

IMAGES IN CLINICAL MEDICINE

Urinary Calcium Oxalate Crystals in Ethylene Glycol Intoxication



A 73-YEAR-OLD MAN PRESENTED WITH A SELF-INFLICTED STAB WOUND TO the abdomen. A plasma ethanol level of 27 mg per deciliter was found on preliminary toxicologic screening; the results of chemical analyses were normal. No internal injuries were found on exploratory laparotomy. Eight hours postoperatively, the patient became confused and was intubated because of respiratory distress. Arterial blood gas measurements showed a pH of 6.91, partial pressure of carbon dioxide of 12 mm Hg, and base excess of -30 mmol per liter. Blood chemical analyses showed a bicarbonate level of less than 5 mmol per liter, a creatinine level of 1.4 mg per deciliter (123.8 μ mol per liter), an anion gap of 26, and serum osmolality of 346 mOsm per liter with an osmolar gap of 38 mOsm per liter. Light-microscopical analysis of the urine showed various forms of calcium oxalate monohydrate crystals, including “cigar” (Panel A) and “dumbbell” (Panel B) shapes. Free crystals were extensive (Panel C), with many incorporated in casts (Panel D). Oxalate is a metabolite of ethylene glycol that is excreted by the kidneys. Oxalate readily precipitates with calcium to form dihydrate crystals and the more stable monohydrate crystals. Final toxicologic screening of plasma was positive for ethylene glycol, with a level of 72 mg per deciliter. It was later determined that the patient had ingested automotive antifreeze in a suicide attempt. Short-term treatment included fomepizole and continuous hemodialysis, but the patient remained on long-term hemodialysis for two months after hospital discharge.

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