

Transarterial Diffusion of Mepivacaine

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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).¹ Because arteries supplying

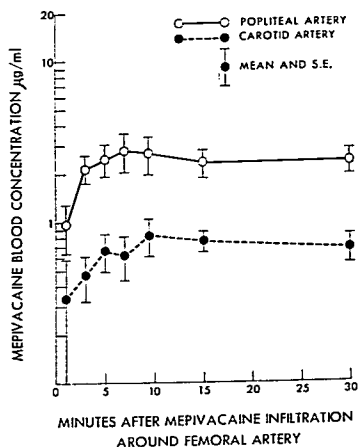


FIG. 1. Mean concentrations of mepivacaine (\pm SE) in popliteal and carotid arterial blood in five sheep following infiltration of 300 mg around the femoral artery.

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Received from the Departments of Anesthesiology, Obstetrics, Gynecology and Surgery, University of California, San Francisco, California. Supported in part by the U. S. Navy Medical Corps, and USFHS Grants 5T1 GM0063-11 and 1 P01 GM15571-01A1.

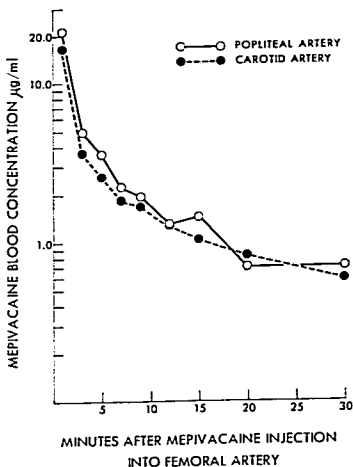


FIG. 2. Concentration of mepivacaine in popliteal and carotid arterial blood in a sheep following injection of 300 mg into the femoral artery.

blood to the placenta often pass near the site of paracervical injection, a high concentration of local anesthetic around the arteries may be produced.² 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.

We tested this hypothesis by injecting mepivacaine about the femoral artery and measuring the concentration downstream relative to the systemic arterial concentration. With the animals under low spinal and local infiltration anesthesia with tetracaine, we exposed the left femoral, left popliteal, and right carotid arteries in six sheep. Plastic catheters were placed in the carotid artery and the popliteal artery eight inches distal to the exposed femo-

ral artery. In each five sheep, mepivacaine, 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 mepivacaine using a gas-liquid chromatographic technique.³

Popliteal arterial mepivacaine 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 mepivacaine into the femoral artery produced a different type of decay curve with little difference between popliteal and carotid concentrations after the first minute.

CONCLUSIONS

Mepivacaine 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.

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

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Investigators who have compared bupivacaine (Marcaïne) with lidocaine (Xylocaine), mepivacaine (Carbocaine), and tetracaine (Pontocaine) 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 mepivacaine and 20 to 30 per cent longer than that of tetracaine.¹⁻⁴ 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 com-

pared bilateral intercostal nerve blocks with bupivacaine and with mepivacaine to relieve postoperative pain following thoracotomy in 58 patients; by Widman, who compared bupivacaine and mepivacaine for digital blocks in 16 volunteers; and by Albert and Lofstrom, who compared bupivacaine, mepivacaine, and tetracaine for ulnar block in 12 volunteers.¹⁻³

This study was designed to compare bupivacaine with lidocaine, mepivacaine, 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-

Received from The Mason Clinic and The Virginia Mason Research Center, Seattle, Washington 98101. Supported in part by USPHS Grant 1R01 GM 14416-01 from the National Institutes of Health. Presented at the Annual Meeting of the American Society of Anesthesiologists, San Francisco, October 29, 1969.