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ONLINE CASE REPORT

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A case of odontogenic brain abscess arising from covert dental sepsis

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ABSTRACT

Odontogenic infections can spread to any organ of the body and in some cases cause life threatening infections. We report a case of multiple odontogenic brain abscesses resulting from undetected tooth decay. Whereas most odontogenic brain abscesses occur following dental treatment, this report documents brain abscesses prior to dental treatment, signifying the dangers of covert dental infections. This case report updates the literature on the topic of odontogenic brain abscesses.

KEYWORDS

Brain abscess – Odontogenic abscess – Untreated caries

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Odontogenic infections are known to spread throughout the body and cause distant organ failure and life threatening infections (eg endocarditis, meningitis and Ludwig's angina).[1–4] Brain abscesses are of particular concern because of the potentially debilitating sequelae. Their incidence in the US is cited as 1:100,000 annually.[5] The prevalence of odontogenic brain abscesses ranges between 3% and 10% of all cases.[5–7]

Brain abscesses occur more frequently in men than in women.[5,7,8] Odontogenic brain abscesses in children are virtually unheard of. The advent of computed tomography (CT) technology and magnetic resonance imaging (MRI) has greatly improved the diagnosis of brain abscesses and consequently reduced the rate of mortality.[5] However, the outcome of treatment is still haunted by death or permanent handicap.[8] The following case report serves as a salient reminder of this danger of untreated dental disease.

Case history

A 56-year-old man was taken to a remote hospital by his co-worker because he arrived at work looking unwell and had mental changes. The patient's medical history was significant for hypertension, cholecystectomy and obstructive sleep apnoea with lisinopril, losartan and furosemide as his daily medications. He had recently experienced a dry cough for more than one month that was attributed to lisinopril being added to his prescribed medications. At about the same time he developed an intermittent fever. One week before presentation he experienced tunnel vision and memory lapse of recent events. Over the one-month time period he had a headache that progressively grew worse. Five days prior to presenting at hospital he developed pain in his neck and back with nausea and vomiting. His wife reported that six months earlier he had a toothache on his left side that resolved without treatment.

CT showed multiple intracranial mass effect lesions and hydrocephaly. Vancomycin, aciclovir and ceftriaxone were administered before the patient was flown to a level 1 trauma centre for a higher level of care with the suspicion of brain abscess versus neoplasm. There he was found to be sleepy but making intentional movements such as pulling out his urinary catheter. He moved all extremities spontaneously and withdrew from noxious stimuli. His pupils were sluggish to non-reactive and miotic. Nuchal rigidity was unclear. Aciclovir and lisinopril were discontinued and fluconazole was started.

The patient had bilateral external ventricular drains inserted, was placed on mechanical ventilation, had a subclavian central catheter inserted peripherally and had a nasogastric tube placed within one day of admission. Cerebrospinal fluid samples showed elevated protein and white blood cells. MRI and CT ruled out peripheral neoplasm and confirmed unchanged intracranial lesions of mass effect (Fig 1). Two days following his admission, abdominal CT revealed a metallic object in the abdomen similar to a dental filling that had not been seen in previous CT.

A craniotomy of the right temporal lesion confirmed brain abscesses four days following admission. Pathology tests from the brain biopsy and exudates demonstrated Gram-positive anaerobic streptococcal species commonly linked to dental infections. Oral aetiology was suspected.

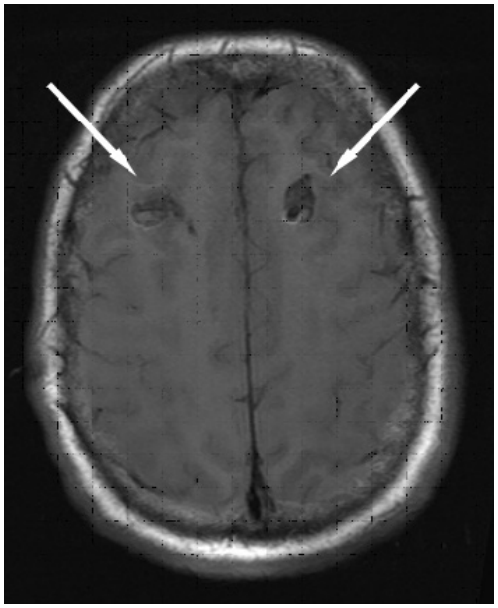

Figure 1 Magnetic resonance imaging indicating intracranial lesions of mass effect

Figure 2 Computed tomography demonstrating grossly decayed upper left molars with a periapical radiolucency around the root tips of tooth 15, signifying periodontal abscess

CT of the maxillofacial region revealed grossly decayed first and second upper left molars. The left second molar only had retained root tips and radiographic evidence of periodontal abscess encroaching on the maxillary sinus (Fig 2). The clinical diagnosis was gross caries, necrotic pulp and chronic periapical abscess of teeth 14 and 15.

Both decayed molars were removed surgically and sent for histopathological evaluation. An apical granuloma from the socket of the left second molar was also removed and sent for culture and sensitivity. Ceftriaxone was continued as the only antimicrobial following microbiological analysis of the biopsy specimen.

The remainder of the patient's hospital stay included replacement of both external ventricular drains. Twenty-three days following hospital admission (nineteen days following molar extractions) the patient's level of consciousness deteriorated. Electroencephalography revealed non-convulsive status epilepticus in the frontal lobes secondary to hydrocephalous and failed drainage. The status epilepticus continued for six days and was managed with levetiracetam. A left ventriculoperitoneal shunt was placed to permanently divert cerebrospinal fluid; both drains were removed. His hypertension required additional measures to control and prophylactic precautions were taken for deep vein thrombosis.

The patient's hospital stay lasted 44 days. Follow-up MRI and CT confirmed reduction of the brain abscess lesions. At discharge he had the following list of prescription medications: amlodipine, clonidine, famotidine, heparin, levetiracetam, metoprolol, modafinil, nystatin powder, salt tablets, valsartan, vitamin D and ceftriaxone. The patient was discharged from hospital care to a skilled nurse facility to complete recovery and to continue with ceftriaxone for 14 days following discharge.

Discussion

Most odontogenic brain abscesses occur following dental treatment such as periodontal therapy and the extraction of infected teeth as the integrity of the vascular endothelium is breached. The fact that dental procedures frequently cause bacteraemia and extraoral infections is well documented. Notorious examples include endocarditis and meningitis.[1–4] However, extraoral abscesses are rare because the body's immune system expunges most odontogenic bacteraemia.[5] This case report is unique in that odontogenic brain abscesses occurred before dental treatment, signifying the dangers of untreated dental infection.

Published guidelines on antibiotic treatment of brain abscesses include simultaneous cephalosporin and metronidazole administration.[9] In the present case, resolution was achieved solely with ceftriaxone, a cephalosporin. Vancomycin was initially prescribed as a precaution against an infection of unknown aetiology. It was discontinued with the diagnosis of brain abscess in light of its limited accessibility to the central nervous system.[5]

Eradication was only possible after the odontogenic source was addressed but without excision of the encapsulated abscess. Some published cases failed to suspect oral aetiology and consequently did not immediately eliminate the infection. In one case the odontogenic brain abscess did not resolve until the infected teeth were removed;[10] in another case the odontogenic source was not identified until autopsy.[11]

Some authors have suggested the classic brain abscess triad with headache, fever and neurological deficit is not reliable in identifying patients with brain abscesses.[5,12] In this case the triad was present.

Conclusions

This report documents the application of contemporary treatment protocols with minor modifications. In that much of the available literature on odontogenic brain abscesses cites classic reports and studies, there is a need to update the literature on the topic of odontogenic brain abscesses.[5,7,10,11]

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