Introduction

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Abstract

Lyme disease is an infectious disease transmitted by ticks. One of the earliest sites of dissemination is the tissue of the heart and the cardiovascular system. In this introductory chapter we broadly cover introductory knowledge on the topic, some historical considerations, and a structural outline of the entire book.

Keywords

Lyme disease • Lyme carditis • Atrioventricular block • Myocarditis

1 Introduction

The discovery of *Borrelia burgdorferi* as the cause of Lyme disease (LD) was published in 1982 when the spirochaetal bacteria was isolated from *Ixodes dammini* ticks [1, 2]. Since that time, the geographic prevalence of this tick-vector disease has spread and it is now considered endemic amongst many regions of the northern hemisphere including Canada, the United States, Europe, and Asia [2, 3].

LD is known to affect the skin and joints, but more significantly can manifest within the neurological and cardiovascular (CV) systems. This book will focus on the cardiac manifestations of LD. The incidence of CV involvement in LD has

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A. Baranchuk et al. (eds.), *Lyme Carditis*,
https://doi.org/10.1007/978-3-031-41169-4_1

historically been between 4 and 10% [4], but its prevalence may be underestimated due to the lack of clear cardiac markers of infection (i.e. physical exam and/or surface ECG) in patients with highly suspicious or confirmed LD attending clinical offices or emergency departments [4, 5].

Lyme carditis (LC) is one of the features of early disseminated LD, usually occurring in the first few weeks [2–5]. Patients with LC can present with a myriad of clinical symptoms, which can change rapidly and cause life-threatening illness if not addressed immediately. The cardiac conduction system is the most frequently involved in LC, with nearly 90% of patients presenting with atrioventricular (AV) block [4, 6]. Several reports indicate that conduction abnormalities can fluctuate from first degree AV block (prolongation of the PR interval) to high degree AV block (triggering profound bradycardia) [6, 7]. LC can also lead to disease of the distal conduction system (bundle branch blocks), sinus node, and cause cardiac arrhythmias [6, 7]. Evolution from minor involvement to fatal manifestations may occur within hours, so cardiac monitoring is essential [7]. Additional clinical manifestations during the early disseminated phase include myocarditis, pericarditis, endocarditis and pancarditis. These cases can be severe and some of them may not respond to antibiotics, requiring the evaluation for cardiac transplantation [2, 4].

It is paramount that LC is recognized as a cause of unexpected AV block as it is potentially reversible when treated promptly with guideline-directed antibiotic therapy [9]. The importance of avoiding permanent device implantation and its potentially associated complications in otherwise young and healthy individuals cannot be over-emphasized [10]. The diagnosis and management of LC should be approached using the algorithm highlighted in this book [2, 4]. Each step will be discussed in detail to help guide clinical decision making.

This book will cover many different aspects of LC, however, readers should understand that some questions are still under active investigation. These include ideal diagnostic testing, the association between Lyme carditis and dilated cardiomyopathy, and the role of vaccination to prevent disease in those living within endemic regions. This book aims to share common strategies to help with the early diagnosis and management of LC, including the application of appropriate supportive management and avoidance of unnecessarily invasive treatment.

As science continues to advance in this area, future updates to this book will undoubtedly be required. Ongoing research is imperative to reduce the incidence and impact of LD. It is the joint responsibility of scientists, medical societies, governments, and patient/family led non-governmental organizations to change current legislation to improve LC prevention measures and secure a world with less LD.

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