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Title : THE NECESSARY INGREDIENTS OF A TEST DOSE PRIOR TO EPIDURAL OR CAUDAL BLOCK

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INTRODUCTION. Many anesthesiologists do not use test doses prior to epidural or caudal block because: (1) they are time-consuming; (2) the results seldom prove an intravascular or subarachnoid injection; and (3) the incidence of such reactions is one in 800 blocks and one in 2,000 blocks, respectively. This study found a test dose which definitely indicated subarachnoid or intravascular injection in two minutes and which could be performed by the gloved (sterile) anesthesiologist.

METHOD. Three milliliters of a 1:200,000 epinephrine solution (0.015 mg) was injected intravenously into 11 volunteers (six males, five females). Then, in 40 unmedicated surgical patients (N = 10 for each drug) and in 175 moderately premedicated ones scheduled for epidural or caudal block, 3 ml of 0.75 percent bupivacaine, 3.0 percent chloroprocaine, 1.5 percent lidocaine, or 1.5 percent mepivacaine were injected intravenously. These dosages are known to produce definitive evidence of spinal block in two minutes. The unmedicated patients received plain solutions; the premedicated ones were given solutions with epinephrine 1:200,000. The local anesthetic solution injected was that which was to be used for the surgical procedure. The site of injection was the hand, and the rate was one milliliter per second.

In 100 of 175 premedicated patients, plain solutions of the local anesthetic drug and the epinephrine were autoclaved by us and the epinephrine added immediately prior to injection (N = 25 for each drug). In 50 patients, solutions of bupivacaine or lidocaine with epinephrine 1:200,000 were administered as received from the pharmaceutical company (N = 25 for each drug). And, in 25 patients, lidocaine with epinephrine 1:200,000 which had been autoclaved by us was given. These solutions were selected to simulate those generally employed. We routinely autoclave all solutions prior to use, but others do not. Therefore, both types of solutions were tested to ascertain if autoclaving altered the effects of the epinephrine. Bupivacaine with epinephrine was not autoclaved because it turns yellow and smells like sulphur. Mepivacaine and chloroprocaine are not available with epinephrine.

The volunteers were constantly interrogated. Their pulses were monitored by palpation, and their blood pressure was recorded at 15-second intervals using a sphygmomanometer. All 215 patients were similarly interrogated and monitored. However, in addition to this, the 175 premedicated patients were monitored by electrocardioscopy with a heart rate indicator (Hewlett-Packard #763B) and documented by a recorder (Hewlett-Packard #7864A).

RESULTS. All the volunteers showed a typical epinephrine reaction: (1) circumoral pallor; (2) pulse rate increase of 20 to 40 percent above the control level; (3) blood pressure increase of 10 to 25 percent above the control level; (4) a feeling of warmth; (5) palpitation; (6) weakness, particularly in the legs; and (7) nervousness or shaking, that is, "the jitters." These signs and symptoms occurred within 20 to 40 seconds and lasted two minutes or less, except for the jittery feeling, which lasted up to 10 minutes.

Of the 40 unmedicated patients, 35 exhibited no evidence of systemic toxicity. The others reported only questionable signs -- that is, slight warmth or numbness of the tongue and lips. No electrocardiographic changes occurred in these 40 patients.

Of the 175 premedicated patients who received 3 ml of the local anesthetic with 1:200,000 epinephrine, only 50 percent complained of transient palpitation. However, the heart rates of all but three patients increased 25 to 40 percent, as reflected by the electrocardioscopy and documented by an electrocardiogram. The three patients whose heart rates did not accelerate were taking propranolol (Inderal^{R}). In the first 10 of the 175 patients, blood pressures increased 10 to 25 percent. Nonetheless, we stopped monitoring blood pressure because doing so would require a knowledgeable, conscientious person in addition to the gloved anesthesiologist, and in practice one is not usually available.

CONCLUSIONS. For a 3 ml test dose to indicate within two minutes either an inadvertent subarachnoid or an intravascular injection when performing an epidural or caudal block, all of the following criteria must be met. First, the milligram dose of the local anesthetic drug must be adequate to produce spinal block rapidly. Second, the solution must contain 0.015 mg of epinephrine. Finally, the patient must be monitored by an electrocardiograph with a pulse indicator.

Beta adrenergic blocking agents negate the action of the epinephrine. Furthermore, no test is absolutely "fool-proof." Therefore, even if the above criteria of a test dose are met and it is negative, constant observation and monitoring of the patient are still mandatory to avoid the complications of the therapeutic dose. Nonetheless, an effective test dose of the local anesthetic solution should be given.