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.

Neelkanth V. Palkar MD FFARCS
Randall C. Boudreaux MD
Aparna V. Mankad MD
Department of Anesthesiology
University of South Alabama Medical Center
Mobile, AL 36617

REFERENCES

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.
2 *Casey WF.* Epidural test doses in obstetrics. Anaesthesia 1985; 40: 597.
3 *Shah JL.* Epidural test doses in obstetrics. Anaesthesia 1985; 40: 1131.
4 *Prince G, McGregor D.* Obstetric epidural test doses: a reappraisal. Anaesthesia 1986; 41: 1240–50.
5 *Cartwright PD.* Obstetric epidural test doses. Anaesthesia 1987; 42: 556–8.
6 *Chestnut DH, Owen CL, Brown CF, Vandewalker GE, Weiner CP.* Does labor effect the variability of maternal heart rate during induction of epidural anesthesia? Anesthesiology 1988; 68: 622–5.
7 *Hood DD, Dewan DM, James FM.* Maternal and fetal effects of epinephrine in gravid ewes. Anesthesiology 1986; 64: 610–3.
8 *Leighton BL, Norris MC, Sosis M, Epstein R, Chayen B, Larijani GE.* Limitations of epinephrine as marker of intravascular injection in laboring women. Anesthesiology 1987; 66: 688–91.

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]

David O'Flaherty MB MD FFARCSI
Department of Anaesthetics
Guy's Hospital
London, England

REFERENCES

1 *Hall R.* Esmolol – just another beta blocker? Can J Anaesth 1992; 39: 757–64.
2 *Chung K, Sinatra R, Halevy J, Paige D, Silverman D.* A comparison of fentanyl, esmolol, and their combination for blunting the haemodynamic responses during rapid-sequence induction. Can J Anaesth 1992; 39: 774–9.
3 *O'Flaherty D, Husain M, Moore M, Wolff, Sills S, Giesecke AH.* Circulatory responses during electroconvulsive therapy – the comparative effects of placebo, esmolol and nitroglycerin. Anaesthesia, 1992; 47: 563–7.
4 *Murthy V, Patel K, Elangovan R, et al.* Effects of esmolol in circulatory response to intubation and succinylcholine-induced neuromuscular blockade in man. Anesthesiology 1985: 63; A367.

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.