CASE REPORT

Pontine abscess with initial treatment failure following infectious endocarditis with *Streptococcus salivarius*Fredrikke Christie Knudtzen,¹ Maja Lynge,² Shahin Gaini¹

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SUMMARY

We present a case report of a 65-year-old man admitted to the department of infectious diseases on suspicion of meningitis with headache, fever and double vision. A cerebral MRI revealed a 17×30 mm pontine abscess with surrounding oedema. The patient had, 2 months prior to admission, been treated for *Streptococcus salivarius* aortic valve endocarditis. The abscess was not suitable for surgery, and the patient received multidrug antibiotic treatment for 4 weeks. The patient initially responded well clinically, but was readmitted 4 weeks after discontinuation of treatment, with headache and dizziness. A new cerebral MRI showed progression of the abscess. He received an additional 8 weeks of broad spectrum antibiotic treatment, followed by 12 weeks of oral treatment with pivampicillin. His symptoms resolved and a cerebral MRI at discontinuation of treatment showed regression of the abscess to 7.5 mm.

BACKGROUND

Brain abscesses are rare, with an estimated incidence of 0.3–1.3 per 100 000/year.¹ Only 0.5–6% of brain abscesses are located in the brain stem, and are primarily in the pons.^{2–3} Although the prognosis of brain stem abscesses has been considerably improved through better diagnostic imaging, and advancements in antibiotic therapy and surgery, brain stem abscesses are still associated with a high mortality rate.³ We present a case of a patient with a pontine abscess following endocarditis with *Streptococcus salivarius*.

CASE PRESENTATION

A 65-year-old previously healthy Caucasian man was admitted to his local hospital due to severe headache, dizziness and temporary blindness for 15 min. At the time of admission, the neurological examination was normal. As part of further investigation, blood cultures were drawn and *S. salivarius* was found in two of four blood culture bottles. The isolate was susceptible to penicillin G with a minimum inhibitory concentration <0.1 µg/mL, and was also susceptible to cephalosporins. Transesophageal echocardiography (TEE) detected aortic valve endocarditis. The patient received antibiotic treatment with intravenous penicillin G (5 million units four times a day) according to local guidelines. He had fluctuating neurological symptoms and a cerebral MRI showed several small infarctions in the left cerebellar hemisphere, due to septic embolies. The patient was transferred to a tertiary university hospital. The endocarditis required implantation of a biological aortic valve

due to destruction of the native valve resulting in severe aortic insufficiency. The tissue from the aortic valve was without bacterial growth. Dental examination, CT scan of thorax and abdomen, and a positron emission tomography CT (PET-CT) were all performed during admission, in search of a primary focus of infection. No primary focus other than the aortic endocarditis was found.

Owing to continuous fever despite relevant antibiotic therapy and cardiac surgery for endocarditis, a new MRI of the brain and a new TEE were performed, both with normal findings. Drug fever was suspected and the treatment was changed from penicillin G to ceftriaxone for the remaining duration of antibiotic therapy. The patient received 6 weeks of intravenous treatment and was discharged without fever and in good general condition.

Six weeks later, the patient was readmitted to the neurological department at his local hospital due to double vision and headache. He had fever and was started on meningitis treatment with intravenous penicillin G (3 million units q4h) and ceftriaxone (4 g four times a day). The spinal tap showed 600 leucocytes, 70% neutrophils and elevated spinal protein of 0.92 g/L. He was transferred to the infectious disease department at a tertiary university hospital. A new TEE showed no endocarditis.

A PET-CT was performed with possible dental focus. However, dental examination showed no signs of infection. A new MRI revealed an abscess with surrounding oedema measuring 17×30 mm in the anterior part of the pons. Oral metronidazole (500 mg three times a day) was added to the treatment. The neurosurgeons preferred a conservative approach without neurosurgical intervention. The spinal fluid was without bacterial growth, as were the new blood cultures. The patient improved, although a new cerebral MRI performed 2 weeks after initiation of treatment showed no change in abscess size, and progression of surrounding oedema (figure 1). The patient received ceftriaxone for 2 weeks, followed by penicillin G (5 million units four times a day) and oral metronidazole for an additional 4 weeks. MRI at discontinuation of treatment showed minor regression of the abscess, and the patients symptoms had resolved at time of discharge.

Four weeks after discharge, he was readmitted again with recurring dizziness and headache. The abscess was progressing on the new MRI (figure 2), and he received another 8 weeks of ceftriaxone (4 g four times a day) and oral metronidazole (500 mg three times a day). His cerebral symptoms

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Figure 1 T2-weighted axial slice showing typical MRI appearance of an abscess located anteriorly and on the left side of the pons with hypointense wall, hyperintense centre and peripheral oedema.

disappeared, and he was discharged with another 3 months of oral treatment with pivampicillin (700 mg three times a day). At the end of this treatment, the patient was asymptomatic, and the abscess had regressed to 7.5 mm with reduced oedema (figure 3).

DISCUSSION

The patient described in this case report developed a pontine abscess following bacterial endocarditis. Haematogenous spread of infection from the heart, lungs, etc, is found in

approximately 1/3 of patients with brain abscesses. A primary infectious focus in the ear/nose/throat area is the most common.¹

Neurological complications of infective endocarditis are seen in 20–40% of endocarditis patients, with brain abscesses being a rare complication in only 1% of the cases.⁴ Neurological complications are associated with a poorer prognosis in patients with endocarditis.

In a study where 30 patients with infectious endocarditis and concomitant neurological symptoms had a cerebral MRI performed, brain abscesses were found in 20% (6/30).⁵

Brain stem abscesses typically present with headache, fever and neurological symptoms such as diplopia, unilateral face or extremity numbness/weakness or ataxia,³ and this clinical presentation was also seen in our patient. Although he had presented with neurological symptoms earlier in the course of disease, the neuroimaging at that time did not show signs of an abscess.

Serum inflammatory markers are frequently within normal range in patients with brain stem abscesses,^{1 3} and though the spinal fluid is often found with elevated white cell count, it is generally sterile.³ Our patient was suspected of meningitis due to his clinical presentation and the elevated white cell count in the spinal fluid, but his spinal fluid was without bacterial growth.

The most frequently found bacterial species in brain abscesses are streptococci in about 1/3 of the patients.^{1 3} In our case report, the *S. salivarius* was the only pathogen found during our investigations, and it was suspected as the culprit pathogen causing the abscess. *S. salivarius* is a Gram-positive bacteria and part of the viridans streptococci family. It is part of the human oral flora, and when found in single blood cultures without evidence of significant infectious focus, it is usually considered a contaminant. However, invasive infections, including endocarditis and central nervous system infections, have been described.⁶ Viridans streptococci are among the most frequently found

Figure 2 T2-weighted axial MRI slice during treatment showing progression of the pontine abscess and increased peripheral oedema with sequelae after bleeding in the abscess.

Figure 3 T2-weighted axial MRI slice after treatment showing regression of the pontine abscess along with regression of the surrounding oedema.

bacteria in patients with endocarditis, and even though the incidence has been declining over the past decades, they still represent 17.6% of incident endocarditis in the 2000s.⁷

To the best of our knowledge, only one prior case of *S. salivarius* brain abscess has been described in the literature.³ This patient, as in the patient described in our case report, had the abscess located in the pons. Unlike our patient, no bacteraemia, infectious endocarditis or other infectious foci were found.

For diagnosing a brain abscess, an MRI is the gold standard.⁸ The typical appearance of a brain abscess on a conventional MRI is that of a ring-enhancing lesion. However, the presence of a ring-enhancing lesion in the brain is not diagnostic of an abscess and must be distinguished from, for example, a necrotic tumour. MRI has the ability to distinguish cerebral abscess from other ring-enhancing lesions with the addition of diffusion-weighted imaging and apparent diffusion coefficient (ADC). A pyogenic abscess typically shows diffusion restriction and a fall in the ADC, in contrast to observation in the case of a necrotic tumour.

The main treatment of brain stem abscesses are broad spectrum antibiotic therapy, and empirical treatments should cover both Gram-positive and Gram-negative aerobic and anaerobic bacteria. The duration of treatment is dependent on the clinical picture and regression of the abscess monitored with neuroimaging. In the review by Mandapat *et al*,³ patients in the different case reports received from 20 days to 18 months of antibiotic treatment, with the mean duration being 6–8 weeks. Neurosurgical intervention with drainage of abscess seems to have improved the prognosis and the mortality of brain abscesses is declining, but it is still high with up to 10% mortality.¹ Our patient was not considered for surgery due to the location of the abscess and its small size. He received, in all, 26 weeks of antibiotic therapy.

In conclusion, we present a patient with a brain stem abscess, and our case report confirms the difficulties and dilemmas in the treatment of this rare disease.

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Competing interests None declared.

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Learning points

- ▶ A brain stem abscess can present with meningitis symptoms, and should be remembered as a differential diagnose in the febrile patient with neurological symptoms.
- ▶ Always consider a brain stem abscess in patients with endocarditis presenting with neurological symptoms.
- ▶ In infectious diseases of the brain, MRI is the gold standard due to the range of sequences available in addition to the conventional sequences.
- ▶ There is no general antibiotic treatment duration for brain stem abscesses; treatment duration depends on the clinical picture and regression of the abscess.
- ▶ With persisting or recurring symptoms in a patient with an abscess, always re-examine the patient and beware of treatment failure.

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