UNIVERSITI TEKNOLOGI MARA

ESTIMATION OF AMIKACIN PHARMACOKINETICS IN HOSPITALIZED PEDIATRIC PATIENTS

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One can pay back the loan of gold, but one dies forever in debt to those who are kind.

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ABSTRACT

This study was conducted to analyse the effectiveness of pharmacokinetics monitoring as well as to establish a population pharmacokinetics in hospitalized pediatric patients which has been treated with amikacin. The data consist of 104 pediatric patients including 77 of male patients and 27 of female patients. Population pharmacokinetics has been calculated by using one-compartment model. The patients' parameters such as body weight, gender, age and creatinine clearance (CrCl) were analyzed to identify their potential influence on amikacin pharmacokinetics. Analysis of the data showed the mean and standard deviation of Ke (0.119 ± 0.066), t1/2 (8.026 ± 6.239) and Vd (0.630 ± 0.993). This study indicates that this population has a wide inter-patient variability with the coefficient of variation showed (COV) for Ke = 54%, t1/2 = 72% and Vd = 157%. Therefore, individualized pharmacokinetics is very crucial among pediatric patients treated with amikacin in order to achieve therapeutic effect and ensuring minimal adverse effect.

CHAPTER ONE

INTRODUCTION

1.1 Problem of statement

The study and treatment of infant, children and adolescent is the field of medicine known as pediatric. Patients will be considered as pediatric when their age ranges from birth to 16 or 18 years old, depending on region. The treatment of children with medicinal product is an important scientific area since it differs from adult medicine in many respects(Jacqz-Aigrain & Choonara, 2006). To ensure the safety and efficacy of pharmacotherapy in pediatric patients, it requires a lot of information and a good understanding on the use of medicinal products in regards to the development of pediatric dosage regimen of those products(Rose & Anker, 2007).

Amikacin has a broad spectrum of activity against Gram-negative bacteria infection in children. Since amikacin is an aminoglycoside, it has a narrow therapeutic index and dosage regimen should be individualized. Careful monitoring of therapeutic use is essential in children to minimize ototoxicity and nephrotoxicity effects since their physiological maturation rapidly changes over time(Mingeot-Leclercq & Tulkens, 1999). Thus, evaluation of pharmacokinetics