

FP Essentials

Call for Authors – February 2025

Acid-Base and Electrolyte Disorders

We are seeking an author or author group to write an edition of *FP Essentials* on the topic of acid-base and electrolyte disorders. This edition will cover four topics:

1. Disorders of Sodium
2. Disorders of Potassium
3. Acid-Base Disorders
4. Disorders of Calcium

The main text of the manuscript should be approximately 10,000 words in length, divided into four sections of approximately 2,500 words each, plus an abstract of approximately 200 words for each section. In addition, there should be key practice recommendations, a maximum of 15 tables/figures total, additional resources, and up to 200 references to provide support for all recommendations and factual statements in the manuscript. References must be numbered sequentially by section, with section headers dividing the list and each new section starting over at “1.”

This edition should focus on what is new in each topic and should answer the key questions listed for each section. Each section should begin with an illustrative case, similar to the examples provided, with modifications to emphasize key points; each case should have a conclusion that demonstrates resolution of the clinical situation. The references provided here include information that should be considered in preparation of this edition of *FP Essentials*. However, these should be used only as a starting point in identifying the most current guidelines and references to include in the edition.

Needs Assessment

Family physicians provide care to patients across the lifespan and in multiple settings. They frequently encounter patients with abnormalities of their electrolytes or acid-base balance and are called upon to provide timely care for these patients. In a survey of members of the American Academy of Family Physicians (AAFP), fatigue and myalgias, which can be associated with electrolyte or acid-base abnormalities, were listed in the top 50 education needs. This monograph will help readers assess and treat electrolyte and acid-base disorders.

Section 1: Disorders of Sodium

Example Case

LT is a 63-year-old who was admitted to the hospital due to acute shortness of breath. Her physical examination is remarkable for bilateral inspiratory crackles at the lung bases and lower extremity edema. A chest radiograph is consistent with pulmonary congestion. You receive a call from her nurse that LT's serum sodium is low at 125 mEq/L.

Key Questions to Consider

- What is the difference among osmolarity, osmolality, and tonicity?
- Briefly review the normal maintenance of appropriate osmolality in the body. What is the role of the pituitary, the kidney, and antidiuretic hormone? What is the impact of dietary sodium intake, fluid intake, and an individual's environment on serum and urine osmolality?

Hyponatremia

- What is the usual clinical presentation? Is there a difference between acute and chronic hyponatremia and how are these defined? How common is it?
- What are the risk factors for developing hyponatremia? What medications are commonly associated with it? What adverse outcomes are associated with hyponatremia? When do patients need to be referred to the emergency department or for admission?
- What is pseudohyponatremia? How is it identified and managed?
- What is hypertonic hyponatremia? What are the common conditions causing hypertonic hyponatremia, and how are they treated?
- For hypotonic hyponatremia:
 - How does hypovolemic hypotonic hyponatremia develop? How is it diagnosed? What are the effective treatment and prevention strategies?
 - What conditions are associated with hypervolemic hypotonic hyponatremia? How is it diagnosed and treated?
 - What is the most common cause of euvolemic hypotonic hyponatremia? How is it diagnosed and treated?
- Use an algorithm to display the suggested approach to classifying hyponatremia.
- Is there a difference in treating acute vs chronic hyponatremia? What are the risks of too rapid correction of serum sodium?
- What are the indications for and limitations of water restriction, hypertonic saline, salt tablets, and pharmacotherapy for the different types of hyponatremia?

Hypernatremia

- What is the usual presentation? What patients are at risk for developing it? What are the adverse outcomes associated with hypernatremia?
- When do patients need to be referred to the emergency department or for admission?
- What is the most common cause of hypernatremia? What medications are associated with it?
- What are the diagnostic considerations for hypernatremia?
- What are the preferred treatments for hypernatremia?

Initial References to Consider

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Section 2: Disorders of Potassium

Example Case

CP is a 45-year-old with hypertension who is currently taking 10 mg of amlodipine per day. His home blood pressures have been above 150/90 mm Hg, and your colleague prescribes 20 mg of lisinopril per day. One month after starting the lisinopril, CP has routine blood work done, which demonstrates an elevated serum potassium of 6 mEq/L.

Key Questions to Consider

- Briefly review the normal processes to maintain potassium homeostasis. What are the roles of the kidney, the gastrointestinal tract, and the endocrine system? What is the impact of dietary potassium intake on serum potassium levels?

Hyperkalemia

- What is pseudohyperkalemia and how is it diagnosed and managed?
- How common is hyperkalemia?
- What are the predisposing factors, including medication use?
- What are the common causes? What is the usual presentation? What are the potential complications of untreated hyperkalemia? When do patients need to be referred to the emergency department or for admission?
- How is it diagnosed?
- When should an electrocardiogram be performed?
- When is emergency treatment indicated? What is the preferred emergency treatment for hyperkalemia, including the use of calcium gluconate, insulin, and albuterol? When is urgent hemodialysis required?
- What is the preferred nonemergent treatment of hyperkalemia? When should pharmacotherapy be used for nonemergent treatment?
- How does the diagnosis and treatment of chronic hyperkalemia differ from acute hyperkalemia?

Hypokalemia

- How common is hypokalemia? What conditions and medications predispose to its development?
- What is the usual clinical presentation of hypokalemia? What are the complications of untreated hypokalemia? When do patients need to be referred to the emergency department or for admission?
- How is it diagnosed?
- How is the potassium deficit calculated?
- Which patients can receive oral potassium replacement? How much should be given? Are particular potassium formulations preferred for specific patients or situations?
- When is intravenous potassium needed to replace a deficit? What is the maximum rate of intravenous potassium replacement?
- What is the role of magnesium in potassium metabolism and replacement?

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Hypokalemia

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Section 3: Acid-Base Disorders

Example Case

CR is a 22-year-old with a history of type 1 diabetes. She has had gastroenteritis for the past few days with frequent loose stools and poor oral intake. She reduced the settings of her insulin pump because she was afraid of hypoglycemia. In the office, she appears very lethargic and has a fruity smell to her breath. Her urinalysis in the office shows 3+ ketones.

Key Questions to Consider

- How is physiologic pH maintained in the body? What are the acute and chronic mechanisms for maintaining proper acid-base balance?
- How is acid-base status assessed in clinical practice? What are the limitations of these approaches? What is the role of arterial vs venous blood gases and how should they be interpreted? Use an algorithm to outline the typical approach.

Acidosis

- What are the causes of an acute respiratory acidosis? Which patients are at risk for developing it? What is the usual diagnostic workup? How should these patients be treated? What are the long-term outcomes?
- How does chronic respiratory acidosis differ from acute respiratory acidosis? How are they similar? Which patients are at risk for chronic respiratory acidosis? What is the usual workup and treatment strategy?
- What are the usual causes of acute metabolic acidosis? Which patients are at risk for developing it? What is the usual diagnostic workup and initial treatment strategy? How does chronic metabolic acidosis and its management differ from that of acute metabolic acidosis?

Alkalosis

- What are the causes of an acute respiratory alkalosis? Which patients are at risk for developing it? What is the usual diagnostic workup? How should these patients be treated? What are the long-term outcomes?
- How does chronic respiratory alkalosis differ from acute respiratory alkalosis? How are they similar? What patients are at risk for chronic respiratory alkalosis? What is the usual workup and treatment strategy?
- What are the usual causes of acute metabolic alkalosis? Which patients are at risk for developing it? What is the usual diagnostic workup and initial treatment strategy? How does chronic metabolic alkalosis and its management differ from that of acute metabolic alkalosis?

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Section 4: Disorders of Calcium

Example Case

SG is a 29-year-old woman who has just been treated for her third kidney stone in two years. As part of her metabolic workup, serum chemistries are obtained, and her calcium is found to be 12 mg/dL.

Key Questions to Consider

- Briefly review the normal processes to maintain calcium homeostasis; what are the roles of the kidney, the gastrointestinal tract, and the endocrine system? What is the metabolic interaction among calcium, phosphorus, and magnesium? How does dietary calcium impact serum calcium?
- What is the difference between measurements of calcium and ionized calcium?

Hypercalcemia

- How common is it?
- What are the predisposing factors, including medication use?
- What are the common causes? What is the usual presentation? What are the potential complications of untreated hypercalcemia?
- What is the recommended diagnostic approach?
- How is hypercalcemia categorized as requiring emergent treatment, nonemergent treatment, or no treatment?
- What is the preferred emergency treatment for hypercalcemia?
- What is the preferred nonemergent treatment of hypercalcemia? When should pharmacotherapy be used for nonemergent treatment?
- How does the treatment of chronic hypercalcemia differ from acute hypercalcemia?

Hypocalcemia

- How common is hypocalcemia? What conditions predispose to its development?
- What is the usual clinical presentation of hypocalcemia? What are the complications of untreated hypocalcemia?
- How is it diagnosed?
- Which patients can receive oral calcium replacement? How much should be given?
- When is intravenous calcium needed to replace a deficit?

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Hypercalcemia

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