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Epinephrine test dose for confirmation of intravascular migration of epidural catheter in a parturient

To the Editor:

We would like to report a case illustrating the probable intravascular migration of an epidural catheter which presented as tinnitus during injections and was confirmed by use of an epinephrine test dose via the catheter.

A 22-year-old primiparous term parturient requested epidural analgesia after eight hours of labour and at five cm cervical dilatation. A Tuohy epidural needle was inserted at the L₄₋₅ interspace and 4 ml of 0.5 per cent bupivacaine was injected via the needle. A catheter (Portex, 18G nylon catheter, 3 eyes) was inserted and an additional 4 ml of 0.5 per cent bupivacaine was injected via the catheter. The patient had no systemic complaints during the injection and had good analgesia for two hours, after which she requested a second injection. Five ml of 0.5 per cent bupivacaine was given. The parturient immediately complained of ringing in the ears which disappeared after a few minutes. After no improvement in pain relief in 30 minutes an additional injection of only 2 ml of 0.5 per cent bupivacaine again caused ringing in the ears.

Aspiration of the epidural catheter did not yield any blood. Because of our suspicion of an inadvertent intravenous injection, 10 µg of epinephrine were injected into the epidural catheter during ECG monitoring. A uterine contraction began soon after the injection and so the increased heart rate could not be properly evaluated. After four minutes, an additional 10 µg of epinephrine were injected into the epidural catheter with a subsequent increase in heart rate from 66 to 86 beats·min⁻¹ after 30 seconds. After another four minutes' wait, a third injection of 10 µg of epinephrine into the epidural catheter caused the heart rate to increase from 74 to 88 beats·min⁻¹ after 26 seconds. Systolic blood pressure increased from 110 to 140 mmHg over the course of the three injections. Finally, a 5 ml saline placebo injection produced neither tinnitus nor an increase in heart rate.

The epidural catheter was removed and on inspection only the proximal hole was patent, with the distal two holes being plugged with blood. A second epidural catheter placed at the L₂₋₃ interspace provided excellent analgesia with no systemic complaints.

The addition of epinephrine to an epidural test dose was described by Moore and Batra¹ who showed that an intravenous injection of 15 µg of epinephrine caused an increase in heart rate of about 30 beats·min⁻¹ within an average of 30 seconds after injection. In our case, we injected only 10 µg of epinephrine, although we repeated the injection three times. The heart rate increased 20 beats·min⁻¹ within 30 seconds of the second injection and 14 beats·min⁻¹ within 26 seconds of the third injection. These responses clearly suggest that the epinephrine was injected intravascularly via the epidural catheter.

Abraham *et al*² reported on eight parturients out of 250 who exhibited an increase in heart rate following the injection of a lidocaine, epinephrine and dextrose containing test dose via an epidural catheter. They presumed those to be accidental intravenous injections.

Cartwright *et al*³ subsequently showed however that the epidural injection of bupivacaine alone will cause an increase in maternal heart rate in 12 per cent of patients. Our patient received epinephrine alone without any local anaesthetic and showed no response to a placebo saline injection.

Therefore, when testing for the accidental intravenous placement of an epidural catheter we would suggest using epinephrine alone. The ideal single epidural test dose that will clearly demonstrate both intravenous and subarachnoid injections remains to be established.

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