



Impetigo Associated with Cyanobacteria Exposure at a Kansas Lake: An Adolescent Case Series

Kari Harris, M.D., Kerri Meyer, M.D.,
Teolinda Milsap, M.D.
University of Kansas
School of Medicine-Wichita
Department of Pediatrics

Introduction

Cyanobacteria, or blue-green algae, have existed for about 3.5 million years and are common inhabitants of terrestrial, fresh, brackish, or marine waters.^{1,2} They are important organisms in biodiversity and contribute greatly to the pharmaceutical and human health fields.¹

Cyanobacteria have the capacity to produce a diversity of toxins, some being the most powerful toxins known.³ The literature reports 150 known types of cyanobacteria, 50 of which inhabit freshwater. One-third of the freshwater inhabitants are toxigenic and have the potential to cause adverse health conditions in both humans and animals.^{1,4} This toxicity was first reported over 120 years ago, when several livestock animals died within hours of drinking from a lake containing cyanobacterium.²

Adverse human health conditions include headache, myalgia, oral blistering, allergic reactions, skin rashes and gastrointestinal symptoms as well as potential hepatotoxicity.^{1,2} Furthermore, there remains concern that exposure to cyanotoxins produced by these bacteria potentially could be carcinogenic and/or neurotoxic.^{1,3-5} Toxic exposure can occur by direct contact, ingestion, or inhalation of recreational or untreated water as well as by deliberate ingestion of herbal supplements containing cyanobacteria.⁶⁻⁸

Several case reports have described a range of clinical sequelae developing after

exposure to recreational waters contaminated with cyanobacteria. The most commonly reported were allergic-like symptoms, skin rashes, and gastrointestinal symptoms, all of which were self-limited.² The mild and self-limited nature of these manifestations makes it likely that underdiagnosis and misdiagnosis of cyanobacteria-related health effects occur.² Much information is available about types of symptoms associated with blue-green algae, however, little exists on how medical professionals should evaluate and treat patients presenting with these complaints.

In 2011, the Kansas Department of Health and Environment issued a public advisory or warning for many lakes around Kansas regarding the potential harm associated with exposure to cyanobacteria.^{9,10} We report three adolescent female patients who presented with similar impetiginous rashes after exposure to the toxic algae at Cheney Lake in south central Kansas. All three cases began within days after swimming in Cheney Lake during the time that the public health announcement was released.

Case Series

Case 1. A 15-year-old female presented to clinic two weeks after a rash started on her elbow (see Figure 1). She had been swimming in Cheney Lake on the day prior to the rash. The lesion on her elbow started

as a red blistering rash and progressed to involve her other arm and both legs. Her only associated symptom was some itchiness on the skin where the rash was located. She denied any fever, respiratory symptoms, nausea, or vomiting. Her vital signs were all within normal limits and her exam was only significant for multiple erythematous lesions over her arms and legs some with superficial ulcerations. The lesion that was most involved was located around her left elbow with some serous fluid drainage as well as honey-crusting noted circumferentially. The patient was started on oral cephalexin and the rash improved.



Figure 1. Honey-crusted lesion with fluid drainage.

Case 2. A 14-year-old female presented for a follow-up appointment after being treated at a local emergency department for what was diagnosed as a spider bite. The lesion had started 2-3 weeks prior, two days after swimming at Cheney Lake. The lesion existed primarily on her right knee, but had spread to involve her left ear lobe and left face at her follow-up appointment. The lesions itched and she admitted to scratching

and picking at them prior to the rash spreading. She denied any fever, respiratory symptoms, nausea, or vomiting. On exam, her vital signs were unremarkable. On her right knee, she had what appeared to be a healing abscess that had drained and had remaining erythema with superficial scabbing present. There were several smaller satellite lesions with honey-crusting present surrounding the larger lesion on her knee. She had similar lesions with surrounding erythema and honey-crusting on her left ear lobe and cheek (directly adjacent to her left ear lobe). She was started on oral cephalexin and her rash resolved after treatment.

Case 3. A 16-year-old female presented to the clinic after a lesion began under her nose three days prior. She had been swimming at Cheney Lake approximately three weeks before she presented. Directly after swimming, she had nasal congestion that worsened until her presentation. The skin lesion began as a red sore on her upper lip. A similar lesion formed under her left naris two days before presentation and a third lesion began inside her left naris on the day of her appointment. She also had symptoms of a sore throat for the three days before presentation and one episode of diarrhea. She denied nausea or vomiting and had no history of fever. On exam, she was afebrile and vital signs were within normal limits. She had a 1.5 cm, honey-crusted, erythematous macule under her left naris and an approximately 0.5 cm circular, crusted lesion on her left upper lip at the vermillion border. The remainder of her exam was unremarkable. She was started on amoxicillin as treatment for sinusitis and topical mupirocin as treatment for her impetigo. Her symptoms improved with treatment.

Discussion

Multiple advisories and warnings have been posted for recreational lakes in Kansas

during 2011 because of the cyanobacteria in the water.^{9,10} Depending on the amount of cell counts, or the presence of specific toxins, the Kansas Department of Health and Environment release either an Advisory or a Warning to the public stating the potential harm and recommended actions. At the time of submission of this article, eight Public Health Warnings and five Advisories had been released for lakes around Kansas.⁹ Many people often are unaware of these public health announcements, or may ignore them altogether, thus exposing themselves to the toxic algae. Health care professionals are left to diagnose and treat the subsequent symptoms patients develop from this exposure. However, little information is available on how these illnesses should be diagnosed and managed.

The true incidence of human illnesses associated to toxic algae exposure is unclear. Many symptoms mimic other self-limited illnesses and could go unnoticed or misdiagnosed. Even in our three patients, if they had not presented within such a short time frame from exposure to the same contaminated water, we may not have tied the symptoms to the algae exposure.

References

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- ³ Hudnell HK. The state of U.S. freshwater harmful algal blooms assessments, policy and legislation. *Toxicon* 2010; 55(5):1024-1034. PMID: 19646465.

Because no diagnostic testing was performed, we only can link the skin lesions to the toxin exposure by the patients' temporal association with recreation at that specific lake and the similarity of their presentations.

All three patients were treated conventionally for bacterial impetigo with good response indicating that routine management for future lesions would be appropriate. In fact, supportive care for many manifestations linked to cyanobacteria exposure would likely be appropriate given their mild and self-limited nature.

The relevance for our cases lies in that Kansas has many lakes affected by cyanobacteria and such exposure should be considered when a patient presents with these types of symptoms. It is critical to get a thorough history which should include recent recreational activities, exposure to lake or pond water, and locations of summer camps or other outdoor activities. When exposure to cyanobacteria has been identified, it is important that the health care provider is aware of the possible manifestations of toxin exposure including the potentially more severe complications.

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⁹ Kansas Department of Health and Environment. Current Advisories and Warnings. http://www.kdheks.gov/algae-illness/algae_advisories.htm. Accessed: August 19, 2011.

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