Consultant360 Multidisciplinary Medical Information Network

CASE IN POINT

PEER REVIEWED

Brain Abscess Due to Streptococcus intermedius Infection

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A 54-year-old woman presented to the emergency department (ED) of a community hospital with concern for a 1-week history of worsening dizziness, headaches, and nausea. The patient was accompanied by her husband and arrived in a wheelchair, having been referred to the ED by an infectious disease specialist out of concern for her rapid decline in functional status.

History. The patient reported a 7-day history of low-grade fever, poor appetite, weakness, and increased somnolence. She localized the headache to the occipital region, graded the pain as 5 of 10, and stated that it was associated with nausea, vomiting, and lightheadedness. She also stated that she had been persistently vomiting and described the contents of her vomitus as recently eaten food. The headaches were worse in the morning and upon bending over, and the pain had not been relieved with oral combination acetaminophen, caffeine, and aspirin. The patient's spouse noted that she increasingly had been confused over the past 2 days.

The patient's medical history was significant for edentulous dental caries, hypertension, glucose intolerance, and a right lung mass that had been resected for suspicious malignancy 17 years prior. A month before presentation, she had had a position emission tomography scan, the results of which showed a right lower-lobe lung mass. A computed tomography (CT) guided lung biopsy did not, however, retrieve any malignant cells; it did show giant cell macrophages and was negative for anaerobic, fungal, or viral cultures, findings that were consistent with an unknown chronic lung infection.

Physical examination. In the ED, her vital signs included an elevated blood pressure of 170/90 mm Hg and a bradycardic heart rate of 50 beats/min. She was afebrile at 36.9°C and had an oxygen saturation of 96% on room air.

Diagnostic tests. Laboratory results were significant for an elevated white blood cell count of 19,700/μL with a neutrophil shift of 86%. A CT scan of the head without contrast showed a large lesion measuring up to 4.8 cm within the right frontal lobe with an apparent cystic component (**Figure 1**).

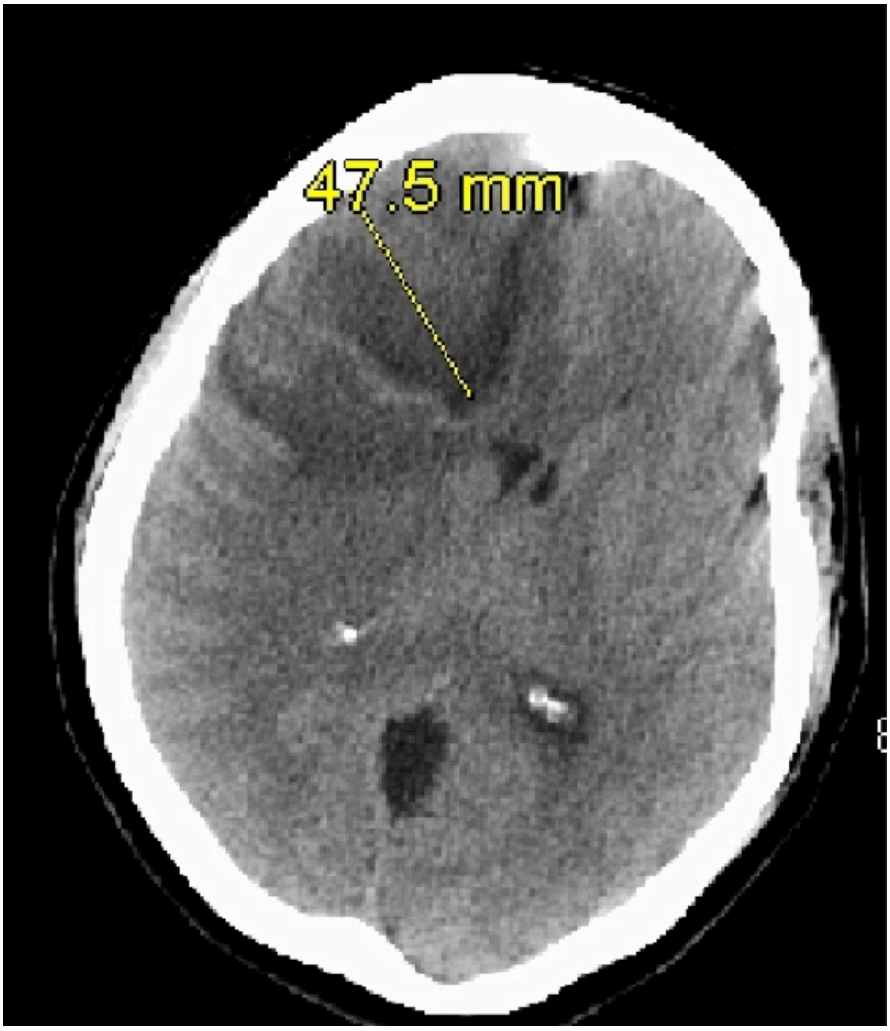

Figure 1. *CT of the head without contrast showing a lesion with possible central cystic component measuring up to 4.8 cm in largest diameter.*

A subsequent same-day magnetic resonance imaging (MRI) scan of the brain with contrast showed a large right frontal lobe mass with extensive necrosis, with the differential diagnosis including a large glioblastoma multiforme, a large abscess, or an isolated metastasis from an extracranial primary malignancy. Also seen on MRI was extensive mass effect with subfalcine herniation, with an approximately 10-mm shift of the midline structures to the left (**Figure 2**).

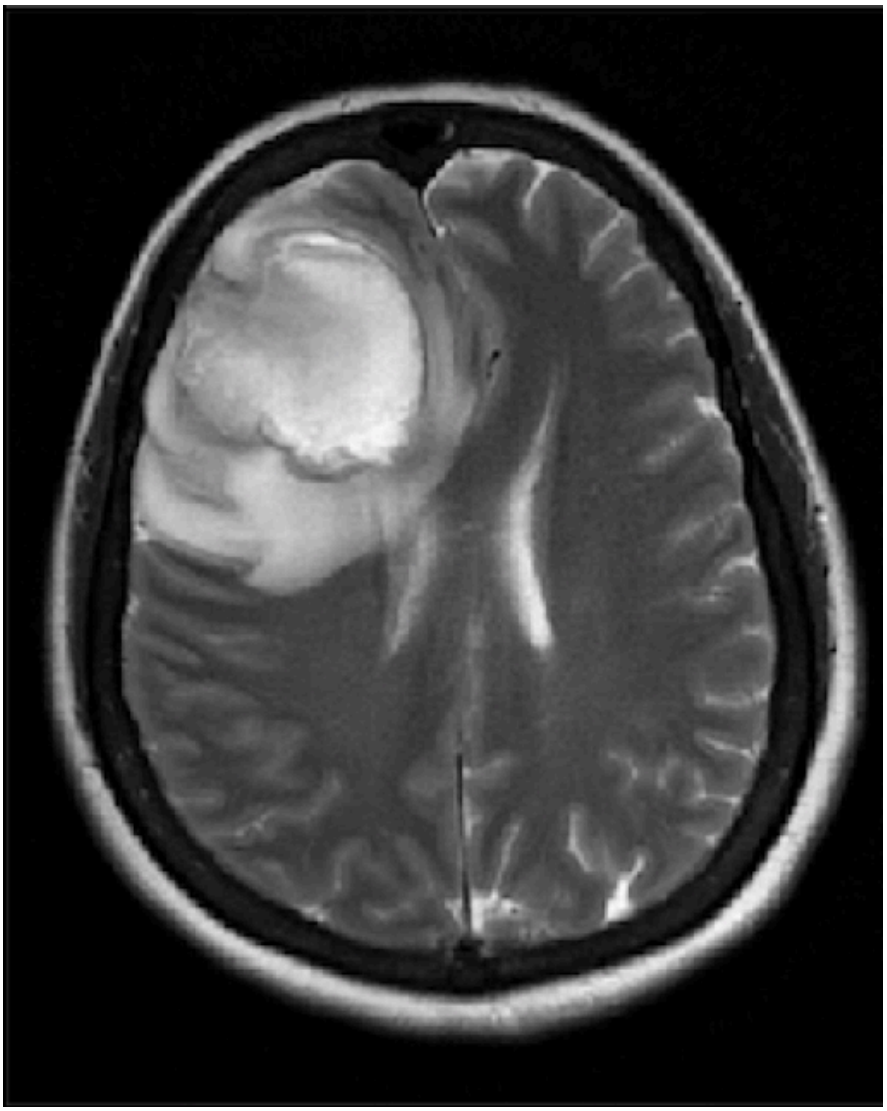

Figure 2. *MRI of the head showing a large lesion in the right frontal lobe with corresponding mass effect and subfalcine herniation.*

Hospital course. A neurosurgery consult was placed, and the patient was admitted to the intensive care unit of the admitting hospital and prepped for craniotomy the following morning.

The patient underwent a right craniotomy incision, the findings of which were significant for high-pressure, purulent-looking pus emanating from the incision site. The bacterial culture was positive for *Streptococcus intermedius*.

The patient was empirically started postoperatively on intravenous carbapenem-derivative meropenem. On day 8, she was discharged home with orders for intravenous ceftriaxone, 2 g daily for 42 days, via a peripherally inserted central catheter.

Outcome of the case. Two months after the surgical drainage of the abscess, an MRI scan demonstrated right frontal lobe postsurgical changes and stable localized enhancement in the surgical bed (**Figure 3**).

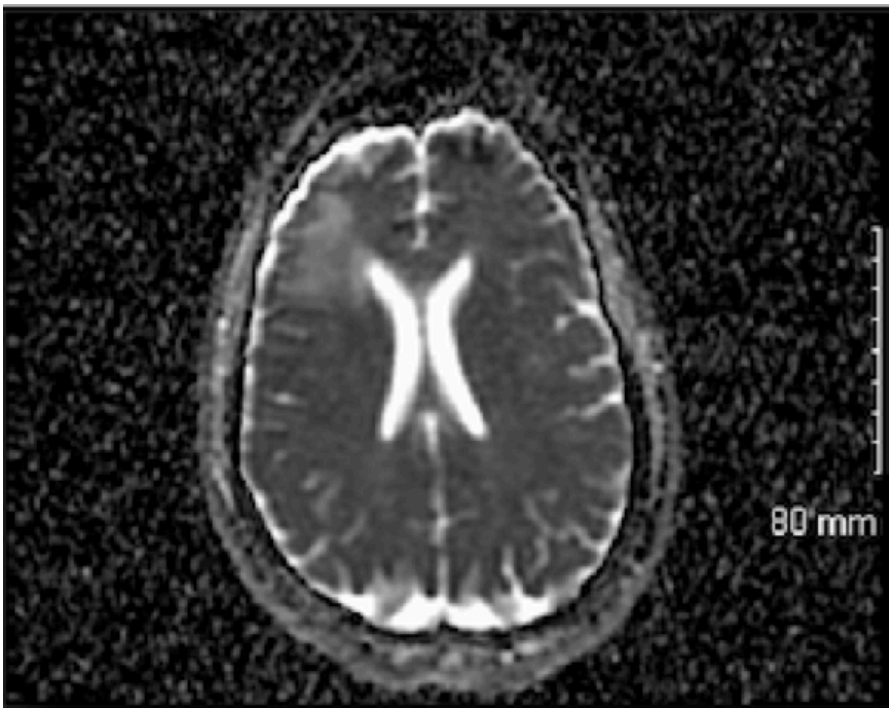

Figure 3. *Postoperative MRI showing stable enhancement in the right frontal lobe.*

Discussion. *S intermedius* is a major cause of brain abscess.[1] The species is normally present in the oral, genitourinary, and gastrointestinal cavities as a commensal organism, but when its virulence factors—including hyaluronic acid, deoxyribonuclease, and chondroitin sulfate—are activated, it can become pathogenic. This leads to invasive suppurative infections at a range of sites, including liver and brain abscesses, dentoalveolar infections, and infective endocarditis.[2]

S intermedius is part of the *Streptococcus milleri* group of microorganisms that also comprises *Streptococcus anginosus* and *Streptococcus constellatus*.[3] They are well-known for causing suppurative infections. In our patient, who had an uncomplicated edentulous dentition history and a greater than 10-year history of recurrent lung masses that were negative for malignancy, these 2 sites represented the most probable sources of infection.

Our patient's indolent clinical presentation appears to be a trademark of cases involving *S intermedius*. The authors of one case report emphasize a clinical triad—including subacute presentation, lack of bacteremia, and difficulty in recovering the organism—as seemingly synonymous with *S intermedius* infections.[3] In a reported case of a 3-year-old healthy child with a brain abscess secondary to *S intermedius* (following a 3½-week diagnostic dilemma), it took repeated ED visits for the diagnosis to finally be made, attesting to the slowly progressive nature of the disease.[4] In another case, a 29-year-old man with longstanding history of left perianal fistula presented with aphasia and was subsequently found to have a *S intermedius*-infected brain abscess measuring 5.3 cm in the frontotemporal lobe of the left cerebrum.[5]

Our patient described early symptoms that were subacute and nonspecific, such as weakness, headaches, and nausea, but with no neurological or focal deficits. It has been postulated that an accurate diagnosis can be made only when tissue is obtained from a lesion.[6,7] Even when

accurate diagnosis can be made only when tissue is obtained from a lesion.[6] Even when blood and lung cultures are negative, as in our patient's case, the absence of microorganisms can only be confirmed definitively by direct tissue specimen analysis.[6,7]

Also noteworthy is the differential diagnoses based on MRI and CT scans of the head for glioblastoma multiforme. MRI with diffusion-weighted imaging (DWI) is considered the gold standard for diagnosing brain abscess,[8] but as a result of high costs and lack of availability, CT with contrast of the head is still widely used.

On MRI with DWI and T2-weighted MRI scans of the brain, a hyperintense and ill-defined area will be seen in patients with brain abscess but without enhancement. When mature, a brain abscess on MRI with DWI will show a well-defined ring with marked perifocal edema and mass effect delineated on postcontrast images.[9] Glioblastoma multiforme, on the other hand, shows improved enhancement on T2-weighted MRI, especially when fluid-attenuated inversion recovery imaging is used.[9]

The insidious and indolent nature of brain and lung abscess secondary to *S intermedius* is compensated by its sensitivity to multiple medication regimens including carbapenems, metronidazole, cephalosporins, and vancomycin. In a typical case, 4 to 8 weeks of intravenous antibiotics are recommended. When no surgical intervention is done due to small size (<5 mm), lack of expertise, or increased morbidity risk, a longer duration such as 8 weeks of intravenous antibiotics is recommended.[8] The preferred antibiotic combination is cefotaxime and metronidazole.[10] Neurosurgical intervention and an antibiotic regimen are recommended for most *S intermedius* brain abscess infections.[11,12]

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