Anesthesiology
V 45, No 3, Sept 1976

Correspondence

Anesthesia for the Foot

To the Editor:—I found the article, "Ankle block anesthesia for foot surgery" (ANESTHESIOLOGY 44:348–352, 1976) of considerable interest. If Dr. Schurman had investigated the recent literature more thoroughly, he would have discovered a larger and more complete examination of the issue in my paper, "Regional anaesthesia for the foot" (Can Anaesth Soc J 12:465–474, 1965).

There is one difference in technique. I chose to do a lateral popliteal block instead of a combined anterior–tibial block and subcuticular injection. Not only is one injection better than two, but the lateral popliteal is a much easier, more successful and reliable technique than is the anterior tibial block.

The foot drop is not a significant complication.

R. M. McCUTCHEON, M.D., F.R.C.P.(C)
Northwestern General Hospital
Toronto, Ontario, Canada

(Accepted for publication April 27, 1976.)

Dose, Potency, and Square Root of Time

To the Editor:—When Miller and Eger (ANESTHESIOLOGY 44:297–300, 1976) describe the "early and late relative potencies of pancuronium and *d*-tubocurarine in man," they attribute the pharmacokinetic differences to metabolism, renal excretion, plasma and tissue binding. My analysis of their data shows that the pharmacokinetic differences between these drugs of different potencies is most easily explained by different loading doses.

By taking the data from their table and graphs, obtaining the cumulative doses, and plotting these against the square root of elapsed minutes (fig. 1), an excellent linear correlation is obtained. The cumulative doses of both muscle relaxants are proportional to the square roots of minutes. The least-squares best-fit lines for the data appear in the figure together with the correlation coefficients (r).

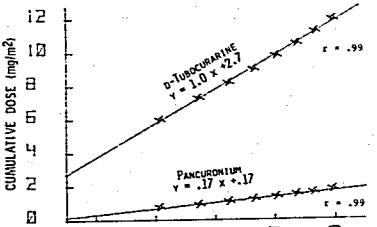

FIGURE 1.

This analysis permits several inferences within the scope of their study: 1) The main difference between the pharmacokinetics of *d*-tubocurarine and pancuronium is the loading dose, *i.e.*, that initial dose needed to obtain 90 per cent twitch depression. Following the loading doses, the pharmacokinetic effects of tissue binding, redistribution, metabolism, and excretion are similar and do *not* require that "doses of *d*-tubocurarine should be reduced proportionally more with time than doses of pancuronium." One explanation for the relatively larger loading dose of *d*-tubocurarine is greater binding to plasma proteins. 2) The best estimate of the relative potencies of pancuronium and *d*-tubocurarine is the ratio of the slopes of these two best-fit lines, *i.e.*, 1/.17, or 5.9. This ratio is somewhat larger

than their late relative potency of 5.1 and lower than their early relevant potency of 7.4. 3) Lowe *et al.*[1] have shown the convenience of using the square root of time approximation for determining doses of inhalation anesthetics. My analysis of these data from Miller and Eger suggests the application of the square root of time approximation to pancuronium and *d*-tubocurarine.

ALFRED FEINGOLD, M.D.
Associate Professor
Department of Anesthesiology
School of Medicine
University of Miami
Miami, Florida 33152

REFERENCE

1. Lowe HJ, MacKrell TN, Mostert JW, et al: Quantitative closed-circuit anesthesia. Anesthesiol Rev 2:16–19, 1974

(Accepted for publication May 14, 1976.)

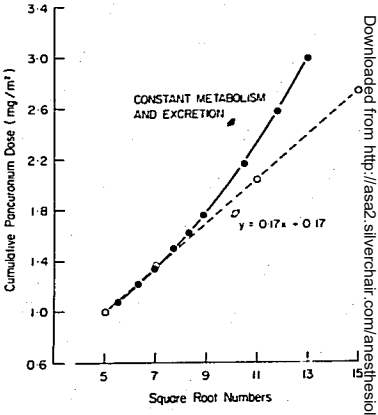

FIG. 1. Comparison of Feingold's square root of time method (O – – – O) with that assuming constant metabolism or excretion (● —— ●).

To the Editor:—We appreciate the opportunity to respond to Dr. Feingold's letter. We presented data which indicate that the ratio between that amount of relaxant representing tissue uptake and that amount representing metabolism and excretion is larger for *d*-tubocurarine than for pancuronium. A difference in the required "loading" dose is obvious in table 1 of our article. *d*-Tubocurarine, with its larger relative tissue uptake, which may be due to protein binding, requires a larger loading dose relative to pancuronium.

We believe the square root of time approach adds little to the understanding of our data and, in fact, may produce an erroneous result. The square root of time approach presumes that uptake of relaxant progressively decreases with time; at each doubling of the square root, the uptake is halved, approaching zero as time becomes very large. This markedly differs from our interpretation, which is that the later values for relaxant requirement represent excretion and/or metabolism which remains constant indefinitely. Assuming constant metabolism and/or excretion of pancuronium (0.135 mg/m²/10 min), the difference between our interpretation and the square root of time method becomes apparent (fig. 1). For these reasons we believe that the square root of time is not an appropriate method of analysis for our data.

RONALD D. MILLER, M.D.
EDMOND I. EGER, II, M.D.
Department of Anesthesia
University of California
San Francisco, California 94143

(Accepted for publication May 14, 1976.)