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TUBERCULOUS BRAIN ABSCESS IN A PATIENT WITH AIDS: CASE REPORT AND LITERATURE REVIEW

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SUMMARY

Tuberculous brain abscesses in AIDS patients are considered rare with only eight cases reported in the literature. We describe the case of a 34-year-old woman with AIDS and previous toxoplasmic encephalitis who was admitted due to headache and seizures. A brain computed tomography scan disclosed a frontal hypodense lesion with a contrast ring enhancement. Brain abscess was suspected and she underwent a lesion puncture through a trepanation. The material extracted was purulent and the acid-fast smear was markedly positive. Timely medical and surgical approaches allowed a good outcome. Tuberculous abscesses should be considered in the differential diagnosis of focal brain lesions in AIDS patients. Surgical excision or stereotactic aspiration, and antituberculous treatment are the mainstay in the management of these uncommon lesions.

KEYWORDS: Tuberculous abscess; Brain abscess; Acquired immunodeficiency syndrome.

INTRODUCTION

Human immunodeficiency virus (HIV) infection and acquired immunodeficiency syndrome (AIDS) are the major known risk factors to develop tuberculosis in individuals previously infected with *Mycobacterium tuberculosis*[24]. HIV epidemic rendered tuberculosis more prevalent and increased the indices of mortality, multidrug resistance, and extrapulmonary and disseminated forms[16,27,28].

Central nervous system (CNS) is involved in 10-20% of the cases where HIV infection coexists with tuberculosis. The main clinical syndrome is tuberculous meningitis. Focal tuberculous lesions are infrequent and may appear as tuberculomas and more rarely as abscesses[35].

We report a case of brain tuberculous abscess in an AIDS patient and review of the literature.

CASE REPORT

A 34-year-old woman was admitted to our service in September 2002 because of holocranial headache and generalized tonic-clonic seizures. She had a history of intravenous drug use, chronic hepatitis C, oral candidiasis, and toxoplasmic encephalitis. She had refused any prophylactic or antiretroviral therapies. Neurological examination on presentation was unremarkable, without any focal abnormalities. Laboratory revealed moderate anemia (hemoglobin of 10 g/dL), with leukopenia (white blood cell count of 1900 cells/mm^3), and lymphopenia (260 cells/mm^3). Chest radiograph was normal. His tuberculin skin test, using purified protein derivative (PPD) was negative. *Toxoplasma* IgG was higher than 250 UI (ELISA method). The absolute CD4+ count was 55 cells/μL, and HIV-RNA level was 160,000 copies/mL.

Brain computed tomography (CT) scan showed a hypodense frontal lesion with significant associated edema (Fig. 1A). She underwent trepanation on the same day, draining 10 ml of pus. The Ziehl-Neelsen stain showed abundant acid-fast bacilli (AFB). After one week, the general status improved and a new CT scan showed a decrease in the lesion size (Fig. 1B). She was discharged to home with isoniazid, rifampicin, pyrazinamide, zidovudine, lamivudine, and efavirenz. Besides that, she received primary prophylaxis for *Pneumocystis carinii* pneumonia and secondary prophylaxis for toxoplasmic encephalitis.

DISCUSSION

Tuberculous brain abscesses are infrequently described in the world literature. Before the AIDS era, WHITENER[33] reviewed from 1886 to 1978 only 17 cases with etiological diagnosis, and established diagnosis criteria of cerebral tuberculous abscess. In these patients were not reported any information about preexisting conditions or non-infectious diseases.

In the AIDS era, we reviewed the literature from 1981 to 2002 using the MEDLINE database (National Library of Medicine, Bethesda, MD). The key words used were tuberculous brain abscess, cerebral abscess

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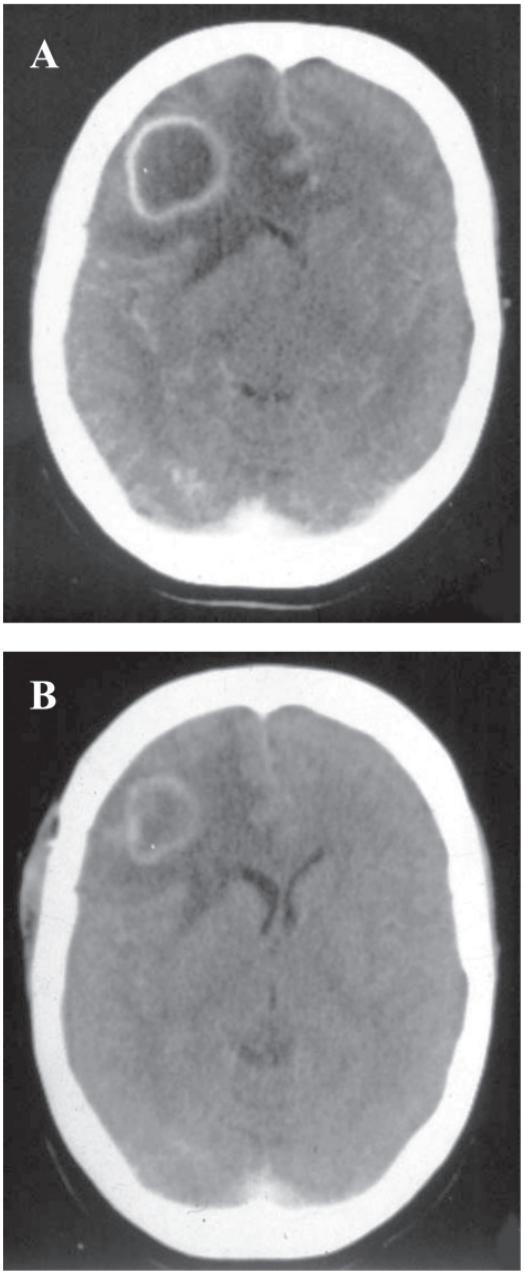

Fig. 1 - Pre-trepanation contrast CT scan showing a large lesion with ring-enhancing in the right frontal area (A). Post-trepanation CT scan (B) demonstrate a marked diminution in the size, residual enhancement and a moderate degree of edema at the site of the lesion.

and acquired immunodeficiency syndrome. We also searched manually in journals, and cases with incomplete clinical or microbiologic information were excluded. In accordance with WHITENER's criteria[33], we found 8 cases of tuberculous brain abscesses in HIV-infected patients: three in the USA[12,13,14], three in Spain[29,31], one in France[11] and one in Brazil[17]. One of these cases was associated with toxoplasmic encephalitis[13]. Interestingly, we excluded three cases previously reported as tuberculous abscesses[31]. However, histopathology information corresponded to tuberculomas[6].

The histopathologic features of tuberculous abscess are different from those of tuberculomas and the definitive diagnosis depends on the following criteria: macroscopic evidence of pus in the abscess cavity, microscopic evidence of acute inflammatory alterations in the abscess walls, and the presence of AFB or *M. tuberculosis* growth on culture[30,33]. Tuberculous abscesses are generally single lesions[11,12,13,17,29,31], larger than tuberculomas[2] and also evolve more rapidly[32]. The exact pathogenesis mechanisms leading to formation of abscess are unknown. It is hypothesized that after the initial hematogenic dissemination of the bacilli[34], there would be brain areas of cerebritis that go on to meningitis or tuberculomas. The abscesses would come from caseous necrosis and liquefaction of these tuberculomas[10] .

In AIDS era, tuberculous brain abscess usually is a subacute illness and the most frequent clinical manifestations are seizures[12,17,31], consciousness alterations[11,29,31], paresis[12,14,17], fever[11,13,17], and headache[11,17,31]. Other findings are paresthesias[12,17], cerebelar signs[11,31], facial palsy[31], and intracranial hypertension[11]. Before AIDS era, WHITENER[33] reported that patients with tuberculous brain abscess usually had an acute illness, and the most common finding were focal neurological deficit (71%), headache (47%), fever (46%), seizures (35%) and consciousness alterations (24%).

Our case is in accordance with other reports of AIDS patients, specially in what concerns the lack of a previous occurrence of tuberculosis[11,12,13,17,31], history of use of intravenous drugs[12,29,31], and normal chest radiographs[11-13,17,29,31]. Formerly, WHITENER[33] reported that patients with tuberculous brain abscess frequently presented epidemiological, historical or laboratory evidence of extracranial tuberculosis, but chest radiographs consistent with tuberculosis were uncommon.

Only four of eight cases found in the literature performed serology for *T. gondii*[11-13,17]. All these patients had detectable IgG antibodies. It is known that 3-6% of patients with toxoplasmic encephalitis have negatives results of serological tests[26], so that a negative serology points to another etiologic possibilities. The positive serology in our case was justified by the previous episode of CNS toxoplasmosis.

The major causes of intracranial focal lesions coexist with low CD4+ values, typically below 100 cells/μL[26]. CD4+ values for tuberculous abscesses without other CNS infections are reported to be between 112-270 cells/μL[12,31]. This important finding for the diagnostic reasoning would be misleading in our case since her CD4+ cell count was 55 cells/μL. This finding and the history of toxoplasmic encephalitis and the lack of secondary prophylaxis for this opportunistic infection could have retarded the diagnostic trepanation, and consequently delayed the treatment.

Tomographic alterations of the tuberculous abscesses may be similar to those ones related to other causes of expansive lesions in AIDS patients[32]: a hyperdense ring, hypodense center, and marked contrast enhancement. The presence of single lesions, a thick capsule, ring enhancement, and a lobular contour, make the diagnosis of tuberculous abscess more likely[12,17,22,25,31,32]. On the other hand, toxoplasmic encephalitis lesions in general are multiple, their capsules are not thick and are not multilobulated.

The differential diagnosis of tuberculous abscesses is wide, including toxoplasmic encephalitis (the most frequent cause of intracranial mass in AIDS patients) and CNS primary lymphoma[19,21,23,26]. Moreover, other rare causes have been described such as tuberculoma[18], cryptococcal abscess and cryptococcoma[21], non-tuberculous mycobacteria abscess[15], pyogenic abscess[12], syphilitic gumma[23], aspergilloma[20], Chagas disease[9], and intracranial mass due to cytomegalovirus[5].

The AIDS patients with focal brain lesions, presence of IgG antibodies against *T. gondii* and CD4+ cell count below 200 cells/μL should receive anti-*Toxoplasma* treatment. If after two weeks of treatment there are no clinical or tomographic improvement, a stereotaxic brain biopsy is needed[22]. However, as reported in a case of "cytomegaloviroma"[5], a high index of suspicion may justify earlier surgical approaches. In accordance with this suggestion, our patient underwent a trepanation on the first hospital day.

The availability of imaging techniques such as Thallium-201 single-photon emission CT (SPECT)[19], positron emission tomography (PET)[26], spectroscopic magnetic resonance imaging[7] and molecular techniques (polymerase chain reaction in cerebrospinal fluid)[3,26] may add to the diagnostic strategy. These tools allow "minimally invasive" approach, decrease the number of brain biopsies, and increase the number of *in vivo* diagnosis[3,4,8,19,26]. However, until larger validation studies are completed, brain biopsy will continue the only definitive diagnosis modality[26].

Biopsy and early treatment of tuberculous brain abscess in AIDS patients, allowed a good outcome in the majority of the reported cases[11,12,14,17,31]. No one of these patients had another associated CNS disease, and all deaths observed were linked to other causes than the abscesses themselves[13,29,31]. Interestingly, before AIDS era, WHITENER[33] reported survival in all cases that received antituberculous chemotherapy and underwent surgical treatment.

Considering the present case, tuberculous brain abscess, in spite of its rarity, must be included in the differential diagnosis of focal lesions in AIDS patients. A high index of suspicion may define an earlier surgical excision or stereotaxic biopsy, which are considered to be the gold standard for the diagnosis and treatment of tuberculous brain abscess.

RESUMO

Abscesso tuberculoso cerebral em paciente com aids: relato de caso e revisão da literatura

Os abscessos tuberculosos cerebrais em pacientes com aids são raros, existindo apenas 8 casos publicados. Os autores relatam o caso de uma paciente de 34 anos com aids e antecedente de toxoplasmose cerebral, que foi admitida por cefaléia e convulsões. A tomografia computadorizada de crânio evidenciou lesão frontal única, grande, com realce anular e efeito expansivo. Diante da suspeita de abscesso cerebral foi submetida a trepanação, drenando material purulento e demonstrando presença de abundantes bacilos ácido-álcool resistentes. Abordagem cirúrgica e clínica oportuna determinaram uma boa evolução. Os abscessos tuberculosos devem ser considerados no diagnóstico diferencial das massas intracranianas em pacientes com aids. Excisão cirúrgica ou aspiração por estereotaxia e tuberculostáticos constituem as bases do tratamento destas lesões incomuns.

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