

## Case report

# *Prevotella* brain abscess in a healthy young patient with a patent foramen ovale

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## ARTICLE INFO

## Article history:

Received 8 July 2015

Received in revised form 14 January 2016

Accepted 23 January 2016

Available online 28 January 2016

## Keywords:

Prevotella

Brain abscess

Patent foramen ovale

## ABSTRACT

Brain abscesses are frequently caused by poly-microbial conditions. Comparatively, brain abscesses caused by *Prevotella* species are very rare. Right-to-left cardiac shunting due to a patent foramen ovale may predispose patients to infection. We report an isolated *Prevotella* brain abscess that occurred in a healthy, young, male patient with a patent foramen ovale. The patient did not have a clinically obvious odontogenic source of infection, and no other distant extracranial infectious sources were observed. The patient was successfully treated with stereotactic aspiration and antibiotics

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## 1. Introduction

Brain abscesses are life-threatening infections that require immediate neurosurgical procedures [1,2]. They frequently arise from a contiguous source of infection, due to hematogenous spread in a distant focal infection, or after the trauma of surgery [1,3]. Brain abscesses frequently occur as a result of otorhinolaryngological or odontogenic infections [1,4]. However, in some cases (20–30%), the primary source of the brain abscess remains unknown, which is known as a cryptogenic brain abscess [3,4].

Brain abscesses are frequently poly-microbial [2]. The most commonly cultivated bacteria form hematogenous brain abscesses is *viridans streptococci*. Comparatively, brain abscesses caused by *Prevotella* species are very rare [2].

In patients with congenital heart disease manifesting as a right-to-left cardiac shunt, the accumulation of a bacterial mass without trapping in the pulmonary microcirculation may be embolized in the cerebral microcirculation and cause a brain abscess [4]. The foramen ovale, which is usually closed after birth, is a channel between the atria that allows passage of blood from the inferior vena cava into the left atrium in during fetal life. A right-to-left cardiac shunt through the patent foramen ovale (PFO) may be one of the etiologies of brain abscesses because it permits infected mate-

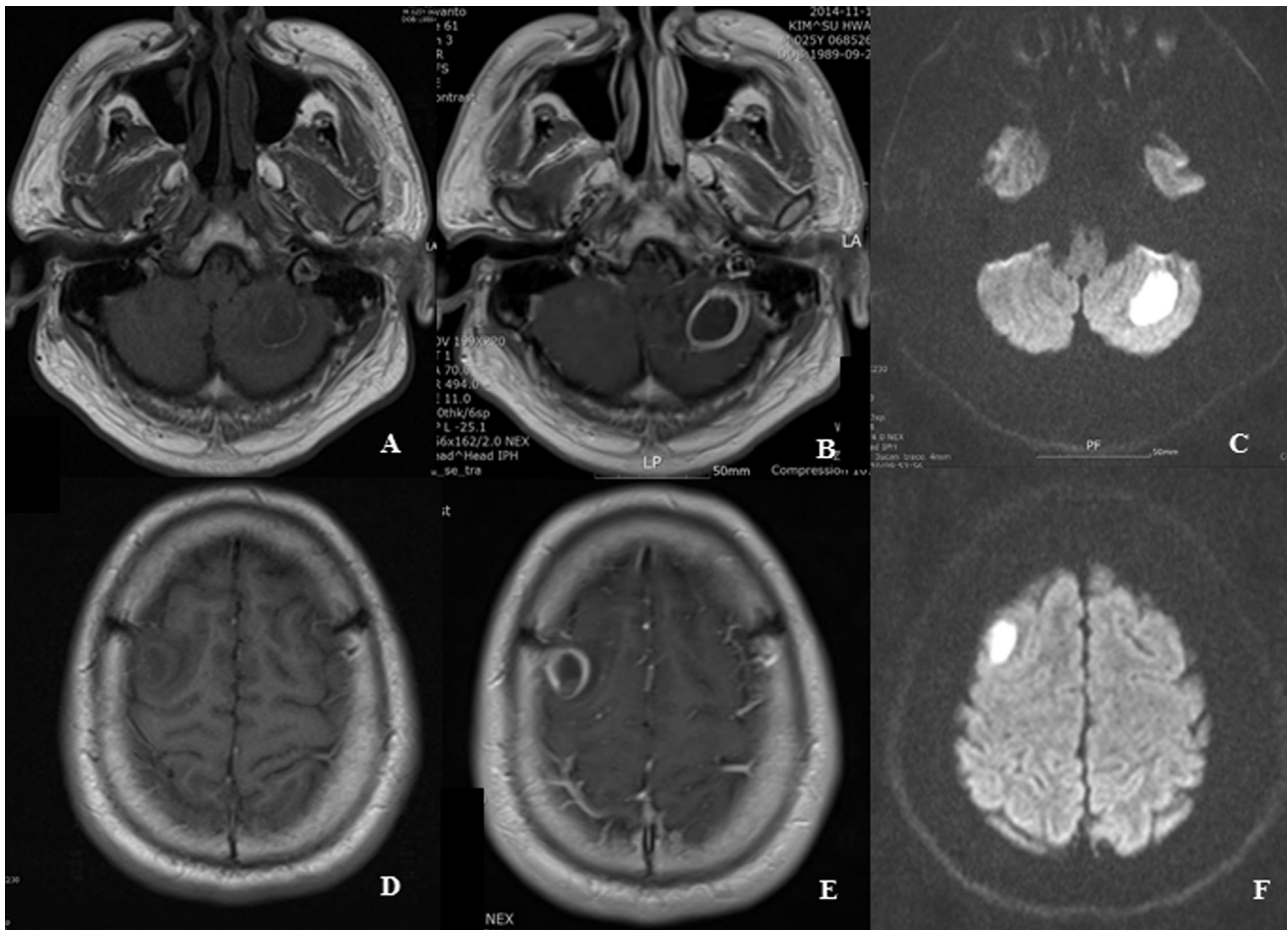
rial to bypass the lungs and enter the systemic circulation [3,4]. In this paper, we present a *Prevotella*-mediated brain abscess that occurred in healthy young male patient with a PFO who did not have a clinically obvious odontogenic source of infection.

## 2. Case report

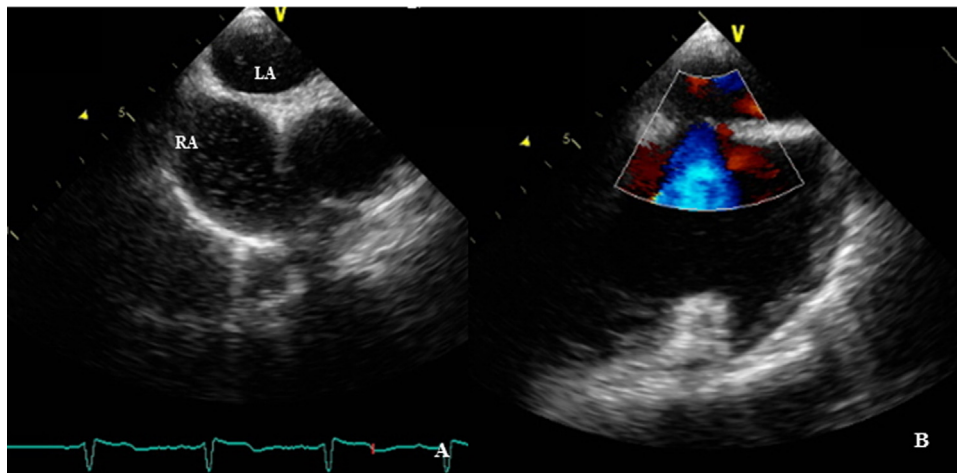
A 20-year-old man presenting with seizures and confusion was referred to our hospital. He had experienced a progressive headache for several days. The physical examination was non-remarkable. A neurologic examination showed a slightly drowsy level of consciousness, and his eye movements showed a full range, except for the right side gaze, which showed nystagmus. The other examinations were non-remarkable. We examined the brain CT findings, which revealed two hypo-dense areas in the right frontal lobe and left cerebellum. Brain MRI with enhancement showed thick, peripheral, rim-enhancing masses with central necrosis in the right frontal lobe (1.7 × 1.3 cm) and the left cerebellum (2.6 × 2.1 cm) (Fig. 1A, B, D, E). Diffusion-weighted images showed restriction of the mass (Fig. 1C, F). The peripheral white blood cell count was 11,650 cells/mm<sup>3</sup>, the erythrocyte sedimentation rate was 20, and the C-reactive protein level was 0.6. These findings were compatible with a brain abscess. We performed frameless stereotactic aspiration of the brain abscess using a surgical navigation system (Stryker®). We successfully drained the right frontal abscess but failed to aspirate the abscess in the left cerebellum. The abscess material consisted of yellowish pus, and the bacterial species obtained was confirmed to be *Prevotella*. The patient was treated with intravenous (IV) metronidazole plus

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**Fig. 1.** T1 weighted axial (A, D) and gadolinium-enhanced axial brain MR images (B, E) show peripheral rim-enhanced masses with central necrosis and edema in the right frontal lobe ( $1.7 \times 1.3$  cm) and left cerebellum ( $2.6 \times 2.1$  cm). Diffusion-weighted images revealed marked diffusion restriction of the mass (C, F).



**Fig. 2.** Transoesophageal echocardiography detected crossover of micro bubbles from the right atrium (RA) to the left atrium (LA) after intravenous injection of agitated saline (A). A right to left shunt was suggested by color Doppler analysis (B).

third-generation cephalosporin. One week after the stereotactic aspiration, we examined a brain CT image with contrast that showed slight enlargement of the abscess ( $3.4 \times 2.7$  cm) in the left cerebellum and a decrease in size of the abscess in the right frontal lobe (Fig. 3A, D). We searched for potential sources of the brain abscess. The paranasal sinuses, teeth, middle ears and mastoid air cells were radiologically normal. The patient did not have any dental disease, and no other distant extra-cranial infectious sources,

including the ear, nose and throat, were identified. The patient had a past medical history of hypertension. Electrocardiography was unremarkable. Transoesophageal echocardiography (TEE) detected crossover of micro bubbles from the right atrium to left atrium after intravenous injection of agitated saline (Fig. 2A), which was indicative of a PFO. Vegetation of the valve and symptoms associated with a PFO were not observed. Therefore, we decided that the patient should be observed closely rather than performing PFO closure.

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