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Fusobacterium nucleatum-caused brain abscess – Case report



KEYWORDS

Brain abscess;
Fusobacterium nucleatum;
 Periodontal pathogen;
 Oral cavity

Brain abscesses are most frequently caused by bacterial dissemination from a primary lesion at a distant site. Oral cavity can be one of the important sites of primary infection.^{1,2} Here, we presented a *Fusobacterium nucleatum*-caused brain abscess at the left temporal lobe of a 52-year-old male patient.

This 52-year-old male patient was an aboriginal and a truck driver. He had smoking habit for more than 20 years, but the betel quid chewing and drinking habits had been quit several years ago. He came to the Emergency Department of Hualien Tzu Chi General Hospital due to the chief complaint of severe headache, periorbital pain, and blurred vision of the left eye since last night. His consciousness was clear and no dizziness, trauma, fever, limb weakness, and chest and abdominal pain were found. Under the clinical impression of a brain tumor, the head and brain magnetic resonance imaging (MRI) and computed tomography (CT scan) were performed. The MRI images with contrast showed a lobulated mass lesion measuring 3.6 cm × 2.6 cm at the left temporal lobe with prominent subcortical edema and rim-enhancement (Fig. 1A, B, and C). The head and brain CT scan image showed a mass about 3.9 cm in greatest dimension at the left temporal lobe with evident perifocal edema, resulting in a mass effect (Fig. 1D). Based on the findings of MRI and CT scan, the tentative diagnosis was an abscess or a metastatic lesion. Because of the suspicion of a brain abscess or a metastatic lesion, craniotomy was performed under navigation. The lesion was accessed transcortically and pus discharge from

the firm capsule of the lesion was noted. The pus sample was collected and sent for bacterial culture. The culture report showed the presence of *F. nucleatum* in the brain abscess drain. After surgery, the patient received intravenous ceftriaxone and steroid treatment. Fosfomycin and penicillin were given to the patient according to the bacterial sensitivity test results and they were shifted to levofloxacin (also known as cravit) and penicillin for a total of one month. The patient was discharged one month after surgery without neurological deficits. Steroid was changed to oral form and was tapered down during the follow-up period. No more antibiotic was given to the patient after discharge. MRI image with contrast 6 months after surgery showed complete resolution of the brain abscess (Fig. 1E). Because *F. nucleatum* was a periodontal pathogen, the patient was referred to dental department for consultation one month later. Intraoral examination, the periapical radiograph (Fig. 1F), and the panoramic radiograph (not shown) revealed that the patient wore upper and lower removable partial dentures, teeth 13 and 23 are retained roots, teeth 14, 15, 25, and 26 had severe chronic periodontitis, tooth 14 also had severe mobility and a periapical radiolucent lesion, and the rest of teeth were all missing. The tooth 14 was extracted and the periapical lesional tissues were enucleated. The majority of the periapical tissues were sent for pathological examination and a small piece of tissue was sent for bacterial culture. The pathological report was a radicular cyst and the bacterial culture yielded *Klebsiella pneumoniae* and *Enterobacter cloacae*.

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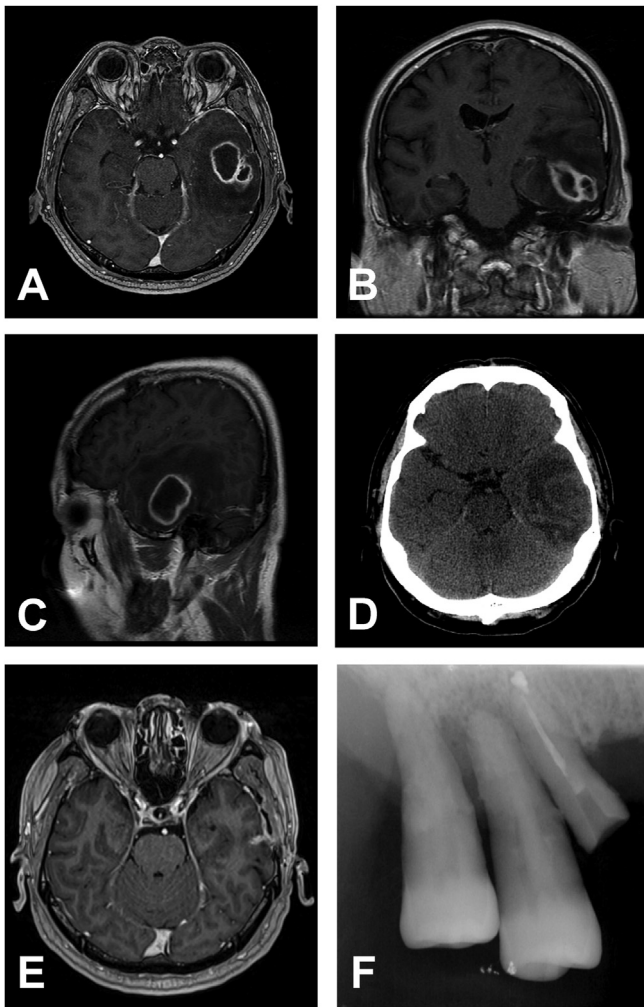


Figure 1 Magnetic resonance imaging (MRI) and computed tomography (CT) images and periapical radiograph of our patient. MRI T1 weighted axial (A), coronal (B) and sagittal (C) views with contrast showed a lobulated mass lesion measuring 3.6 cm × 2.6 cm at the left temporal lobe with prominent subcortical edema and rim-enhancement. The MRI findings were compatible with an abscess or a metastatic lesion. (D) CT scan image showed a mass about 3.9 cm in greatest dimension at the left temporal lobe with evident perifocal edema, resulting in a mass effect. The CT scan finding was also compatible with an abscess or a metastatic lesion. (E) MRI image with contrast 6 months after surgery showed complete resolution of the brain abscess. (F) The periapical radiographs revealed that the teeth 13 was a retained root, teeth 14 and 15 had severe chronic periodontitis, and tooth 14 also had a periapical radiolucent lesion.

F. nucleatum is an anaerobic Gram-positive oral commensal bacterium and a key component of periodontal plaque. It plays an important role in periodontal disease.^{1,2} A genetic comparison of the pathogens from intracranial abscess and oral cavity is necessary to establish the intimate relation between the brain abscess and periodontal pathogen. In our patient, because the number of *F. nucleatum* contained in the tissue sample may be too small to culture them out, the significant association between the

brain abscess and *F. nucleatum* is not established. Two previous studies emphasized that 16S ribosomal RNA analysis is a more sensitive method than bacterial culture to identify the *F. nucleatum*.^{3,4} Further 16S ribosomal RNA analysis studies may be needed to prove the presence of *F. nucleatum* in the oral cavity of our patient.

Declaration of competing interest

The authors have no conflicts of interest relevant to this article.

References

1. Franceschi D, Giuliani V, Giuntini V, Prato GP. Brain abscess and periodontal pathogens (*Fusobacterium nucleatum*). Report of a case. *Clin Case Rep* 2020;8:2488–93.
2. Akashi M, Tanaka K, Kusumoto J, Furudo S, Hosoda K, Komori T. Brain abscess potentially resulting from odontogenic focus: report of three cases and a literature review. *J Maxillofac Oral Surg* 2017;16:58–64.
3. Chakvetadze C, Purcarea A, Pitsch A, Chelly J, Diamantis S. Detection of *Fusobacterium nucleatum* in culture-negative brain abscess by broad-spectrum bacterial 16S rRNA Gene PCR. *Case Rep* 2017;8:94–5.
4. Kenig A, Kessler A, Alaa S, et al. An immunocompetent patient with culture-negative multiple brain abscesses caused by *Fusobacterium nucleatum*. *Case Rep* 2020;65:102261.

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