Beware of the Tick Bite—a Case of Lyme Meningitis in a 5-year-old Boy Causing Diffuse Cranial Neuropathy

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Introduction

Lyme disease is a bacterial infection caused by the spirochete Borrelia burgdorferi. It is a systemic disorder which affects many organ systems including, uncommonly, the central nervous system. This case will highlight one of the potential radiologic sequelae of Lyme Disease, cranial nerve abnormalities caused by Lyme meningitis.

Case Presentation

A 5 y.o. boy in Virginia presented with a four day history of headache and right facial droop. The patient's history was notable for a recent camping trip in the Shenandoah, as well as recent foreign travel. A detailed neurologic exam demonstrated palsies of cranial nerves III and VII on the right. A CT head was performed which was normal without evidence of increased intracranial pressure. A lumbar puncture yielded elevated CSF white blood cells (predominantly lymphocytes). The patient was started on empiric antibiotics. An MRI of the brain demonstrated bilateral enhancement of cranial nerves III through IX (see below). There were no white matter lesions. During his hospitalization, the patient also manifested left sided cranial palsies. The CSF from the original lumbar puncture returned elevated IgM and IgG compatible with Lyme Disease.

Imaging findings

White matter lesions

- In periventricular white matter and spinal cord
- CT: hypodense, T1: slightly low signal, T2: high signal
- Usually multiple, 2-3 mm in size

Cranial nerve (CN) enhancement

- Best sequence = thin section post-contrast through brainstem
- Classically described in differential for CN VII enhancement, but can be seen in multiple cranial nerves

Non-CN leptomeningeal enhancement

- Can be diffuse
- Cauda equina may enhance

Atrophy

Imaging findings in CNS Lyme disease

- White matter lesions
- Cranial nerve (CN) enhancement
- Non-CN leptomeningeal enhancement
- Atrophy

ddaX for pediatric CNS Lyme disease

White matter lesions: multiple sclerosis (MS), acute disseminated encephalomyelitis (ADEM), shear injury, white matter infarcts

CN enhancement: Bell's palsy, herpes zoster, schwannoma, neurosyphilis, MS, metastases, Langerhans cell histiocytosis

Non-CN leptomeningeal enhancement: tuberculous meningitis, fungal meningitis, leptomeningeal carcinomatosis

Atrophy: HIV, cytomegalovirus (CMV)

Leptomeningeal enhancement

Cranial nerve enhancement

Atrophy