CASE REPORT

Operative strategy for large brain abscess resulting from immune reconstitution inflammatory syndrome in an AIDS patient in Swaziland

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Summary The objective of our study was to report a rare case with a large brain abscess related to central nervous system immune reconstitution inflammatory syndrome (IRIS) and to discuss the operative strategy for it. Brain abscess with HIV co-infection is considered to be a critical infectious condition that requires neurosurgical intervention. The presentation of IRIS may worsen the patient’s condition after the initiation of antiretroviral therapy, especially in IRIS of the central nervous system. Only a few cases of IRIS-related brain abscess have been reported in the current literature, with discussion of the operative strategy. A 30-year-old man was diagnosed with HIV infection in 2007 and he developed right-sided convulsion episodes in 2008. His first brain computed tomography (CT) scan revealed two intracranial cysts, and his symptoms were well controlled by anticonvulsant treatment. He also initiated antiretroviral therapy in the same year. However, his neurological conditions gradually worsened with sensory loss, weakness, visual impairment on the right side, as well as motor aphasia. A CT scan in 2011 revealed a well-encapsulated, hypodense 8 cm × 9 cm intracranial lesion in the left frontal parietal lobe with a 3-cm midline shift. Surgery was performed with a combination of direct suction and quick-suturing of the incision. The abscess capsule was enucleated completely. After surgical removal, he recovered well and remains functional at work in the following year with only minor neurological sequelae. In conclusion, this case illustrates

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well the clinical course of brain abscess resulting from IRIS in Swaziland, where the prevalence rate of HIV infection is relatively high and delay in diagnosis and treatment is common. The use of a modified excision method for HIV co-infection brain abscess may be considered the operative strategy, with a probable good outcome in such a resource-limited area as Swaziland. Copyright © 2013, Taiwan Surgical Association. Published by Elsevier Taiwan LLC. All rights reserved.

1. Introduction

Brain abscess with HIV co-infection is a critical neurosurgical emergency associated with long hospital stay and high mortality.1 The treatment strategy for the patient not only requires consideration of the abscess itself, but also of the immune status and response of the patient. The immune reconstitution inflammatory syndrome (IRIS), which refers to a consequence of the restoration of an immune response against pathogen-specific antigens, is usually seen in patients after initiation or reinitiation of antiretroviral therapy (ART). As compared with other types of IRIS in AIDS patients, IRIS of the central nervous system (CNS) has greater morbidity and mortality,2 and the treatment strategy for brain abscess with CNS IRIS is still uncertain according to current studies.

We report atypical presentation of a large brain abscess with CNS IRIS in an patient with HIV infection. After modified surgical intervention of abscess nucleation, the patient remained in good condition during the following year. This case not only illustrates the clinical course of brain abscess related to IRIS, but also highlights the operative strategy for brain abscess treatment of AIDS patients in resource-limited countries.

2. Case report

A 30-year-old man had a 4-year history of HIV infection without treatment. He began to have right-sided convulsion episodes in 2008. Since his symptoms progressed, a computed tomography (CT) scan was taken, which revealed two intracranial cysts. His convulsions were well controlled after administration of valproic acid, 300 mg/day. He was also initiated on ART of abacavir/didanosine/lopinavir/ritonavir in December 2008.

Early in 2009, he developed right hemiplegia and right facial palsy. In the following months, he developed motor aphasia and right visual impairment. He remained afebrile with no sign of sepsis. He presented to our neurology clinic in 2010, where a CT scan revealed a well-encapsulated, hypodense 8 cm × 9 cm intracranial lesion in the left frontoparietal region with a 3-cm midline shift (Fig. 1). The patient refused surgical intervention and did not come to us until 2011.

Surgery was performed in October 2011 under general anesthesia with assisted ventilation. Craniotomy was performed and the dura was widely opened. Diffuse inflammatory signs were noted over the cerebral cortex and meninges. After careful corticotomy, the abscess capsule was explored. A linear 3-cm incision was made over the superficial aspect of the abscess, and preliminary aspiration was carried out. Turbid, smelly yellowish, thick pus was noted. A combination of direct suction and quick suturing of the incision was applied, which gradually shrunk the abscess into a small spheroid and prevented the leakage of pus. The abscess capsule was enucleated completely. The dura and scalp were closed smoothly without drainage. The patient stayed in the intensive care unit with postoperative antibiotics: ceftriaxone [1 g intravenously (iv) every 12 hours], gentamicin (120 mg iv every 12 hours), and metronidazole (500 mg iv every 8 hours) for 6 days (Fig. 2).

Figure 1 Preoperative brain computed tomography shows a well-encapsulated, hypodense 8 cm × 9 cm intracranial lesion in the left frontoparietal region with a 3-cm midline shift.

Figure 2 Operative findings: turbid, yellowish thick pus was drained out during the operation, strongly indicating a brain abscess.
In our case, the intracranial cystic lesions and symptoms presented without any systemic infection symptoms, which is relatively rare in HIV-co-infected patients. Surgical treatment is indicated for abscesses >2.5 cm, located in non-eloquent areas or causing significant mass effect, therefore, surgery was considered the best treatment strategy for our patient.

Aspiration and excision have been considered as the standard methods of surgical management for brain abscess. The choice between these two procedures has caused a debate about operative strategy. According to updated literature, aspiration is considered the first surgical choice in patients with supratentorial parenchymal brain abscesses. For deep-seated abscesses, multiple abscesses, and abscesses located in eloquent areas, CT-guided stereotactic aspiration is particularly useful because excision is inappropriate in such situations. However, on account of unavailability of proper equipment and techniques, it has been difficult, if not impossible, to perform stereotactic aspiration in resource-limited countries such as Swaziland. In contrast, the use of excision is indicated for lesions that are superficially located, large, solitary, and encapsulated. The advantages of excision include not only reduction of recurrence of the abscess, but also reduced occurrence and recurrence of seizures.

Reviewing our case, treated by a combination of direct suction and quick suturing of the incision, we believe that the abscess capsule could be nucleated completely without additional brain damage. In view of the high mortality rate and poor outcome in the current study of HIV co-infection brain abscess management in South Africa, our patient had a superior outcome without significant complications after surgery.

According to recent studies, the majority of patients with brain abscess operations yield isolated organisms, which may have formed a contiguous focus of infection. The most common organisms in brain abscess infection are Staphylococcus aureus and Streptococcus milleri, and Mycobacterium tuberculosis infection might also be taken into consideration in immunodeficient patients. In our case, the patient had no history of M. tuberculosis infection, and the content of the abscess was turbid, smelly, yellowish thick pus. However, because pathology and culture results are not easily available in resource-limited countries such as Swaziland, there are limitations in confirming the microbiological diagnosis.

In conclusion, this case report proposes an operative strategy for large brain abscess resulting from IRIS in AIDS patients, and shows that our procedure can produce good outcome in resource-limited countries such as Swaziland.

3. Discussion

IRIS is an early complication of ART due to excessive pathogen-specific immune recovery reaction in AIDS patients, which mainly occurs in developing countries. As compared with other types, morbidity and mortality associated with IRIS of the CNS are greater. A review of the literature showed that the diagnostic criteria for CNS IRIS, which have so far been provided, include: (1) worsening of neurological status; (2) new or deteriorating neurological finding; (3) decrease in plasma viral load (≥1 log10 copies/mL); (4) presence of symptoms not explained by a newly acquired disease or usual course of a previously acquired illness; and (5) histopathological evidence of T-cell infiltration. In our case, the intracranial cystic lesions and seizure episodes were revealed before ART initiation, which was followed by progressive seizures and new neurological findings, which developed paradoxically with virological improvement. The patient’s clinical course met not only four of the criteria in the CNS IRIS diagnostic guidelines, but was also consistent with previous case reports of paradoxical reaction of brain abscess in AIDS patients. It is interesting to note that clinical manifestations of our patient present only neurological focal signs and convulsions without any systemic infection symptoms, which is

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**Figure 3** Postoperative brain computed tomography shows mild residual left frontal lobe cerebritis without any intracranial space-occupying lesion. The patient recovered well and remains with only minor neurological sequelae.

He was discharged 12 days after surgery and physiotherapy. A CT scan 2 months later revealed only mild residual left frontal lobe cerebritis without any intracranial space-occupying lesion (Fig. 3). The patient remains with right-sided distal muscle weakness, although his symptoms of aphasia and convulsion completely resolved. He remains functional at work and is followed up regularly at our neurosurgical clinic.

