Transarterial Diffusion of Mepivacaine

J. L. Steffenson, M.D., S. M. Sinider, M.D., A. A. de Lormier, M.D.

Are arteries impervious conducting vessels? We questioned this generally-held concept in an attempt to explain an unusual distribution of the local anesthetic mepivacaine following paracervical-block analgesia in obstetrics. We frequently found that within ten minutes of the block the concentration of local anesthetic in fetal blood exceeded that present simultaneously in maternal arterial blood (brachial or radial artery). Because arteries supplying blood to the placenta often pass near the site of paracervical injection, a high concentration of local anesthetic around the arteries may be produced. Diffusion across the arterial wall would produce a higher concentration of local anesthetic in the blood delivered to the placenta than in maternal arterial blood.

Fig. 2. Concentration of mepivacaine in popliteal and carotid arterial blood in a sheep following injection of 300 mg into the femoral artery.

Fig. 1. Mean concentrations of mepivacaine (±SE) in popliteal and carotid arterial blood in five sheep following infiltration of 300 mg around the femoral artery.

* Present address: Department of Anesthesiology, Oak Knoll Naval Hospital, Oakland, California.

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nal artery. In each of five sheep, mepipvacaine, 2 per cent, 300 mg, was infiltrated around the femoral artery. In the remaining animal, the drug was injected directly into the vessel. Simultaneous popliteal and carotid arterial blood samples were drawn 1, 3, 5, 7, 9, 15 and 30 minutes following injection. All samples were analyzed for mepipvacaine using a gas-liquid chromatographic technique.³

Popliteal arterial mepipvacaine concentrations were three to four times higher than those in the carotid artery (fig. 1). This gradient appeared in one minute and reached its maximum five to ten minutes after injection. That this difference is not due to a direct intravascular injection is shown by the data from such an injection (fig. 2). Placing mepipvacaine into the femoral artery produced a different type of decay curve with little difference between popliteal and carotid concentrations after the first minute.

CONCLUSIONS

Mepipvacaine rapidly crosses the intact wall of a major artery. This absorption may explain the unusually high concentration of local anesthetic sometimes found in the human fetus following paracervical block for obstetrical analgesia.

REFERENCES


Bupivacaine for Peripheral Nerve Block: A Comparison with Mepipvacaine, Lidocaine, and Tetracaine

DANIEL C. MOORE, M.D., L. DONALD BRIDENBAUGH, M.D., PHILLIP O. BRIDENBAUGH, M.D., GEOFFREY T. TUCKER, PH.D.

Investigators who have compared bupiva-
caine (Marcaine) with lidocaine (Xylocaine), mepipvacaine (Carbocaine), and tetracaine (Pantocaine) for epidural, caudal, and peripheral nerve block have concluded that the duration of action of bupivacaine is two to three times longer than that of lidocaine or mepipvacaine and 20 to 30 per cent longer than that of tetracaine.³-¹⁴ Most of these investigators arrived at this conclusion by comparing one patient with another, not by using the patient as a control. The latter technique was used, however, by Telivuo, who compared bilateral intercostal nerve blocks with bupivacaine and with mepipvacaine to relieve postoperative pain following thoracotomy in 58 patients; by Widman, who compared bupivacaine and mepipvacaine for digital blocks in 16 volunteers; and by Albert and Lofstrom, who compared bupivacaine, mepipvacaine, and tetracaine for ulnar block in 12 volunteers.¹-³

This study was designed to compare bupivacaine with lidocaine, mepipvacaine, and tetracaine in peripheral nerve block for surgical procedures, using the patient as his own control.

METHOD OF STUDY

Selection of Patients and Premedication

This study was carried out on patients who were to receive regional blocks, whose surgical procedure involved similar areas of anes-

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