Shots All Around
J Willis BS, W Shaffer MD, L Fox MD, P Thien MD
Department of Internal Medicine
Louisiana State University Health Sciences Center, New Orleans, LA 70112

INTRODUCTION
There are many patients that present to the emergency department with vague abdominal complaints and poor recall and while “what is common is common,” such as the progression of chronic disease our suspicions must address the additional possibilities and evaluate all patients thoroughly as well, especially in those at high risk. Risk stratification must take into account the unusual, especially with ingestions in elderly patients of common household and easily accessible chemicals.

CASE REPORT
76 year old male with chronic kidney disease (CKD), hypertension, chronic obstructive pulmonary disease, chronic systolic heart failure, and coronary artery disease presented to the emergency department four days after accidentally ingesting four ounces of brake fluid. The patient had been working on his car and had drained his brake fluid into an orange juice container. While distracted, he drank the entire container in shot-like fashion before realizing it was contaminated. The patient thought nothing of it until several days later when he developed persistent lower, 9/10, sharp, non-radiating, constant abdominal pain associated with nausea, vomiting (two times nonbilious, nonbloody vomitus), and anuria. The patient was evaluated in the emergency department and admitted to the Internal Medicine service at LSUHSC.

Nephrology reviewed the case and felt that, due to the patient’s late presentation, competitive inhibitors such as fomepizole and ethanol were not prudent, and that the ethylene glycol, a primary ingredient in brake fluid, had already been converted to its destructive metabolites and done its damage. The patient was started on hemodialysis secondary to a rise in his blood urea nitrogen and creatine (93 mg/dL and 12.1 mg/dL from a baseline of 27 mg/dL and1.9 mg/dL) and an increasing anion gap metabolic acidosis with hyperkalemia. After three rounds of hemodialysis the patient’s electrolyte abnormalities, signs and symptoms resolved and he was discharged home with a diagnosis of ESRD and continued home dialysis.

Common Things Are Common.

This case demonstrates a case of mistaken identity found on extended historical review. A patient with chronic renal disease ingested Ethylene Glycol and induced acute renal failure.

DISCUSSION
Ethylene glycol, present in hundreds of industrial products such as brake fluid, solvents, cleaners, and fuels causes dozens of fatal intoxications in the United States annually. Inhalation and dermal contact rarely produce significant toxicity whereas ingestion of any more than 1 g/kg is considered a lethal dose. Ethylene glycol itself is relatively nontoxic, in most cases causing central nervous system sedation, but hepatic oxidation with the enzymes, alcohol dehydrogenase and aldehyde dehydrogenase, metabolize ethylene glycol to glycolate, glyoxalate, and oxalate which all negatively target the kidney. Renal failure in these patients is primarily due to glycolate-induced damage to tubules and tubule obstruction from precipitated oxalate crystals. The most common reasons for ingestion include substitution for ethanol, intentional harm of self, and accidental (following transfer from the original container). CNS sedation, headache, vomiting, and hypercapnea/tachypnea are common early presenting symptoms while signs of renal failure such as flank pain, oliguria, and hematuria are common later physical signs and symptoms. More serious toxic doses can result in cranial nerve palsies and tetany and then eventually to multisystem organ failure, cerebral herniation, and death. Diagnostic evaluation consists of direct testing for blood ethylene glycol concentration, urine analysis for Oxalate precipitates, close monitoring of electrolytes, anion gap calculations, arterial or venous blood gas analysis, and BUN/creatinine. Diagnosis is made via the combination of clinical evaluation of signs and symptoms in the setting of a high anion gap acidosis and plasma osmolar gap. Anion and Osmolar gaps are crucial to diagnosis as there are very few conditions that can cause the level of change that ethylene glycol toxicity often produces. Overall prognosis is good for most patients who receive relatively early alkalinization with bicarbonate, early hemodialysis and/or a course of ethanol or fomepizole (alcohol dehydrogenase competitive inhibitors) with good supportive care. Retrospective studies indicate that renal function often recovers over a period of days to months in survivors of ethylene glycol poisoning. However, it has been shown that patients with underlying CKD who suffer any kind of AKI are more likely, as in our case to be dialysis dependent and may provide a terminal hit to a patient with already poor renal function.

REFERENCES

ACKNOWLEDGMENTS
1. Lee Engel, M.D.,Ph.D., Department of Medicine, Louisiana State University Health Sciences Center, New Orleans, LA.
2. Diana Thien M.D., Department of Medicine, Louisiana State University Health Sciences Center, New Orleans, LA.