The Elephant's Ears Can Be Misleading

When the blind men were sent to examine and describe an elephant, one of them palpated the ears, and found them to be long and floppy like wings. He therefore concluded that the elephant was a bird. Another felt the tail, remarked that it was long and thin, and determined that the beast was a snake. Neither man was incorrect in his observation. But both erred when they based a general conclusion upon one observation of a complicated creature.

One of the complicated creatures which we in anesthesia are presently examining and describing is the interaction between depolarizing and nondepolarizing muscle relaxants. This problem may have at least as many aspects as an elephant, and we must be careful not to draw general conclusions from too limited observations. Two aspects of the problem are described in the current issue. One report is that of Miller and Way, "The Interaction between Succinylcholine and Subparalyzing Doses of d-Tubocurarine and Gallamine in Man." These authors utilized a single experimental design (three successive doses of 1 mg/kg succinylcholine). Each patient could thus serve as his own control. His first response to succinylcholine was compared with his third response (after he had been given 20 mg of gallamine or 3 mg of d-tubocurarine). Such an experimental design can yield useful data from small numbers of subjects. But, strictly speaking, it measures only what happens when a nondepolarizing drug is administered before the third dose of succinylcholine. Not much happened to the aspects of thumb adduction that Miller and Way chose to measure, and they concluded that "prior administration of ... either gallamine (20 mg) or d-tubocurarine (3 mg) has little effect on the magnitude and type of neuromuscular blockade produced by succinylcholine." To this we must add "under the exact conditions of this study."

Cullen studied other conditions in his report, "The Effect of Pretreatment with Nondepolarizing Muscle Relaxants on the Neuromuscular Blocking Action of Succinylcholine." He studied many drugs at several dose levels, and thus had to observe more patients to get reliable data. He measured some aspects of finger twitch, but not all those studied by Miller and Way. But he added observations of clinical import, including depression of fasciculations and ease of intubation. These are qualitative judgements which again necessitate large numbers of observations if differences between groups are to transcend variations in judgement.

And what did Cullen find? From his side of the elephant he observed that the doses used by Miller and Way (20 mg of gallamine or 3 mg of d-tubocurarine preceding 1 mg/kg of succinylcholine) resulted in poor conditions for endotracheal intubation. Studying more dose levels, he discovered that 20 mg gallamine preceding a larger dose of succinylcholine (1.5 mg/kg) provided adequate conditions for intubation while still eliminating fasciculations. Cullen's work thus describes a clinical phenomenon. Miller and Way's more detailed look at finger twitch, including tetanus and posttetanic facilitation, describes a drug interaction measured in terms perhaps more relevant for pharmacology, but less for clinical anesthesia.

The apparent disagreements between these two authors can thus be resolved with the realization that they used different methods to study different phenomena. But here the story does not end. In the original fable of the elephant, attributed to Gautama Buddha, many blind men approached the beast. He was described as a set of pillars (his long legs) and his trunk was called a windrowing pole. So too, will this drug interaction problem be described by other researchers in other ways. And finally, when we build a composite picture of the problem, we may find that none of the data were really contradictory—only the preliminary interpretations.

Harry Wollman, M.D.  
Professor of Anesthesiology and Pharmacology  
University of Pennsylvania  
School of Medicine  
Philadelphia, Pennsylvania 19104

Reference
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