

Lyme Disease: A Case Report with Typical and Atypical Lesions

Abstract

Lyme disease is a multisystem infectious disease caused by the spirochete “*Borrelia burgdorferi*,” which is transmitted by “*Ixodes*” tick, with skin being the most common and earliest organ to be affected. Diagnosis of erythema chronicum migrans (ECM), which is the characteristic lesion of early disease, may help in early treatment and prevention of complications. Here, we are reporting a case of Lyme disease in a 10-year-old young boy from a non-endemic zone of Himachal Pradesh, who presented with typical as well as atypical ECM lesions. The clinical diagnosis was confirmed serologically, and the child was treated successfully with doxycycline.

Keywords: *Atypical erythema chronicum migrans, erythema chronicum migrans, Lyme disease*

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Introduction

Lyme disease is a multisystem illness caused by the strains of spirochete “*Borrelia burgdorferi*” which is transmitted by the various species of a tick named “*Ixodes*.”^[1] The characteristic eruption, erythema chronicum migrans (ECM), at the site of inoculation is a common early manifestation, and dissemination of the infection may cause disease of the nervous system, heart, and joints, in addition to other dermatoses.^[2] Although the disease has been mostly reported from temperate regions, the incidence has increased worldwide due to increasing travel and changing habitats of the vector. There are only a few previously reported cases from India.^[3] This report illustrates a case of Lyme borreliosis in a young boy from Himachal Pradesh with classical ECM as well as atypical ECM lesions.

Case History

A 10-year-old boy from a hilly village presented in April 2016 with a 3-day history of sudden appearance of a painful brownish raised lesion over the back of his left leg, associated with surrounding redness which was increasing progressively. The child did not have fever or any other systemic complaints. He gave a history of visit to the nearby forest a few days before the appearance of the lesion. On examination, there was an erythematous

annular plaque on the back of the left lower leg approximately 6 × 5 cm in size, with a central brownish fluid filled blister [Figure 1]. Induration and tenderness were present over the lesion, and local popliteal lymphadenopathy was seen. In addition, there was a lymphangitic streak on the inner aspect of the thigh [Figure 2a]. The patient also had petechiae over the scapular regions [Figure 2b] and a few maculopapular lesions over the dorsum of the hands and ankle region. Systemic examination was unremarkable. Clinical diagnosis of ECM was made.

The patient was subjected to baseline investigations including complete hemogram with peripheral blood smear which was found to be normal. Serology for *Borrelia burgdorferi* Ospc (23 KDa) antigen was done with enzyme-immunoassay technique. IgM was raised at 4.4 U/ml (normal <0.90), whereas IgG was found to be normal [0.3 U/ml (normal<0.90)], which was indicative of acute infection. Western blot could not be performed due to financial constraints. Biopsy from the active margin of the lesion showed moderate perivascular lymphocytic infiltrate with a focus of spongiosis, with papillary dermis showing extravasation of red blood cells [Figure 3].

Treatment was initiated immediately with doxycycline 100 mg tablets twice daily along with other symptomatic therapy. After 1 week of treatment, the lesion did not

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Figure 1: Erythematous annular plaque measuring 6 x 5 cm in size with a central blister on the back of the left leg

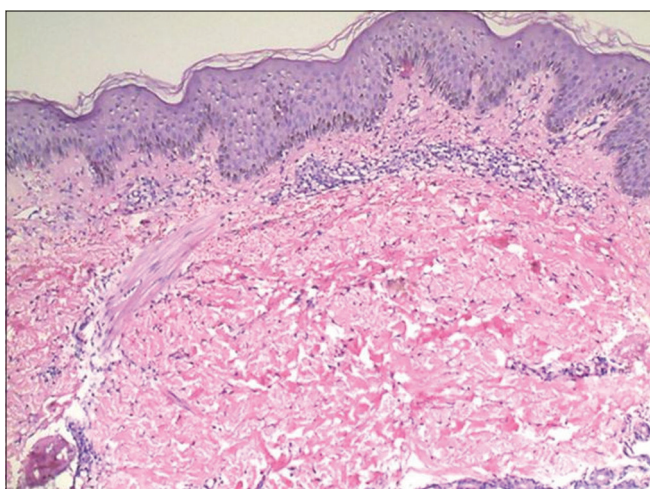


Figure 3: Perivascular lymphocytic infiltrate with red blood cell extravasation into the papillary dermis (H and E, x100)

progress beyond the initial size and there was a decrease in erythema and induration. At 2 weeks, there was further improvement in the above mentioned features associated with exfoliation of the skin [Figure 4a]. The medications were continued for a total of 3 weeks resulting in the clinical resolution of the lesion [Figure 4b].

Discussion

Lyme disease is caused by pathogenic genospecies of *B. burgdorferi sensu lato* (comprising at least 20 genospecies, both pathogenic and non-pathogenic): *sensu stricto*, *afzelli*, *garinii*, *bavariensis*, and *speilmani*, of which *B. garinii* and *B. afzelli* have been most commonly implicated as pathogens in Asia (mainly central Asia).^[3] Though the disease is most commonly found in temperate regions, it may exist in our country as the *Ixodes* ticks are said to be present in the Himalayan region. Various species of the genus *Ixodes* reported from this region are *I. acutitarsus*, *I. granulatus*, *I. himalayensis*, *I. kashmericus*, and *I. ovatus*.^[4] The species of the tick said to be responsible for transmission of the disease in Asia is *I. persulcatus* (reported from central

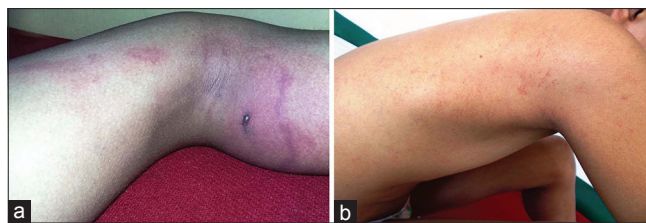


Figure 2: Atypical erythema chronicum migrans (ECM) lesions; (a) ECM lesion with lymphangitic streak on the antero-medial aspect of the thigh, (b) atypical lesions in the form of petechiae on the right scapular area

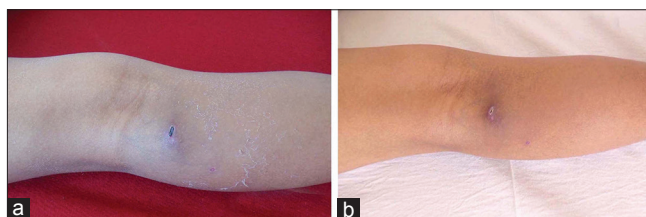


Figure 4: (a) Improvement in erythema, disappearance of the advancing margin, and exfoliation after 2 weeks of treatment. (b) Resolution of the erythema chronicum migrans lesion and healing of the blister after 3 weeks

Asia) and has not been seen in India. Skin is the most commonly affected organ and the manifestations are called as “dermatoborreliosis.” The disease is divided into three stages, namely, early localized disease, disseminated disease, and chronic disease. ECM is seen in early localized disease and is widely regarded to be pathognomonic. It occurs at the site of a tick bite and can take two forms, i.e., either expansion with various hues of erythema or can spread centrifugally with central clearing and bull’s eye, appearing like a target lesion. Atypical ECM lesions reported include vesicles, erythematous papules, purpura, and lymphangitic streaks. Differential diagnosis of ECM includes tinea corporis, urticaria, erythema multiforme, erythema annulare centrifugum, and fixed drug eruptions. Histopathology is characterized by the presence of a perivascular dermal lymphohistiocytic infiltrate with few interspersed plasma cells. Spirochetes may be demonstrated with Warthin-Starry stain in 50% of primary ECM lesions.^[3]

The diagnosis of ECM is mainly clinical with laboratory evidences acting as a supporting tool. Detection of *B. burgdorferi* by culture (expensive and lacks sensitivity) and/or polymerase chain reaction from skin biopsy are helpful in proving infection in suspected clinically atypical ECM manifestations. Serology has been the most practical and commonly used modality for the diagnosis of Lyme borreliosis; it is essential in all cases of clinically suspected Lyme borreliosis except ECM. It follows a two-step approach involving an initial screening test (usually ELISA) followed by a Western blot for reactive and equivocal samples. Single-step ELISA using recombinant proteins (such as C6 peptide) may replace the standard two-tiered strategy in the future.^[5]

Various antibiotics have been used with success for the treatment. Doxycycline (4 mg/kg/day in divided doses;

Table 1: Review of cases/studies of Lyme's disease in India

References	Demographic parameters/type of study	Location	Clinical presentation	Method of diagnosis
Praharaj <i>et al.</i> ^[7]	65 out of 500 (13%) patients/prospective study	North-east India	Asymptomatic, general population including service personnel and their family members	Detection of IgG antibodies to recombinant antigens (multiple antigens of several strains)
Patial <i>et al.</i> ^[8]	15-year-old M/case report	Shimla (Northern India)	Meningitis, arthritis, carditis (congestive cardiac failure, and variable AV blocks without valvular lesions)	Presence of <i>Borrelia</i> in peripheral blood smear
Handa <i>et al.</i> ^[9]	1 out of 64 patients, Prospective study	North India	mono/oligoarticular arthritis, healthy blood donors, known rheumatoid arthritis patients	Detection of antibodies to <i>B. burgdorferi</i> (North American strain 2591)
Babu <i>et al.</i> ^[10]	45-year-old F/case report	South India	History of tick bite, followed in the left eye, neuroretinitis on fundus evaluation	IgM antibodies by ELISA and Western blot tests
Rajeev ^[11]	5 cases/newspaper report	Wayanad (Southern India)	flu-like symptoms including fever, fatigue, and rashes on the body	Serological tests (details-NA)
Kandhari <i>et al.</i> ^[12]	11-year-old M, German descent (traveller)/case report	New Delhi (North India)	History of camping to Shenandoah valley in America; annular, erythematous plaque on the scrotum and root of penis suggestive of lymphocytoma	Positive ELISA for IgG and IgM, followed by western blot (IgG positive for 8/10 bands, negative for IgM)
Jairath <i>et al.</i> ^[13]	7-32 years age group, 3:2(M:F)/series of 5 cases	Haryana (North India)	History of insect bite in 4/5 cases, ECM in all cases, local lymphadenopathy in 3/5 cases; constitutional symptoms in 4/5 cases	ELISA and western blot (IgM positive in all, IgG in 2 of them)
Present case	10-year-old M/case report	Himachal Pradesh (Northern India)	History of visit to the forest area, characteristic ECM lesion on the back of the left lower leg along with lymphangitic streak on thigh with petechiae over scapular regions; local lymphadenopathy	Serology using ELISA (IgM positive and IgG negative)

M: Male, F: Female, AV: Atrioventricular, ECM: Erythema chronicum migrans, ELISA: Enzyme-linked immune-sorbent assay, NA: Not available

maximum 200 mg/day; after 8 years of age) for 2 weeks is the drug of choice in early localized disease. Amoxicillin and cefuroxime axetil are equally effective alternatives. Disseminated disease usually requires parenteral treatment with ceftriaxone, cefotaxime, or benzyl penicillin.^[6]

Only few cases of Lyme disease have been reported from India in the past. A review of various cases/studies from the country is summarized in Table 1.^[7-13] The patient in the present case had both the characteristic centrifugally spreading lesion of ECM as well as other atypical lesions in the form of lymphangitic streaks, petechiae, and maculopapular lesions. This case report highlights the possibility of future risk of Lyme disease in Himachal Pradesh and warrants the treating physicians to be aware of its occurrence in this part of the world. Identifying the cutaneous features early can help in the prevention of development of advanced disease. Awareness needs to be created among the public regarding various preventive strategies.

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Conflicts of interest

There are no conflicts of interest.

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