Drug Therapy Individualization for Patients with Chronic Kidney Disease

Marisa Battistella and Gary R. Matzke

LEARNING OBJECTIVES

On completion of the chapter, the reader will be able to:

1. State the mechanisms by which kidney disease can alter bioavailability of a drug.
2. Describe the effect of chronic kidney disease (CKD) on protein binding, and list the types of drugs for which binding is typically decreased or increased.
3. Discuss how a change in protein binding can alter the interpretation of serum drug concentrations.
4. Discuss the mechanisms by which CKD can affect drug metabolism and list enzymes known to be affected.
5. Calculate the dosage adjustment factor (Q) and use it to modify the dose and/or dosing interval for a drug when given drug- and patient-specific data, including the fraction of the drug eliminated renally unchanged in patients with normal renal function.
6. Develop a loading and maintenance dosage regimen for a patient with CKD given patient-specific data and the relationships between the drug’s pharmacokinetic parameters and kidney function.
7. Describe the processes by which drugs are removed by hemodialysis (HD).
8. List the factors that influence drug removal by HD including the relevant drug characteristics and dialysis conditions.
9. Rate the relative efficiency of peritoneal dialysis, high-flux HD, short-daily hemodialysis (SDHD), and nocturnal hemodialysis (NHD) in removing drugs.
10. Compare and contrast the methods to determine/quantify the effect of HD on the pharmacokinetics of a drug.