

Gastric Toxoplasmosis in a Patient With Acquired Immunodeficiency Syndrome

A Case Report and Review of the Literature

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● **Toxoplasmosis is a common opportunistic pathogen in patients with acquired immunodeficiency syndrome (AIDS). It usually presents with ocular, central nervous system, or pulmonary disease. Gastric toxoplasmosis is uncommon in AIDS patients, especially in the absence of central nervous system manifestations. In the few reported cases, patients have presented with abdominal pain and other digestive complaints that usually are attributed to the more common gastrointestinal manifestations of human immunodeficiency virus infection. We describe a 49-year-old man with AIDS who presented with abdominal pain, diarrhea, dry cough, and systemic symptoms and was diagnosed with toxoplasmosis by a gastric biopsy.**

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We describe a 49-year-old man with acquired immunodeficiency syndrome (AIDS) who presented with abdominal pain, diarrhea, dry cough, and systemic symptoms and was diagnosed with toxoplasmosis by a gastric biopsy.

REPORT OF A CASE

A 49-year-old African American man, known to be positive for human immunodeficiency virus for 15 years, was admitted to the hospital with the principal diagnosis of AIDS-related pneumonia. In addition to a dry cough, he also complained of diarrhea, nausea and vomiting, abdominal pain, weight loss, generalized weakness, and night sweats. Physical examination revealed epigastric tenderness. Laboratory examination showed pancytopenia (a white blood cell count of $1900 \times 10^3/\mu\text{L}$, a hemoglobin level of 10 g/dL, a platelet count of $8000 \times 10^3/\mu\text{L}$), a CD4 cell count of 9/ μL , and a human immunodeficiency virus quantitation of 693 430 particles/ μL . Stool examination was negative for blood, ova and parasites, and *Clostridium difficile* toxin. Sputum examination and culture, bronchoalveolar lavage, and bronchial biopsy

failed to reveal *Pneumocystis carinii* or other pathogens. Results of a computerized tomography scan of the brain, with and without contrast, were within normal limits. A computerized tomography scan of the abdomen, with and without oral and intravenous contrast, showed hepatosplenomegaly. Esophagogastroduodenoscopy and colonoscopy showed erosive gastritis, duodenitis, and left-sided colitis.

PATHOLOGIC FINDINGS

A biopsy of the gastric antrum showed numerous *Toxoplasma gondii* cysts filled with bradyzoites in an edematous lamina propria with a slight mononuclear cell infiltrate (Figure 1). Periodic acid–Schiff stain highlighted the bradyzoites. Immunoperoxidase stain for *T gondii* (Ventana Medical Systems, Tucson, Ariz) was positive (Figure 2).

Organisms were not identified in biopsies from the small and large bowels.

COMMENT

Toxoplasma gondii is an obligate intracellular coccidian protozoan that infects humans, other mammals, and birds. Sexual reproduction occurs in cats; oocytes are formed in the intestinal mucosa and are passed in the feces. Oocytes ingested from contaminated soil or other sources excyst in the duodenum, and released sporozoites invade the intestine. Infection also occurs through the ingestion of viable tissue cysts in undercooked meat. There are 2 tissue stages. Tachyzoites multiply in many cells, divide every 6 to 8 hours, and destroy the cells they invade. Bradyzoites develop as immunity develops and multiply very slowly in many tissues but show a predilection for the muscle and brain. They develop within a vacuole in the host cytoplasm and form tissue cysts. Because of their amylopectin content, bradyzoites in these cysts are periodic acid–Schiff positive.¹ Human *T gondii* infection is common and rarely causes disease, except in immunosuppressed patients and after transplacental infection of the neonate. Toxoplasmosis in severely immunosuppressed patients may be caused by primary infection but is most often due to recrudescence of a latent infection.^{2,3} It is believed that reactivation is due to disruption of the cyst form, followed by uncontrolled proliferation of organisms and tissue destruction.

Infection with *T gondii* induces both cellular and humoral immune responses. Immunoglobulins G, M, A, and E (IgG, IgM, IgA, and IgE) are produced in response to

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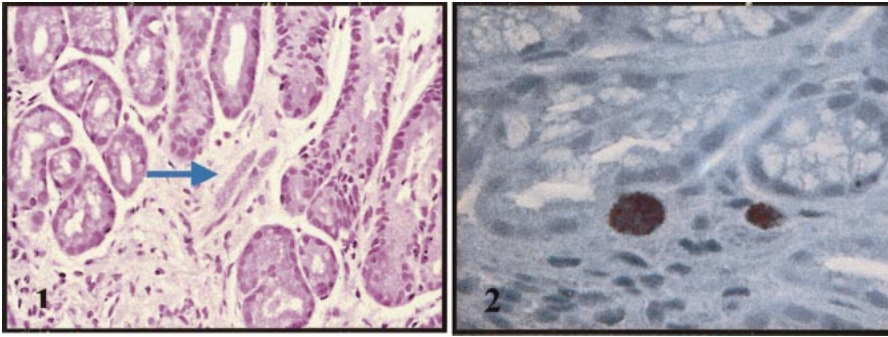


Figure 1. Toxoplasma cysts (arrow) filled with bradyzoites in muscularis mucosa and chronically inflamed lamina propria (hematoxylin-eosin, original magnification $\times 300$).

Figure 2. Toxoplasma gondii cysts are highlighted (immunoperoxidase, original magnification $\times 400$).

Study Findings				
Age, y/Sex	Clinical Findings	Pathology	Radiographic Endoscopic Findings	Study
32/F	Anorexia, weight loss, pain, fever	Edema, nonspecific inflammation, cysts and free trophozoites	Antral narrowing	Smart et al ⁷
34/M	Severe epigastric pain	Multiple tachyzoites and bradyzoites	Ulcerated lesion	Forencio et al ⁸
35/F	Nausea, vomiting, epigastric pain	Acute and chronic inflammatory changes and cysts	Normal endoscopic findings	Peraire et al ⁹
22/F	Abdominal pain, fever	Cysts, pseudocysts, and tachyzoites	Gastric wall thickening	Alpert et al ⁶
22/M	Abdominal pain, anorexia, vomiting	Tachyzoites and pseudocysts	Diffuse lesions of fundus and lesser curvature	Kofman et al ¹⁰

the organism. In immunosuppressed individuals, especially those with human immunodeficiency virus infection, a decrease in CD4 lymphocytes and a gradual shift from a T-helper 1 cell population to a T-helper 2 cell population permits uncontrolled multiplication of the parasite and subsequent tissue destruction that eventually may kill the host.³ It has been suggested that genetic factors influence individual susceptibility to the disease.^{2,4} HLA-DQ3 appears to predispose AIDS patients to the development of toxoplasmosis, whereas HLA-DQ1 may be protective.²

Most acute infections in immunocompetent children and adults are asymptomatic, whereas 10% to 20% are associated with lymphadenopathy. Rarely, acute infection may cause a flulike self-limiting illness. Asymptomatic, chronic latent infection commonly follows. In contrast, infection in immunosuppressed patients often causes life-threatening disease.⁴ Reactivation of latent infection is the most common cause of toxoplasmosis in patients with AIDS, malignancies, and organ transplants. Assessment of these patients should include testing for *T gondii* IgG antibodies. Clinical manifestations of toxoplasmosis in AIDS patients usually occur when the CD4 count is less than 100 and commonly reflect involvement of the brain (encephalitis), the lung (pneumonitis), and the eyes (chorioretinitis). Encephalitis is the most common presentation of *T gondii* infection in AIDS patients. Focal central nervous system lesions also commonly occur. Pulmonary toxoplasmosis usually causes a prolonged febrile illness with a cough and dyspnea. Chorioretinitis in AIDS patients is characterized by ocular pain and loss of visual acuity. Other uncommon manifestations in AIDS patients include pan-hypopituitarism, the syndrome of inappropriate secretion of antidiuretic hormone, and orchitis.

Therapy may be offered after a presumptive diagnosis is made on the basis of clinical, serologic, and radiograph-

ic findings. A definitive diagnosis requires microscopic identification of the parasite, which is usually associated with an inflammatory infiltrate.

The presence of tachyzoites is diagnostic of active infection. Identification of a solitary cyst is only diagnostic of active disease when inflammation is present, whereas identification of multiple cysts generally is associated with active infection. Immunoperoxidase stain identifies the organism when the morphology of the parasite is distorted by tissue necrosis or autolysis and when it cannot be easily distinguished on a routine hematoxylin-eosin-stained section.⁵ Other means of diagnosis are by detection of *T gondii* DNA by polymerase chain reaction techniques or by isolation of the parasite.²

Gastrointestinal disease is uncommon in toxoplasmosis. Symptoms associated with gastrointestinal disease include abdominal pain, diarrhea, vomiting, nausea, anorexia, and ascites. *Toxoplasma* infection has been identified in the stomach, small intestine, colon, and esophagus in both biopsy specimens and postmortem examinations.^{2,6} There are at least 5 reported cases of antemortem diagnosis of gastric toxoplasmosis, in addition to cases identified at autopsy.⁶ All patients had AIDS and presented with mild-to-severe abdominal pain. Other symptoms were nausea, vomiting, anorexia, weight loss, fever, and diarrhea. Four patients had abnormal endoscopic findings including ulcerated lesions and thickening of gastric folds. In 3 patients, radiographic abnormalities included narrowing of the antrum and thickening of the gastric wall. The antrum and the fundus appear to be main sites of involvement. The pathologic findings were variable acute and chronic inflammatory cell infiltrates and the presence of trophozoites in the forms of tachyzoites, bradyzoites, and pseudocysts (Table).

In summary, gastric involvement is an unusual com-

ponent of *T gondii* infection in AIDS patients. Although unusual, it should be considered in the differential diagnosis of an AIDS patient with abdominal symptoms. Clinical, radiographic, and endoscopic findings are nonspecific, and a biopsy is necessary for definitive diagnosis.

References

1. Frenkel JK. Toxoplasmosis. In: Connor DH, Chandler FW, Schwartz DA, et al, eds. *Pathology of Infectious Disease*. 1st ed. Stamford, Conn: Appleton & Lange; 1997:1262–1278.
2. Montoya JG, Remington JS. *Toxoplasma gondii*. In: Mandell GL, Bennett JE, Dolin R, eds. *Principles and Practice of Infectious Disease*. 5th ed. Philadelphia, Pa: Churchill Livingstone; 2000:2858–2888.
3. Yezid G. Tissue apicomplexa. In: Yezid G, ed. *Diagnostic Pathology of Parasitic Infections With Clinical Correlation*. 2nd ed. Cary, NC: Oxford University Press; 2000:201–235.
4. Suzuki Y, Wong S-Y, Gumet FC, et al. Evidence for genetic regulation of susceptibility to toxoplasmic encephalitis in AIDS patients. *J Infect Dis*. 1996;173:265–268.
5. Eyzaguirre EJ, Walker DH. Immunohistochemistry of infectious diseases. In: Dabbs DJ, ed. *Diagnostic Immunohistochemistry*. 1st ed. Philadelphia, Pa: Churchill Livingstone; 2002:640–650.
6. Alpert L, Miller M, Alpert E, et al. Gastric toxoplasmosis in the acquired immunodeficiency syndrome: antemortem diagnosis with histopathologic characterization. *Gastroenterology*. 1996;110:258–264.
7. Smart P, Weinfeld A, Thompson NE, et al. Toxoplasmosis of the stomach: a cause of antral narrowing. *Radiology*. 1990;174:369–370.
8. Forencio FRC, Albuquerque Filho FB, Moraes MAP. *Toxoplasma gondii* na mucosa gastrica como primeiro archado em paciente aidetico. *Rev Soc Bras Med Trop*. 1992;25:275–276.
9. Peraire J, Vidal F, Mayoya E, et al. Gastric toxoplasmosis in the acquired immunodeficiency syndrome. *Am J Gastroenterol*. 1993;88:1464–1465.
10. Kofman E, Khorsandi A, Sarlin J, et al. Gastric toxoplasmosis: case report and review of the literature. *Am J Gastroenterol*. 1996;91:2436–2438.