Chapter 07: Reconstitution of Medications

ESSAY

1. Ordered: cefadroxil oral suspension 0.6 g PO bid, for a patient with an upper respiratory infection. Available:

   a. Estimated dose after reconstitution:
   How many milliliters will the nurse prepare?
   b. DA equation:
   c. Evaluation:
   Shade in the medicine cup with the nearest measurable dose. Indicate with an arrow the additional amount to be added with the syringe.

   ANS:

   a. More than 20 mL (0.6 g = 600 mg)
   b.
   c. Equation is balanced. Estimate supports answer.

2. Ordered: amoxicillin oral susp 0.35 g PO q8h, for a patient with a urinary tract infection. Available:

   a. Is this a unit-dose or a multidose container?
   b. Estimated dose:
   How many milliliters will the nurse prepare?
   c. DA equation:
d. Evaluation:
Shade in the medicine cup with the nearest measurable dose. Indicate with an arrow the additional amount to be added with the syringe.

ANS:

a. Multidose  
b. Estimate: Over 10 mL (0.35 g = 350 mg)  
c.  
d. Equation is balanced. Estimate supports answer.

3. Ordered: dicloxacillin sodium susp 0.2 g PO q8h. Available:

   a. Estimated dose after reconstitution:  
      How many milliliters will the nurse prepare?  
   b. DA equation:  
   c. Evaluation:  
      Shade in the medicine cup with the nearest measurable dose. Indicate with an arrow the additional amount to be added with the syringe. ANS:

   a. Estimate: over 10 mL  
   b.  
   c. Equation is balanced. Estimate supports answer.

4. Ordered: oxacillin sodium 0.4 g IM stat, for a patient with an infection. Available:

   a. How many milliliters of SW will be added for the IM preparation?  
   b. Estimated dose after reconstitution:  
      How many milliliters will the nurse prepare?  
   c. DA equation:  
   d. Evaluation:  
      Indicate with an arrow the amount to be added to the syringe with the nearest measurable dose.

ANS:

   a. 11.5 mL  
   b. Estimate: More than 1.5 mL; less than 3 mL (0.4 g = 400 mg)
c. d. Equation is balanced. Estimate supports answer.

5. Ordered: carbenicillin disodium 0.5 g IM q6h.

a. What amount of diluent will the nurse use for this dose? Refer to the label.
b. Estimated dose after reconstitution:
   How many milliliters will the nurse prepare?
c. DA equation:
d. Evaluation:
   Indicate with an arrow the amount to be added to the syringe with
   the nearest measurable dose.

ANS:

a. 9.5 mL
b. 
c. d. Equation is balanced. Estimate supports answer.

6. Fractional Strength (Active Ingredient to Total Parts)
   Ratio of Active to Inactive Ingredients

Percent Strength Ordered

Volume and Frequency Ordered
Amount Active Ingredient to be Used Amount Diluent (Inactive Ingredient
   to be Added)
1:9 60 mL tid
ANS:

Fractional Strength (Active Ingredient to Total Parts)
Ratio of Active to Inactive Ingredients

Percent Strength Ordered

Volume and Frequency Ordered
Amount Active Ingredient to be Used Amount Diluent (Inactive Ingredient
   to be Added)
1:9 10% 60 mL tid 6 mL 54 mL
7. Fractional Strength (Active Ingredient to Total Parts)
   Ratio of Active to Inactive Ingredients
   Percent Strength Ordered

   Volume and Frequency Ordered
   Amount Active Ingredient to be Used Amount Diluent (Inactive Ingredient to be Added)
   200 mL q8h
   ANS:
   Fractional Strength (Active Ingredient to Total Parts)
   Ratio of Active to Inactive Ingredients
   Percent Strength Ordered

   Volume and Frequency Ordered
   Amount Active Ingredient to be Used Amount Diluent (Inactive Ingredient to be Added)
   1:3 25% 200 mL q8h 50 mL 150 mL
   8.
   Fractional Strength (Active Ingredient to Total Parts)
   Ratio of Active to Inactive Ingredients
   Percent Strength Ordered

   Volume and Frequency Ordered
   Amount Active Ingredient to be Used Amount Diluent (Inactive Ingredient to be Added)
   1:1 250 mL bid
   ANS:
   Fractional Strength (Active Ingredient to Total Parts)
   Ratio of Active to Inactive Ingredients
   Percent Strength Ordered

   Volume and Frequency Ordered
   Amount Active Ingredient to be Used Amount Diluent (Inactive Ingredient to be Added)
9.
Fractional Strength (Active Ingredient to Total Parts)
Ratio of Active to Inactive Ingredients

Percent Strength Ordered

Volume and Frequency Ordered
Amount Active Ingredient to be Used Amount Diluent (Inactive Ingredient to be Added)
50% 30 mL every hour
ANS:

Fractional Strength (Active Ingredient to Total Parts)
Ratio of Active to Inactive Ingredients

Percent Strength Ordered

Volume and Frequency Ordered
Amount Active Ingredient to be Used Amount Diluent (Inactive Ingredient to be Added)
1:1 50% 30 mL every hour 15 mL 15 mL

10.
Fractional Strength (Active Ingredient to Total Parts)
Ratio of Active to Inactive Ingredients

Percent Strength Ordered

Volume and Frequency Ordered
Amount Active Ingredient to be Used Amount Diluent (Inactive Ingredient to be Added)
1:2 90 mL daily
ANS:

Fractional Strength (Active Ingredient to Total Parts)
Ratio of Active to Inactive Ingredients

Percent Strength Ordered

Volume and Frequency Ordered
Amount Active Ingredient to be Used Amount Diluent (Inactive Ingredient to be
11. Ordered: Penicillin G potassium 300,000 units IM q6h, for a patient with an infection. Available: Use 18.2 mL diluent.

a. Estimated dose: more or less than drug concentration after reconstitution
b. How many mL will the nurse prepare per dose?

_______ DA equation:
c. Evaluation:
Indicate the nearest measurable dose with an arrow on the syringe provided.

ANS:

a. A little more than drug concentration
b. How many mL will the nurse prepare per dose? 1.2 mL
DA equation:
c. The estimate supports the answer. The equation is balanced.

12. Ordered levothyroxine sodium 0.08 mg IV daily for a patient with hypothyroidism.
Available:

a. Estimated dose: more or less than drug concentration after reconstitution
b. How many mL will the nurse prepare? DA equation:

c. Evaluation:
Indicate the nearest measurable dose with an arrow on the syringe provided.

ANS:

a. Twice as much as drug concentration: 2 mL
b. How many mL will the nurse prepare? 2 mL (0.08 mg = 80 mcg)
DA equation:
c. Estimate supports answer. Equation is balanced.

13. Ordered: Vancomycin HCl 0.25 g IV q 6 h in a compatible solution, for a patient with a severe infection.
Available:

a. Estimated dose: more or less than drug concentration after reconstitution
b. How many mL of Vancomycin sol will the nurse withdraw after the first dilution
before further dilution by adding to IV?
DA equation:
c. Evaluation.
Indicate the dose with an arrow on the appropriate syringe below:

ANS:

a. More (50 mg \times 5 = 250 mg; 0.25 g = 250 mg)
b. 5 mL
DA equation:
c. Estimate supports answer. Equation is balanced.

14. Ordered: clarithromycin 300 mg PO for 7 days, for a patient with an infection. Available:

a. Estimated dose:
b. How many mL will the nurse prepare?
DA equation:
c. Evaluation:

ANS:

a. Over two times the drug concentration after reconstitution
b. 12 mL
DA equation:
c. Estimate supports answer. Equation is balanced.

15. Ordered: Ampicillin Sodium 0.3 g IM q6h, for a patient with an infection. Available:

a. Amount of diluent to be added for IM injection b. Estimated dose to be given after reconstitution c. How many mL will the nurse prepare? DA equation:
d. Evaluation:
Indicate dose on the syringe with an arrow.

ANS:

a. 1.2 mL
b. Two times the drug concentration (300 mg = 0.3 g)
16. May the nurse substitute SW for bacteriostatic SW for dilution? Where would this information be obtained? Reconstituted medications have a shorter shelf life.

ANS:
No. SW and bacteriostatic SW are not interchangeable. The bacteriostatic product has an agent, usually benzyl alcohol. The appropriate diluent would be obtained from the product label, product accompanying information, and/or a current drug reference, and/or the pharmacist.

17. Which has a shorter shelf life: reconstituted or unreconstituted medications?

ANS:
Reconstituted medications have a shorter shelf life.

18. Which is the diluent in a solution such as an antibiotic and SW?

ANS:
The sterile water (SW) is the diluent, the inactive ingredient.

19. If the prescriber orders 30 mL q 1 hr of a 50% formula for an adult nutritional formula, what is the ratio of the formula to the water added?

ANS:
1:1 ratio (50% of 30 = 15 mL) (15 mL of formula. 30 mL – 15 mL = 15 mL water).

20. If you were preparing 100 mL of a 10% solution of hydrogen peroxide for an irrigation, how much peroxide and how much water would you use?

ANS:

a. 10 mL of hydrogen peroxide (10% of 100 mL = 10 mL)
b. 90 mL of sterile water (100 mL – 10 mL = 90 mL)

21. Why are sterile solutions used for wound irrigations?
ANS:
Sterile solutions are used for most wound irrigations to prevent and treat wound infections.

22. Ordered: 100 mL q2h of a 25% solution for an irrigation.
   a. How many mL of the active ingredient will you prepare?
   b. What is the ratio of the active ingredient to the inactive ingredient?

ANS:
   a. 25 mL (25% of 100 = 25 or strength or 1 out of 4 parts )
   b. 1:3 (1 part plus 3 parts = 4 total parts)

23. The patient is told upon discharge to soak his heel every 2 hr for 20 min in 500 mL of 1 part Epson salts to 4 parts (the ratio) of warm water.
   a. What is the % of Epson salts in the solution?
   b. How much Epson salts should the patient measure in the metric measuring cup provided?

ANS:
   a. 20% Epsom salts active ingredient (1 part plus 4 parts = strength)
   b. 100 mL (20% of 500 mL)

24. What information must be placed on a label for a multidose reconstituted medication vial that is to be stored for subsequent use?

ANS:
   Patient name if needed, Date of reconstitution, Reconstituted strength, Nurse preparer, and Reconstitution expiration date and hour if agency requires.

25. Can the nurse prepare a medication from a container that has been reconstituted on an unknown date? If so why; if not, why not?

ANS:
   No. The nurse cannot use an unlabeled reconstituted medication because it may have expired and be ineffective, decomposed, or contaminated.

26. The nurse calculates an oral medication dose of 18 mL.
   a. How many mL will be placed in the medicine cup? b. How many mL will be added with a syringe?
ANS:

a. Fill medicine cup to 15 mL.
b. Add 3 mL with syringe.

27. The nurse prepares an oral medication of 24.2 mL. a. How many mL will be placed in the medicine cup? b. How many mL will be added with a syringe?

ANS:

a. Fill medicine cup to 20 mL.
b. Add 4.2 mL with a 5 mL syringe.

28. The nurse prepares an oral medication of 11 mL. a. How many mL will be placed in the medicine cup? b. How many mL will be added with a syringe?

ANS:

a. Fill medicine cup to 10 mL.
b. Add 1 mL with syringe.

29. The nurse prepares an oral medication of 7.4 mL. a. How many mL will be placed in the medicine cup? b. How many mL will be added with a syringe?

ANS:

a. Fill medicine cup to 5 mL.
b. Add 2.4 mL with syringe.

30. What actions should the nurse take if the order is clear but the nurse is unsure of how to prepare the reconstituted solution?

ANS:
Read the product label and accompanying information. Contact pharmacist for further clarification.