

Background:

Lyme disease (LD) is a multisystem infectious disease caused by the bacterium *Borrelia burgdorferi* and is transmitted primarily by the deer tick “Ixodes” [1,2]. The characteristic bull’s eye rash, erythema migrans (EM) is the most common manifestation of early Lyme disease accompanied by constitutional symptoms such as fever, headache, fatigue, arthralgia, myalgias and regional lymphadenopathy [1,3]. Rash could develop later in the course and prompt initiation of antibiotics without awaiting serology is important to make an early and full recovery [4]. Dissemination of the infection may involve the nervous system, heart and joints and additionally to the skin causing rash [1,2,3].

Our case is peculiar due to the atypical nature of the rash, along with the occurrence of systemic symptoms before the appearance of diffuse rash. There are few atypical cases reported in the literature

Age	Gender	Clinical features	Diagnosis	Treatment	Author
80	Female	Fever, confusion, headache, bilateral lower extremity weakness and an episode of stool incontinence. After 3 days, patient experienced mild right sided facial droop and a diffuse macular rash throughout the body.	CT and MRI of head and neck were negative. ELISA positive for IgM antibody which is confirmed by Western blot IgM.	Ceftriaxone for 21 days	Kantamaneni et al [4]
64	Male	4 weeks of polyarthralgia of bilateral knees, hands and neck which were previously preceded by erythema migrans rash. Despite treatment patient developed dermatomyositis and interstitial lung disease and died later in the course.	ELISA and western blot positive for Lyme disease.	2 weeks of doxycycline for Lyme disease and steroids for polyarthralgia	Nguyen et al [6]
65	Female	Flu like symptoms and non-pruritic rash on her lower limbs. On physical examination, multiple red blanching patches with a diameter of up to 20 cm were seen.	IgM positive for Lyme disease.	3 weeks course of oral doxycycline with complete resolution of symptoms on follow up visit.	Toarta et al [7]

Case Study:

This is a 58-year-old male from Pine Valley, Chemung County with past medical history of pre-diabetes, hypertension, hyperlipidemia, coronary artery disease status post PCI and CABG, obesity, sleep apnea, anxiety and depression who presented to Primary Care Clinic in July 2021 with complain of fever that lasted about 6 days associated with night sweats and chills. The fever reached as high as 104-degree F. COVID test was negative, and no source of fever was found. There were no significant findings on both the review of systems and examination. Subsequently, a resolving viral illness was suspected.

5 days later patient again presented in the clinic with rash all over the body that initially appeared on body trunk and got worse in the last 2 days. Patient did not complain of itching and was fever free. On examination, we noted erythematous large annular blanchable non-scaly patches along trunk and legs, largest patch 6.0 cm, several other smaller lesions including red blotches ranging from nickel-sized to dime sized 4 x 2 inch under the breast. Pt was started prophylactically on 100 mg Doxycycline BID and Lyme serology was ordered. Lyme titre came back positive and positive serology was later confirmed by positive IgM Western blot test. The patient was also subjected to baseline investigations that revealed increased ESR and CRP. Of note, results of the Western blot were available a few days after the skin lesions has resolved. On 2 weeks follow-up visit, the rash resolved, and the patient was asymptomatic, but the patient was asked to complete the 28-day course of doxycycline.

Discussion:

LD is the most common tick-borne infectious disease in North America and in countries with temperate climates in Europe and Asia [4]. The disease is divided into three stages, namely, early localized disease, disseminated disease, and chronic disease. EM 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 EM lesions reported include vesicles, erythematous papules, purpura, and lymphangitic streaks. Differential diagnosis of EM includes tinea corporis, urticaria, erythema multiforme and fixed drug eruptions [5]. Lyme disease manifests with clinical symptoms as early as one week to several months after bacterial infection [6].

With the incidence of Lyme disease and its atypical presentations on the rise, the physicians should be aware of the other rashes that are associated with this disease, particularly those associated with disseminated cutaneous Lyme. Early diagnosis of the disseminated forms of Lyme is critical to prevent the occurrence of life-threatening cardiovascular and neurological complications known to occur with this disease [7].

CDC recommends erythema migrans be diagnosed and treated exclusively based on compatible clinical findings [8]. The diagnosis of EM is mainly clinical with laboratory evidence acting as a supporting tool. 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 EM. It follows a two-step approach involving an initial screening test (usually ELISA) followed by a Western blot for reactive and equivocal samples [5].

- Our patient did not have the classic “targetoid” EM rash on initial presentation. Another unique feature was development of the rash after the fever subsided. Given the symptomatology and patient being from an endemic area of the United States, there was a high suspicion of early disseminated LD. Lyme serology was ordered and the patient was started on doxycycline. The symptomatology immediately improved with appropriate antibiotic treatment. A few days after the rash was resolved, the confirmatory Western blot test for LD came back positive.

- Our case highlights the fact that the suspicion of LD should be very high in endemic areas. The lack of the classic bull’s eye appearing rash and typical symptoms should not completely exclude the presence of LD. Serologic testing for antibodies is an adjunct to the clinical diagnosis and can neither establish nor exclude the diagnosis of LD. A positive or negative serologic test simply changes the probability that a patient has been infected with *Borrelia burgdorferi*. This must be interpreted in clinical context. In suspected early disseminated LD, the treatment with antibiotics should be started immediately without waiting for serology as prompt initiation of antibiotics is paramount to making a quick and a full recovery.

References:

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Image1: Large erythematous non scaly rash measuring 6 cm



Image2: Red blotches ranging from nickel sized to dime sized measuring 4 x 2 inch under the breast.