Absceso cerebral debido a embolización sistémica

Brain abscess due to systemic embolization

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ABSTRACT

A brain abscess is a focal infection of the brain. It can be caused by hematogenous or direct spread, presenting with non-specific symptoms that can delay diagnosis. They are most often bacterial, but they can also be fungal, parasitic or granulomatous. Neurological manifestations such as stroke, meningitis, or brain abscess can develop from endocarditis, so this entity should always be considered and investigated.

The authors present a case of a patient with a heart valve prosthesis for aortic stenosis and a brain abscess due to systemic embolization from subacute endocarditis.

Keyword: Brain abscess, endocarditis, heart valve prosthesis, neurological manifestations.

RESUMEN

Un absceso cerebral es una infección focal del cerebro. Puede deberse a una diseminación hematógena o directa y cursar con síntomas inespecíficos que pueden retrasar el diagnóstico. La mayoría de las veces son bacterianos, pero también pueden ser fúngicos, parasitarios o granulomatosos. A partir de una endocarditis pueden desarrollarse manifestaciones neurológicas como ictus, meningitis o abscesos cerebrales, por lo que esta entidad siempre debe tenerse en cuenta e investigarse.

Los autores presentan el caso de un paciente con una prótesis valvular cardiaca por estenosis aórtica y un absceso cerebral debido a una embolización sistémica por endocarditis subaguda.

Palabras clave: Absceso cerebral, endocarditis, prótesis de válvula cardíaca, manifestaciones neurológicas.

CASE REPORT

A 76-year-old male, retired, with a personal history of aortic stenosis with valvuloplasty and the placement of a mechanical prosthesis in 2004; history of prostate cancer, undergoing prostatectomy and 23 sessions of radiotherapy in 2010, and was considered cured; essential hypertension; transient ischemic attack in 2016. He was medicated accordingly.

The patient was brought to the emergency department due to sudden-onset aphasia. He presented hypertensive (183/71 mmHg), with a capillary blood glucose reading of 108mg/dL. On examination, there were no heart murmurs; the abdomen and skin were unremarkable; at the neurological evaluation, the patient was conscious and cooperative. No motor, sensitive, or visual field deficits were identified, but Broca's aphasia was present, resulting in a total score of two points on the National Institutes of Health Stroke Scale. The patient performed a cranioencephalic computed tomography (CE-CT) revealing "(...) a left frontal cortico-subcortical nodular lesion of approximately 12 mm, and a hyperdense peripheral region that was surrounded by an extensive vasogenic edema (...). No occlusions in the proximal segments of the major intracranial arterial trunks were detected (...)" (Figure 1). The electrocardiogram showed sinus rhythm at 75 bpm with isolated ventricular extrasystole. The analytic results only showed microcytic and hypochromic anemia (hemoglobin at 11.4 g/dL; MCV at 90.2 fL), with no other changes. The internal medicine department admitted the patient for an etiological investigation, after raising the hypothesis of a secondary deposit. Therefore, the patient performed a thoraco-abdomino-pelvic CT and gastrointestinal endoscopic study that were unremarkable. Tumor markers were normal, including prostate-specific antigen. Brain magnetic resonance showed no additional information.

The patient's neurological manifestations deteriorated, with the worsening of Brocas's aphasia and right hemiparesis (muscle strength grade four). As such, the patient underwent bifrontal craniotomy and excision of the lesion. The anatomopathological examination of the lesion excluded metastatic origin and documented a cerebral abscess. The microbiological study isolated *Streptococcus intermedius* bacteria. Targeted antibiotic therapy with benzylpenicillin and metronidazole was promptly initiated, considering a brain abscess. As there was a history of heart valve prosthesis, the transesophageal echocardiogram performed showed a "(...) small filamentous structure, hyperechogenic, vibratile, measuring 7 mm in length, probably related to vegetation in the aortic valve (...) ", diagnosing a subacute endocarditis with systemic embolization to the brain. There was no indication for surgical intervention.

Considering these findings, the stomatology department observed the patient and found no significant changes. Among the tested serologies, cytomegalovirus (CMV) showed positive IgG antibodies (667.6 AU/mL) and positive IgM antibodies, with an IgG anti-CMV avidity index of 87.9%. The viral load was 464 ng/L. Evaluation by ophthalmology revealed signs of CMV retinitis, leading to a 28-day treatment with ganciclovir, with viral load clearance and clinical improvement.

The patient progressed satisfactorily, completing eight weeks of antibiotic therapy. On the 17th day of antibiotic therapy, the transesophageal echocardiogram showed an "(...) absence of vegetations or abscesses (...)". On the 27th day after surgery, a CE-TC revealed: "(...) post-surgical changes, with overlapping dimensions and serohematic content, with reduced local mass effect (...)". At the time of discharge, he was capable of walking with support, communicating ver-

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bally, comprehending requests, and executing simple commands. He was referred to a rehabilitation institution.

DISCUSSION

A brain abscess is a focal infection of the brain that begins as a localized area of cerebritis and develops into a collection of pus surrounded by a well-vascularized capsule. Different phases have been described, through day one and 14 of development: early cerebritis (days 1–3), late cerebritis (days 4–9), early capsule formation (days 10–13), and late capsule formation (after day 14).[1]

The clinical manifestations of a brain abscess are non-specific and mostly due to the edema surrounding the lesion, leading to intracranial hypertension and neurological manifestations[2]. Headache, fever, and focal neurological deficits occur in approximately 20% of patients on admission[1]. Seizures develop in 25% of cases and abnormal mental status, focal neurologic deficits were reported in more than one-third of patients.[3]

Hematogenous dissemination is the most common vector. In up to 25% of cases, no source can be found. Bacterial endocarditis rarely causes a brain abscess and is more likely to be associated with acute endocarditis than with the subacute form.[2]

Endocarditis remains a significant clinical problem, with mortality rates of 20% to 40%[4]. The development of a metastatic abscess occurs as a sequela of systemic embolization, typically occurring in 22% to 50% of cases of IE. Up to 65% of embolic events involve the central nervous system, and 90% of central nervous system emboli lodge in the distribution of the middle cerebral artery.[5]

Brain abscesses are usually caused by bacteria, but can also be caused by fungi and protozoa. The *Streptococcus milleri* group is commensal of the oropharynx and gastrointestinal tract and is well recognized for its propensity to cause abscesses, including in the central nervous system[6]. These agents are also associated with IE.

Harvesting of tissue and laboratory analysis is of the utmost importance for determining treatment options. Medical therapy is fruitful if initiated in the cerebritis stage. Surgical treatment is indicated in the presence of a significant mass effect, difficulty in diagnosis, ventricle proximity, intracranial hypertension, poor neurological condition, traumatic abscess associated with foreign material, a fungal abscess, multiloculation, or failure of medical management.[2]

The selection of empiric therapy for a brain abscess should be guided by local antimicrobial susceptibility data, the presumptive source of infection, and the host immune status. Therapy should be tailored according to culture results, but polymicrobial infection is common in brain abscesses, so anaerobic coverage may be continued, especially if the source of infection is a contiguous site.[7]

This case illustrates the difficulty that may occur in the recognition and timely diagnosis of a brain abscess, delaying treatment. Given the background of a heart valve prosthesis, the diagnosis of a brain abscess due to systemic embolization through IE was plausible, but the symptoms and signs presented would make us think otherwise.

Figure 1. Brain lesion detected on CT-CE.

CONFLICT OF INTEREST
The authors declare that they have no conflict of interests.

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ETHICAL ASPECTS
All participants submitted a consent form to be included in this study.

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