

Cerebellar Brain Abscess Associated with Tongue Piercing

Richard A. Martinello and Elizabeth L. Cooney^a

Section of Infectious Diseases, Department of Internal Medicine,
Yale University School of Medicine, New Haven, Connecticut

We describe a previously healthy adult who had a solitary cerebellar brain abscess diagnosed. This infection occurred 4 weeks after the patient underwent a tongue piercing procedure that was complicated by an apparent local infection. The clinical history, abscess culture results, and lack of an alternative explanation suggest that infection of the tongue piercing site was the source of the cerebellar abscess.

Cerebellar brain abscesses most often develop secondary to the contiguous spread of infection from an ipsilateral otogenic site. Less commonly, cerebellar abscesses have been associated with a hematogenous source [1]. We report a cerebellar brain abscess temporally associated with a tongue piercing procedure that was complicated by an apparent postprocedure infection.

Case report. A previously healthy 22-year-old woman had a midline tongue piercing performed at a body art establishment. On the second day after the procedure, the patient noted increasing pain, swelling, and the development of a purulent, ill-tasting discharge from the piercing site. These local symptoms lasted 4 days, then resolved ≤ 2 days after the patient removed the implanted tongue jewelry. The patient denied experiencing any fever, chills, or sweats, and she did not seek medical attention during this period, because the symptoms rapidly improved after the jewelry was removed.

Four weeks after the patient had her tongue pierced, she noted the acute onset of a diffuse throbbing headache, nausea, vomiting, and vertigo. These symptoms progressed during a 2-day period, during which time no relief was obtained from

analgesics. The patient sought care for these symptoms. The patient's social history was notable for prior use of recreational inhaled and injected substances, including cocaine and heroin, although the patient denied any injection drug use during the 5 months before presentation.

During the physical examination, the patient was afebrile and had normal vital signs. Head and neck examination revealed intact, noninflamed tympanic membranes and normal mastoid regions bilaterally. The tongue was without any signs of inflammation, and the piercing site was no longer visible. The patient's dentition was intact, and there were no signs of caries or periodontal disease. Cardiac examination revealed a normal S1 and S2, and there were no murmurs, gallops, or rubs. Neurological examination revealed that the patient was awake, alert, and cooperative; no abnormalities were found in cranial nerve, motor, or sensory function. Cerebellar examination was significant for mild ataxia during left-sided heel-to-shin testing. Examination of the skin did not reveal any stigmata associated with endocarditis, injection drug abuse, or hereditary hemorrhagic telangiectasia (HHT). CT scan of the brain revealed a right cerebellar enhancing lesion with surrounding edema, and an MRI scan with gadolinium confirmed the presence of a solitary brain abscess.

The patient underwent a right suboccipital craniotomy, and the cerebellar abscess was drained. The cerebellum was irrigated with a bacitracin solution and saline, and the craniotomy site was closed without the placement of drains.

After the operation, the patient was empirically treated with vancomycin (1 g iv q12h), ceftazidime (2 g iv q8h), and metronidazole (500 mg iv q6h), pending the results of culture. Gram stains of intraoperative specimens revealed numerous leukocytes, gram-positive cocci in pairs and chains, and gram-positive and gram-negative rods. Cultures of the surgical specimens yielded penicillin-susceptible *Streptococcus viridans*, *Peptostreptococcus micros*, non-*israelii* species of *Actinomyces*, and *Eikenella corrodens*. Blood samples were obtained before antibiotic therapy was initiated, and the results of blood cultures were negative. The findings of transesophageal echocardiography with bubble study were within normal limits, without evidence of any valvular abnormalities or intracardiac shunt. The results of HIV antibody testing were negative.

Antibiotic therapy was modified to ceftriaxone (2 g iv q12h) and metronidazole. The patient received a 6-week course of therapy. Her recovery was uneventful, other than the development of a distal symmetric peripheral neuropathy of the lower extremities, possibly due to metronidazole use, which

Received 19 June 2002; accepted 8 October 2002; electronically published 3 January 2003.

Presented in part: 39th Annual Meeting of the Infectious Diseases Society of America, 25–28 October 2001, San Francisco, California (abstract 154).

Financial support: National Institutes of Health (grant T32 AI07517-05 to R.A.M.).

^a Present affiliation: Bristol-Myers Squibb, Wallingford, Connecticut.

Reprints or correspondence: Dr. Richard A. Martinello, Yale University School of Medicine, PO Box 208022, 800 LCI, 333 Cedar St., New Haven, CT 06520 (richard.martinello@yale.edu).

Clinical Infectious Diseases 2003;36:e32–4

© 2003 by the Infectious Diseases Society of America. All rights reserved.
1058-4838/2003/3602-00E5\$15.00

resolved ≤ 8 weeks after the discontinuation of antibiotic therapy. Follow-up CT of the brain performed at the end of the course of antibiotic therapy revealed complete resolution of the abscess with mild residual postoperative changes. The patient underwent HIV testing, and the results were again negative.

Discussion. There are several unusual aspects of this case. These features relate to the location of the abscess, its polymicrobial nature, and the possibility that the tongue was the original source of infection.

Cerebellar brain abscesses account for 9%–28% of all brain abscesses, and 85%–99% of cases result from the contiguous spread of infection from an ipsilateral otogenic or sinus site [1–4]. Bacteria are presumed to spread to the cerebellar region by either retrograde spread through emissary veins draining the middle ear or sinuses or via direct spread from an area of osteomyelitis or osteitis [1]. In our patient, there was no evidence of an active or resolving sinus or otogenic infection, as assessed by physical examination and imaging studies, and it would be highly unlikely for such an infection to fully resolve without the use of antibiotics.

Brain abscesses secondary to dental infections have been reported elsewhere [5]. It is possible that the patient had a dental infection that led to the cerebellar abscess, but she denied any recent history of dental problems and appeared to have excellent dental hygiene. In addition, dental infections most commonly give rise to frontal lobe abscesses. Cerebellar abscesses less commonly result from bacteremia, with or without endocarditis. Given the patient's history of injection drug use, the latter possibility was considered. However, the benign physical examination findings, the negative blood culture results, and the normal transesophageal echocardiogram findings argued against this pathogenesis.

A cerebellar abscess occurring secondary to a tongue infection would presumably result from hematogenous spread, because the venous drainage of the tongue flows from the lingual vein into the internal jugular vein [6]. Hematogenous polymicrobial brain abscesses have been previously documented in patients with HHT. In a review of brain abscesses in patients who had arteriovenous malformations (AVM) associated with HHT, 41% of the abscesses were found to be polymicrobial [7]. One case in this study of 31 cases was polymicrobial and involved the cerebellum. Two other cases of cerebellar abscesses in patients with HHT have been previously reported [8, 9]. The pathogenesis of these infections is not completely understood, although it has been speculated that septic microemboli pass through AVM, bypassing the pulmonary capillary filter [7]. There have been reports of brain abscesses occurring in patients with HHT and tongue AVM, although these patients have also had concomitant pulmonary AVM [8, 10]. It is unlikely that our patient had an occult pulmonary AVM in the absence of symptoms or a detectable cardiopulmonary abnormality.

In the medical literature, there are few reports of tongue infection after piercing procedures [11–14]. Two cases of endocarditis associated with tongue piercing have been previously reported [15, 16]. We were unable to identify any previous reports that have implicated tongue piercing or tongue infections in the pathogenesis of brain abscesses. In this particular case, the history of a recent apparent tongue infection after implantation of a foreign body, the isolation of oral microbial flora from the intraoperative cultures, and the lack of an alternative explanation suggest that the tongue may have been the source of the cerebellar abscess.

The seeming rarity of infectious complications after tongue piercing is surprising, particularly when one considers the procedure itself. Typically, the tongue is not prepared with antiseptic before piercing, other than mouthwash, and local anesthesia is not used. A 14-gauge needle or other sharp object is used to puncture the tongue, followed by insertion of jewelry. After persons undergo the procedure, they are instructed to eat only bland, soft foods and to gargle frequently with mouthwash or diluted hydrogen peroxide for a 2-week period (personal communication). The tongue may be relatively resistant to infection as a result of (1) constant washing with saliva, (2) the thick, keratinized outer tissue layer, (3) the high vascularity of the tongue, and (4) the presence of proteins secreted by the mucosal epithelial cells that appear to possess antimicrobial properties [17–19].

In conclusion, we postulate that our patient's brain abscess was likely related to the apparent postpiercing tongue infection. The rate of infection after tongue piercing is unknown, and studies aimed at characterizing the spectrum of infectious complications that occur after this procedure are lacking. Tongue piercing appears to be increasing in popularity, but, despite the invasive nature of the procedure, it remains a largely unregulated practice. On the basis of our experience with this case, we feel that this subject merits further study.

References

1. Tunkel AR, Wispelwey B, Scheld WM. Brain abscess. In: Mandell GL, Bennett JE, Dolin R, eds. *Mandell, Douglas and Bennett's principles and practice of infectious diseases*. 5th ed. Philadelphia: Churchill Livingstone, 2000:1016–28.
2. Moran H, Wood MW, Murphey F. Experience with 88 consecutive cases of brain abscess. *J Neurosurg* 1973;38:698–704.
3. Beller AJ, Sahar A, Praiss I. Brain abscess: review of 89 cases over a period of 30 years. *J Neurol Neurosurg Psychiatry* 1973;36:757–68.
4. Yang SY. Brain abscess: a review of 400 cases. *J Neurosurg* 1981;55:794–9.
5. Baddour HM, Durst NL, Tilson HB. Frontal lobe abscess of dental origin. *Oral Surg Oral Med Oral Pathol* 1979;47:303–6.
6. Cranial and intracranial veins. In: Williams PL, Bannister LH, Berry MM, et al. *Gray's anatomy*. 38th ed. Philadelphia: Churchill Livingstone, 1995:1580–9.
7. Press OW, Ramsey PG. Central nervous system infections associated with hereditary hemorrhagic telangiectasia. *Am J Med* 1984;77:86–92.

8. Ogino M, Inoue H, Harada S, Horinouchi H, Nakamura T. Cerebellar abscess associated with pulmonary arteriovenous fistula and hereditary hemorrhagic telangiectasia. *Neurol Med Chir (Tokyo)* **1996**;36:575–9.
9. Roman G, Fisher M, Perl DP, Poser CM. Neurological manifestations of hereditary hemorrhagic telangiectasia (Rendu-Osler-Weber disease): report of 2 cases and review of the literature. *Ann Neurol* **1978**;4:130–44.
10. Woods ML. Hereditary hemorrhagic telangiectasia, pulmonary arteriovenous malformations and brain abscess. *Clin Infect Dis* **1998**;26:1071, 1220–1.
11. Fehrenbach MJ. Tongue piercing and potential oral complications. *J Dent Hyg* **1998**;72:23–5.
12. Dyce O, Bruno JR, Hong D, et al. Tongue piercing: the new “rusty nail”? *Head Neck* **2000**;22:728–32.
13. Perkins CS, Meisner J, Harrison JM. A complication of tongue piercing. *Br Dent J* **1997**;182:147–8.
14. Olsen JC. Lingual abscess secondary to body piercing. *J Emerg Med* **2001**;20:409.
15. Tronel H, Chaudemanche H, Pechier N, Doutrelant L, Hoen B. Endocarditis due to *Neisseria mucosa* after tongue piercing. *Clin Microbiol Infect* **2001**;7:275–6.
16. Harding PR, Yerkey MW, Deye G, Storey D. Methicillin resistant *Staphylococcus aureus* (MRSA) endocarditis secondary to tongue piercing. *J Miss State Med Assoc* **2002**;43:109.
17. Roberge RJ, Fowler RM, Mayer NM. Glossal abscess. *Am J Emerg Med* **1989**;7:406–8.
18. Sands M, Pepe J, Brown RB. Tongue abscess: case report and review. *Clin Infect Dis* **1993**;16:133–5.
19. Canny G, Levy O, Furuta GT, et al. Lipid mediator–induced expression of bactericidal/permeability-increasing protein (BPI) in human mucosal epithelia. *Proc Natl Acad Sci USA* **2002**;99:3902–7.

