

Loading Dose and Maintenance Doses

Find the answers to the following questions for a 45 year old, 60 kg woman with a serum creatinine of 0.1 mmol/L (Patient A):

- I. The target concentration for theophylline for the treatment of bronchoconstriction is 10 mg/L. Tablets of theophylline contain either 200 mg or 300 mg.

Hint: Age and renal function do not influence V or CL for theophylline

- A. What is the predicted volume of distribution?
- B. What is the predicted clearance?
- C. What loading dose is required?
- D. What maintenance dose is required?

Typical Pharmacokinetic Parameters for a 70 kg Patient

	Theophylline	Digoxin
F (oral)	1	0.65
V Liters	35	490
CLr L/h	0	CLcr
CLh L/h	2.8	3

- II. The target concentration of digoxin for the treatment of atrial fibrillation is 2 ng/mL. Tablets of digoxin contain 62.5 micrograms and 250 micrograms (mcg).

- A. What loading dose is required?
- B. What maintenance dose is required?

Creatinine Clearance Prediction

$$CL_{cr} (L/h) = \frac{160 - \text{Age}(yr)}{250 \cdot S_{cr}(mmol/L)} \cdot \frac{Wt(kg)}{70} \cdot 0.9 \text{ if } F$$

60 year old, 140 Kg male with S_{cr} 0.1 mmol/L:

$$CL_{cr} (L/h) = \frac{160 - 60yr}{250 \cdot 0.1mmol/L} \cdot \frac{140kg}{70} = 8L/h$$

- III. The target concentration of cimetidine for the treatment of peptic ulceration is 1 mg/L.
- A. What IV loading dose is required?
 - B. What IV infusion rate is required?
 - C. What concentration would be reached 12 hours after starting an infusion? (no loading dose)

Typical Pharmacokinetic Parameters for a 70 Kg Patient

	Cimetidine
F (oral)	0.6
V Liters	150
CLr L/h	7 x CLcr
CLh L/h	10

Additional Problems:

Answer the questions for the following patients:

Patient B: A 65 year old 70 kg man with a serum creatinine of 1 mmol/L.

Patient C: An 85 year old 60 kg woman with a serum creatinine of 0.1 mmol/L