Strongyloides stercoralis Hyperinfection Syndrome as a Cause of Fatal Gastrointestinal Hemorrhage

Shanti Rao, MD1, Helen Tsai, MD2, Eugenia Tsai, MD3, Yukihiro Nakanishi, MD, PhD4, and Robert Bulat, MD3

1Department of Medicine, Tulane University, New Orleans, LA
2Department of Medicine, Stony Brook University Medical Center, Stony Brook, NY
3Division of Gastroenterology, Department of Medicine, Tulane University, New Orleans, LA
4Department of Pathology, Tulane University, New Orleans, LA

ABSTRACT

Strongyloides stercoralis is a small intestinal nematode that is widespread in regions with poor sanitation. We present a 57-year-old man from Colombia who was undergoing corticosteroid therapy for a meningioma who presented after neurosurgery with abdominal pain and a profound gastrointestinal (GI) bleed. The patient underwent an esophagogastroduodenoscopy (EGD), an attempted embolization, and an exploratory laparotomy to remove the necrosed duodenum. His pathology examination revealed Strongyloides infection of the duodenum, and he died of profound blood loss. This rare diagnosis displays the importance of screening patients at a high risk of Strongyloides infection before starting glucocorticoid therapy.

INTRODUCTION

Strongyloides stercoralis hyperinfection syndrome is a rare syndrome that can occur in patients on glucocorticoid therapy.1 Strongyloidiasis affects an estimated 30–100 million people worldwide. In the United States, immigrants, travelers, and returning military personnel from endemic regions have the highest rates of infection. Strongyloides has the unique ability to replicate within the human host, resulting in a subclinical autoinfection cycle that can persist for decades after exposure.2 Individuals undergoing glucocorticoid therapy and those with human T-cell lymphotropic virus 1 infection are 2 groups at a particularly high risk of an aggressive form of autoinfection known as hyperinfection syndrome. This syndrome is characterized by a high parasitic burden, and clinical manifestations include intestinal damage, respiratory distress, and sepsis and meningitis due to enteric bacterial superinfection. It carries a mortality rate up to 87%. Because chronic strongyloidiasis can be asymptomatic, diagnosis is often delayed until life-threatening complications occur, such as gastrointestinal hemorrhage.3

CASE REPORT

A 57-year-old man who emigrated from Colombia 2 years before his presentation arrived to the hospital with a 2-day history of fever and nausea, with nonbloody, nonbilious vomiting and abdominal pain. His medical history was significant for a meningioma that underwent a staged resection, with the last surgery performed 1 month ago. Previous hospital records indicated that the patient received 4 mg IV dexamethasone every 6 hours for 2 days and then a 10-day taper as part of the management of his meningioma. Laboratory tests during admission revealed the following: mild anemia 11.4 g/dl, leukocytosis 13,000 white cells per microliter of blood (74% neutrophils and 1% eosinophils), serum sodium level 128 mEq/L, and blood glucose level 267 mg/dL. In the hospital, the patient was treated for a Pseudomonas shunt infection and Enterobacter aerogenes bacteremia with cefepime. Despite antibiotic treatment, the patient failed to improve clinically and continued to experience nausea and vomiting accompanied with abdominal pain. The abdomen was soft and nondistended. Gastroenterology was consulted for persistent symptoms and for the development of a decrease in hemoglobin and new coffee ground emesis. He was managed conservatively and placed on a proton pump inhibitor drip.
A brain scan showed a possible abscess, and neurosurgery took the patient back to the operating room. On intubation, the patient was found to have approximately 300 mL of brown gastric content with terminal bright red blood. Gastroenterology consultants performed an EGD revealing diffuse gastric erythema and blood clots with necrotic lesions in the duodenal bulb (Figure 1). Repeat EGD 2 days later for massive upper GI bleeding requiring vasopressors demonstrated active bleeding from the duodenum, and an epinephrine injection failed to achieve hemostasis. Embolization of the pancreaticoduodenal branch was performed, followed by coiling of the gastroduodenal artery, mesenteric branch, and right gastric branch, all of which were unsuccessful. Abdominal computed tomography (CT) showed thickening of the duodenal wall and dilated loops of the small bowel (Figure 2). The patient went for exploratory laparotomy and was found to have a duodenal mass, had ligation of the gastroduodenal artery, and pyloroplasty with jejunostomy tube placement. Duodenal biopsy showed extensive Strongyloides infection (Figure 3).

The patient was initiated on oral ivermectin, then subcutaneous ivermectin, for Strongyloides hyperinfection. He continued to have massive GI bleeding, requiring extensive blood products and multiple vasopressors for several weeks with development of multigorgan failure, likely because of disseminated infection and shock from continued hemorrhage. Multiple stool studies for ova and parasites returned negative for Strongyloides during this time. Ultimately, his abdominal wound began to dehisce, leaking black material. Abdominal CT revealed a large amount of blood in the small bowel and a large amount of intraperitoneal free fluid suggestive of GI tract perforation found to be inoperable. After a long discussion with his family, care was deescalated to comfort care only, and the patient died.

**DISCUSSION**

Diagnosis of strongyloidiasis can be difficult because infection with S. stercoralis is usually asymptomatic. Patients may present with urticaria, abdominal pain, nausea, and vomiting. It is a rare worldwide infection found in areas with poor sanitation and most commonly found in Asia, Africa, Latin America, Eastern Europe, and Southern United States. Because of its widespread prevalence, S. stercoralis infection should be highly suspected in patients with eosinophilia coming from an endemic region. Disseminated strongyloidiasis can be found in patients who are immunocompromised, specifically in patients either currently or recently treated with corticosteroids, such as in this patient. It was found that Strongyloides produced more eggs when the patient was on steroids because of the immunosuppressive effect. The larvae were able to mature in greater proportion in patients on...
steroids, leading to a greater larval load and hyperinfection in the host. The larvae then directly invade the GI tract mucosa, leading to nausea, vomiting, diarrhea, ulcerations, and massive hemorrhage. Hyperinfection has been found in any steroid use, regardless of the dose, duration, or route of administration.

*Strongyloides* infection is diagnosed via stool microscopy examination most commonly; although in advanced cases, it can be diagnosed via tissue pathology or serology. There is a reported 75.9% sensitivity for the first stool assay, increasing to 92% on repeat assays. Limitations with the stool test are that there are false negatives, leading the physician to believe that the patient is not at risk of hyperinfection if treated with corticosteroids. Patients may benefit from either serology or tissue biopsy during EGD for patients whom a physician has a high suspicion may be infected with *Strongyloides*. Patients with eosinophilia either immigrating from or recently traveling from an endemic region should receive a stool microscopy test, serological test, or EGD with biopsy to look for *Strongyloides* infection before starting steroids because of the high risk of fatality due to hyperinfection with steroid use. Eosinophilia can be obscured by corticosteroid courses, as seen in this patient. Physicians should be aware of this rare hyperinfection syndrome and the symptoms found with it and be able to identify the patients who are at a high risk of hyperinfection.

**DISCLOSURES**

Author contributions: S. Rao reviewed the literature, wrote the manuscript, and is the article guarantor. H. Tsai reviewed the literature and wrote the manuscript. E. Tsai and R. Bulat edited the manuscript. Y. Nakanishi provided pathology slides and descriptions.

Financial disclosure: None to report.

Informed consent was obtained for this case report from the deceased patient’s next of kin.

Received June 23, 2018; Accepted November 24, 2018

**REFERENCES**

1. Mejia R, Nutman TB. Screening, prevention, and treatment for hyperinfection syndrome and disseminated infections caused by *Strongyloides stercoralis*. *Curr Opin Infect Dis*. 2012;25:458–63.
2. Yee B, Chi NW, Hansen LA, et al. Case report: *Strongyloides stercoralis* hyperinfection syndrome presenting as severe, recurrent gastrointestinal bleeding, leading to a diagnosis of cushing disease. *Am J Trop Med Hyg*. 2015;93(4):822–7.
3. Csermely L. *Strongyloides* hyper-infection causing life-threatening gastrointestinal bleeding. *World J Gastroenterol*. 2006;12(39):6401–4.
4. Rios JT, Franco MC, Da Costa Martins B, et al. *Strongyloides stercoralis* hyperinfection: An unusual Cause of gastrointestinal bleeding. *Rev Assoc Med Bras*. 2015;61(4):311–2.
5. Kassalik M, Monkmuller K. *Strongyloides stercoralis* hyperinfection syndrome and disseminated disease. *Gastroenterol Hepatol (N Y)*. 2011; 7(11):766–8.
6. Minamide T, Fukushima M, Inokuma T. Gastroduodenal involvement in disseminated strongyloidiasis. *JGH Open*. 2018;2(2):75–6.