PHA 5127

Case Study 1

I.   Mr J.S., a 41 yr old, 60 kg, double amputee patient with G-ve pneumonia, was being treated with gentamicin and ampicillin. Gentamicin had been given as an iv bolus (0.5 mg/kg). Serum samples were obtained at 1 and 8 hours post injection, and the lab reported concentrations of 3 and 0.5 µg/ml, respectively. Assume one compartment, first-order elimination for gentamicin.

a.   Calculate ke and half-life of gentamicin in this patient.

b.   Calculate Vd. Knowing that Vd in normal subjects=0.25 L/kg, explain any observed deviations for this patient.

II. A 10 yr old, 25 kg patient suffering from Status Asthmaticus was given an iv bolus of aminophylline (500 mg). When serum concentrations were measured at 0 and 5 hours after injection, drug levels were found to be 35 and 14.4 µg/ml, respectively. Assume a therapeutic range of (10-20) µg/ml for theophylline, 1 mg aminophylline is equivalent to 0.8 mg theophylline, and elimination occurs by a first-order process.

a.   Calculate $t_{1/2}$, ke, Vd and CL for theophylline in this patient.

b.   How long will it take before the patient is subtherapeutic?

c.   Given the data below calculate $AUC_{0 \to \infty}$.

t	C_p
0	35
1	30
2	25
4	17
9	7
16	2

III. A patient is admitted to the ER upon ingesting an overdose of theophylline. A serum drug level was measured at 53 µg/ml. Assuming an 8 hour $t_{1/2}$ and and no further drug absorption, determine how long it would take for the serum level to drop to the upper limit of the therapeutic range (20 µg/ml).