PHARMACOKINETICS

THE CLINICAL SCIENCE OF HOW THE BODY WORKS WHEN GIVEN A MEDICATION

By Allen Nichol

For practicing attorneys whose field is related to patient injury caused by medications, or conversely, those who are in the defense of physicians wrongly accused by their patients of medical malpractice blaming prescribing decisions, this information can be the difference of winning or losing a case.

Pharmacokinetics is the study of how the body works when given medication or combinations of multiple medications. It can be further described as the branch of clinical pharmacy that studies the fate of therapeutic substances in the body. Or even more simply described as what the body does to a drug.

Pharmacokinetics has four concepts: (1) Absorptions/Administration: Identifying how the medication enters into the bloodstream. (2) Distribution: Identifying mechanistically how medication is transported throughout the body and distributed throughout the tissue and fluids of the body. (3) Metabolism: Identifying how the body begins to break down the medication once it has entered the body. The metabolism is performed by either the kidneys (renal system) or the liver (hepatic system) or in some cases a combination thereof. Metabolism of the medication evaluates how the body begins to inactivate the medication(s) once it has entered into the body. Depending upon the functionality of the kidneys or the liver, the rates and the ability to metabolize the medication(s) can be altered. Furthermore, if in the case of either renal insufficiency or hepatic insufficiency, the medications may not be able to be appropriately metabolized. From that, there could be the potential for causing an accumulation of free drug in the blood stream and the occurrence of a toxic accumulation of medications could occur, having the potential to be injurious to the patient. Also, there are numerous pathways within the hepatic system through which medications are metabolized and further complicates safe treatment considerations. (4) Excretion: Identifying how the medication and/or its metabolites are removed from the body. Enzymatic process enhances this process. The medications and their metabolites are then excreted through urine or feces.

Medications are also bound by plasma protein. Medications compete for a limited number of receptor sites within the body. If you have multiple medications that undergo similar pharmacokinetics, they have the potential to compete for those limited receptor sites. If the medications do not bind to the receptor sites as anticipated, the pharmacokinetics of the medications will be altered. This could mean that more free drug could be absorbed into the bloodstream and the effects the medication could have on the patient would be either in excess or deficient of the intention of the prescriber. That possibility could be a direct causation of injury or a non-resolution to a medical condition resulting in harm to the patient. Pharmacokinetics is taught in Colleges of Pharmacy to all Doctor of Pharmacy level students.

Practicing attorneys whose clients have issues that would benefit from an evaluation and expert opinion on pharmacokinetics may wish to consider a consultation from a clinical pharmacist who has completed a doctoral level degree (Pharm.D) program.

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