

Ocular Manifestations of Lyme Disease

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Although ocular manifestations of Lyme disease have long been noted, they remain a rare feature of the disease. The spirochete invades the eye early and remains dormant, accounting for both early and late ocular manifestations. A nonspecific follicular conjunctivitis occurs in approximately 10% of patients with early Lyme disease. Keratitis occurs often within a few months of onset of disease and is characterized by nummular nonstaining opacities. Inflammatory syndromes, such as vitritis and uveitis, have been reported; in some cases, a vitreous tap is required for diagnosis. Neuro-ophthalmic manifestations include neuroretinitis, involvement of multiple cranial nerves, optic atrophy, and disc edema. Seventh nerve paresis can lead to neurotrophic keratitis. In endemic areas, Lyme disease may be responsible for approximately 25% of new-onset Bell's palsy. Criteria for establishing that eye findings can be attributed to Lyme disease include the lack of evidence of other disease, other clinical findings consistent with Lyme disease, occurrence in patients living in an endemic area, positive serology, and, in most cases, response to treatment. Management of ocular manifestations often requires intravenous therapy.

Ocular findings in Lyme disease were first noted in the original observations of Steere *et al* [1]. Since then, a small number of cases of patients with ocular manifestations involving different parts of the eye have been reported [2-4]. Animal studies have shown that the Lyme spirochete invades the eye early and may remain dormant [5,6].

Although ocular involvement is not commonly seen in Lyme disease, it is important for the physician to be aware of the possibility. Criteria that may be used to attribute ocular findings to Lyme disease include clinical findings of Lyme disease in other organs, occurrence in patients living or having traveled in endemic areas, positive serology, and lack of evidence of other diseases to explain the ocular findings.

FOLLICULAR CONJUNCTIVITIS

A nonspecific follicular conjunctivitis may occur in as many as 10% of patients during the flulike illness of Lyme disease [1,7]. Periorbital edema, episcleritis, photophobia, and subconjunctival hemorrhages have been noted [7].

KERATITIS

One of the most common findings is keratitis, characterized by bilateral nonstaining opacities. Interstitial and ulcerative keratitis have also been observed [8-12]. Most cases have been reported as occurring within a few months after the onset of disease. Topical steroids, after an adequate course of systemic antibiotics, have been used successfully for treatment of the corneal opacities.

INFLAMMATORY SYNDROMES

Many types of inflammatory syndromes, involving all or parts of the eye, have been reported in patients with Lyme disease [13-16]. At least two patients with vitritis, one of whom was seronegative, were found to have spirochetes in the vitreous [17,18]. In 12 patients with Lyme disease with vitritis, the vitritis responded to treatment. The response was gradual, however, and continued after the completion of treatment [19]. In cases where there is persistent vitritis, a vitreous tap is recommended.

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Borrelia burgdorferi has also been found in the iris of one patient with anterior uveitis [20]. In two reviews of patients with uveitis without a history of Lyme disease [21,22], routine screening was ineffective in diagnosis.

NEUROLOGIC SYNDROMES

Optic neuritis and periorbital neuritis associated with Lyme disease have been described in both Europe and the United States [23-25]. Lesser *et al* [26] reported two cases of optic neuritis, one with minimal and the other with profound decrease in vision. At least three cases of neuroretinitis have been observed [26-28; N. Miller, M.D., personal communication, November 1993]. One case of an optic neuropathy-like condition has been seen in a patient with late Lyme disease who initially presented with sixth nerve palsy and continued to have fatigue, malaise, and arthralgias despite multiple courses of treatment [26]. Routine screening for Lyme disease is not recommended in cases of optic neuritis unless there is a clinical history that suggests the diagnosis. Papilledema is seen in association with meningitis, particularly in children.

Cranial nerves III, V, VI, and VII have been associated with Lyme disease, with seventh nerve paresis occurring most frequently [29-32]. Seventh nerve paresis can lead to neurotrophic keratitis. In 38 cases reported by Pachner and Steere [33], one half the patients had facial palsy, a third of these with bilateral involvement.

Halperin *et al* [34] concluded that Lyme disease may be responsible for approximately 25% of new-onset Bell's palsy in an endemic area, with the palsy sometimes developing before positive serologic testing. No antibody was found in the cerebrospinal fluid of those patients tested, which supported this being a peripheral neuropathy. Because of this, the authors urge caution in using steroids in "idiopathic Bell's palsy."

Sixth nerve palsies are caused by either direct infection, as a peripheral neuropathy, or secondary to elevated intracranial pressure [26,33]. In one case, magnetic resonance imaging demonstrated a high signal abnormality at the pontomedullary junction, which suggested fascicular involvement [35].

CONCLUSION

In most cases, treatment for ocular manifestations of Lyme disease should include intravenous therapy, as these findings may represent a manifestation of central nervous system involvement. In some cases, topical steroids have been used for the

management of corneal infiltrates, as this may represent an immunologic phenomenon.

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