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Salt, sweat and unclear? Diaphoresis and hypernatremia in end-stage kidney disease: Answers

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Keywords

hypernatremia; diaphoresis; end-stage kidney disease; bethanecol; muscarinic toxicity

Answers

The most common causes of diaphoresis in patients receiving dialysis are related to various types of infections, particularly catheter-associated infections. Fever can result in diaphoresis and an increase in insensible losses leading to hypernatremia. Less common causes of diaphoresis may include: endocrine causes (hyperthyroidism, hypoglycemia), occult malignancy, and certain medications. Notably, the two patients we describe had persistent diaphoresis in the absence of fevers or identifiable infectious sources. Given concern for possible medication toxicity in the first case, bethanecol and diphenhydramine were discontinued. His diaphoresis resolved within one day, and his serum sodium corrected. The diphenhydramine was resumed without recurrence of symptoms. The second case had repeated episodes of profuse diaphoresis, and eventually the bethanecol was discontinued with prompt resolution of symptoms and hypernatremia.

Discussion

Bethanecol is a muscarinic receptor cholinergic agonist used for a variety of indications including urinary retention, decreased gastrointestinal motility, and gastroesophageal reflux disease (GERD). The usual symptoms and signs associated with muscarinic toxicity include exhaustion, irritability, muscular cramps, salivation, frothing, sweating, lacrimation, blurring of vision, miosis, ptosis, bronchorrhea, cough, tachypnea, bronchospasm, bradycardia, hypotension, abdominal cramps, vomiting, and diarrhea [1]. In pediatrics, bethanecol is commonly used for the treatment of GERD. However, there are no dosing guidelines for its administration in the end-stage kidneys disease (ESKD) population. Bethanecol is primarily

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metabolized in the liver and excreted by the kidney. To our knowledge, there are no data regarding its ability to be cleared by hemodialysis (HD) or peritoneal dialysis (PD). There are two prior reports in the literature describing bethanecol toxicity in patients with markedly reduced renal function. The first case describes a 65-year-old male admitted with acute urinary retention and a creatinine of 11.3 mg/dL. He underwent catheterization and was treated with bethanecol. After four days of bethanecol treatment, he developed profuse sweating, hypersialorrhea, polydipsia and hypernatremia. All signs and symptoms normalized after stopping bethanecol, and he made a complete recovery [2]. The other report describes a 59-year-old female with diabetic nephropathy and residual urine output on HD who developed urinary retention after an acute myocardial infarction. Bethanecol was initiated, and over the next several days she developed signs of muscarinic intoxication, including profuse sweating, hypersialorrhea, and gastrointestinal distress. Within 24 hours of discontinuing bethanecol, her symptoms resolved [3]. Given these prior reports and our described experience, we recommend avoiding this medication in patients with ESKD.

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