2.4. Renal Drug Dosing

Solutions

To view a video demonstrating solutions to renal dosing problems, go to https://www.youtube.com/user/murphyassessment.com.

1. $Q = 1 - [f_e \times (1 - KF)]$

   $Q = 1 - [0.85 \times (1 - \frac{20}{120})]$

   $Q = 0.29$

   $Dr = Dn \times \frac{\tau_r}{\tau_n}\ Q \times = 1000\ mg \times \frac{12\ h}{8\ h} \times 0.29$

   = 435 mg every 12 hours

   This could be rounded to 500 mg every 12 hours.

2. Tissue distribution and redistribution are slow with digoxin. The hemodialysis effectively removes the very small amount of digoxin in the bloodstream. After dialysis, drug redistributes from tissue to bloodstream and the concentration rises.

3.

Drug	f_e	CrCl (mL/min)	Q
Cidofovir	0.9	50	**0.48**
Glyburide	0.5	30	**0.63**
Itraconazole	0.35	10	**0.68**

3. (continued)

Cidofovir:

$$Q = 1 - [f_e \times (1 - KF)]$$

$$Q = 1 - [0.9 \times (1 - \frac{50}{120})]$$

Q = 0.48

Glyburide:

$$Q = 1 - [f_e \times (1 - KF)]$$

$$Q = 1 - [0.5 \times (1 - \frac{30}{120})]$$

Q = 0.63

Itraconazole:

$$Q = 1 - [f_e \times (1 - KF)]$$

$$Q = 1 - [0.35 \times (1 - \frac{10}{120})]$$

Q = 0.68

The lowest Q requires the greater dose adjustment and order of need would be cidofovir, followed by glyburide, and finally itraconazole. It can be seen that even with low CrCl if a drug has a low f_e, then the need for adjustment is reduced.

4. $$Q = 1 - [f_e \times (1 - KF)]$$

$$Q = 1 - [0.9 \times (1 - \frac{30}{120})]$$

$$Q = 0.325$$

$$Dr = Dn \times \frac{\tau_r}{\tau_n} \times Q = 600 \text{ mg} \times \frac{12 \text{ hr}}{8 \text{ hr}} \times 0.325$$

= 292.5 mg every 12 hours
(round to 300)

5. A. Lower molecular weight drug

Increase Decrease

B. Higher protein binding of drug

Increase **Decrease**

C. Greater dwell time (i.e., the same dialysate stays in contact with the blood longer)

Increase **Decrease**

D. High fat solubility of drug

Increase **Decrease**

6. Q = 1 – [0.6 × (1 – 30/120)] = 0.55

800 mg twice daily × 0.55
= 440 mg twice daily
(round to 400 mg)

$$Dr = Dn \times \frac{\tau_r}{\tau_n} \; Q \times = 400 \text{ mg} \times \frac{8 \text{ h}}{6 \text{ h}} \times 0.55$$

= 293.3 mg every 12 hours
(round to 300 mg)

7. <u>80 mL/min</u>:

Q = 1 – [0.8 × (1 – 80/120)] = 0.733

Dr = Dn × Q = 1000 mg × 0.733

= 733 mg every 8 hours
(round to 750 mg)

<u>60 mL/min</u>:

Q = 1 – [0.8 × (1 – 60/120)] = 0.6

Dr = Dn × Q = 1000 mg × 0.6

= 600 mg every 8 hours
(round to 500 mg)

$$Dr = Dn \times \frac{\tau_r}{\tau_n} \; Q \times = 1000 \text{ mg} \times \frac{12 \text{ h}}{8 \text{ h}} \times 0.6$$

= 900 mg every 12 hours
(round to 1000 mg)

<u>40 mL/min</u>:

Q = 1 – [0.8 × (1 – 40/120)] = 0.467

Dr = Dn × Q = 1000 mg × 0.467

= 467 mg every 8 hours
(round to 500 mg)