

Case Report

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Peroperative cardiogenic shock suggesting acute coronary syndrome as initial manifestation of Lyme carditis

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Abstract Carditis can complicate Lyme disease in an estimated <5% of cases, and cardiogenic shock and severe cardiac arrhythmias are described with electrocardiographic abnormalities that could be suggestive of coronary manifestations. We report a case of severe persistent biventricular heart failure complicated by cardiac arrhythmias as initial manifestation of a Lyme disease developing peroperatively electrocardiographic abnormalities suggesting acute transmural myocardial infarction. © 2016 Elsevier Inc. All rights reserved.

1. Case report

A 49-year-old man presented to the emergency department with abdominal pain secondary to subacute intestinal occlusion after a nephrectomy for renal tumor a few weeks before. Intestinal limited resection had to be performed and was complicated at the end of the operation by sudden hemodynamic instability, with shock and electrocardiographic (ECG) inferolateral lesions suggesting acute coronary syndrome confirmed by troponin dosage. The findings from the coronarographic examination performed immediately at the end of the operation were normal. Inotropic support has to be initiated to stabilize the patient situation.

On intensive care unit (ICU) admission, the patient developed severe cardiac arrhythmias with ventricular tachycardia (VT) alternating with transient bradycardia. There was no fever or erythema migrans-like rash. At ICU admission,

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http://dx.doi.org/10.1016/j.jclinane.2016.08.005 0952-8180/© 2016 Elsevier Inc. All rights reserved. repolarization abnormalities suggestive of acute coronary problem on ECG (Fig. 1A), followed by complete atrioventricular (AV) block, were present. Once stabilized, echocardiography revealed severe biventricular heart failure with a left ventricular ejection fraction (LVEF) of 12%, suggesting myocarditis (Fig. 2). An underlying sinus rhythm was present, but third-degree AV block persisted with intermittent sinus pauses. In a few instances, these had transformed into VT and ventricular flutter (Fig. 1B and C). Within 4 hours in the ICU, he developed polymorphic VT. The patient was resuscitated with intravenous magnesium, a 300-mg bolus of amiodarone, and defibrillation. Intermittent failure of the temporary pacemaker to sense and capture was evident and became more frequent. These events paralleled the continued rise in inflammatory parameters and serum C-reactive protein for the first 4 days of hospitalization and were attributed to diffuse, worsening myocardial inflammation. Nuclear magnetic resonance confirmed the severe alteration of left ventricle function associated with the presence of increased signal intensity suggesting inflammatory lesions of the myocardium and the diagnosis of myocarditis (Fig. 3). Ceftriaxone 1 g was given initially for suspected Lyme disease.



Fig. 1 Electrocardiographic (ECG) examinations. (A) ECG on ICU admission showing suggestive repolarization abnormalities developed peroperatively. (B) Third AV block with external pacing, supraventricular followed by ventricular tachycardia (VT) with resuscitation of the patient (C) several VT episodes during the first 5 ICU days.

Serum enzyme-linked immunosorbent assay and IgM Western blot were positive for Lyme disease (91 UA/mL; nL <22), without evidence of coinfection. Methylprednisolone 1000 mg was administered daily for 3 days. Hemodynamic support could slowly and successfully be withdrawn.

A second echocardiography demonstrated an LVEF between 10% and 25%. Oral vasodilators were initiated. Intrinsic conduction had improved sufficiently, but because of persistent left ventricle failure with recurrent ventricular arrhythmias, an automated implantable cardioverter/defibrillator



Fig. 2 Echocardiographic examination showing severe alterations of left ventricular function (14% left ventricular ejection fraction).

(Medtronic Protecta XT, Brussels, Belgium) was implanted after cardiac electrophysiological evaluation and failure of ablation procedures. β -Blockers and angiotensin-converting enzyme inhibitors were then initiated.

Ceftriaxone was administered for 21 days, combined with oral doxycycline during the first week. Cardiac magnetic resonance (MR) demonstrated persistent abnormal systolic function with an LVEF of 21%, and the ECG findings remained abnormal.

After 2 months, cardiac MR with gadolinium confirmed persistent altered systolic left ventricle function. Neither of



Fig. 3 Cardiac nuclear magnetic resonance demonstrates active myocarditis without evidence of giant cell myocarditis or sarcoidosis.

the cardiac MR studies revealed gross myocardial edema or fibrosis, suggesting possible complete recovery. Patients refused to be listed for cardiac transplantation.

2. Discussion

Lyme disease is the most common vector-borne infection, but cardiac manifestations are relatively uncommon. Lyme disease survey in the United States reported cardiac findings of palpitations (6.6%), conduction abnormalities (1.8%), myocarditis (0.9%), cardiac dysfunction (0.5%), and pericarditis (0.2%) [1]. From 2001 to 2010, 70 (0.8%) of 9302 confirmed that Lyme disease cases had second- or third-degree AV block. Lyme carditis has a good prognosis in patients receiving treatment, keeping with what is recommended in the guidelines, but Lyme carditis is also a rare manifestation with potentially lethal complications.

As with viral myocarditis, changes in surface ECG are a common finding in Lyme carditis. Diffuse myocardial involvement frequently results in ST-segment changes. According to the largest published study of Steere et al [2], 60% of the patients showed ST-segment depression or T-wave inversion, especially in the inferolateral leads. With clinical remission, these changes disappeared completely. Even more common than these unspecific repolarization abnormalities are AV conduction disorders that can be observed in the 12-channel ECG and 24-hour Holter ECG [3,4].

We describe in our case sudden peroperative ST abnormalities suggesting an acute coronary syndrome but rapidly followed by cardiac arrhythmia's and conduction alterations as a known complication of cardiac Lyme disease. If parenteral ceftriaxone treatment is suggested for patients with second- to third-degree AV block, guidelines for steroid administration remain undefined; reported cases of Lyme carditis have resolved without steroids. However, steroid implementation has been described for cases that exhibited consistent third-degree AV block for a minimum of 24 to 48 hours up to 1 week [2,3].

Meanwhile, acute heart failure in Lyme disease is very rare. The few studies that described severe heart failure were limited to patients having long-standing dilated cardiomyopathy. Among these patients, earlier ceftriaxone treatment may have been associated with complete recovery or improved LVEF, but the role of steroids remains unclear [4].

This patient's clinical course and treatment brought to question what caused this disease; specifically, what could be the contribution of foreign bacteria vs the immune response? Peroperative sudden decompensation associated with transient ECG abnormalities suggesting acute coronary syndrome also remains unclear. Antigen release triggered the inflammatory response, the putative pathologic entity driving the "disease" state of the patient's arrhythmias and cardiogenic shock, which could be decompensated by the surgical and anesthesiological procedures. Corticosteroids could temporally be associated, but substantial clinical improvement needs cessation of lifethreatening arrhythmias, marked decline in inflammatory parameters, and restoration of near-normal LVEF, which did not happen in the case we describe [5-8].

3. Conclusion

Peroperative shock associated with ECG abnormalities suggesting non–ST-segment elevation myocardial infarction, followed by severe biventricular failure with life-threatening ventricular and conduction arrhythmias is a not described initial manifestation of Lyme infection. Implementation of steroids seems to be considered as adjunctive therapy if inflammatory parameters acutely rise after initiation of antimicrobial treatment of Lyme carditis but should be investigated further in myocarditis therapy. Persistent ECG abnormalities could be correlated with persistent cardiac ventricular dysfunction.

Disclosures

There is no conflict of interest.

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