

Clinical report

Hematuria, an unusual systemic toxicity, in formic acid ingestion: a case report

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Background: Acid ingestion can cause severe injuries of the upper gastrointestinal tract and the respiratory tract. Besides hydrofluoric acid and selenious acid, systemic toxicities of acid ingestion can occasionally occur. However, hematuria is a rare systemic toxicity reported in caustic poisoning.

Objectives: To describe a case of a one-year-old girl who accidentally ingested liquid formic acid.

Methods: This patient had severe local corrosive effects including a compromised upper respiratory tract and developed gross hematuria during the hospital admission.

Results: Hematuria could be a consequence of acid ingestion.

Conclusions: Significant hematuria can be a systemic effect of acid ingestion, but in this case was self-limiting.

Keywords: Caustic poisoning, formic acid, hematuria, systemic toxicity, unusual

Acid ingestion can cause severe injuries of the upper gastrointestinal tract, which is mostly localized in the mouth, esophagus, stomach, and respiratory tract. Besides hydrofluoric acid and selenious acid, systemic toxicities of acid ingestion, such as metabolic acidosis, hemolysis, hepatitis, disseminated intravascular coagulopathy are observed occasionally [1-4]. However, isolated hematuria is a rare systemic toxicity reported in caustic poisoning. In this report, we described a patient who presented with hematuria after formic acid ingestion.

Case report

A one-year-old girl was referred from a community hospital to the Emergency Department (ED) of Surin General Hospital after accidental ingestion of one mouthful of formic acid being kept in her house intended for coagulating para rubber latex. The girl developed nausea and vomiting shortly after the ingestion. At the ED, she was fully

conscious. Her vital signs were normal, except tachypnea. Oxygen saturation was 90%. The other abnormal physical findings were stridor and severe oropharyngeal erythema. Chest x-ray image was normal. Her blood chemistry tests showed mild metabolic acidosis with anion gap of 13. Shortly after admission, she was intubated with an endotracheal tube in the operation room. She was diagnosed as having severe gastrointestinal injury from caustic ingestion. Conservative treatment was planned. Nothing per oral and total parenteral nutrition was implemented. On the first day of admission, she developed gross hematuria; a urinary catheter was then inserted without urinary irrigation. The first urinary analysis showed red blood cells (RBC) 50–100 per high power field (hpf) without dysmorphic RBC, blood 3+, protein 1+ and pH 5.5. Serum blood urea nitrogen and creatinine were 28 and 0.43 mg/dL, respectively. Ultrasonographic study of both kidneys was unremarkable. The gross hematuria gradually subsided. Because fever was observed, intravenous antibiotic was administered. The RBC in the urinary analysis decreased 10–20 per hpf, 5–10 per hpf, and 0–1 per hpf on the second, third, and fourth days, respectively. However, her hematocrit was continuously decreased

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from 34% to 24%. Pack red cell (100 mL/kilogram of body weight) were then transfused. During this time, her urine output was normal. Investigation for the anemia included platelet count, blood coagulogram, liver function test, urine culture, and hemoculture. All were normal. A cystoscopic study was not done because of her young age and no urology surgeon was available. With this conservative treatment, she recovered eventually and was discharged 14 days after admission. When she came back for follow up 2 weeks after discharge, she still had mild symptoms of dysphagia. Upper gastrointestinal series was performed and showed narrowing of the gastric antrum. However, her urine was clear since discharge.

Report of this case was approved by the Committee on Human Rights Related to Research Involving Human Subjects, Faculty of Medicine Ramathibodi Hospital, Mahidol University (MURA 2015/139). The mother of patient provided written informed consent for this publication.

Discussion

Acute kidney injury is reported as one of the systemic toxicities of acid ingestion [5-7]. However, hematuria was rarely described. It was found to be associated with patient mortality [7-9]. Nevertheless, these prior studies did not describe the investigation in detail or the suspected cause or the mechanism of the hematuria.

In the present patient, the history and physical examination findings of formic acid ingestion were clear. Here, we have reported a case of self-limiting gross hematuria after ingesting formic acid, causing significant gastrointestinal and upper respiratory tract injury. Investigational studies for establishing its cause were performed. No abnormality that might be the etiology of hematuria was found. From our observation, hematuria should not be caused by glomerular injury because there was no dysmorphic RBC found in her urine. The ultrasonography study suggested no anatomical abnormality of the urinary tract in this patient. However, because we did not perform a cystoscopic study of the urinary bladder, we could therefore not elucidate the probable

pathophysiology of hematuria after acid ingestion. We confirm some previous studies and accent that hematuria could be a consequence of acid ingestion, although more studies are needed. In conclusion, significant hematuria could be a systemic effects from acid ingestion, but in this case it was self-limiting.

Conflict of interest statement

The authors declare that there is no conflict of interest in presenting this case report.

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