Preface

One of the time-honored foundations of the practice of pediatric medicine is the understanding and application of the principles of fluid, electrolyte, and acid–base disorders. In *Fluid and Electrolytes in Pediatrics: A Comprehensive Handbook* we have selected authors with a passion, appreciation of the contributions of pioneers in pediatric medicine, and an expertise for their respective areas. Although medicine has changed enormously from the days of Gamble, Cooke, Holliday, Segar, Winters, and many other great pediatric clinical investigators, the evaluation and management of fluid, electrolyte, and acid–base disorders still form the basis of acute care and inpatient pediatrics. Today pediatric admissions are more complex and the survival of premature infants as young as 24 weeks gestation provides challenges for the generalist and specialist alike. Regardless of the location of care – from the neonatal unit, pediatric critical care, inpatient service to the emergency rooms – the clinician almost always obtains a set of electrolytes and a urinalysis on their patients and must interpret the results with regard to the specific clinical presentation.

In each chapter the authors have provided in-depth discussions, with the assistances of many scenarios in order to exemplify the major clinical pearls that will guide our continuing understanding and appreciation of the unique characteristics of pediatric fluid and electrolytes homeostasis. We have provided the authors some leeway in placing scenarios in the text or at the end of the section/chapter. In prescribing fluid and electrolyte therapies to our infants, children, and adolescents, we must apply critical analyzing skills to provide the most precise recommendations in order to assure a safe and effective environment for our precious future – our children. An example is that 5% Dextrose in Water with \( \frac{1}{2} \) isotonic saline does not work for everyone. The jargon of giving 1.5 or 2 times maintenance fluid therapy is not appropriate because it is the crudest of “estimates.”

In the first section, the chapters on Disorders of Water Homestasis by Feld, Massengill, and Friedman provide an in-depth examination of hypo- and hypernatremic disorders with detailed scenarios supported by many illustrations and tables. In the subsequent chapter on Disorders of Sodium Homeostasis, Woroniecki et al. present a discussion of sodium balance, renal regulation from the neonatal period, and the approach to assessing renal sodium excretion and the different volume states.

Disorders of Potassium Homeostasis is a key chapter because of the dire consequences of abnormal potassium balance and serum concentrations. The discussion emphasizes the practical and methodical approach to potassium abnormalities to avoid catastrophic consequences to the children.

In the second section, Charles McKay presents an elaborate review of both Disorders of Calcium and Magnesium Homeostasis. Although calcium disorders with both its low and high values are quite common, the analysis of the evaluation and treatment with detailed scenarios helps the reader to achieve a clear understanding of this important
mineral. When faced with an abnormal serum magnesium concentration, this chapter will be an invaluable resource.

Valerie Johnson presents the chapter on Disorders of Phosphorus Homeostasis with an exceptional expertise and understanding. Similar to magnesium, this chapter is a ready resource to assist the clinician in the evaluation, diagnosis, and treatment of phosphorus disorders.

Part III covers Disorders of Acid–Base Homeostasis. The section editor Uri Alon has done a magnificent job in helping to guide the authors in these five chapters. Mahesh and Shuster start with an overview of normal acid–base balance, followed by Howard Corey and Uri Alon covering the ever difficult area of metabolic acidosis. Their insights in this field bring a challenging area into simpler terms. Wayne Waz reviews metabolic alkalosis and illustrates the value of the “lonely” urine electrolyte – chloride. Young and Timmons emphasize the importance of understanding respiratory disorders of acid–base physiology.

Part IV highlights Special Situations of Fluid and Electrolyte Disorders. Although it is nearly impossible to cover all areas, we have tried to include a chapter on the neonatal ICU, liver as well as renal failure, unique situations of the endocrine system, the importance of nutrition and understanding Uric Acid by Bruder Stapleton. The book would not be complete without a chapter on the genetic syndromes that affect the body’s balance of water and electrolytes. In some instances there is intentional overlap of some information in this section to the first three sections of the book.

We truly hope that you will find this book an indispensable handbook and guide to the management of your patients as well as a critical resource for medical and graduate students.

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