Q fever mimicking herpetic encephalitis

Article abstract—We describe a patient with temporal lobe encephalitis associated with primary *Coxiella burnetii* infection who presented with CT and MRI findings suggestive of herpes simplex encephalitis and an initial improvement during treatment with acyclovir. Q fever should be considered in the differential diagnosis of patients whose manifestations suggest herpes encephalitis.

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Q fever is a rickettsial infection caused by *Coxiella burnetii*. Neurologic involvement is very rare, generally presenting as meningitis or encephalitis. Focal neurologic signs are unusual in acute primary infections,[1] and brain imaging studies are generally normal. We report an adult patient with focal encephalitis associated with primary *C burnetii* infection that presented CT and MRI findings that were highly suggestive of herpes simplex encephalitis.

Case report. A 51-year-old man was admitted to the hospital on May 19, 1992, because of a grand mal seizure and a febrile syndrome of 48 hours' duration. His medical history was unremarkable. He worked as a university professor and had no specific exposure to animals. On admission, he was disoriented, with no focal neurologic abnormalities, and was negative for signs of meningeal irritation. Temperature was 37.9 °C and blood pressure was normal. Lungs, heart, abdomen, and extremities were normal. An urgent cranial CT, performed before and after the intravenous administration of contrast material, was normal. Lumbar puncture revealed 22 WBCs/mm^3 (100% lymphocytes), a protein level of 46 mg/dl, and a normal glucose level. Therapy with intravenous acyclovir 10 mg/kg every 8 hours, together with phenytoin, was initiated immediately. Two days later, the patient was still disoriented, and neurologic examination showed marked dysnomia. Temperature was 39 °C and physical examination remained unremarkable. A cranial CT obtained 3 days after the first study revealed a deep left temporal lobe hypodensity that did not enhance after the administration of intravenous contrast (figure 1). A repeat lumbar puncture on May 22 disclosed 42 WBCs/mm^3 (90% lymphocytes), a protein level of 46 mg/dl, and a normal glucose level. CSF culture for bacteria, fungi, and mycobacterium tuberculosis were all negative. Seven days after admission, the patient's neurologic condition had improved, and neurologic examination showed only transcortical sensory dysphasia; temperature was 37.5 °C. A cranial CT disclosed no significant change. On the 15th hospital day, MRI of the head was performed; T_2-weighted images demonstrated high signal intensity in the deep left temporal lobe, with gyral effacement (figure 2). A lumbar puncture performed the same day, June 4th, revealed 73 WBCs/mm^3 (100% lymphocytes), a protein level of 95 mg/dl, and a normal glucose level. Serologic investigation for herpes simplex virus (HSV), syphilis, human immunodeficiency virus, *Brucella*, and *Borrelia burgdorferi*, both in serum and CSF, were negative. The patient's neurologic status gradually improved, with only dysnomic errors persisting. Despite neurologic improvement, the patient's clinical condition deteriorated, with chills and fever. Temperature rose to 39 °C. There were no heart murmurs, and lungs were clear. Blood cultures were negative, and repeated chest x-rays were normal. An echocardiogram visualized a vegetation in the aortic valve. Antibiotic therapy with cephalothin and vancomycin was initiated; however, chills and fever persisted for 3 weeks. Serologic evaluation yielded positive titers to *C burnetii* (table). Doxycycline (200 mg/d) was begun, and fever abated within 3 days. There was no change in the patient's neurologic condition after treatment with doxycycline during 1 month.

Discussion. We considered this patient with acute encephalitis and focal signs of left temporal involvement as clinically typical of herpetic encephalitis. CT and MRI disclosed a lesion localized in the deep left temporal lobe. The CSF results and the good response to acyclovir therapy seemed to support the initial clinical diagnosis. We questioned the herpetic etiology only when the patient's clinical condition deteriorated and serologic studies showed no evidence of intrathecal synthesis of HSV antibodies. The diagnosis of Q fever was confirmed by four-fold elevation of the indirect immunofluorescence antibody titers to phase II antigen.

This is the first report of clinical involvement of the temporal lobe with acute primary Q fever. In general, focal neurologic deficits associated with *C burnetii* infection are secondary to emboli from endocarditis,[2] but this was unlikely in our patient.

The precise mechanism by which *C burnetii* causes CNS dysfunction is unknown. There are two possible explanations: (1) a direct effect on the CNS, and (2) an indirect effect through an immunologic mechanism. Isolation of the microorganism has rarely been attained,[3] and we did not demonstrate evidence of intrathecal synthesis of antibodies to *C burnetii* in the CNS. The second mechanism seems more likely, based on the spontaneous and rapid recovery despite absence of specific antibiotic therapy as shown by this and other cases[4,5]; the existence of other neurologic complications related to Q fever, such as the Miller Fisher syndrome, which

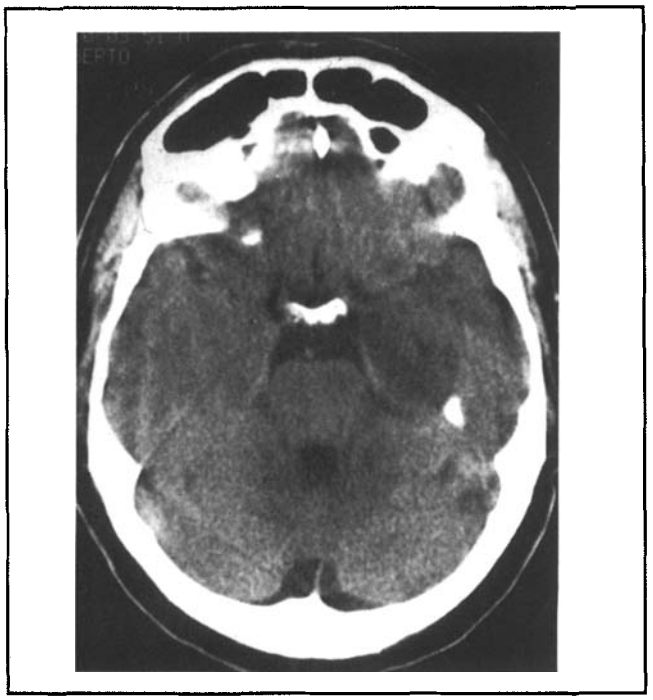

Figure 1. Noncontrast cranial CT showing a hypodense lesion in the deep left temporal lobe.

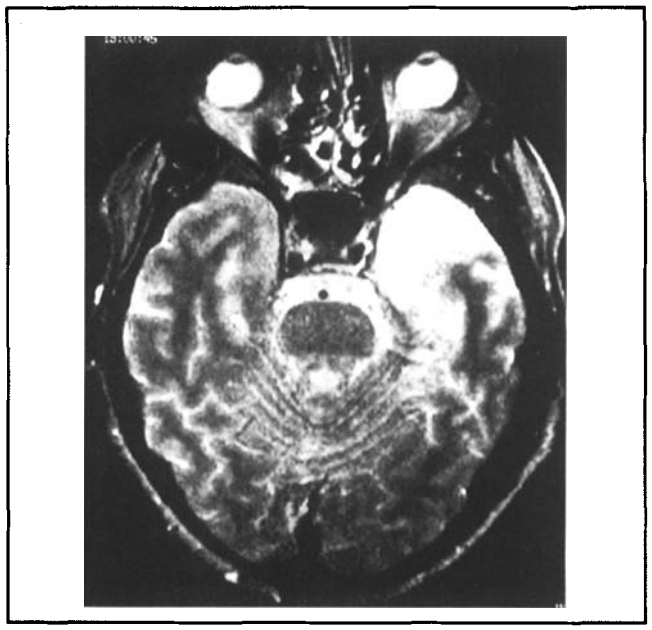

Figure 2. MRI (T_2-weighted) showing high-intensity signal in the deep left temporal lobe, with gyral effacement.

has a presumed immunologic basis[6]; and the detection of circulating immune complexes in patients with Q fever.[7]

The clinical and neuroimaging findings of the present case, seemingly typical for herpetic encephalitis, and the "apparent" response to acyclovir therapy can induce false confidence in the diagnosis of HSV. Untreated, Q fever can be followed by endocarditis, a complication that can be fatal.[8] Therefore, Q fever should be considered in patients with presumed herpetic encephalitis, even if there is a good response to acyclovir therapy.

Table. Serologic results to *C Burnetii* (IIF)

	Serum				Cerebrospinal fluid	
	Phase I		Phase II		Phase I	Phase II
Dates	IgG	IgM	IgG	IgM	IgG	IgG
5/22/92	128	<16	1,024	32	<16	<16
6/4/92	256	<16	1,024	32	<16	<16
7/22/92	ND	ND	4,096	64	ND	ND

IIF Indirect immunofluorescence.
ND Not done.

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