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Neuroborreliosis Manifesting with Multiple Cranial Neuropathies

Case Report

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Abstract

It is imperative to rule out neuroborreliosis in a patient presenting with multiple cranial neuropathiesinaLyme endemic area to prevent long term complications associated with the disease. Interpretation of serological tests is critical. With a recent history of tick bite and positive IgM antibodies, some patients do not have the IgG antibodies against Lyme within 30 days of the exposure. Doxycycline effectively treatsLyme disease but must be given for 28 days.

Keywords: Neuroborreliosis; Multiple cranial neuropathies; Doxycycline

Introduction

Neuroborreliosis is a common manifestation of Lyme disease, usually presents with facial nerve weakness, but other cranial nerves can also be affected. It is essential to rule out other causes of multiple cranial neuropathies before starting the treatment to prevent further complications. About 5-10% of the patient would present with cranial neuropathies [1].

Case Report

A 48-year-old female with no significant past medical history presented to an outside hospital with a one-weekhistory of progressive bilateral facial weakness, increased lacrimation, and difficulty chewing. As per the patient, she was in her usual state of health when she noticed a tick bite about two weeks back. She initially started having a dull bilateral occipital headache after the tick bite, which later resolved after a few days. She denies having any recent fevers,weight loss, sensory or motor weakness in her extremities, or altered awareness. At presentation, her vital signs were stable. General physical examination was unremarkableexcept for difficulty in sensorineural hearing in both ears.Neurological examination revealed dis-conjugate gaze,bilateral lower motor neuron facial nerve weakness, and sensorineural hearing loss. Her basic labortary investigations including complete blood, comprehensive metabolic profile, chest x ray, urine analysisdid not show any abnormality, while the Lyme testing showed a positive IgG/IgM antibody value of 7.28 with 1 IgG and 3/3 IgM positive antibodies. The significant IgM bands were 23,39,41. She later underwent an MRI (magnetic resonance imaging) of the brain with and without contrast,which showed enhancement of bilateral facial nerves(canalicular segments), bilateral trigeminal nerves (cisternal segments), and left cochlear nerve ,as shown in Figure 1B,1E,1F. A spinal tap showed normal CSF (cerebral spinal fluid) protein and glucose with 1 white cell, while the bacterial, viral, and fungal cultures were negative for any infectious etiology. Patient was diagnosed with neuroborreliosis secondary to her positive tick bite history, serological testing, and imaging findings. She was later started on Doxycycline 100 mg twice a day for 28 days, withclose follow-up scheduled in the neurology outpatient setting. The patient did not have the follow-up MRI imaging yet.

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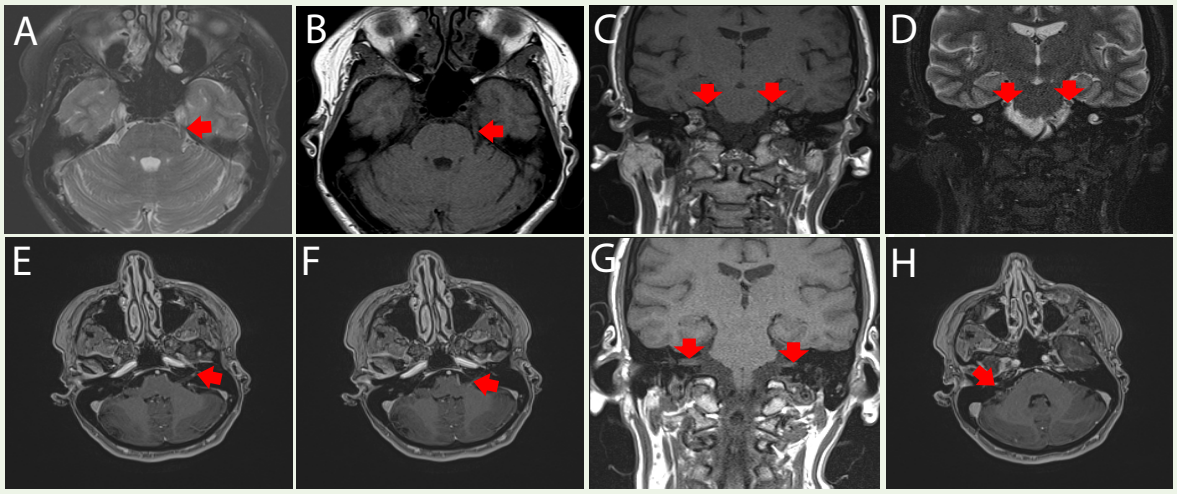

Figure 1: (A&B) Axial T2 fat sat thin sequence of MRI brain with and without contrast showing bilateral trigeminal nerve cisternal segment enhancement with associated T2 hyperintensity as shown with the red arrows. (B) Axial T1 sequence of MRI brain with and without contrast showing bilateral trigeminal nerve cisternal segment as shown with the red arrows. (C) coronal T1 sequences of MRI brain with and without contrast showing bilateral trigeminal nerve cisternal segment as shown with the red arrows(E&F) Axial T2 fat sat thin sequences of MRI brain with and without contrast showing bilateral facial nerve canalicular segment enhancement as shown with the red arrow. (G) Coronal T1 sequence of MRI brain with and without contrast showing bilateral facial nerve canalicular segment enhancement as shown with the red arrows. (H) Axial T2 fat sat thin sequence showing cochlear nerve enhancement as shown with the red arrow.

Discussion

Lyme disease is a tick-borneillness caused by Borrelia burgdorferi. About 15% of the patients infected with Lyme disease will have neurological manifestations, including 7th cranial nerve palsy, painful radiculopathy, and meningitis [2]. Careful history about the tick exposure and appearance of erythema migrans (bulls-eye rash) are important clues for the correct diagnosis. The accurate interpretation of the serological testsis important to ensure that proper treatment is instituted to prevent long-term complications to prevent mortality and morbidity.

Although there is a broad differential diagnosis for multiple cranial neuropathies which include vascular causes likebrain stem infarcts, cavernous sinus thrombosis, intracranial aneurysms, vasculitis, traumatic causes including skull-based fractures, intracranial dissection, autoimmune conditions like multiple sclerosis, sarcoidosis, acute inflammatory demyelinating polyneuropathy including Guillain-Barré syndrome (GBS) and Miller Fisher variant,infectious etiologies including Human ImmunodeficienyViurs (HIV), varicella-zoster, neurosyphilis, chronic fungal meningitis, neoplastic causes like brain stem glioma's, leptomeningeal carcinomatosis,metastatic tumors, metabolic causes like thyroid ophthalmopathy, thiamine deficiency and Melkersson-Rosenthal syndrome [3]. In our patient, we excluded these differentials with the help of an MRI of the brainas shown in Figure 1. CBC, urine analysis and CSF analysis were negative for any infectious etiology but positive for lyme serology with a spinal tap showinga protein of 45 and normal glucose, normal metabolic profile with normal liver and kidney function tests.

As per the previousguidelines from the Center of DiseaseControl (CDC), a two tier testing is recommended which include to have an initial enzyme-linked immunosorbent assay(ELISA) testing for the specific antigens, and if the sample is positive or borderline positive it undergoes Western blot testing to confirm the diagnosis. If 5/10 specific IgG bands are present in patients with symptoms of more than 30 days or 2/3 IgM bands present with symptoms of less than 30 days, the Western blot is considered positive [4].

A new modified two-tier testing algorithm has also been approved by the CDC, which is as accurate as the standard two-tier testing utilizing only the enzyme immunoassay (EIA). If the initial test is positive, another EIA is performed to confirm with a different set of antigens [5,6]. Prompt treatment with Doxycycline 200 mg daily for 2-4 weeks or in a patient who is allergic to Doxycycline, Amoxicillin 1.5 gm daily is considered effective, while Azithromycin or Clarithromycin can be used if an alternative agent is needed. Ceftriaxone 2 gm daily is also viewed efficacious [7,8].

It is important to have a broad differential in a patient with multiple cranial neuropathies patient, but a concise history, optimal serological markers, and imaging need to be done to prevent long-term complications.

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