TITLE: 2-CHLOROPROCAINE AND BUPIVACAINE AS INDICATORS OF INTRAVASCULAR INJECTION

AUTHORS: B.E. Harrington, M.D., J.M. Neal, M.D., D.C. Mackey, M.D., M.F. Mulroy, M.D.

AFFILIATION: Department of Anesthesiology, Virginia Mason Clinic, Seattle, WA 98111

PURPOSE: The use of a test dose in epidural anesthesia to check for undesired intravenous or subarachnoid location is well established. Moore and Batra have shown that a 15 microgram epinephrine test dose is a reliable indicator of intravenous administration[1]. Concern has arisen in certain groups of patients (e.g., pregnant patients and those on beta adrenergic blocking drugs and tricyclic antidepressants[2]) that this indicator may be unreliable or even undesirable.

The mild systemic toxic effects noted with small doses of intravenously administered local anesthetic agents have also been recommended and utilized as clinical indicators of intravascular location. Bupivacaine[3] (B) and 2-chloroprocaine[4] (CP) in a wide range of doses have been advocated. Experimental data is needed to support the clinical utility of these regimens. A recent preliminary report indicates that 100 mg of CP provides a reliable indication of intravenous administration in healthy unpremedicated volunteers[5].

We studied the reliability of 2 lower doses of CP (60 and 90 mg) and of B (25 mg) which have been recommended.

METHODS: With Human Research Committee approval and informed consent, 10 healthy unmedicated volunteer subjects were monitored with continuous electrocardiography and blood pressure determination each minute. Three ml of CP, 2% (60 mg) or 3% (90 mg) or normal saline was injected in random order. Injections were given 10 minutes apart and the subjects monitored closely throughout, with subjects questioned approximately every 30 seconds concerning the presence or absence of symptoms by a blinded observer.

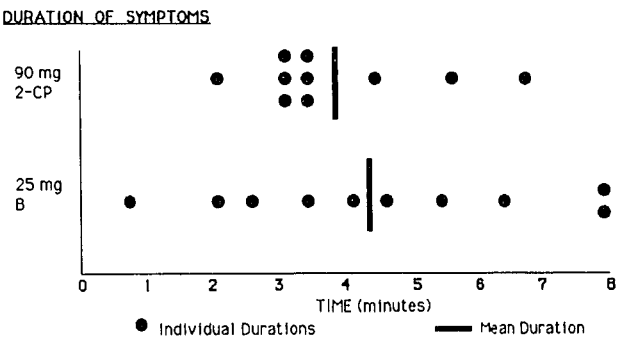
Following the first three injections, patients were injected with 2 random 5 ml injections of either 25 mg B or normal saline. Injections were again given 10 minutes apart and the subjects monitored both subjectively and objectively as above. At the conclusion of the study, patients were asked to rate the intensity of their symptomatic episodes on a scale of 1 (mild) to 10 (severe) and to state if the symptoms they experienced were "unmistakable."

RESULTS: Administration of 90 mg of CP and 25 mg of B yielded unmistakable symptoms in all 10 patients studied. Subjective intensity scores for these two regimens were similar (6.4 for 90 mg CP and 5.0 for 25 mg B). Detection of administration of 60 mg CP was inconsistent (with two subjects failing to experience any symptoms and only half of the patients experiencing unmistakable symptoms) and considerably less severe (mean intensity score being 2.65). Symptoms were similar for all subjects and universally included tinnitus, fullness in the head, and lightheadedness. Other variable symptoms included warmth, numbness, fullness in the throat, taste in the mouth, drowsiness, thickness of the tongue, vertigo, heart pounding, and a variety of other sensations. One subject had slurring of speech. There were no changes in blood pressure, pulse, or cardiac rhythm.

Onset of symptoms was consistent (between 30 and 45 seconds) among subjects regardless of agent or dose administered. Duration of symptoms (i.e. until subjective return to baseline) was 3.8 (range 2 to 6.75 min) minutes for 90 mg CP and 4.5 (range 0.5 to 8 min) minutes for 25 mg B (Figure 1).

DISCUSSION: Our data support the claims that 90 mg 2-chloroprocaine (3 ml 3%) and 25 mg bupivacaine (5 ml 0.5%) are reliable indicators of intravascular injection in healthy, unpremedicated patients. The subjective changes persist for 3.5 to 4 minutes, allowing adequate time for reliable detection. In contrast, however, the use of 60 mg 2-chloroprocaine (3 ml 2%) was an unreliable indicator based on our group in which half of subjects tested failed to detect an unmistakable subjective change.

Further study is needed to assess the reliability of these agents and doses in medicated surgical patients and in pregnant women during labor.



REFERENCES

1. Moore DC, Batra MB. Anesthesiology 55:693-6, 1981.

2. Wong KC, Puerto AX, Puerto BA, Blaatnick RA. Anesthesiology 53:525, 1980.

3. Abouleish E, Bourke D. Anesthesiology 61:344-345, 1984.

4. Abboud TK, DerSarkissian L, Terrasi J, et al. Anesth Analg 66:71-5, 1987.

5. Grice SC, Eisenach JC, Dewan DM, Mandell G. Anesthesiology 67:A627, 1987.

Downloaded from http://pubs.asahq.org/anesthesiology/article-pdf/69/3A/A358/636790/0000542-198809010-00357.pdf by guest on 19 August 2022