SYSTEMIC REACTION TO SUBARACHNOID INJECTION OF PHENYLEPHRINE

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SUMMARY

An adverse reaction is presented. The patient developed a skin rash, hypertension, bradycardia, a ventricular bigeminal rhythm, and signs of ischaemia in the electrocardiogram after subarachnoid injection of phenylephrine 10 mg.

The injection of vasoconstrictors together with a local anaesthetic will prolong the duration of spinal anaesthesia. We use phenylephrine ((-)-1-(m-hydroxyphenyl)-2-methyl-aminoethanol HCl), which has been reported to double the duration of anaesthesia (Moore and Bridenbaugh, 1966). These authors found no systemic response to the added phenylephrine in a retrospective study of 1911 spinal anaesthesias.

CASE REPORT

A 42-year-old woman was admitted for removal of varicose veins. She was in good general health.

Premedication was with atropine 0.5 mg, pethidine 50 mg and promethazine 50 mg i.m. A lumbar puncture was performed, and aspiration produced clear spinal fluid. Amethocaine 15 mg in a glucose solution with phenylephrine hydrochloride 10 mg was injected.

The patient immediately complained of dizziness. She remained conscious, but seemed withdrawn. A skin rash appeared on the thorax and upper extremities and the mean arterial pressure increased from 105 to 165 mm Hg. The E.C.G. showed premature ventricular contractions in a bigeminal rhythm, and the effective heart rate was 55 beat min⁻¹. The cardiac arrhythmia responded to lignocaine 100 mg, the arterial pressure returned to normal and the rash gradually disappeared. E.C.G. 10 min after the onset of symptoms showed signs of ischaemia with depression of the ST segment and inversion of the T wave, most prominent in the lateral precordial leads. Five hours later E.C.G. showed no ischaemic changes, and the patient reported no after-effects.

With the patient's consent the drugs given for the operation were given again in the intensive care unit a few days later. E.C.G. was monitored continuously, and an i.v. infusion was established. After no local

FIG. 1. A: Leads aVF and V4 recorded on admission. B: The same leads recorded 10 min after the adverse reaction. C: The recording made 5 h after the episode. Note marked ST-depression and T inversion in B, indicative of myocardial ischaemia. Paper speed 50 mm s⁻¹.
response was provoked with intracutaneous injections of dilute solutions of amethocaine and phenylephrine, i.v. injections were given. Amethocaine caused no response. After phenylephrine 0.25 mg, however, the patient reported the same feeling of dizziness, but remained alert. Mean arterial pressure increased from 115 to 145 mmHg, the heart rate was reduced from 90 to 75 beat min⁻¹, and a rash developed. Arterial pressure and heart rate returned to normal within 5 min and the rash disappeared. E.c.g. monitoring continued for another 30 min.

**DISCUSSION**

Phenylephrine has mainly alpha-adrenergic effects. It causes peripheral vasoconstriction, increased arterial pressure, and reflex bradycardia, while the blood flow to the skin and kidneys is reduced (Eckstein and Abboud, 1962). The drug may be used to treat atrial tachycardia and hypotensive states, and in topical preparations as a mydriatic agent and a nasal decongestant. It has not been reported as causing cardiac arrhythmia when used during halothane anaesthesia (Martindale, 1977). Moore and Bridenbaugh (1966) compared the effects of ephedrine, adrenaline and phenylephrine as additives to the local anaesthetic. They found that the duration of anaesthesia was increased twofold by phenylephrine 5 mg, and by 50% by adrenaline 0.2 mg. Ephedrine had no influence on the duration of block.

There are several reports on systemic effects of topical phenylephrine (Vaughan, 1973; Fraunfelder and Scafidi, 1978; Leopold, 1978), but none from subarachnoid injection. We do not know if our patient's reaction was allergic or toxic. The transient rash may suggest allergy, but allergies to adrenergic substances are rare.

The dose of phenylephrine would be sufficient to cause toxic symptoms. The most likely explanation is that the phenylephrine gained access to the circulation, either by very rapid absorption from the subarachnoid space, or by some degree of i.v. injection.