinylcholine are metabolized by esterases and their combined administration may be associated with prolonged duration of action.[4]

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REPLY (1)

We appreciate the concern raised by Dr. O'Flaherty, as it calls attention to the potential for unplanned pharmacologic interactions when a new drug is introduced in the clinical setting. As noted by Dr. O'Flaherty, esmolol has the theoretical potential to affect neuromuscular as well as haemodynamic events.