

Periodontitis Associated With Septic Lateral Sinus Thrombosis and Pulmonary Embolism

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Abstract

A 42-year-old woman had acute headache and intermittent fever for 1 month. Neuroimaging revealed acute venous thrombosis in the left transverse and sigmoid sinuses. Cerebrospinal fluid analysis showed increased protein, reduced glucose and leukocytosis. Blood culture yielded *Peptostreptococcus*, which was highly suspected due to the patient having periodontitis. Meanwhile, multiple pulmonary emboli were detected during the course of treatment. The patient recovered well after antibiotic therapy followed by dental treatment. Dental diseases may cause septic cavernous sinus thrombosis, but their association with lateral sinus thrombosis has not been previously reported. This case report describes the unusual presentation of lateral sinus thrombosis and multiple pulmonary emboli in a patient with periodontitis, and demonstrates that oral cavity can be the primary infection focus, and dental evaluation should be considered for patients with cerebral venous sinus thrombosis.

Keywords: Periodontitis; Cerebral sinus thrombosis; Pulmonary embolism; Oral infection

Introduction

Septic cerebral venous sinus thrombosis (CVST) has been an uncommon disease during the antibiotic era. It includes three basic subtypes: cavernous sinus thrombosis, lateral sinus thrombosis and superior sagittal sinus thrombosis. The infection source associated with the subtypes of septic CVST differs due to an extinct venous drainage pathway and anatomical location. According to previous reports, septic lateral sinus

thrombosis is almost exclusively associated with otitis media or infection of the mastoid air cells [1, 2]. By contrast, cavernous sinus thrombosis is more vulnerable to facial, dental, sphenoid and ethmoid sinus infections since the cavernous sinus receiving blood from the facial veins and pterygoid plexus [3].

Periodontitis is one of the most common chronic bacterial infections, accounting for 5-15% in any population [4]. It has been proposed that chronic periodontitis may contribute to the pathogenesis of several systemic infectious and inflammatory diseases such as infective endocarditis and carotid atherosclerosis [5, 6]. There have been a few reports showing that odontogenic infection may cause septic cavernous sinus thrombosis but there have been no reports with regard to the other cerebral venous sinuses [7]. Here we report a case of septic CVST involving the transverse and sigmoid sinuses which was related to periodontitis.

Case Report

A 42-year-old woman who denied any previous major disease had acute headache in left temporal region and intermittent fever for 1 month. She visited our emergency room for explosive headache and a painful sensation radiating to her waist that made it difficult to sit or walk.

On admission, her temperature was 38.8 °C. Neurological examination revealed neck rigidity and weakness of the right upper extremity. Head magnetic resonance imaging showed thrombosis in the left transverse and sigmoid sinuses (Fig. 1 A, B). Leukocytosis (WBC count 13,360/μL) was present. Lumbar puncture revealed increased intracranial pressure (280 mm H₂O), elevated protein (199 mg/dL), low glucose (19 mg/dL) and neutrophil-predominant leukocytosis (WBC count 1,539/μL). Chest plain film revealed a dense nodular shadow at the right upper lung field, and follow-up chest computed tomography revealed multiple pulmonary nodules, and some with cavitation (Fig. 1C). Septic lateral sinus thrombosis complicated with septic pulmonary emboli was considered. The fever and headache subsided after empirical antibiotic therapy with ceftriazone, vancomycin and metronidazole. The follow-up cerebrospinal fluid (CSF) analysis revealed reduced WBC count and chest plain film showed gradual resolution of the dense nodular shadow.

The blood culture yielded *Peptostreptococcus micros*, an

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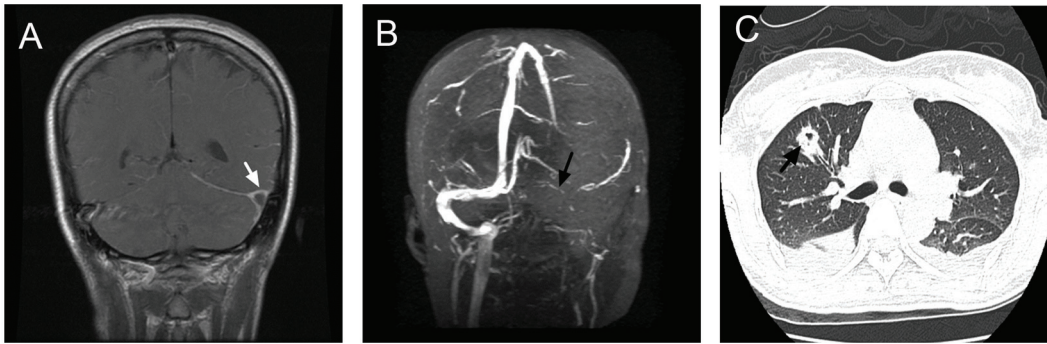


Figure 1. Imaging of a patient with periodontitis who developed cerebral sinus thrombosis and pulmonary embolism. (A) Gadolinium-enhanced T1-weighted magnetic resonance image reveals filling defect in the left transverse sinus, indicating thrombus formation within the dural sinus. (B) Magnetic resonance venogram shows absence of flow signal in the left transverse and sigmoid sinuses and internal jugular vein. (C) Chest computed tomography shows multiple pulmonary nodules with cavitation, which is compatible with septic emboli.

anaerobic bacteria being a commensal organism in the mouth, skin, and gastrointestinal tract. The CSF analysis after empirical antibiotic treatment was negative for acid-fast stain, cryptococcal antigen, and bacterial culture. An ear, nose and throat (ENT) specialist confirmed the absence of otogenic infection. A complete dental examination revealed full-mouth periodontitis. Meanwhile, a transthoracic echocardiogram did not show intra-atrial thrombus or valvular vegetation. Serum studies for coagulopathies, tumor markers and autoimmune profiles were within normal limits. Therefore, we considered the peptostreptococcal bacteremia to be the infection source of lateral sinus thrombosis and pulmonary emboli, and it was highly suspected due to the patient having periodontitis. She received regular dental treatment after discharge, and no recurrent episode was noted during more than 2-year follow-up.

Discussion

This report illustrates the unusual presentation of a patient with periodontitis and demonstrates that untreated periodontitis can be the source of septicemia with reactive prothrombotic status, preceding septic lateral sinus thrombosis and pulmonary embolism.

In our case, the primary infection origin for the septic lateral sinus was thought most likely to be periodontitis after extensive workup for the source of peptostreptococcal bacteremia. Possible mechanisms in our case include direct bacterial invasion of the cerebral vessel walls and systemic bacteremia with reactive prothrombotic status.

Septic CVST has been associated with pulmonary emboli in 11% of patients in one series [8]. The association of CVST and pulmonary embolism may be explained by two mechanisms, that is the consequence of a global prothrombotic status or the detaching thrombus from the lateral sinus [9].

Any procedure performed by dentists on the teeth, or even everyday brushing, can produce transient bacteremia, causing a pathogen to enter the circulation, which may initiate a secondary infection within distant organs, especially the cardiovascular system [10]. Reducing the bacterial load in the

mouth is considered to be a key step for preventing secondary thrombus formation [11]. In our patient, dental treatment and maintenance of oral hygiene effectively prevented a recurrent episode.

In conclusion, although it is very rare, periodontitis can be the cause of septic lateral sinus thrombosis. This report highlights the importance of dental evaluation in patients with CVST.

Conflict of Interest

None.

Source of Funding

None.

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