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Neurotoxoplasmosis in a Patient with Acquired Immunodeficiency Syndrome: Magnetic Resonance and Magnetic Resonance Spectroscopy Findings

Edinsel İmmün Yetersizlik Sendromlu Hastada Nörotoksoplazmozis: Manyetik Rezonans ve Manyetik Rezonans Spektroskopi Bulguları

Pınar Gülmez Çakmak[1], Selda Sayın Kutlu[2]

[1]Pamukkale University Faculty of Medicine, Department of Radiology, Denizli, Turkey
[2]Pamukkale University Faculty of Medicine, Department of Infectious Diseases and Clinical Microbiology, Denizli, Turkey

ABSTRACT

Human immunodeficiency virus (HIV) infection and acquired immunodeficiency syndrome (AIDS) is an important public health problem. In recent years, opportunistic infections that can develop in patients with AIDS are rapidly diagnosed by imaging modalities. A 31-year-old HIV-positive male patient presented with fever, headache and progressive bilateral muscle weakness. Magnetic resonance imaging (MRI) revealed multiple mass lesions with peripheral edema. In MR spectroscopy (S), lactate-lipid peak was detected. Hemorrhagic transformation was observed in some lesions in control brain MRI. Here, we aimed to present MRI and MRS findings of a patient with neurotoxoplasmosis and to demonstrate that hemorrhagic transformation may develop during follow-up and treatment.

Keywords: AIDS, cerebral toxoplasmosis, HIV, magnetic resonance spectroscopy

ÖZ

İnsan immün yetmezlik virüsü (HİV) enfeksiyonu ve edinsel immün yetmezlik sendromu (AIDS) önemli bir halk sağlığı sorunudur. Son yıllarda, edinsel immün yetersizlik sendromlu hastalarda gelişebilen fırsatçı enfeksiyonlar, görüntüleme ile hızlı bir şekilde tanı almaktadır. Otuz bir yaşında bir HİV-pozitif hasta; ateş, baş ağrısı ve ilerleyen iki taraflı kas güçsüzlüğü ile başvurdu. Manyetik rezonans görüntülemede (MRG) ödemi de bulunan çok sayıda kitle lezyonu izlendi. Lezyonların MR spektroskopisinde (S), laktat ve lipit piki tespit edildi. Kontrol beyin MRG'de bazı lezyonlarda hemorajik transformasyon gözlendi. Bu yazıda, bir nörotoksoplazmozis hastasının MR ve MRS görüntüleme bulgularını sunmak ve takip-tedavi sırasında hemorajik transformasyonun gelişebileceğini göstermek istedik.

Anahtar Kelimeler: AİDS, serebral toksoplazmozis, HİV, manyetik rezonans spektroskopi

Introduction

Toxoplasma gondii is an intracellular protozoan that causes central nervous system involvement in patients with human immunodeficiency virus (HIV) infection or acquired immunodeficiency syndrome (AIDS). Toxoplasma is transmitted by oral or transplacental route (1). Acute infection is usually asymptomatic. Neurotoxoplasmosis is caused by the reactivation of latent infection in the brains of immunocompromised patients with a CD4+ T lymphocyte count of less than 200 cells/μL (2,3). The clinical presentation most commonly includes headache, fever, hemiparesis, intracranial mass, and cranial nerve palsy (4). In addition to the brain, lung, heart and skeletal muscle involvement can be seen. Today, early diagnosis of HIV infection and opportunistic infection prophylaxis in patients with AIDS has reduced the frequency of neurotoxoplasmosis. We present magnetic resonance imaging (MRI) and MR spectroscopy (S) findings of a patient with neurotoxoplasmosis.

Case Report

A 31-year-old male patient admitted to emergency department of our hospital in December 2017 with complaints of fever, headache, vomiting, blurred vision and progressive bilateral weakness. Regarding medical history and laboratory findings of the patient, AIDS was diagnosed in the emergency department. Laboratory data showed reactive HIV antibodies and HIV-RNA was 1.109.000 copies/mL. An absolute CD4 count was 8 cells/mm^3. Brain MRI was performed at 1.5 Tesla (Signa Excite HD; GE Medical Systems, Milwaukee, WI, USA) with an 8-channel head coil due to fever and neurological symptoms. MRI showed T2-FLAIR hyperintense lesions

Address for Correspondence/Yazışma Adresi: Pınar Gülmez Çakmak, Pamukkale University Faculty of Medicine, Department of Radiology, Denizli, Turkey
Phone: +90 505 258 98 49 **E-mail:** pinarcakmak20@gmail.com **ORCID ID:** orcid.org/0000-0003-4652-6748

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with edema in the centrum semiovale, basal ganglia, corticomedullary junction and cerebellum (Figure 1). In addition, a ring-enhancing lesion in the cerebellum was also observed in contrast-enhanced MRI (Figure 2). MRS (single voxel, short TE) was performed for the cerebellar lesion. Point resolved spectroscopy sequence (PRESS) with short echo time was used. PRESS parameters were TR/TE=2000/32 ms; NEX=128 and voxel volume=1 mL. MRS revealed Choline (Cho) reduction at 3.19 ppm, creatinine reduction at 3.04 ppm and N-acetylaspartate (NAA) reduction at 2.00 ppm, and increased lipid-lactate (Lip/Lac) at 1.33 ppm.

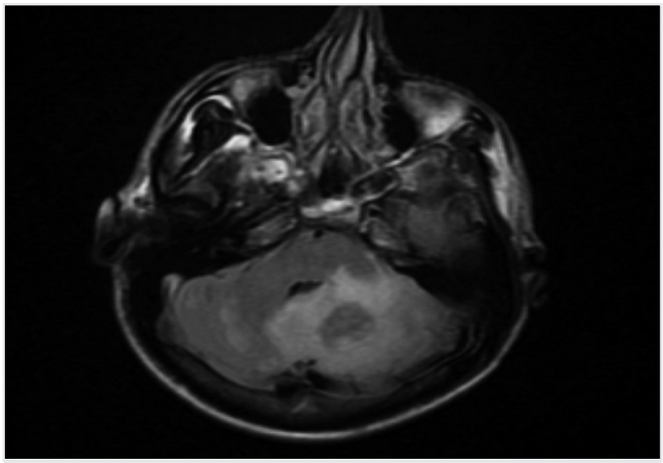

Figure 1a. Axial T2-FLAIR images showing hyperintense lesions with edema in the cerebellum

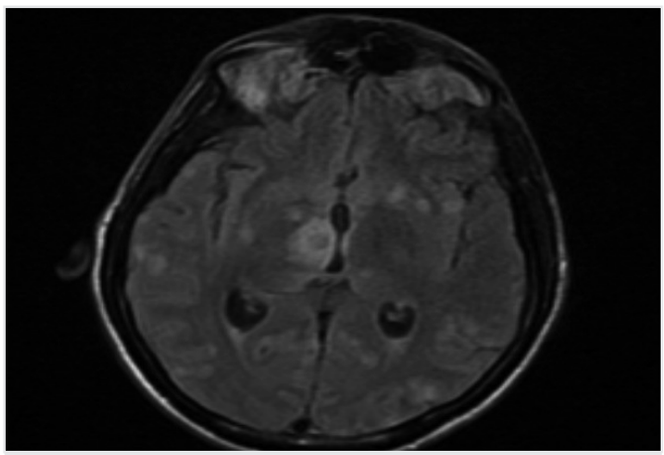

Figure 1b. Axial T2-FLAIR images showing hyperintense lesions with edema in the basal ganglia

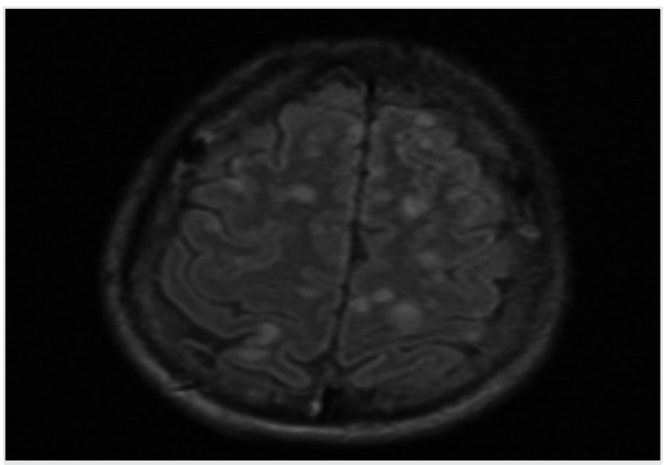

Figure 1c. Axial T2-FLAIR images showing hyperintense lesions with edema at the corticomedullary junction and in the centrum semiovale

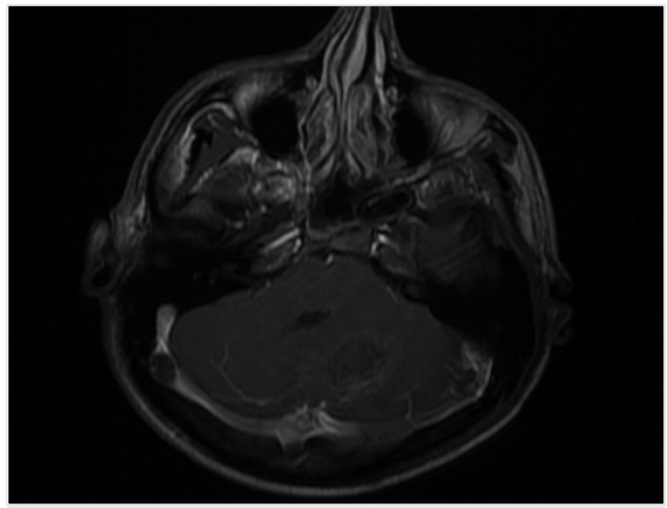

Figure 2. Axial contrast-enhanced T1W images showing a ring-enhancing lesion in the cerebellum

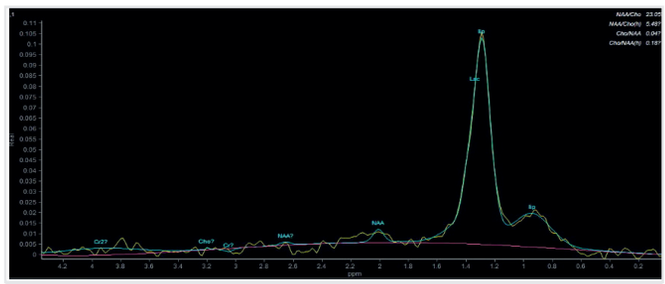

Figure 3. Magnetic Resonance Spectroscopy (single voxel, PRESS; TR/TE/NEX=2000 ms/32 ms/128); reduced choline (3.19 ppm), creatinine (3.04 ppm) and N-acetyl aspartate (2.00 ppm), increased lipid-lactate peak (1.33 ppm)

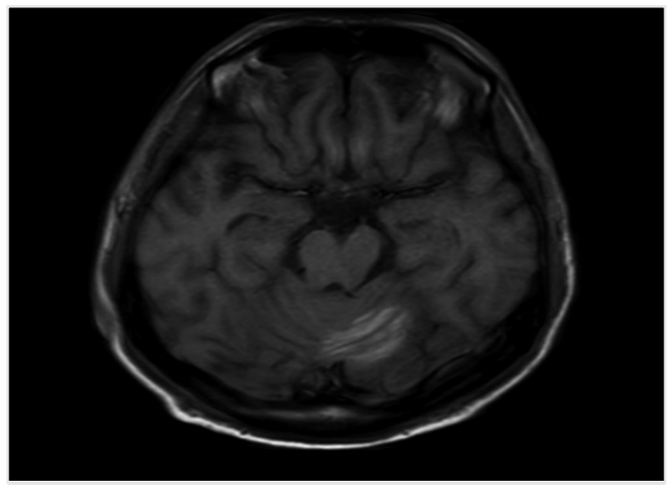

Figure 4a. Axial T1W image showing hemorrhagic transformation developed in the cerebellum

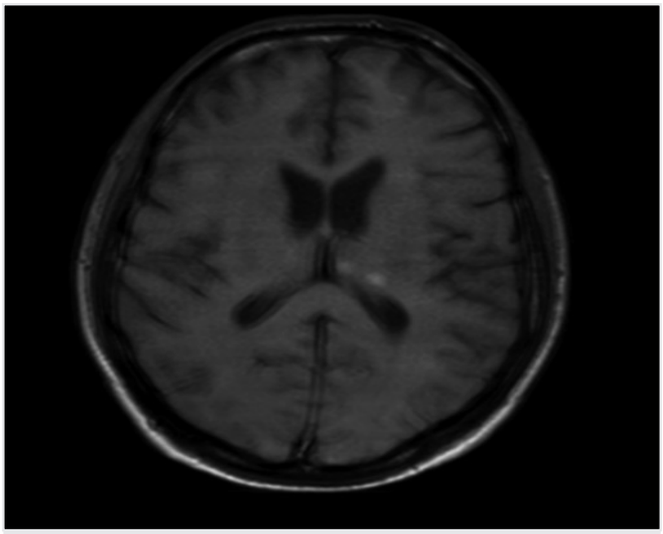

Figure 4b. Axial T1W image showing hemorrhagic transformation developed in the basal ganglia

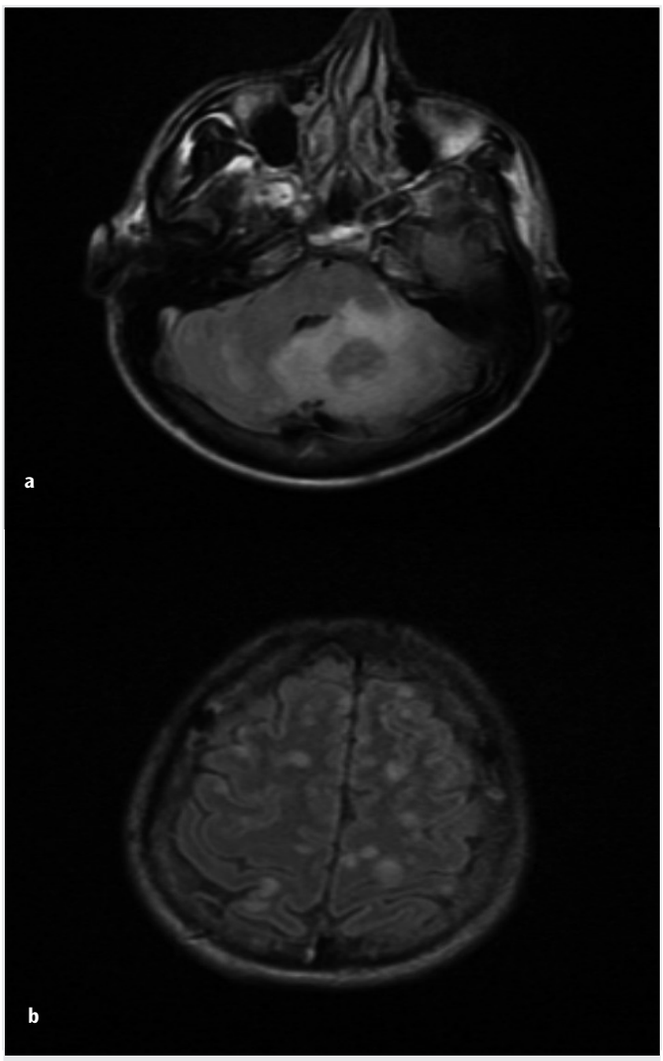

Figure 5a,b. Axial T2-FLAIR image of the patient on admission

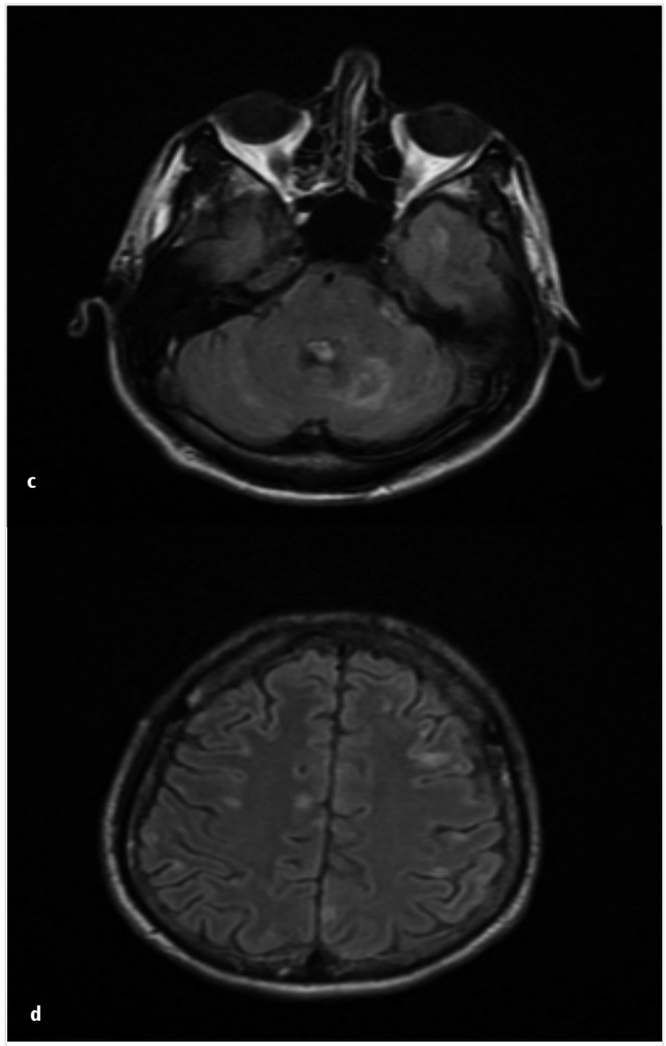

Figure 5c,d. Axial T2-FLAIR image of the patient during treatment period

In our patient, MRS demonstrated Lip/Lac peaks compared to healthy brain parenchyma (Figure 3). Brain biopsy could not be performed. Neurotoxoplasmosis was suspected with clinical and MRI findings. Antiviral, antiparasitic and anti-edema treatment was initiated. In control MRI, T1W hyperintense, T2W hypointense areas compatible with early subacute hemorrhage developed in some lesions (Figure 4). The patient had no history of thrombocytopenia, hemorrhagic diathesis and trauma. In the second control brain MRI, the number and size of the lesions decreased and the clinical improvement was observed during this period (Figure 5). In this case report, consent was obtained from the patient to present the case.

Discussion

Neurotoxoplasmosis is an important diagnosis in HIV-positive patients. Neurotoxoplasmosis in patients with AIDS is due to the reactivation of acquired infection as immunity decreases when CD4 count is less than 200/µL (5). In patients with suspected neurotoxoplasmosis, it is necessary to define bradyzoites in brain tissue and to determine toxoplasma gondii DNA in the cerebrospinal fluid with polymerase chain reaction

test to confirm the diagnosis. However, in patients with suspected neurotoxoplasmosis, treatment precedes the diagnosis and brain MRI and MRS provide valuable information for toxoplasma encephalitis (6). In brain MRI, multiple ring enhancing lesions with edema and mass effect at the corticomedullary junction of frontal and parietal lobe, centrum semiovale and basal ganglia in patients with AIDS are diagnostic for neurotoxoplasmosis. Ring enhancing lesions in brain MRI can be seen in abscess, glioblastoma, tuberculoma, metastasis and radiation necrosis (7,8). The eccentric target sign is considered pathognomonic for neurotoxoplasmosis (9). In MRS, neurotoxoplasmosis is generally associated with an increase in Cho and decreases in NAA along with the presence of lactate-lipid peaks. Gupta et al. (10) reported that MRS could provide information about definitive diagnosis, especially in brain abscess and parasitic infection, when combined with diagnostic imaging. Follow-up MRI should be used for the evaluation of response to medical treatment. In our case, we detected hemorrhagic transformation in follow-up MRI.

Conclusion

We report MRI and MRS findings of neurotoxoplasmosis in an HIV-positive patient. When neurotoxoplasmosis is suspected in a patient with AIDS with ring enhancing lesions with edema in brain MRI, medical treatment should be performed at the earliest. The presence of lactate and lipid peak in MRS in addition to brain MRI supports the diagnosis of neurotoxoplasmosis in suspected patients with AIDS.

Informed Consent: Informed consent was obtained from the patient to present the case.

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Conflict of Interest: No conflict of interest was declared by the authors.

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