

Unusual presentation of arsenic poisoning in a case of celiac disease

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Arsenic poisoning may occur from sources other than drinking water such as rice, seafood, or insecticides. Symptoms and signs can be insidious, non-specific, atypical, and easily overlooked. We present a 39-year-old woman with celiac disease who was on gluten-free diet for 8 years and presented with diarrhea, headache, insomnia, loss of appetite, abnormal taste, and impaired short-term memory and concentration, but with no skin lesions. Arsenic concentration in her 24-hour urine was 682.77 µg/g creatinine (normal <15). She responded very well to chelation therapy with dimercaptosuccinic acid given orally and recovered within 2 weeks. The suspected source of arsenic poisoning was rice, as drinking contaminated ground water is not known in Saudi Arabia and she had not taken seafood. Therefore, arsenic poisoning should be suspected based on the meticulous medical history in cases of patients with celiac disease whose main food is rice and who present with unusual symptoms.

Arsenic poisoning is known to occur in areas with contaminated drinking ground water such as Bangladesh, India, Taiwan, and United States.¹⁻⁴ Other sources may include certain industries, particularly, carpenters dealing with pressure-treated wood that has been treated with arsenic-containing wood preservative. Other sources include food (sea food and rice), insecticides, and drugs.⁵⁻¹⁷ Arsenic poisoning can easily be overlooked because of atypical symptoms and signs, lack of awareness, and unavailability of the arsenic level test. We present a case of arsenic poisoning who presented with atypical signs and symptoms and was overlooked, and treatment was delayed for several months. We present this case to illustrate that such cases can be easily diagnosed and treated if arsenic poisoning is suspected and not overlooked.

CASE

Our case is a 39-year-old housewife, known with celiac disease for 8 years, who presented with progressive fatigue, profound watery diarrhea (12 times/d), palpitation, dry mouth, poor appetite, poor taste, sleeplessness, impaired concentration, and short-term memory. She was on gluten-free diet (mainly rice and corn de-

rivatives) and vitamin and mineral supplements. She had not eaten sea food for almost 1 month prior to this admission. She continued to have regular menstrual periods. She was married with 4 healthy children. She had no other illnesses, and her medical history was unremarkable. No other family members had celiac disease or similar symptoms. On physical examination, she looked ill, exhausted, and anxious. Her height was 160 cm, weight 47 kg, pulse 110/min, regular, and blood pressure 110/70 mm Hg. No pallor or skin lesions were observed, and her abdominal, cardiovascular, and neurological examinations were normal. At this point, we thought that she was not compliant with her gluten-free diet, and probably she had a mixture of multiple deficiencies (e.g., calcium, magnesium, zinc, iron, vitamin B12) and depression. Laboratory tests were as follows: white blood cells $8.9 \times 10^9/L$, Hb 94 g/L, mean corpuscular volume 76.6 fl, platelets $397 \times 10^6/L$, erythrocyte sedimentation rate 41 mm, fasting glucose 4.7 mmol/L, urea 3.6 mmol/L, creatinine 40 µmol/L, albumin 31 g/L, globulins 36 g/L, total bilirubin 5 µmol/L, alkaline phosphatase 153 U/L, alanine aminotransferase 70 U/L, aspartate aminotransferase 30 U/L, gamma glutamyl transferase 25 U/L, zinc 7.3 µmol/L (normal

7.65-22.9), corrected calcium 2.29 mmol/L, magnesium 0.9 mmol/L, ferritin 97.2 ng/mL, vitamin B12 157.8 pmol/L, gliadin antibodies immunoglobulin (Ig) G 114 (positive >20), and anti-human tissue transglutaminase IgA 53 (positive >20). IgA anti-gliadin, anti-endothelium, and anti-reticulin were negative. Patient was started on intravenous fluids and 24-hour urine were collected and sent to Micro Trace Minerals (Micro Trace Minerals GmbH, Rohrenstrasse -91217, Hersbruck, Germany, www.microtrace.de) for metal analysis. The results of the 24-hour urine showed arsenic concentration 682.77 µg/g creatinine (normal <15). Therefore, the diagnosis of arsenic poisoning was made, and the patient was started on chelation therapy with dimercaptosuccinic acid 30 mg/kg orally every 8 hours along with multivitamin and mineral supplements for 3 days. Her chemistry tests (liver functions, kidney functions, calcium, magnesium, zinc, and copper) were monitored twice/d. She showed a rapid response with gradual improvement of her symptoms over the next 2 weeks, and a repeat of arsenic concentration in the 24-hour urine was 26 µg/g and 12 µg/g creatinine after 7 days and 2 weeks, respectively. The source of arsenic poisoning could not be identified, but rice was the suspected source.

Other possible sources could be insecticides, pressure-wood furniture, supplements, or cosmetics. Drinking water is not suspected because the main water supply is desalination or mineral water. Arsenic is not known in well water in Saudi Arabia.

DISCUSSION

Arsenic is a naturally occurring toxic metalloid that combines with other elements such as oxygen, sulfur, chloride, hydrogen, and carbon.¹⁸ Due to its poisonous properties, arsenic has been used throughout the history as a homicidal and suicidal poison.^{19,20} In the past century, arsenic became very important insecticide, herbicide, and algicide.⁷ Besides, arsenic is used in several industries such as copper smelting, wood preser-

vation, and medicine. Arsenic trioxide is currently used in the treatment of acute promyelocytic leukemia.^{9,10} Exposure to arsenic occurs through drinking water from contaminated wells, inhaling smoke from pressure-treated wood, or inhaling vapors from insecticides, herbicides, algicides or drugs. High levels of arsenic has been found recently in seafood, particularly bivalves and rice. Exposure to arsenic leads to several health problems that affect the gastrointestinal tract, respiratory system, cardiovascular system, nervous system, and skin.¹⁸⁻²⁶ Several malignancies have been attributed to arsenic such as cancer of the skin, bladder, and lung; cancers are caused due the strong carcinogenicity of arsenic.²¹⁻²⁶ Patients with celiac disease are at a high risk of arsenic exposure, because their gluten-free diet is composed mainly of rice.^{13-17,27} Our patient is known with celiac disease who is compliant with gluten-free diet, consuming abundance of rice. Arsenic from seafood was excluded, because she had a poor appetite and did not take any seafood for 1 month prior to admission. Other causes cannot be excluded such as inhalation of vapors from insecticides, pressure-treated wood, and may be some cosmetics. In addition, arsenic may contaminate other grains and supplements. Our patient was unusual, because she lacked classical skin lesions, and the other symptoms were non-specific. Arsenic concentration in the urine is more reliable because blood levels are normal in persons with chronic arsenic poisoning.^{28,29} She responded very well and rapidly to chelation therapy with oral DMSA, which is a safe agent for chelation therapy of heavy metals.³⁰⁻³² We conclude that exposure to arsenic may not be rare, and that it has to be suspected and looked for in high risk persons

In conclusion, chronic arsenic poisoning can present with atypical signs and symptoms. It should be suspected in high risk persons based on their health status, occupation, diet, and life style.

Conflict of interest

None.

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