

Cerebral Toxoplasmosis in an HIV-Negative Patient: A Case Report

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Abstract

Introduction: Toxoplasmosis is caused by infection with the obligate intracellular parasite *Toxoplasma gondii*. Toxoplasmosis is generally a late complication of HIV infection and usually occurs in patients with CD4+ T-cell counts below 200 cells/ μ L.

Case Presentation: A case of cerebral toxoplasmosis is reported in a healthy 39-year-old woman who was admitted to hospital with the complaint of a headache. Gadolinium-enhanced brain magnetic resonance imaging (MRI) showed an irregular, ring enhancing, hyperintense lesion in the right temporoparietal lobe. Toxoplasma serology revealed raised IgG antibody levels. Based on the MRI features, biopsy, and serology, a diagnosis of cerebral toxoplasmosis was made.

Conclusions: Cerebral toxoplasmosis can occur outside the setting of advanced HIV immunodeficiency or drug-induced immunosuppression. This highlights the fact that it should be considered in the differential diagnosis of opportunistic infections in HIV-negative patients.

Keywords: Cerebral Toxoplasmosis, Non-HIV Patient, Headache

1. Introduction

Toxoplasma gondii is an apicomplexan protozoan parasite which is a highly successful global pathogen. *T. gondii* has the ability to infect any nucleated cell in any warm-blooded animal, including humans. Infection with *T. gondii* is typically acquired orally, through the ingestion of contaminated raw or undercooked meat containing cysts, or after ingestion of contaminated fresh water or vegetables (1). A key feature of *T. gondii* pathogenesis is the ability of the parasite to cross formidable biological barriers in the infected host and enter tissues such as the brain, eye, and placenta. Chronic asymptomatic infection affects 30%-50% of the global population with host cells of the parasitic cyst located mainly in the central nervous system (2). Cerebral toxoplasmosis typically presents as cerebral mass lesions with headache, confusion, fever, lethargy, seizures, cranial nerve palsies, psychomotor changes, hemiparesis, and/or ataxia (3). Studies on patients with acquired toxoplasmosis that included immune-competent patients showed that the most common symptoms of cerebral toxoplasmosis were headaches and peripheral lymphadenopathy (4). This article presents a case of cerebral toxoplasmosis in a patient without AIDS or any history of immunodeficiency. The differential diagnosis of cerebral toxoplasmosis will be discussed.

2. Case Presentation

A 39-year-old woman presented to the emergency department of a teaching hospital in Tehran, Iran with

complaints of headache, weakness, and pain in her neck that had persisted for the previous eight weeks. She had no focal weakness, numbness, or seizure activity. Her headaches were generalized mostly in the occipital and parietal lobes, and had a pulsatile character. There was no relief following positional changes or administration of paregoric. After a few days, she began to complain of nausea and dizziness, along with her other symptoms. After a while, she began to experience weakness in her left hand, which gradually spread to the whole left side of her body. It was revealed that she kept a cat in her house. She had been visited once by a neurologist who made the diagnosis of nervous headache. Her condition did not improve, so she went to another specialist who ordered a magnetic resonance imaging scan (MRI), which reported a mass.

Gadolinium-enhanced MRI showed a small, well-enhanced, hyperintense signal lesion in the right temporoparietal region with significant mass effect and edema in the lobes. It was difficult to differentiate cerebral toxoplasmosis based solely on the MRI (Figure 1).

The following step was to perform a biopsy. It revealed inflammation in a chronic granulomatous lesion, compatible with tumefactive toxoplasmosis and right centrum semi-ovale involvement. Ziehl-Neelsen (ZN) and periodic acid-Schiff (PAS) stains were negative for acid-fast bacilli and fungi, but gimsa staining demonstrated tachyzoites. Immunohistochemical (IHC) staining was positive for CD68 in histiocytes and for Glial fibrillary

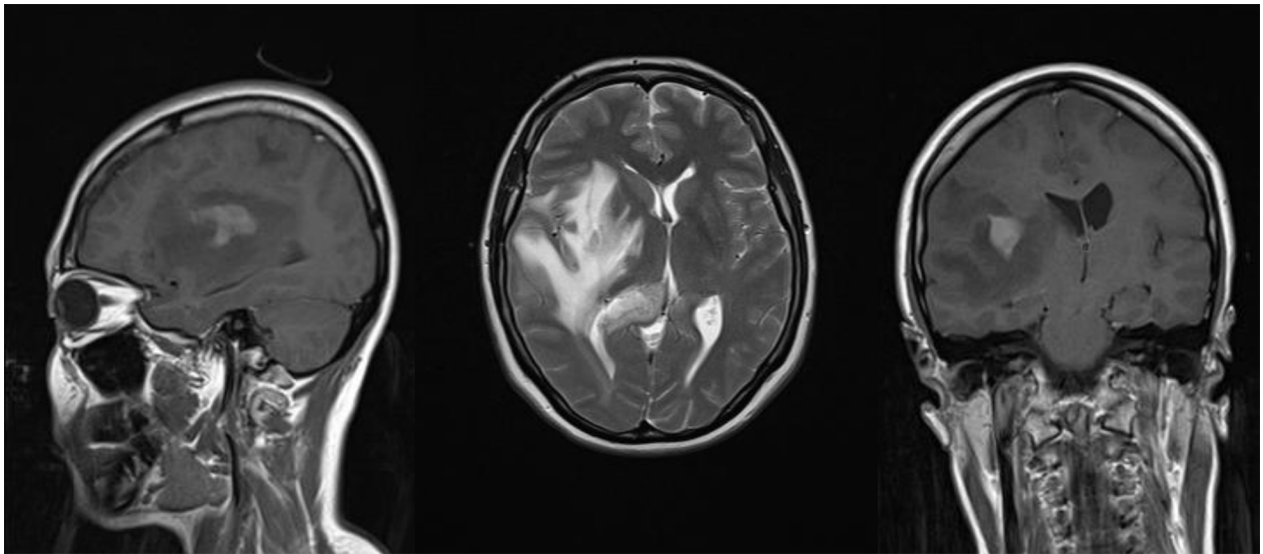


Figure 1. MRI Shows a Hypointense Lesion in the Right Temporoparietal Region.

acidic protein (GFAP) in background proliferated glial cells, as well as for Leukocyte common antigen (LCA) in lymphoid cells. Chest X-ray and ultrasound of the abdomen were normal.

Laboratory investigations revealed a hemoglobin (Hb) of 12 g/dL, total white blood cell count (WBC) of $9.1 \times 10^9/L$, and platelet count of $253 \times 10^9/L$. The erythrocyte sedimentation rate (ESR) was noted to be elevated at 28 mm/1st hour. Serum electrolytes, blood sugar, renal parameters, and liver function tests were normal. Her CD4+ T cell, CD8+ T cell, and CD4/CD8 ratio were normal, and general biochemical investigations showed no abnormalities. The HIV antibody for HIV-1 and HIV viral load were negative, but Toxoplasma antibody test was positive. Toxoplasma serological tests, both IgG and IgM, were requested for the patient. Both tests were found to be strongly positive (IgG 98 IU/mL, reference positive range > 8 IU/mL; IgM 44 IU/mL, reference positive range > 10). Hepatitis B surface antigen (HBsAg), hepatitis B core antibody (HBcAb), and hepatitis C virus antibody (HCV Ab) tests were negative as well.

She was treated with Pyrimethamine 25 mg/TDS, sulfadiazine 500 mg/TDS, and folic acid 15 mg/TDS. She was discharged from the hospital in an ambulatory state.

3. Discussion

Toxoplasmosis is caused by infection with the obligate intracellular parasite *T. gondii*. Human latent toxoplasmosis occurs in as much as half the world's population, though most cases are asymptomatic (5). With the advent of the human immunodeficiency virus (HIV) pandemic, cerebral toxoplasmosis has become one of the more frequent opportunistic infections and the most common cause of focal brain lesions complicating the course of AIDS (6). Human infection occurs through the oral or transplacental routes. The major clinical features

of cerebral toxoplasmosis are headache, hemiparesis, speech disturbances, cerebellar dysfunction, and cranial nerve palsies (7).

Migraine and/or other types of headaches are a common concern affecting 5% and 10% of children and adolescents, respectively, as well as nearly 30% of reproductive-age women (8). Studies have shown that children with recurrent headaches are subject to an ever-increasing risk of such diseases in adulthood, as well as many physical symptoms and psychiatric disturbances, such as depression disorders (9). Studies involving immune-competent patients with acquired toxoplasmosis have revealed that the most common symptom of cerebral toxoplasmosis is headache; unfortunately, cerebral toxoplasmosis is not mentioned in textbooks or scientific papers as a cause of various types of headaches.

Cerebral toxoplasmosis is the reactivation of disease from a prior parasitic infection. Patients may present with fever, headache, seizures, confusion, dementia, or focal neurological deficits. Infection with *T. gondii* was considered in this patient when it was revealed that she had cats. She did not appear to have any evidence of immune depression. A brain biopsy was positive for toxoplasmosis. Neither computed tomography (CT) nor MRI scans can reliably distinguish CNS infections, such as toxoplasmosis (10). Cerebral toxoplasmosis was suspected from the high serum toxoplasma antibody level, and the patient went into remission with sulfadiazine (7). This case emphasizes the need to consider cerebral toxoplasmosis in immune-competent patients and, therefore, screening patients for toxoplasma infection is recommended.

References

1. Harker KS, Ueno N, Lodoen MB. Toxoplasma gondii dissemination: a parasite's journey through the infected host. *Parasite Immunol.* 2015;37(3):141-9. doi: 10.1111/pim.12163. [PubMed: 25408224]

2. Ganiem AR, Dian S, Indriati A, Chaidir L, Wisaksana R, Sturm P, et al. Cerebral toxoplasmosis mimicking subacute meningitis in HIV-infected patients; a cohort study from Indonesia. *PLoS Negl Trop Dis*. 2013;7(1):e1994. doi: 10.1371/journal.pntd.0001994. [PubMed: 23326616]
3. Robert-Gangneux F, Darde ML. Epidemiology of and diagnostic strategies for toxoplasmosis. *Clin Microbiol Rev*. 2012;25(2):264–96. doi: 10.1128/CMR.05013-11. [PubMed: 22491772]
4. Nissapatorn V, Lee C, Quek KF, Leong CL, Mahmud R, Abdullah KA. Toxoplasmosis in HIV/AIDS patients: a current situation. *Jpn J Infect Dis*. 2004;57(4):160–5. [PubMed: 15329448]
5. Sarkari B, Abdolahi Khabisi S. Severe congenital toxoplasmosis: a case report and strain characterization. *Case Rep Infect Dis*. 2015;2015:851085. doi: 10.1155/2015/851085. [PubMed: 25685568]
6. Goswami RP, Goswami RP, Rahman M, Ray Y, Tripathi SK. Alternative treatment approach to cerebral toxoplasmosis in HIV/AIDS: experience from a resource-poor setting. *Int J STD AIDS*. 2015;26(12):864–9. doi: 10.1177/0956462414560594. [PubMed: 25411350]
7. Madi D, Achappa B, Rao S, Ramapuram JT, Mahalingam S. Successful treatment of cerebral toxoplasmosis with clindamycin: a case report. *Oman Med J*. 2012;27(5):411–2. doi: 10.5001/omj.2012.100. [PubMed: 23074553]
8. Prandota J, Gryglas A, Fuglewicz A, Zeslowska-Falenczyk A, Ujma-Czapska B, Szenborn L, et al. Recurrent headaches may be caused by cerebral toxoplasmosis. *World J Clin Pediatr*. 2014;3(3):59–68. doi: 10.5409/wjcp.v3.i3.59. [PubMed: 25254186]
9. Fearon P, Hotopf M. Relation between headache in childhood and physical and psychiatric symptoms in adulthood: national birth cohort study. *BMJ*. 2001;322(7295):1145. [PubMed: 11348907]
10. Kim HW, Won KS, Choi BW, Zeon SK. Cerebral Toxoplasmosis in a Patient with AIDS on F-18 FDG PET/CT. *Nucl Med Mol Imaging*. 2010;44(1):75–7. doi: 10.1007/s13139-009-0014-3. [PubMed: 24899941]