

# Intraparenchymal Hemorrhage due to Neurotoxoplasmosis as First Manifestation of HIV-AIDS

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## ABSTRACT

**Background:** Toxoplasmosis is defined as a parasitic zoonosis caused by the intracellular protozoan *T. gondii* which represents a significant public health problem in immunosuppressed patients, being this the most common opportunistic neuroinfection in those with HIV/AIDS. Its distinctive clinical presentation consists of cephalaea, confusion, seizures, fever, photopsies and focal neurological signs, being its diagnosis achieved through compatible radiological images, positive serology, and a favorable response to empirical treatment. Toxoplasmosis brain lesions are usually a late complication that occurs in patients with AIDS CDC stage C3; it is exceptional that these and their consequences occur as the first manifestation of HIV/AIDS, which takes on special relevance given the physical and neuropsychological sequelae that it entails, as well as the reported mortality rate that can be as high as 20%.

**Case report:** This is the case of a 43 years old man with a history of diabetes mellitus type 2, systemic arterial hypertension, and testicular cancer in apparent remission, which was received in the emergency department of our hospital with symptoms compatible with a cerebrovascular accident, hyperthermia, and borderline oxygen saturation, in which intraparenchymal hemorrhage, pneumonia and neuroinfection were diagnosed. Also, a positive HIV (ELISA) serology, CD4 lymphocyte count for AIDS CDC stage 3 and positive PCR for toxoplasma in cerebrospinal fluid were determined in this patient. Thus, constituting an atypical presentation in which the diagnosis of HIV/AIDS was achieved after a first manifestation of intraparenchymal hemorrhage due to toxoplasmosis.

**Keywords:** HIV; AIDS; Toxoplasmosis; Cerebral; CVA; Hemorrhage; Toxoplasma; Pneumonia; Pneumocystis; Pneumocystosis

## INTRODUCTION

Toxoplasmosis is defined as a parasitic zoonosis caused by the intracellular protozoan *Toxoplasma gondii*. Its distinctive clinical presentation consists of cephalaea, confusion, seizures, fever, photopsies and focal neurological signs due to peripheral parenchymatous brain lesions, or cerebellum and brainstem affection. Its diagnosis is achieved through the triad consistent of compatible radiological images, positive serology, and a favorable response to empirical treatment. In this context, magnetic resonance imaging scan is the preferred technique because it has the highest sensitivity. The MRI shows an intracerebral mass which, when a contrast agent is applied,

displays the typical “ring enhancing” lesion of the parenchymatous abscess, usually revealed with at least 2 intra-axial lesions also with an abscess-like appearance. The findings in the cytochemical analysis of cerebrospinal fluid are not specific for toxoplasmosis. Even the value of PCR for *Toxoplasma gondii* in CBF is still under discussion given the variability of the reported sensitivity which ranges from 50 to 90 percent [1].

Although both mortality and morbidity associated with this parasitosis are generally low, when it occurs in immunosuppressed patients, such as those with HIV/AIDS, it becomes a serious health problem, as toxoplasmosis becoming the most common opportunistic infection of the central nervous

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system in this group of patients, with up to 50% seropositivity being identified in HIV carriers.

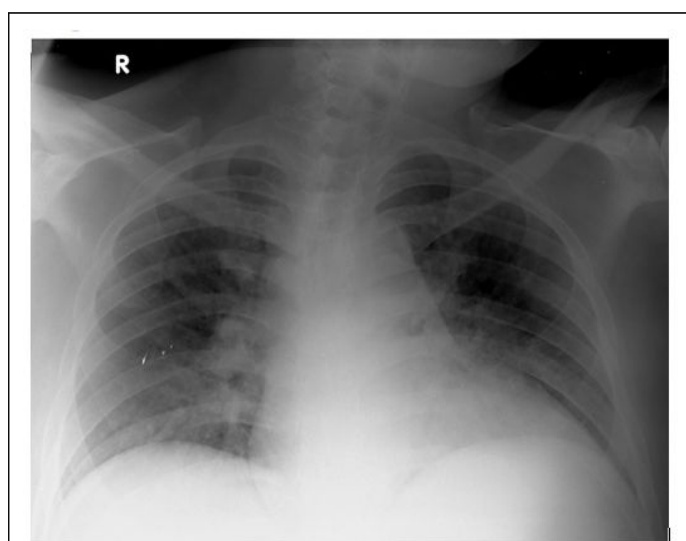
However, it is rare that the first manifestation of HIV/AIDS is a cerebral toxoplasmic lesion, with very few case reports in the scientific literature, as it is rather a late complication that usually occurs when the CD4 T-cell count falls below 100 per microliter (stage C3 CDC). This clinical presentation is relevant because it leads to important physical and neuropsychological sequelae that generate a public health problem, with a reported mortality of up to 20% [2].

## CASE PRESENTATION

We present the case of a 43 years old man from Monterrey, N.L., and Mexico, who denies a history of smoking, alcoholism, drug addiction and cohabitation with tuberculosis patients, which mentions living with 2 immunized canines.

He has been diagnosed with diabetes mellitus type 2 for 15 years in treatment with Metformin 850 mg PO every 12 hours, systemic arterial hypertension for 10 years in treatment with Losartan 50 mg PO every 24 hours and right testicular cancer of seminoma type 15 years ago, treated with chemotherapy, radiotherapy and total orchiectomy, discharged 3 years ago since the absence of tumor activity [3].

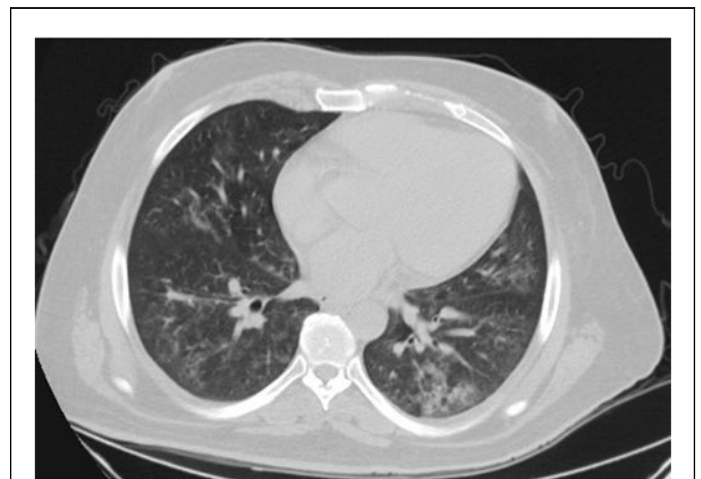
Our patient began his condition in May 2020 when he suddenly presented right hemiparesis, dysarthria, and somnolence, but he did not seek medical attention until 7 days later, when he was taken to the emergency department by relatives who found him in decreased alertness. In the ER he was found with a Glasgow coma scale of 11 points, hyperthermia of 38.2°C, and oxygen saturation by pulse oximetry of 92% on room air and urinary incontinence. As part of the diagnostic approach, an anteroposterior chest X-ray was performed, showing diffuse bilateral alveolar interstitial opacities, predominantly in the lower lobes (Figure 1) [4].



**Figure 1:** Anteroposterior chest X-ray showing diffuse bilateral alveolar-interstitial opacities, predominantly in the lower lobes.

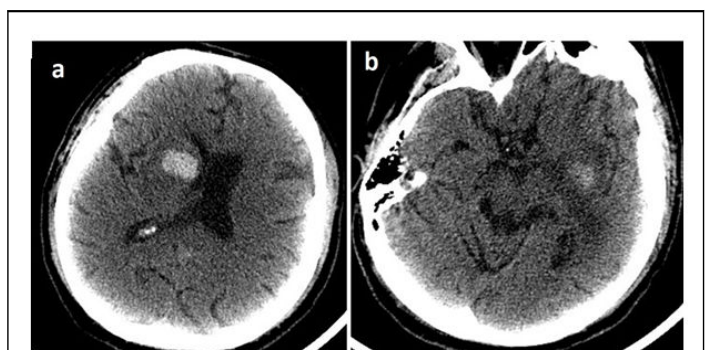
His paraclinical examinations showed an Hb of 8.9 g/dL with hematocrit of 25%, MCV 94.1, MCH 32.6, platelets 94,000. Leukocytes 5,230, neutrophils 2,960, lymphocytes 1,430.

Glucose 95, DB 0.7, IB 1.0, ALT 36, AST 123, FA 86, Na 140, K 3.7, Cl 114. ESR 12, CRP 23. Ferritin 759, D-Dimer 481, BNP 87. GFR (calculated by CKD-EPI) of 116 ml/min/1.73 m<sup>2</sup>. Due to the findings in the chest X-ray, a simple chest CT scan was performed, which showed diffuse bilateral "ground glass" areas in axial section, and interlobular and peribronchovascular thickening, compatible with a pneumonic process (Figure 2) [5].



**Figure 2:** Simple CT scan of the thorax showing bilateral diffuse "ground glass" areas in the axial view, interlobular and peribronchovascular thickening, compatible with pneumonic process.

Due to the neurological alterations, a simple cranial CT scan was performed, showing an area of intraparenchymal hemorrhage at the level of the head of the caudate nucleus on the right side, which caused a mass effect on the anterior horn of the ipsilateral ventricle, as well as another image of similar characteristics at the level of the fourth left temporal gyrus, both accompanied by perilesional edema (Figure 3) [6].

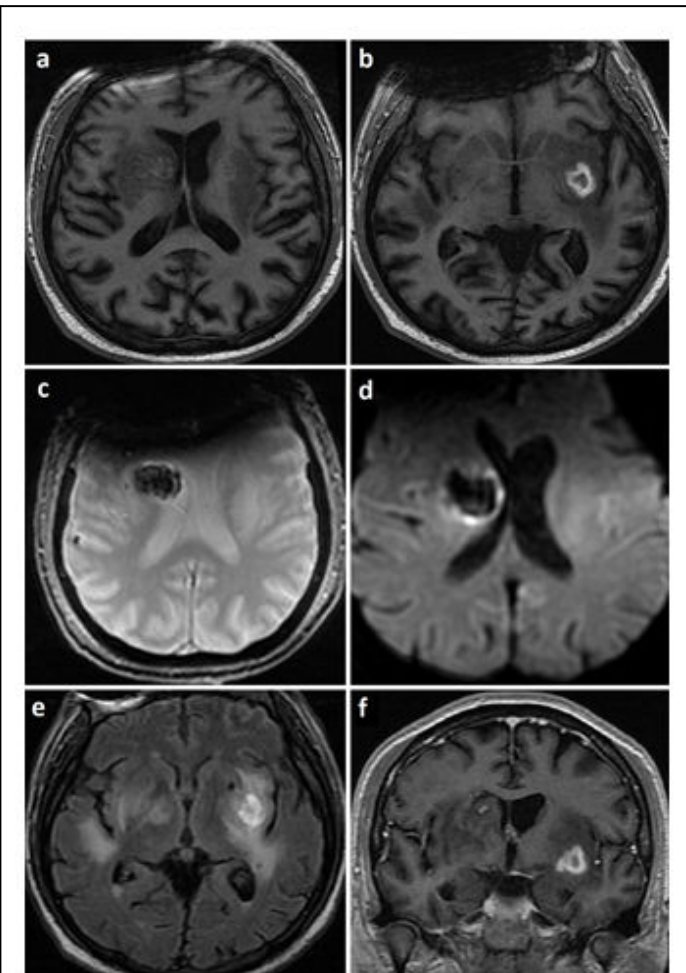


**Figure 3:** Simple CT of the skull, a). Area of intraparenchymal hemorrhage at the level of the head of the caudate nucleus on the right side causing mass effect on the anterior horn of the ipsilateral ventricle, accompanied by perilesional edema; b). Image of similar characteristics at the level of the left fourth temporal gyrus, accompanied by perilesional edema.

Evaluation by neurosurgery was requested, who did not find criteria for surgical management. Given the current epidemiological situation and the findings of the chest images, a

PCR test for SARS-CoV-2 was performed and reported as negative.

As part of the diagnostic approach to intraparenchymal hemorrhage in a young adult patient, hypertensive emergency, vascular malformation and tumors were ruled out, in consequence investigating a possible infectious origin, for which an MRI scan was requested (Figure 4) [7].



**Figure 4:** a and b). Axial slices of brain MRI; c). T1 sequence; d). T2 sequence; e). Diffusion sequence; f). T2 sequence. Coronal brain MRI coronal slice, contrasted T1 sequence. There are two lesions with hematic debris at the level of the head of the right caudate nucleus, and in the region of the external capsule, external antemural capsule and region of the left lenticular nucleus, both accompanied by perilesional edema (a, b and c) that do not restrict diffusion (d), one could also observe punctate enhancement in the contrasted image of the caudate nucleus lesion (e and f) and diffuse and hyperintense lesions in T2, hypointense in T1, at the level of the operculum of the temporal lobe, globus pallidus and putamen of the right side, all this in relation to data of neuroinfection.

## RESULTS

In the brain MRI sequences it was possible to appreciate two lesions with hematic debris in different stages at the level of the head of the right caudate nucleus, and in the region of the external capsule, external ante mural capsule and region of the

left lenticular nucleus, both accompanied by perilesional edema (a, b and c) that do not restrict diffusion (d), it was also observed a punctate enhancement in the contrasted image of the caudate nucleus lesion (e and f) and diffuse and hyperintense lesions in T2, hypointense in T1, at the level of the operculum of the temporal lobe, globus pallidus and putamen of the right side, all this in relation to data of neuroinfection [8,9].

ELISA for HIV was performed and it was reported as positive. CD4 T-lymphocyte cell count was requested and reported at 67 cells per microliter, being classified in AIDS stage C3 of the CDC 1993. Lumbar puncture was performed, and cerebrospinal fluid was reported with no alterations in the cytochemistry, PCR for mycobacteria was not detected and PCR for toxoplasma was detected.

Empirical treatment was started for the presumptive diagnosis of cerebral toxoplasmosis based on pyrimethamine 500 mg IV loading dose followed by 250 mg IV every 24 hours, as well as trimethoprim-sulfamethoxazole 160 mg/800 mg IV every 12 hours for the possible co diagnosis of pneumocystosis and levetiracetam 500 mg IV every 12 hours, in addition to prophylaxis for opportunistic pathogens given the CD4 T lymphocyte cell count, obtaining clinical improvement 24 hours after starting treatment [10].

## DISCUSSION

In the case presented we report the typical presentation of an hemorrhagic cerebral vascular event in an atypical patient: A middle aged man, in whom imaging studies and clinical findings allowed us to rule out the most frequent etiologies such as hypertensive emergency, vascular malformations and tumors, who, in addition, arrived febrile at the emergency department, becoming important to consider infectious differential diagnoses after ruling out a possible coexistent COVID-19 given the current epidemiological context and the findings in his chest X-ray [11].

It is known that toxoplasmosis is the most common opportunistic infection of the central nervous system in patients with advanced immunosuppression such as those with HIV/AIDS C3 CDC with CD4 T-cell counts below 100 cells per microliter, however, given the wide range of symptoms associated with HIV/AIDS infection and its chronology, it is difficult to consider it as the first manifestation of the disease. Therefore, once traumatic, hemodynamic, vascular and tumor origins of intraparenchymal hemorrhage have been ruled out, the next diagnostic possibility to consider is the infectious pathology.

In retrospect it might seem that, with the findings of the MRI scan and because of its high sensitivity, a lumbar puncture could have been avoided, it is still important to rule out other etiologies that could give rise to a similar clinical picture in immunocompromised patients, such as mycobacteria.

## CONCLUSION

Consequently, it is especially important to consider the possible presence of immunosuppression in atypical cases in order to optimize our diagnostic and treatment scheme, with the aim of

improving the prognostic results of our patients by reducing the possible physical and neuropsychological sequelae of infectious entities associated with such immunosuppressed states.

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