

PHA 5127
Case study #4

- 1.) Sarah C. is a 55-year-old woman on aminoglycoside therapy. She is 5'6" tall and weighs 60 kg. Her serum creatinine level is 0.75 mg/dl. What is her creatinine clearance? What is the patient's k_e and half-life? Calculate the i.v. bolus dose in order to achieve 1 mg/L 1 hour after administration. The V_d is 0.25 L/kg and assume that $CL = CrCl$.

$$IBW = 45.5 \text{ kg} + 2.3 * 6 = 59.3 \text{ kg}$$

$$CrCl = 0.85 * \left[\frac{(140 - 55) * 59.3}{72 * 0.75} \right] = 79.3 \text{ ml / min}$$

$$k_e = 0.00293 * (79.3) + 0.014 = 0.246 \text{ h}^{-1}$$
$$t_{1/2} = 0.693 / 0.246 = 2.81 \text{ h}$$

$$C = (\text{Dose}/V) * e^{-k_e * t}$$
$$V = 0.25 \text{ L/kg} * 60 \text{ kg} = 15 \text{ L}$$
$$1 \text{ mg/L} = (\text{Dose}/15) * e^{-0.246 * 1}$$
$$\text{Dose} = 19.2 \text{ mg}$$

- 2.) Bob W. is a 48-year-old man on aminoglycoside therapy. He is 5'11" tall and weighs 140 kg. His serum creatinine level is 1.3 mg/dl. What is his creatinine clearance? What is the patient's k_e and half-life?

$$IBW = 50 + 2.3 * 11 = 75.3 \text{ kg}$$

Patient may be considered obese, therefore check to see if total body weight is 20% over IBW.

$$75.3 * 0.2 = 15.06$$

15.06 + 75.3 = 90.36 kg << 140, therefore use Absolute body weight.

$$ABW = 75.3 + 0.4 * (140 - 75.3) = 101.2 \text{ kg}$$

$$CrCl = \frac{(140 - 48) * 101.2}{72 * 1.3} = 99.5 \text{ ml / min}$$

$$k_e = 0.00293 * (99.5) + 0.014 = 0.305 \text{ h}^{-1}$$
$$t_{1/2} = 0.693 / 0.305 = 2.3 \text{ h}$$

- 3.) A patient has overdosed on phenobarbital, a weak acid drug. If the drug is not cleared hepatically, what are two ways you could treat the patient?

1. Make urine more alkaline.
2. Increase urine flow rate.

4.) True or false:

Fluid is filtered across the glomerulus through passive diffusion. **True.**

An ionized and hydrophilic drug is more likely to cross biological membranes.

False.

Drug below is an acidic drug. **True.**

