

Title: UTILIZATION OF PHARMACOKINETIC COMPUTER MODELING OF INTRAVENOUS ANESTHETIC DRUGS IN RENAL FAILURE AS AN AIDE IN THE TEACHING OF CLINICAL PHARMACOLOGY

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Introduction. Anesthesiologists must develop a strong background in clinical pharmacology and apply the widely available knowledge in pharmacokinetics and pharmacodynamics to prescribe and administer the multitude of drugs employed in the practice of anesthesiology today. This must include a thorough understanding of how disease and altered states of physiology effect the time course of drug disposition due to changes in absorption, distribution and elimination. We have begun to utilize a computer program to model the pharmacokinetics of many anesthetic drugs as an aide in teaching applied clinical pharmacology in the development of anesthetic regimens in "routine" and altered physiologic situations. We present computer modeling of commonly-used anesthetic drugs and demonstrate altered pharmacokinetic profiles in renal failure as an example of this powerful teaching tool.

Methods. A literature search was completed for each drug modeled. Relevant pharmacokinetic parameters were tabulated or calculated from the literature data in "normals" and "renal failure". These included distribution rate constants, elimination rate constants, intercompartmental rate constants, clearance, and apparent volume of distribution. Using a Tektronix Model 4052 microcomputer these parameters were used to graphically model the time course of blood level of a drug. The regimen for an example is listed in Table #1 for pancuronium.

Results. Several commonly administered intravenous anesthetic drugs have been modeled for both "routine" and altered physiologic states (renal failure). The resultant pharmacokinetic profiles were compared and optimized for educational purposes. Figure 1 resulted from modeling the same regimen in patients with intact renal function and those with renal failure. These and several other examples will be presented graphically at the conference.

Discussion. We conclude that applied computerized pharmacokinetic modeling has demonstrated utility in teaching basic drug pharmacology. We believe that many other drugs could be similarly treated in our computer modeling teaching program and suggest that other anesthesiology residency training programs may find this approach invaluable. The application of these modeling programs is being developed into a package which will include individualization of drug administration used pre-operatively on a case-by-case predictive mode.

Table 1
Dosing Regimen for pancuronium

TIME in hours	Dose in mgs IV
0	7
1	3.5
2.5	3.5
4	1.75

SIMULATION OF PANCURONIUM IN NORMAL AND RENAL FAILURE PATIENTS USING THE SAME DOSING REGIMEN (TABLE 1)

