UNIVERSITI TEKNOLOGI MARA

ESTIMATION OF AMIKACIN PHARMACOKINETICS IN HOSPITALIZED GERIATRIC PATIENTS

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A dissertation submitted in partial fulfillment of the requirement for Bachelor of Pharmacy (Hons.)

Faculty of Pharmacy

2013

ACKNOWLEDGEMENT

Thank you Allah for grant me a golden chance and extraordinary patience to be involved in my research paper, Alhamdulillah. First and foremost I would like to acknowledge my dearest supervisor, Prof. Dr. Mohamed Mansor Manan, for giving me an opportunity to collaborate in our research project. I also would like to thank him for giving me strength and his willingness to priceless time to show me a proper way to do a research project from the start to the end. He also helps me in writing a good thesis by giving example with some explanation so that I could motivate myself to give more effort despite of improving my knowledge and language. Last and not least, I want to express my gratitude to all respected lecturers in PHC566/PHC567 as I gain more useful information to complete my study. And not to forget, I would like to thank my best senior for his tireless in helping me to understand more about this topic and I dedicate a special thanks to my beloved family and friends as well as all people involved directly and indirectly in this study who always behind me whenever I am in difficulties during the course.

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ABSTRACT

The study was done to approximate the population pharmacokinetics of amikacin in hospitalized geriatric patients. The data of patients were collected from 2 hospitals and comprised of 64 TDM forms which 41 patients are male and 23 of them are female. The patients' demographics and pharmacokinetics were analyzed to observe the pattern correlating to amikacin. The data was best described by a one-compartment model. The analysis has shown that there is a perfect relationship between rate of elimination, Ke and half-life, $t_{1/2}$ with R^2 value is 1. Furthermore, there is also a strong correlation between half-life and volume of distribution per clearance (Vd/CL) as R^2 is 0.777. The mean of *Ke*, $t_{1/2}$, and *Vd* in this study, (0.075 ± 0.04 hr^{-1}), (11.53 ± 4.97 hr) and (0.51 ± 0.28 L/kg) respectively. The COV value (more than 10%) has shown a high inter-patient variability in terms of pharmacokinetics. The pattern of pharmacokinetics among geriatrics also has been identified; however, the actual practice should able to refer to an exact patient for accuracy. In short, the population pharmacokinetics of hospitalized geriatrics has less inter-patient variability either from hospitals, or gender or weight. However, it is necessary to monitor the patients individually in order to avoid toxicities and achieve therapeutic goal.

CHAPTER 1

INTRODUCTION

The application of pharmacokinetics principles to the safe and effective therapeutic management of drugs in individual patients, is called clinical pharmacokinetics (DiPiro & Spruill, 2010). The patient's drug therapy highlights on efficacy optimization and toxicity prevention in order to get pharmacological responses that helps the healthcare team apply it to actual situations (DiPiro & Spruill, 2010). The process of therapeutic drug monitoring (TDM) provides meaningful and accurate drug concentration interpretation in relationship with pharmacokinetics and pharmacodynamics (Gross, 1998).

The aminoglycoside resistance is of increasing concern because of alteration in target ribosomal protein and possibly the greatest matter is that its minimum inhibitory concentrations (MICs) have been rising slightly for past 20 years, but the concerns about toxicity and narrow therapeutic window have not developed an increase in blood level target (Burton, 2006). Clinical trials have shown that amikacin was effective in