

Case study 1. (PHA5127)

Fall 2003

Question 1.

A 80 year old, 70-Kg patient with pneumonia, was being treated by an iv. bolus of gentamicin (0.5 mg / kg). Serum samples were taken at 0.5 and 6 hours post injection, and the lab reported drug concentrations of 3.41 $\mu\text{g/ml}$, and 0.83 $\mu\text{g/ml}$, respectively. Assume gentamicin follows one compartment, first-order elimination.

- 1.) Calculate the half-life of gentamicin in this patient.
- 2.) Calculate the volume of distribution of gentamicin in this patient.
- 3.) Can you predict what is the drug concentration two half-lives after iv. bolus injection?

Question 2.

A 25-year-old, 60-kg female patient was given an iv. bolus of a aminophylline, (200 mg). Theophylline concentration-time profiles after the first dose was given as following (table). Given the fact that 1mg of aminophylline is equivalent to 0.8mg theophylline and elimination occurs by first-order kinetics, please answer the following questions.

- 1.) Calculate the AUC_{0-12} of theophylline by using trapezoidal rule.
- 2.) Calculate the $\text{AUC}_{0-\infty}$.

Table1. Theophylline concentration-time profiles after iv. bolus of aminophylline.

t(hr)	Con (ug/ml)
0	
1	7.89
3	5.29
5	3.55
7	2.38
12	0.87