Lack of Exaggerated Spread of Epidural Anesthesia in Patients with Arteriosclerosis

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Exaggerated spread of analgesia resulting from epidural injection of local anesthetic has been demonstrated in patients with arteriosclerosis by comparing milliliters of local anesthetic required to block one spinal segment (segmental dose requirement—SDR) in patients with and without arteriosclerosis.† However, SDR is invalid in patients more than 50 years of age because it varies with the volume injected.‡ Bromage used smaller volumes in patients with peripheral vascular disease, which may have biased the results. This problem was re-examined in 40 patients 60 to 80 years of age, 20 with and 20 without peripheral vascular disease.

METHODS

I studied 20 patients elected for epidural anesthesia who had peripheral arteriosclerosis validated by angiography. They were scheduled for either amputation or vascular reconstruction. I also studied 20 patients with no clinically evident peripheral disease, ischemic heart disease, hypertension, or diabetes. Patients in the two groups were similar in height, weight, age and sex (table 1).

Epidural needle puncture with a 17-gauge Tuohy needle was performed with the patient in the lateral decubitus position via a midline approach at the L2–3 interspace, using an air-filled syringe for detection of loss of resistance. All patients received 10 ml (including a 2-ml test dose) of 0.75 per cent bupivacaine (Marcaine*) with freshly added epinephrine, 1:200,000.

After injection of bupivacaine at a rate of 1 ml/sec, a catheter was inserted (Deseret 19-gauge Teflon, cat. #3904), and the patient turned to the supine position. Twenty to 30 minutes after injection, anesthetic levels were determined by absence of pain in response to pinprick, counting upward from the fifth sacral segment.

RESULTS

A 10-ml volume of 0.75 per cent bupivacaine produced anesthetic levels ranging from 13 to 21 spinal segments. Patients who had arteriosclerosis developed anesthesia of 17.90 ± 1.94 spinal segments, and controls, anesthesia of 17.75 ± 1.91 segments, which corresponds to a T5–6 level, assuming complete anesthesia of the sacral and lumbar dermatomes. There was no significant difference between these results.

DISCUSSION

Patients with arteriosclerosis did not demonstrate exaggerated spread of epidural anesthesia in this study. In patients both with and without arteriosclerosis, mid- to upper thoracic anesthesia developed with only 10 ml of 0.75 per cent bupivacaine. Therefore, it is unnecessary to reduce the dose of local anesthetic in patients with arteriosclerosis.

The technique used was identical to that of Bromage, except that a 10-ml volume of bupivacaine.

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<th>Table 1. Characteristics of Patients Studied</th>
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0.75 per cent, was employed rather than variable volumes of lidocaine or mepivacaine. In both studies epidural anesthesia was administered at the L2–3 interspace with the patient in the lateral decubitus position, injections were at a rate of 1 ml/sec, and anesthetic levels were determined by absence of pain in response to pinprick when counting up from the fifth sacral segment. Therefore, the preselection of a lesser dose given to patients with arteriosclerosis will inevitably produce a lower value for SDR.

Enhanced spread of epidural anesthesia in elderly patients is largely due to closure of the intervertebral foramina by sclerotic changes, and the presence of arteriosclerosis does not appear to cause additional blockade. Furthermore, it is unlikely that so-called "massive" epidural anesthesia can be explained by the presence of arteriosclerosis. Extensive epidural spread has usually resulted from injecting volumes in excess of 20 ml into elderly patients when 10 ml would have sufficed. Small volumes of local anesthetic, which have been advocated for use in patients with arteriosclerosis, may be used successfully in all elderly patients.

References

Anesthetic Experiences in a Family with Hypokalemic Familial Periodic Paralysis

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Recently, Miller and Katz found only three case reports of anesthesia in patients with familial periodic paralysis. All patients were hyperkalemic, as originally reported by Fgan and Klein. Two had several hours of paralysis following anesthesia, although in one case only thiopental was used: in the other, an unknown general anesthetic was given. The third patient, given spinal anesthesia during childbirth, had an uneventful delivery. More recently, Siler and Discavage reported a case of hypokalemic familial periodic paralysis in which, after anesthesia, the patient required ventilatory assistance for 36 hours.

The anesthetic experiences of members of a family with a history of hypokalemic familial periodic paralysis are reported. The propositus was anesthetized by the author. Data for other family members (fig. 1) with positive histories were compiled from the hospital records and personal interviews. The diagnosis of hypokalemic familial periodic paralysis was confirmed by a study of two members (D10, D11) at the National Institutes of Health.

**Fig. 1.** A family with hypokalemic familial periodic paralysis. Key □ = males; ○ = females; □ = normal; ■ = affected. The generations are lettered, A–F, with the label near the person number one. Individuals of blood relationship of each generation are numbered.

Report of Two Cases

**Patient 1.** The propositus (D–11), a 22-year-old white man, had mild-to-moderate familial periodic paralysis, for which he was

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