

Case report

***Listeria monocytogenes* brain abscess in a patient with multiple myeloma**

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Abstract

Listeria monocytogenes is an uncommon cause of illness in the general population. Meningoencephalitis is the most common central nervous system (CNS) manifestation of listeriosis. However, brain abscess represents 1-10% of all CNS listeriosis. To our knowledge, *L. monocytogenes* brain abscess in multiple myeloma patients has not been previously reported. Thus we report a 58-year-old male patient with multiple myeloma who developed a brain abscess due to *L. monocytogenes*. Due to a history of penicillin allergy, he was treated with intravenous trimethoprim/sulfamoxazole (TMP-SMX) for a total of 12 weeks, and gentamicin for the first two weeks, followed by oral therapy of TMP-SMX for a total of nine months. He is alive six and a half years after the diagnosis of myeloma with occasional brief seizures despite being on two anticonvulsants.

Key words: invasive CNS disease; meningitis; meningoencephalitis; immunosuppression; *Listeria monocytogenes*; brain abscess; multiple myeloma

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Introduction

Listeria monocytogenes is an uncommon cause of illness in the general population. However, the organism can cause life-threatening infections in neonates, pregnant women, the elderly, and immunosuppressed patients [1,2]. Meningoencephalitis is the most common central nervous system (CNS) manifestation of listeriosis. However, frank brain abscess is an uncommon complication. *L. monocytogenes* may also cause a small number of brain abscesses, representing 1-10% of all CNS listeriosis. In a case series report, three of five patients with listerial brain abscess were cardiac transplant recipients [3]. There are only 40 cases of listerial brain abscesses described in the literature between 1968 and 2003 [4].

To our knowledge, *L. monocytogenes* brain abscess in multiple myeloma patients has not been reported previously. Here, we present a patient with multiple myeloma who developed brain abscess due to *L. monocytogenes* and describe the salient features of the case.

Case report

In March 2003, a 58-year-old male patient presented with back pain. A diagnosis of

immunoglobulin G lambda multiple myeloma, stage IIIA, was established using conventional methods. Therapy was started with Vincristine, Doxorubicin and Dexamethasone (VAD). He was also given radiation therapy to the lumbar spines to relieve pain. Soon after starting the third cycle of chemotherapy, he presented to the emergency room in June 2003 with perianal pain and fever and was found to have perianal abscess. He later developed seizures and a decreased level of consciousness. A computed tomography (CT) of the brain revealed a hypodense area in the right frontal lobe that was interpreted to represent a cerebral infarct (Figure 1). He required intubation and mechanical ventilation, but was extubated the next day. Lumbar puncture yielded clear cerebrospinal fluid (CSF) that contained six white blood cells, of which 45% were neutrophils, 60% were lymphocytes, and 5% were monocytes. CSF protein was 60 mg per deciliter (normal range 12-60). CSF Gram stain and culture were negative. He then developed a decreased level of consciousness and slurred speech and was re-intubated and ventilated. Two blood cultures drawn at the time of admission grew *Listeria monocytogenes*. A repeated CT scan of the brain suggested the presence of infarcts (Figure 2). Because of a history of penicillin

allergy, he was treated with intravenous trimethoprim/sulfamoxazole (TMP-SMX) (5 mg/kg of trimethoprim every six hours) for a total of 12 weeks and gentamicin for the first two weeks followed by oral therapy (two tablets of regular strength TMP-SMX every six hours). A magnetic resonance imaging (MRI) performed four weeks after presentation showed an organized abscess in the right frontal lobe (Figure 3). This was drained the same day with the help of a neuro-navigation technique. Eight milliliters of sterile pus were drained. The patient developed several complications while he was in the intensive care unit. These included *Enterococcus faecalis* blood-stream infection, pneumonia, lung abscess, respiratory failure requiring prolonged mechanical ventilation and tracheostomy, lower extremity deep venous thrombosis, seizure disorder and massive colonic bleeding. After six weeks, he was transferred to the general medical ward. He continued to improve and was discharged home three and a half months after admission on oral TMP-SMX, which was continued for five months. A CT scan of the brain showed gradual resolution of the brain abscess and he received a total of nine months of TMP-SMX therapy. Anti-myeloma therapy was given upon disease progression. He is alive six and a half years after the diagnosis of myeloma. He is ambulatory independently, with slight left upper motor neuron facial palsy and mild hemiparesis. He suffers from the occasional brief seizure despite two anticonvulsants.

Figure 1: A computed tomography (CT) of the brain showing a hypodense area in the right frontal lobe



Figure 2: A brain CT-scan four weeks after presentation showing an organized abscess in the right frontal lobe

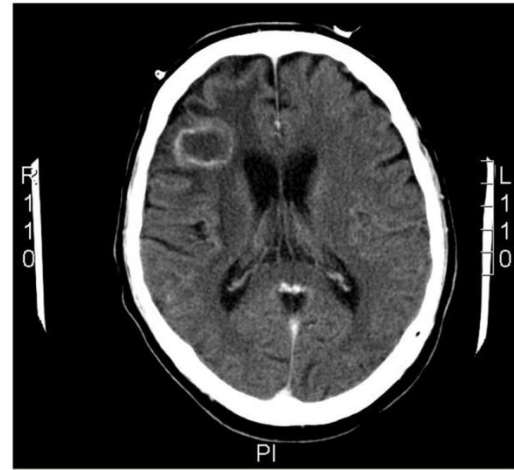
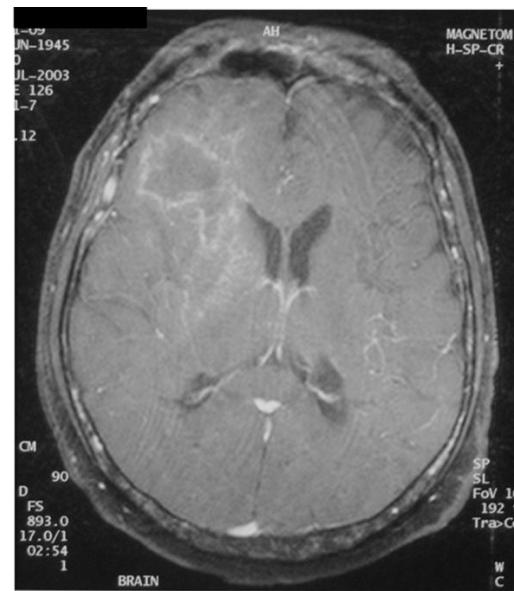


Figure 3: A magnetic resonance imaging (MRI) of the brain, T2 weighted images with gadolinium, showing an organized abscess in the right frontal lobe



Discussion

L. monocytogenes brain abscess is an uncommon manifestation of listeriosis and accounts for 1-10% of all CNS listeriosis. From 1968 to 2003, only 40 cases of listerial brain abscesses were reported [4]. Most affected patients are immunocompromised by an underlying illness or receiving immunosuppressive therapy [3].

The most effective therapeutic agents are a combination of an aminopenicillin (amoxicillin or ampicillin) plus an aminoglycoside [5]. However, TMP-SMX or vancomycin may be used in patients allergic to penicillin [6]. TMP-SMX, a bactericidal

against *Listeria*, achieves adequate levels in serum and CSF, and has documented clinical efficacy [7]. The optimum duration of therapy is uncertain. Prolonged therapy for two to three weeks is needed since ampicillin and gentamicin penetrate the cerebrospinal fluid poorly [5]; however, most authorities recommend six to eight weeks of antimicrobial treatment for listerial brain abscess [6,8]. Radiographic data may show visible residual lesions after successful treatment at the end of the six- to eight-week course [9]. Thus therapy may be stopped before complete resolution of the radiographic abnormalities [10]. However, it was suggested that serial neurologic exams and imaging of the CNS may help monitor therapy and help determine the duration of antimicrobial therapy [8].

The current patient was immunocompromised and had myeloma that caused hypogammaglobulinemia and he received a high dose of glucocorticoid and chemotherapy. He had positive blood cultures which are described in the majority (59-73%) of patients [3,8]. He has a history of penicillin allergy and thus he was treated with trimethoprim/sulfamoxazole and gentamicin. He also underwent drainage of the abscess. We elected to treat him for a prolonged period of time of nine months. Longer antibiotic therapy (at least five to six weeks) is needed in the presence of localized CNS involvement [8]. He made a good recovery, but was left with a mild permanent neurologic deficit and seizures. In patients with CNS listeriosis, the mortality may reach 26%, and is higher among patients with seizures and those older than 65 years of age [8]. In addition, relapse may occur in 7% of episodes [8]. In the current patient no evidence of relapse has been observed in the six years after therapy.

In conclusion, listerial brain abscess is an uncommon infection usually affecting patients with impaired immunity. It should be suspected in such patients, and treated promptly. While it has high mortality it can be successfully treated with antibiotics, with drainage if necessary, and with a reduction of immunosuppressives.

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