



## RESEARCH LETTER

### A protracted case of diarrhoea caused by *Cryptosporidium* in a non-immunocompromised patient

To the Editor,

Immunocompromised patients generally have protracted courses of infectious illnesses that are often self-limiting in immunocompetent individuals. *Cryptosporidium parvum* is a protozoan that causes watery diarrhoea in humans, along with other gastrointestinal maladies such as nausea, vomiting, and abdominal pain. Cases of *Cryptosporidium* causing chronic symptoms of diarrhoea in immunocompetent patients are rare and have not been well-documented. We present a case of a patient with an unusually protracted course of diarrhoea presumably caused by *Cryptosporidium* infection but lacking laboratory evidence of immunodeficiency.

GB was a 64-year-old male with multiple medical problems who presented to the emergency room at the West Los Angeles VA Medical Center for acute worsening of chronic diarrhoea. The patient reported having loose, watery stools for one year, worsened post-prandially, and associated with gas, bloating, and flatulence. The patient developed new onset nausea, vomiting, and worsening crampy abdominal pain for a few days.

The patient grew up in a farm area, but has lived in Los Angeles for several decades. A colonoscopy carried out about two years prior to the onset of the chronic diarrhoea showed tubular adenoma, but was otherwise normal. The patient had not travelled abroad for many years. The patient was an active smoker, but denied alcohol or illicit drug use.

On admission, the patient was afebrile with stable vital signs. He was in slight distress secondary to abdominal pain. He had dry mucous membranes, tachycardia, and mild tenderness to palpation throughout the entire abdominal area without rebound tenderness or guarding. Stool guaiac exam was negative. The complete metabolic panel showed hyperkalaemia, elevated creatinine, and elevated eosinophil count of 3500, but was otherwise unremarkable. HIV antibody screen was negative, but stool ova and parasite returned positive for *Cryptosporidium parvum*. *Clostridium difficile* stool toxin returned negative. CT of abdomen and pelvis did not reveal any acute abnormalities. The patient was hydrated and treated with a four-day

course of nitazoxanole. He was discharged home once his kidney function normalised. Within days after initiating nitazoxanole, his chronic diarrhoea resolved. Repeat stool study performed weeks later at a primary care appointment returned negative for *Cryptosporidium*.

The patient was referred to the allergy clinic for evaluation for the chronic eosinophilia. Repeat eosinophil count done four weeks post-treatment showed the value normalising to 200. Chronic eosinophil workup was performed, which showed normal IgE level, negative allergy testing to foods and to aeroallergens, normal cortisol levels, and negative *Strongyloides stercoralis* antibody. Tryptase level measured was elevated at 28.5, prompting a bone marrow biopsy, which did not reveal any malignancy. Immunodeficiency evaluation was performed, including quantitative immunoglobulins, which returned within normal limits (IgA = 113, IgM = 82.3, IgG = 1070). The patient also demonstrated protective antibody titre levels to 16 of the 23 (70%) tested serotypes of *Streptococcus pneumoniae*. A repeat HIV test done a year later remained negative.

Given the patient's complete resolution of gastrointestinal symptoms with nitazoxanide and the clearing of the parasitic oocytes from the stools post-treatment, we have established a causal association between the patient's symptoms and the finding of *Cryptosporidium* in his stools. The patient lacked laboratory evidence of immunodeficiency, nor did he have any prior history of organ transplantation or use of immunosuppressive medications. Because *Cryptosporidium* generally creates a self-limiting form of diarrhoea in immunocompetent patients, our patient suffered from an unusually protracted course of diarrhoea in the setting of the protozoan infection. Medical conditions associated with increased risk of acquiring cryptosporidiosis include HIV, common variable immunodeficiency, IgA deficiency, organ transplant, and use of immunosuppressive drugs.<sup>1</sup>

*Cryptosporidium* can be found all over the United States, and approximately 748,000 cases are reported in the United States each year.<sup>2</sup> In developed countries, the prevalence rate of cryptosporidiosis among immunocompetent patients who have diarrhoea is about 1–3%.<sup>3,4</sup> The prevalence rate of cryptosporidiosis among HIV patients in United States and Europe is estimated to be 8–30%.<sup>5</sup> Individuals who drink unfiltered water from rivers and streams are at greater risk of becoming infected. The patient's background history lacked such risk factors, and thus the source of the parasitic

infection for our patient remains unknown. However, older age is associated with negative outcomes including hospitalisations, water depletion and even death.<sup>6</sup> Our patient matches the clinical profile closely given that the patient was dehydrated during the emergency room visit. As such, patients at extreme ages appear more susceptible to the parasite. In fact, longitudinal studies from South America show that children infected with *Cryptosporidium* suffer from growth stunting and lack of weight gain.<sup>7,8</sup>

Also noteworthy is that the patient's elevated eosinophil count normalised from 3500 to 200 following treatment with nitazoxanole. With a few exceptions, infections caused by protozoans rarely cause eosinophilia. The only two protozoan parasites known to cause peripheral eosinophilia are *Dientamoeba fragilis* and *Isospora belli*. Chronic eosinophilia workup performed in the allergy clinic did not reveal other contributory factors for the patient's abnormal lab finding.

In summary, we have presented a case of a non-immunocompromised adult with a protracted course of diarrhoea attributed to *Cryptosporidium parvum* infection as he responded to anti-parasitic agent therapy with clearing of oocysts from his stools post-treatment. The patient had chronic eosinophilia which resolved with nitazoxanole, and other causes for his chronic eosinophilia had been ruled out. The case highlights the great variability in the clinical presentation of *Cryptosporidium* and the need to consider the diagnosis in immunocompetent individuals suffering from chronic diarrhoea.

## Ethical disclosures

**Protection of human and animals in research.** The authors declare that no experiments were performed on humans or animals for this investigation.

**Patient data protection.** The authors declare that they have followed the protocols of their work centre on the publication of patient data and that the patient described in this case report has received sufficient information and has given his informed consent in writing to publication about him.

**Right to privacy and informed consent.** The authors have obtained the informed consent of the patient mentioned in the article. The author for correspondence is in possession of this document.

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## Conflicting interests

Dr. Henry Lin and Dr. Joseph Yusin declare no conflicting interests.

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## IgE-mediated reaction induced by arugula (*Eruca sativa*) ingestion compared with a spectrum of *Brassicaceae* proteins

To the Editor,

*Eruca* (E) *sativa* is an edible spontaneous or cultivated plant, native of the Mediterranean area.<sup>1</sup> *E sativa* belongs to

the *Brassicaceae* or *Cruciferae* family, which includes other vegetables such as cabbage, cauliflower, mustard, broccoli, turnip and radish.<sup>2,3</sup> Arugula is a food of the Mediterranean diet and it is commonly used as a condiment in many dishes (pizza, pasta and salad), consumed raw or cooked.<sup>1</sup>

The *Brassicaceae* are able to determine sensitisation and IgE-mediated reactions. Rare cases of adverse reactions after arugula ingestion have been reported, such as contact or systemic manifestations.<sup>1,4,5</sup>