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Odontogenic Cerebral Abscess: 4 Cases Collected at the National Center for Odonto-Stomatology Professor Hamady Traore in Bamako

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Abstract

Introduction: Odogenic brain abscesses are rare but potentially fatal complications and can lead to serious sequelae. The objective of this study was to describe the management of odontogenic brain abscesses through a case series. **Observations: Case 1:** This was a 27-year-old female patient admitted with odontogenic facial cellulitis associated with total right pyramidal syndrome. A craniofacial computed tomography (CT) scan demonstrated a cerebellar abscess and right internal jugular vein thrombosis. Healing with sequelae was achieved after multidisciplinary medical and surgical management. **Case 2:** This was a 23-year-old female patient admitted with a diagnosis of cervicofacial cellulitis of dental origin associated with right pyramidal syndrome and motor aphasia. A craniofacial CT scan revealed a temporal bone abscess. Multidisciplinary medical and surgical treatment resulted in a cure without sequelae. **Case 3:** This was a 9-year-old patient admitted with a diagnosis of right-sided cellulitis with exophthalmos and meningeal syndrome. A craniofacial CT scan revealed a right temporal bone collection. A cure without sequelae was achieved after multidisciplinary medical and surgical management. **Case 4:** This 8-year-old child was admitted with a presentation of facial cellulitis of dental origin associated with functional impairment of the right side of the body, headaches, and seizures. A craniofacial CT scan revealed an

encapsulated left temporal abscess. Multidisciplinary medical and surgical treatment resulted in a cure with no neurological sequelae. **Conclusion:** Despite the low incidence of odontogenic brain abscesses, a dental entry point should always be considered in the etiological diagnosis of a brain abscess.

Keywords

Brain Abscess, Odontogenic, Cellulitis, Bamako

1. Introduction

Brain abscesses are purulent collections located in the brain parenchyma and surrounded by a well-vascularized capsule. They can be the result of a dental infection. They constitute a crucial condition due to their morbidity and mortality, especially in developing countries [1]-[3]. The prevalence is approximately 1 per 100,000 and represents 2.6 cases per 1000 hospitalizations. Mortality is between 4% and 37% [4] [5]. Additional radiographic and biological examinations are performed to establish a definitive diagnosis and identify the entry point [6]. Given the urgency of the situation and the difficulty in making a precise diagnosis quickly, surgical management of the abscess is often imperative. Despite recent therapeutic advances, including in terms of antibiotic therapy, these are still potentially fatal pathologies that can lead to serious sequelae [4]. Early diagnosis and appropriate treatment can improve the prognosis. The objective of this work was to describe through a series of cases the management of odontogenic brain abscesses.

2. Observations

2.1. Case 1

This was a 27-year-old female housewife referred by a community health center for right lower genial cellulitis that had begun 15 days earlier, characterized by toothache followed by swelling of the right lower genial region. She had no known medical or surgical history of pathology.

On admission, her general condition was impaired (WHO score = 3), consciousness was clouded with a Glasgow Coma Scale (GCS) score of 13/15, and conjunctivae were discolored; and her temperature was 38.8˚C.

The dental examination revealed swelling on the right side of the face, covered with shiny, warm, fluctuating, and painful skin; a limitation of mouth opening to 2.5 cm, poor oral hygiene, and pyorrhea over the carious 48th tooth. On neurological examination, there was a total right flascospastic pyramidal syndrome consisting of a motor deficit rated at 3/5 in the upper and lower limbs (LM), brisk deep tendon reflexes (OTR), hypotonia, and dysarthria.

Given this presentation, the diagnosis of a cerebral abscess following diffuse right facial cellulitis was considered.

Craniofacial CT revealed a cerebellar abscess (right and left) and thrombosis of the right internal jugular vein (Figure 1, Figure 2).

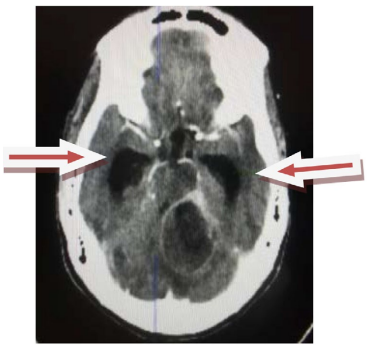

Figure 1. Axial CT scan showing right and left cerebellar abscesses.

Figure 2. Coronal CT scan showing thrombosis of the right internal jugular vein.

Bacteriological examination of the pus isolated Proteus sp. sensitive to ceftriaxone.

A neurosurgical opinion was sought. Management was multidisciplinary and consisted of incision-drainage via the Risdon approach followed by extraction of the causative teeth 47, 48. A puncture of the cerebellar abscess, yielding 30 cc of frank pus, was performed by the neurosurgeons. Medical treatment consisted of ceftriaxone 2 g/day, metronidazole 1.5 g/day for 21 days, then cefixime 200 mg and metronidazole 1.5 g/day for 1 month. The progression was marked by persistent functional impairment of the right thoracic and pelvic limb. Passive and active rehabilitation was performed. The patient was lost to follow-up after 6 months of follow-up.

2.2. Case 2

This was a 23-year-old female housewife who was referred by a dental surgeon for a left lower genial swelling that had begun 15 days earlier. She had no known medical or surgical history of pathology.

On admission, the patient was in good general condition (WHO1), with pale conjunctivae and preserved consciousness (Glasgow 15/15).

The dental examination revealed a left lower genial swelling with submental and cervical extension, fluctuating, painful with local warmth; a limitation of mouth opening to 2 cm; vestibular suppuration opposite the carious 37. The neurological examination revealed a right pyramidal syndrome (motor deficit rated at 4/5 MS and MI; decreased ROT) and motor aphasia. Given this presentation, the diagnosis of a brain abscess following widespread cervicofacial cellulitis was considered. A craniofacial CT scan revealed a supradural collection in the left frontotemporo-parietal and left mandibular areas with osteitis (Figure 3, Figure 4). A bacteriological examination of the pus was unremarkable.

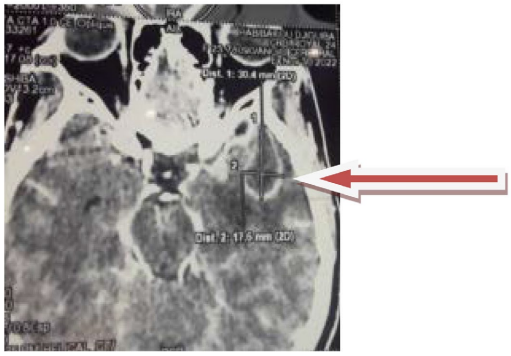

Figure 3. Axial CT scan showing the left temporal collection.

Figure 4. Sagittal CT scan showing left mandibular collection with osteitis.

A neurosurgical opinion was requested. Multidisciplinary care consisted of incision-drainage of the cervicofacial cellulitis then extraction of the causative teeth 38, 47, 48 with curettage. A puncture at the left temporo-parieto-frontal level was performed by the neurosurgeons. Medical treatment was based on ceftriaxone 2 g/day, metronidazole 1.5 g/day for 21 days then cefixime 200 mg and metronidazole 1.5 g/day for 1 month. Rehabilitation was carried out. The evolution was marked by healing without any neurological sequelae.

2.3. Case 3

This was a 9-year-old student admitted to the department with right hemifacial

swelling, which began 15 days earlier with pain in the 46th umbilical cord followed by extensive right genial swelling in the right orbital region. He had no known medical or surgical history of pathology.

On admission, his general condition was good (WHO score = 1), his conjunctiva was pale, and his consciousness was preserved with a Glasgov score of 15/15. Temperature = 38.5˚C.

The dental examination revealed right hemifacial swelling, right exophthalmos, right supraorbital fistulization, a 2 cm limitation of oral opening, and a cavity in the 46th umbilical cord with suppuration.

Following this pattern, a craniofacial CT scan revealed a right temporal collection (Figure 5). The bacteriological examination of the pus returned sterile. Thus, the diagnosis of cerebral abscess following diffuse left facial cellulitis was retained.

Figure 5. Axial CT scan showing the right temporal collection.

A neurosurgical opinion was requested. The treatment consisted of an incision-drainage then extraction of the causative tooth 46. The medical treatment was based on Cefotaxime 2 g/day, metronidazole 750 mg/day for 21 days then cefixime 200 mg/day and metronidazole 250 mg/day for 1 month. The evolution was favorable with healing without sequelae.

2.4. Case 4

This was an 8-year-old female patient admitted to the department with a case of left lower genial cellulitis of dental origin, which had apparently started about a month earlier. She had no known medical or surgical history of pathology. On admission, her general condition was good, her conjunctiva was discolored, and her consciousness was impaired (Glasgow: 10/15), with a temperature of 37.3˚C.

The oral examination revealed a fluctuating swelling of the left genial. The remainder of the intraoral examination was difficult due to a 1 mm tight trismus. The diagnosis of left lower genial cellulitis of dental origin was considered. Medical treatment with antibiotics and analgesics was initiated. The evolution was marked two days later by the appearance of bilateral exophthalmos associated with functional impotence of the right hemibody, headaches and convulsive seizures.

CT and craniofacial magnetic resonance imaging revealed an encapsulated left temporal abscess (Figure 6, Figure 7).

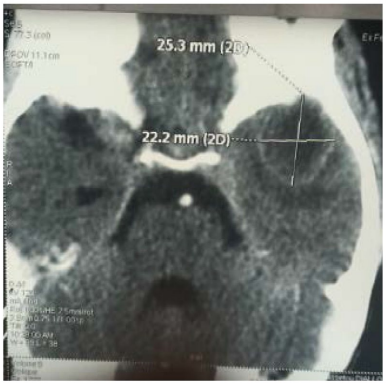

Figure 6. Axial CT scan showing a left temporal abscess.

Figure 7. Sagittal MRI showing a left temporal abscess.

The treatment was multidisciplinary and consisted of an incision-drainage of the facial cellulitis then extraction of the causative tooth 36. A puncture of the cerebral abscess bringing back 8cc of frank pus was performed by the neurosurgeons. The medical treatment was based on ceftriaxone 2 g/day, metronidazole 750 g/day for 21 days then cefixime 200 mg and metronidazole 750/day for 1 month. Rehabilitation was carried out. The evolution was marked by the persistence of functional impotence of the right thoracic and pelvic limb. The child was lost to follow-up after 8 months of follow-up.

3. Discussion

Odontogenic brain abscesses are rare but serious and life-threatening conditions. The prevalence of dental infection in brain abscesses varies from 2.7% to 6.5% depending on the series [1] [2] [6]. Indeed, Kanikomo D *et al.* [1] reported 4 cases over a 3-year period. In this study, 4 cases were observed over a 12-month period. The predominance of one sex varied according to the studies [1] [2] [7] [8]. A female predominance was observed in the present series. The age of the patients

varies according to the series. Some authors reported an age ranging from 30 to 45 years [1] [7] [8]. Anzouan KE *et al.* [2] reported a case in a 9-year-old child. In this series, the age of the patients varied between 8 and 27 years.

Odontogenic brain abscesses may be secondary to a septic focus located at a distance from the clinical manifestation. The spread of oral-dental germs to the brain occurs preferentially by contiguity in the context of an acute infection or by hematogenous route from chronic infectious foci [4]. The brain abscess would be the consequence of a hematogenous dissemination of the dental infection via the facial and ophthalmic veins where the germs penetrate into the skull through the cavernous sinus [2] [8]. The hematogenous spread of the infection in the mid-facial region would be attributable to a continuous communication between the facial vein, the pterygoid plexus, the angular and ophthalmic veins and the cavernous sinus [2] [9]. The absence of any other infection in the patient's history apart from the infection of dental origin could explain that these brain abscesses are consecutive to cellulitis of dental origin. Indeed, in the literature, dental sources of brain abscesses mention dental abscess, cellulitis, periodontitis, extractions, root canal treatments, and the placement of orthodontic appliances [10].

The clinical signs of brain abscesses are polymorphic and non-specific. The diagnosis must be made in the presence of disturbances of consciousness with the existence of focal signs following cellulitis of dental origin [2] [11]. The diagnosis is based on brain CT scan before and after injection of the contrast agent. It remains the reference examination for the diagnosis of brain abscesses with an excellent sensitivity of 90% to 100% [12]. This examination was carried out in all patients and allowed the diagnosis to be suggested. MRI, when performed, provides an earlier and more precise diagnosis. In the case of a brain abscess, it shows a typical ring image, surrounded by edema, significant of the encapsulation of the lesion [4]. In this series, MRI could only be performed in one case due to the high cost of this examination. Biologically, all patients had hyperleukocytosis. This same trend has been reported by other authors [1]. Several species of germs are implicated in the occurrence of brain abscesses. Staphylococcus and streptococcus are the most frequently found germs [1] [2]. In this study, the culture was positive in only one case and allowed the isolation of Proteus sp. This could be explained by the conditions of collection and transport of the samples to laboratories located outside the patient's receiving hospital.

Medical and surgical management is carried out by a multidisciplinary team and is based on the treatment of the brain abscess and etiological treatment. Medical treatment is based on probabilistic antibiotic therapy then adapted according to the antibiogram. The minimum duration is 6 weeks. Neurosurgical treatment consists of performing a trephine puncture. Puncture is used by many authors because it is a simple technique for evacuating pus [1] [13]. It was performed in 3 cases in this series. Exclusive medical treatment is indicated when the size of the brain abscess is less than 2 cm [1] [2] [14]. This approach was observed in 1 case. Surgical management of cellulitis consists of incision-drainage of the cellulitis

with extraction of the causative teeth. This procedure was performed in the reported cases.

Despite improvements in diagnostic and management methods, including antibiotic therapy, brain abscesses remain a potentially fatal condition that can lead to serious sequelae [4]. Kanikomo D *et al.* [1] reported a mortality rate of 17.65%. No deaths were recorded in the reported cases. However, severe neurological sequelae were observed in 2 cases. This trend has been observed in other studies [1] [15].

4. Conclusion

Brain abscess is a rare complication of cervicofacial cellulitis of dental origin. This condition is a significant event and its clinical characteristics are often nonspecific, making diagnosis difficult. Long-term sequelae can be severe, justifying curative and preventive treatment of potential entry points, particularly dental ones.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this article.

Ethical Considerations

We are committed to maintaining the anonymity and confidentiality of the data collected. Informed consent was obtained from patients. The study posed no risk to the patients included.

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