Caso clinico

A case of brain abscess by *Eikenella corrodens* in a HIV-positive patient

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We report the case of a 61-year-old homosexual male who came to our observation because of a recent onset occipital and left frontoparietal headache, weakness, anorexia, hyperosmia and hypergeusia and psychomotor slowing, apathy and fatuous behavior. This case, besides the old problem of the differential diagnosis of intracranial mass lesions in HIV-positive patients, induces one to examine more closely the relationship between HIV, brain abscesses and *Eikenella corrodens*. We suspect that the primary infection was in the oral cavity, since HIV-positive patients have a higher incidence of atypical gingivitis and typical periodontitis due, among others, to *Eikenella corrodens*.

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Key words: AIDS; Brain abscess; *Eikenella corrodens*.

**Introduction**

Seventy percent of AIDS patients develop central nervous system (CNS) involvement during the course of their disease and this usually occurs in severely immuno-compromised patients (CD4 < 200/µL).

Brain abscesses are one of the least common causes of CNS disorders and, to our knowledge, this is the first case due to *Eikenella corrodens*. This pathogen is known to be responsible for atypical gingivitis and rapidly progressive periodontitis in HIV-seropositive individuals. The case of our patient suggests that the oral cavity could be an important primary site of uncommon opportunistic infections in a still immunocompetent subject.

**Case report**

A 61-year-old homosexual male presented to the Florence University Hospital in November 2000. He complained of a recent onset occipital and left frontoparietal headache lasting 2-3 hours. High pressure values (150/110 mmHg) had been registered, both at the time of the attacks of headache, as well as during brief episodes of pre-syncope, skin paleness and cold sweating. Since the beginning of the month he also complained of weakness, anorexia, hyperosmia and hypergeusia and his character modified abruptly, with psychomotor slowing, apathy and fatuous behavior.

On physical examination, the patient was afebrile and had adrenergic hyperactivation signs (tachycardia, pallor, sweating) and on neurological examination a rightsided loss of balance was evident.

A cranial computed tomography (CT) showed, in the right cerebellar hemisphere, a 3.5 cm round mass lesion with ring enhancement.

A magnetic resonance imaging (MRI, Fig. 1 A and B) was suggestive of cerebral toxoplasmosis but anti-toxoplasma antibodies were slightly positive only for IgG (1:10) and repeated samples failed to show any increase in their concentration. The patient was found to be HIV-positive (Western blotting,) with a CD4 cell count of 600/µL and a CD4/CD8 ratio of 1.02.

Consequently, a trial of antibiotics (trimethoprim and sulfamethoxazole), steroids and mannitol was begun and the patient’s symptoms improved. Ten days later a MRI showed a reduction in the perilesional edema, without any reduction in the dimensions of the mass lesion itself. CT and MRI images were not suggestive of a cerebral lymphoma, so the diagnostic help of single-photon emission CT was not strictly necessary. Rachicentesis was not advisable because of the presence of a cerebellar mass and of signs of intracranial hypertension.

The patient underwent diagnostic and therapeutic surgery. A 2-cm deep stiff capsule was found, from which light yellow pus was aspirated. The diagnosis was that of a cerebellar abscess and the operation was completed removing the whole capsule; then, a 3-week antibiotic trial with ceftazidime and levofloxacin was begun.

The culture was positive for *Eikenella corrodens*. Since this pathogen belongs to the oral flora, the patient was submitted to orthopantomography, that revealed periodontal disease. To rule out any other source of infection we performed a chest radiography and an echocardiography, that were normal. Besides, otolaryngologic evaluation failed to show any oral lesion.
The postoperative course was uneventful, and at 3 years of follow-up the patient is in good general conditions, apparently with no neurological sequelae.

Discussion

This case, besides the old problem of the differential diagnosis of intracranial mass lesions in HIV-positive patients, induces one to examine more closely the relationship between HIV, brain abscesses and Eikenella corrodens.

Differential diagnosis of intracranial mass lesions in HIV-positive patients

The most common cause of CNS mass lesions among HIV-infected subjects is Toxoplasma gondii infection which occurs in as many as 40%. A primary CNS lymphoma is the second most common cause, occurring in 10%. Progressive multifocal leukoencephalopathy, tuberculosis, and Cryptococcus neoformans or other opportunistic infections are less usual. HIV-positive patients will occasionally develop brain abscesses due to common pyogenic bacteria.

The clinical distinction between different pathologic CNS conditions in HIV-positive patients is often difficult and the diagnostic help of CT, MRI and positron emission tomography, stereotactic brain biopsy and sequential thallium and gallium scintigraphy is fundamental (Table I); moreover, an Epstein-Barr virus infection can be suggestive of lymphoma and a JC virus infection of progressive multifocal leukoencephalopathy.

When imaging findings are not sufficiently specific for the diagnosis, since toxoplasmosis is the most common cause of intracranial mass lesions among HIV-positive patients, it is common practice to start a therapeutic trial with trimethoprim-sulfamethoxazole and to re-evaluate the lesion after 2-3 weeks. This is the approach we chose for our patient.

Similarly, when a lymphoma is strongly suspected and especially if biopsy is technically difficult, irradiation of the brain may be performed empirically; in this context, a documented Epstein-Barr virus infection and a positive thallium scintigraphy may be of great help.

Brain abscesses and HIV

Although it is not a common event, HIV-positive patients may develop brain abscesses due to the common bacterial pathogens.

A case of both Toxoplasma and Mycobacterium tuberculosis brain abscess has also been described, emphasizing the possibility of polymicrobial infections; such cases have been rarely described and, when they do occur, the implicated pathogens are not the pyogenic organisms found in the healthy host; rather, mycobacteria, fungi, protozoa, and Listeria species have all been reported as causative pathogens.
Only one case of both HIV infection and a polymicrobial pyogenic brain abscess has been reported in the literature. The patient had a CD4 cell count of 250/µL; cultures of the aspirate yielded *Streptococcus bovis*, *Fusobacterium necrophorum*, *Peptostreptococcus* and group C Streptococcus; in this case, the primary source of infection remained unknown, but on the basis of the clinical data it was probably sited in the dental arches5.

To our knowledge, this is the first case of a brain abscess by *Eikenella corrodens* in a HIV-positive patient.

**Eikenella corrodens and HIV**

To understand the pathogenesis of a brain abscess, especially when due to uncommon bacteria such as *Eikenella corrodens*, it is important to find the primary source of the infection which is usually discovered on the basis of the microbiological features of the microorganism.

Considering brain abscesses in general, the most common source of microbial infection is a direct or indirect cranial infection arising from the paranasal sinuses, middle ear or dental arches3. With regard to *Eikenella corrodens*, besides the association with cyanotic congenital heart disease6, the main primary source of infection is the oral cavity; this bacterium indeed belongs to the normal oropharyngeal flora. Moreover, it is known that this microorganism may be isolated from the blood after tooth extraction and that it may be responsible for sepsis and endocarditis in immunocompromised hosts7. An emblematic case is that of a septic shock due to *Eikenella corrodens* and *Staphylococcus epidermidis* in a HIV-positive patient; he had a dental abscess that evolved into neck cellulitis, and an abscess in the right pulmonary apex; the lymphocyte count was 560/µL (7% CD4)8.

*Eikenella corrodens* is a facultative anaerobic gram-negative bacillus and a normal inhabitant of the oral cavity and the respiratory tract; these districts are precisely the most common primary sources of infection.

It is difficult to isolate in the laboratory and it is often implicated in serious and slow healing infections9, both in adults and in children10. *Eikenella corrodens* usually occurs in periodontitis but also in other types of infections. It has most commonly been described in human bite wound-related infections and in case of infections of the neck and head and of the respiratory tract; these districts are precisely the most common primary sources of infection.

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Some examples of *Eikenella* brain abscesses in HIV-seronegative subjects that were associated with different primary sources have been described in the literature. Among these, 2 cases of frontal lobe abscesses in patients with apical-root abscesses confirm the hypothesis of an odontogenic focus\(^1\). Two pediatric cases due to foreign body aspiration suggest the association with the respiratory mucous membranes\(^1\). Finally, a case of recurrent meningitis and brain abscess caused by *Eikenella corrodens* in a patient with a history of otitis media and mastoidectomy has been reported\(^15\).

In HIV-positive patients the primary source of infection is most probably the oral cavity; these patients indeed frequently have atypical gingivitis and periodontal disease that predispose to odontogenic bacteremia\(^8\). This was probably the case in our patient.

Recent studies have shown that atypical gingivitis and rapidly progressive periodontal disease may be early-occurring opportunistic infections associated with HIV. According to a DNA probe analysis of the subgingival plaque, HIV-associated periodontitis sites have a microbial profile qualitatively similar to that of conventional periodontitis, hence including *Eikenella corrodens*\(^16,17\). In contrast, HIV-associated gingivitis sites have a greater prevalence of *Actinobacillus actinomycetemcomitans*, *Bacteroides ginvialis*, *Bacteroides intermedius*, *Eikenella corrodens* and *Wolinella recta* than conventional gingivitis sites; the same bacteria are present in periodontitis sites, suggesting that the HIV gingivitis lesion is a precursor of HIV periodontitis\(^16\). Moreover, *Eikenella corrodens* is known to be one of the pathogens implicated in the conversion from gingival health to periodontal disease, although the main bacteria are *Bacteroides forsythus* and *Campylobacter rectus*\(^18\).

In one study, lower levels of *Eikenella corrodens* were found in non-bleeding sites of HIV infected patients compared with controls\(^19\). Anyway, most of the literature data are suggestive of a similarity of the species associated with periodontal infections in seronegative and seropositive patients, although in the latter infections are usually complicated with enteric and *Candida* species\(^20\).

The case of our patient may be described as a brain abscess by *Eikenella corrodens* in a HIV-positive, still immunocompetent subject, favored by a periodontal infection, that is typical of the first phase of HIV infection.

**Therapy**

The antibiotics that are often used for the empirical treatment of infection caused by oropharyngeal flora may be ineffective against *Eikenella corrodens*; this organism is typically susceptible to penicillin G, ceftriaxone, ampicillin, amoxycillin-clavulanic acid, imipenem, trimethoprim-sulfamethoxazole and fluoroquinolones, while it is resistant to clindamycin, cephalaxin, erythromycin and metronidazole; \(\beta\)-lactamase production is rare, and \(\beta\)-lactamase activity can be inhibited by the use of clavulanate or sulbactam\(^10,11,21\).

Surgical treatment is often critical for a favorable outcome, antibiotic therapy alone being insufficient to achieve resolution of the infection\(^10\).

In conclusion, the most probable source of brain abscesses by *Eikenella corrodens* is the oral cavity. HIV-positive patients are particularly predisposed to odontogenic bacteremia, since they have a greater incidence of atypical gingivitis and typical periodontitis than that observed in the general population. Both these diseases may be due, among others, to *Eikenella corrodens*.

**Riassunto**

Riportiamo il caso di un paziente di 61 anni omosessuale, giunto alla nostra osservazione per una cefalea occipitale e frontoparietale sinistra di recente insorgenza, debolezza, anorexia, iperosmia ed ipergeusia e rallentamento psicomotorio, apatia e comportamento malinconico. Il caso di questo paziente, oltre a sollevare la nota questione della diagnosi differenziale delle masse intracraniche in pazienti HIV-positivi, stimola all’approfondimento del rapporto tra HIV, ascessi cerebrali ed *Eikenella corrodens*. Ipotizziamo che la fonte di infezione fosse il cavo orale, dato che i pazienti HIV-positivi hanno una maggiore incidenza di gengiviti attive e periodontiti tipiche dovute, insieme ad altri patogeni, ad *Eikenella corrodens*.

**Parole chiave:** AIDS; Ascesso cerebrale; *Eikenella corrodens*.

**References**


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