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Intraarterial Injection of 2.5% Thiamylal Does Cause Gangrene

To the Editor:—The reply to the question, "Does 2.5% thiopental cause gangrene?"[1] is affirmative in the literature[2] as well as in our experience. In the former, Waters[2] cited a case, as a personal communication from Prof. T.C. Gray, where the injection of 2.5% solution into an artery on the hand resulted in gangrenous fingers.

In our case, similar to Dr. Taff's patient,[1] 5 ml of 2.5% thiamylal was injected into a radial artery. This happened accidentally while we were treating a 64-year-old woman who developed generalized convulsions. Cyanosis and swelling of the entire hand occurred, followed by gangrene of the thumb, index and middle fingers, and the palmar region. A stellate ganglion block and axillary block were performed twice daily for 15 days along with low-dose heparin therapy. Although these treatments appeared to reduce the area of gangrene, necrosis of the middle and distal phalanges of the index finger occurred (fig. 1). The critical hemodynamic state of our patient might have contributed to this necrosis; however, experimentally, partial necrosis of the rabbit ear has been reported following intraarterial injection of 2.5% thiopental.[3]

Therefore, we believe the answer to the question is affirmative, and therefore that intraarterial injection of 2.5% thiopental or thiamylal should be avoided rigorously.

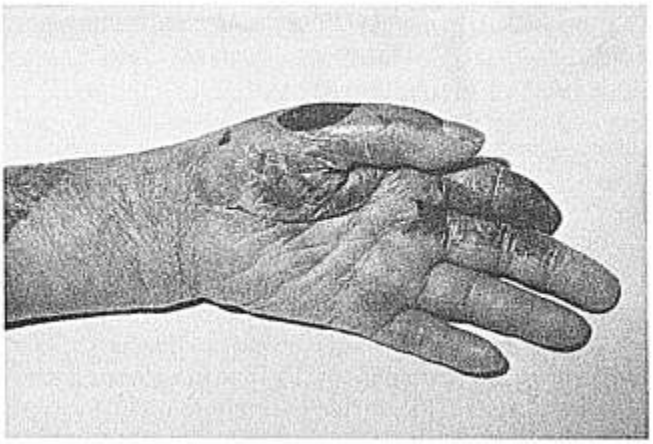

FIG. 1. A picture of a left hand 20 days following the intraarterial injection of 2.5% thiamylal through the radial arterial line.

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Intraarterial Thiopental

To the Editor:—To the best of my knowledge, the first and possibly only documented follow-up of sequelae following certain intraarterial injection of thiopental in a large series of patients was published by me in 1956[1] and repeated in *Intravenous Anaesthesia*[2] in 1974. This was carried out by a questionnaire to about 100 departments in England and the United States dealing with the incidence of arterial injection (estimated 1:3,500) and details of cases. The authors reporting all of these cases were contacted subsequently and accuracy

of their reporting verified. This showed a fairly clear-cut relationship between injected concentration and severity of symptoms in 46 patients. Fourteen of the incidents were with 2–2.5% thiopentone, and there was one slight hypoaesthesia but no gangrene as mentioned in Dr. Taff's letter.[3]

When this survey was carried out, it was common practice to inject directly into a vein, and few of these patients had an infusion. Furthermore, 5% then was an acceptable concentration in both Ireland and North America. I subsequently obtained details of another 18 arterial injections with 2.5% solution (making a total of 32) with no severe sequelae. I would be interested in hearing of cases of gangrene with this low concentration.

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A Simple Way to Convert *p*H to Hydrogen Ion Concentration

To the Editor:—On examining the relationship between the blood *p*H and the corresponding amount of hydrogen ions in nanoequivalents per liter, I realized that for *p*Hs between 7.20 to 7.50, a single rule makes it easy to convert from one scale to the other.

If the last two digits of the *p*H are subtracted from the number 80, the correlative amount of nanoequivalents per liter is found. For example:

$$pH = 7.35$$

$$80 - 35 = 45, \text{ therefore:}$$

$$[H^+] = 45 \text{ n Eq/l}$$

If the amount of nanoequivalents per liter is subtracted from the number 80, the last two digits of the corresponding *p*H are found. For example:

$$[H^+] = 55 \text{ n Eq/l}$$

$$80 - 55 = 25, \text{ therefore:}$$

$$pH = 7.25$$

The proposed rule of 80 has its rationale in the fact that over the *p*H range 7.20–7.50, each 0.01 unit change in *p*H is approximately equivalent to a 1.0 n Eq/l change (in opposite direction) in hydrogen ion concentration.[1] Because the starting point is *p*H 7.40 and $[H^+]$ = 40 n Eq/l, the sum of the last two digits of the *p*H and the correlative number of nanoequivalents per liter of hydrogen ions concentration always will be 80 in the range mentioned above.

I do not know if this rule has been reported before. Recently I presented two lectures on acid-base balance, and my literature review did not reveal any such rule. I would like to hear from any of your readers who might know of previous publications of this rule. In any case, it may help ease the *p*H and $[H^+]$ calculations in the acid-base balance.

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