

## Management Strategies for Acute Kidney Injury and Common Electrolyte Disorders in the Emergency Department Geriatric Population

### STUDY QUESTION

This paper presents a thorough review of the diagnosis and management of acute kidney injury, sodium disorders, and hypercalcemia in geriatric patients.

### STUDY DESIGN

**Design:** Summarization of current literature

**Setting:** Not applicable

**Patients:** Literature review, specific to geriatric population

**Description of Intervention:** No intervention

**Outcomes:** Not applicable

### MAIN RESULTS

The aging kidney is associated with structural, functional, and physiologic changes that make geriatric patients more susceptible to acute kidney injury (AKI) and associated electrolyte abnormalities.

**Hyponatremia** (sodium < 136 mEq/L) in the elderly presents with primarily nonspecific CNS manifestations which will vary depending on the rate of sodium decline, and should be classified based on the patient's volume status, serum osmolality, urinary specific gravity and sodium concentration. Most cases reflect a net gain of free water. Management depends on severity, acuity, and type of hyponatremia, clinical status, and the underlying cause. Osmotic demyelination syndrome is a significant complication of overly aggressive management of chronic hyponatremia.

**Hypernatremia** (sodium > 145 mEq/L) often presents with dehydration and altered mental status. It is an independent mortality risk factor. The primary problem is usually inadequate water intake. Slow correction with normal saline or hypotonic fluids (oral, if able) is preferred to avoid cerebral edema.

**Hypercalcemia** (mild 10.5-12, moderate 12-14, severe > 14 mg/dL) is most commonly due to malignancy, hyperparathyroidism, immobilization, or medications, all of which increase with age. Altered mental status, vague gastrointestinal complaints, bone pain, and dehydration are frequent presenting symptoms. Treatment of severe hypercalcemia consists of IV normal saline hydration, IV bisphosphonates, IM or SQ calcitonin, and correction of underlying causes.

**Acute Kidney Injury (AKI)** increases with advancing age due to associated co-morbidities. The severity of AKI is classified by taking into account serum creatinine, GFR, urine output, and duration. The most common geriatric causes are sepsis, hypovolemia, medications, vascular disease and urinary obstruction. Prevention and early treatment give the best outcome. Complications such as severe hyperkalemia, fluid overload, encephalopathy, acidosis, and pericarditis should be treated with renal replacement therapy, most often in the form of hemodialysis.

### CONCLUSION

Geriatric patients frequently present with renal and electrolyte emergencies; clinicians should be familiar with the most common causes, diagnostic strategies, and treatment regimens available.

### ABSTRACTED FROM

Al-Zahrani A, Sinnert R, Gernsheimer J. Acute Kidney injury, Sodium Disorders, and Hypercalcemia in the Aging Kidney: Diagnostic and Therapeutic Management Strategies in Emergency Medicine, *Clin Geriatr Med*. 2013 Feb; 29(1):275-319.

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### COMMENTARY by Kirk A. Stiffler, MD, MPH (Summa Akron City Hospital)

Emergency medicine clinicians are facing a tremendous shift in the population they care for as the proportion of geriatric patients visiting the emergency department continues to rise to unprecedented levels.[1] While this article does not present any new experimental data, it succinctly reviews the most common renal and electrolyte abnormalities encountered in geriatric emergency patients. The impact on morbidity, mortality, hospital length of stay, and health care costs of these disorders are well documented.[2, 3] While the appropriate prevention and management of AKI, sodium disorders, and hypercalcemia may seem difficult to pursue in the ED, the authors summarize an extensive literature review to present relatively simple guidelines on how to evaluate and promptly treat these common disorders in hopes of minimizing adverse outcomes.

1. Wilber ST, Gerson LW, Terrell KM, Carpenter CR, Shah MN, Heard K, Hwang U: **Geriatric emergency medicine and the 2006 Institute of Medicine reports from the Committee on the Future of Emergency Care in the U.S. health system.** *Academic emergency medicine : official journal of the Society for Academic Emergency Medicine* 2006, **13**(12):1345-1351.
2. Chertow GM, Burdick E, Honour M, Bonventre JV, Bates DW: **Acute kidney injury, mortality, length of stay, and costs in hospitalized patients.** *Journal of the American Society of Nephrology : JASN* 2005, **16**(11):3365-3370.
3. Shea AM, Hammill BG, Curtis LH, Szczech LA, Schulman KA: **Medical costs of abnormal serum sodium levels.** *Journal of the American Society of Nephrology : JASN* 2008, **19**(4):764-77