

A Very Unique Case of Boric Acid Intoxication With Very High-magnitude Rhabdomyolysis

IJKD 2017;11:256-9
www.ijkd.org

Dear Editor

Boric acid (BA) is used in topical disinfectants and insecticides, at concentrations up to 99%. Potential lethal doses are 3 g to 6 g in infants and 15 g to 20 g in adults. Clinical manifestations of BA toxicity include nausea, vomiting, diarrhea, abdominal pain, headache, seizure, and coma. Death from BA overdose results from circulatory collapse or kidney failure.

No case of high-magnitude rhabdomyolysis associated with BA intoxication is reported. A 41-year-old man was admitted to our unit complaining muscle and abdominal cramps, after about 10 hours from the accidental ingestion of a glass of water containing 10 g of BA used as hand disinfectant. History and inspection were unremarkable, body temperature 37.9°C and blood pressure 140/90 mm Hg. On blood chemistry, kidney function tests were unremarkable, mild leukocytosis was noted (13500 per μ L), aspartate aminotransferase level was 250 U/L, and alanine aminotransferase level was 102 U/L. Creatine kinase level was 18000 U/L. Urinalysis showed mild proteinuria with few erythrocytes and leukocytes. Plasma boron was 78 mg/mL.

Half-saline solution (300 mL/h) together with 200 mmol of sodium bicarbonate were infused on the first 2 days. The second day, creatine kinase level rose to 133000 U/L and a hemodialysis session (polysulphone 1.8 m² dialyzer, 240-minute bicarbonate dialysis) was prescribed. Notwithstanding one more dialysis session, creatine kinase raised to 167000 U/L, but from the 4th day, it halved every following day. Boron level reduced (from 60 mg/mL to 3 mg/mL, to undetectable). Dialysis was stopped, hydration reduced, and the patient was discharged on the 10th day with normal creatine kinase and kidney function.

Boric acid forms complexes with hydroxyl group-containing glycolipids, glycoproteins and phosphoinositides affecting membrane integrity, calcium chelator function and redox metabolism.

It is easily cleared by hemodialysis. No case of high magnitude rhabdomyolysis associated with BA intoxication is reported. In 2004 the American Association of Poison Control Centers reported 2443 cases of BA exposure with 140 intentional, causing moderate to major outcomes in 62 and death in 1.¹

Teshima and colleagues reported successful treatment of an attempted suicide by a 26-year-old woman ingesting BA via furosemide and intravenous fluids forced diuresis.² Prabhakar and coworkers³ reported a laundry detergent ingestion with acute kidney failure and creatine kinase at 12000 U with complete recovery after 9 dialysis sessions. Riella and colleagues⁴ reported a patient presenting acute kidney failure complicating laundry detergent ingestion, whose renal biopsy showed severe cortical necrosis.

This case is interesting essentially for: (1) to our knowledge it is the first case of BA intoxication associated with a really high rhabdomyolysis (creatinine kinase up to 167000 U/L), which completely recovered after hemodialysis; (2) acute kidney failure was not present; and (3) the extremely high creatine kinase was associated with BA intoxication, which did not respond to the abundant hydration and urine alkalinization.

Only patients with a creatine kinase higher than 20000 U/L associated with BA intoxication do not seem to respond to hydration and required dialysis.⁵ Our case did not answer the question "how much creatine kinase is too much," for starting dialysis, due to patient's very high level of creatine kinase. However, it supports starting dialysis in patients with creatine kinase blood level higher than 20000 U/L and not waiting for an eventual effect of hydration and urine alkalinization.

Ugo Vertolli, Marianna Alessi, Elena Naso,
Agostino Naso, Lorenzo A Calò*

Department of Medicine, Nephrology, University of Padova, Italy
*E-mail: renzcalo@unipd.it

REFERENCES

1. Watson WA, Litovitz TL, Rodgers GC Jr, et al. Annual Report of the American Association of Poison Control Centers Toxic Exposure Surveillance System. *Am J Emerg Med.* 2005;23:589-666.
2. Teshima D, Taniyama T, Oishi R. Usefulness of forced diuresis for acute boric acid poisoning in an adult. *J Clin Pharm Ther.* 2001;26:387-90.
3. Prabhakar KS, Pall AA, Woo KT. Rhabdomyolysis and Acute Renal Failure Complicating Detergent Ingestion. *Singapore Med J.* 2000;41:182-3.
4. Riella LV, Golla S, Dogaru G, Rennke HG, Christopher K. Renal cortical necrosis complicating laundry detergent ingestion. *Nephrol Dial Transplant Plus.* 2009;2:40-2.
5. Kenny JE. Creatine Kinase: How Much is Too Much? November 3, 2010. Available from: <http://www.clinicalcorrelations.org>