



## Lyme disease And Sudden Hearing Loss: Case Report

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### Abstract

Lyme disease is a tick-borne multisystemic infection caused by *Borrelia burgdorferi*. It can be associated with involvement of cranial nerves and otolaryngologic manifestations. We report a case of women with sudden sensorineural hearing loss without other symptoms. Acute Lyme infection was detected by laboratory tests. After systemic antibiotic treatment, hyperbaric and corticoid treatment the patient showed a clear audiologic recovery. Although borreliosis has a low incidence, it should be considered as a possible aetiological factor in sudden sensorineural hearing loss.

**Keywords:** Lyme disease, Sudden hearing loss, Corticotherapy, Antibiotic

### Introduction

Lyme disease (LD) or Lyme borreliosis, one of the most prevalent vector-borne diseases in Europe, is caused by spirochetes of the *Borrelia burgdorferi* species complex, which are transmitted by several species of Ixodid ticks [1]. In Portugal, LD has been a mandatory reporting disease since 1999, but there seems to be a clear underreporting of cases, hindering its epidemiological analysis and understanding of its impact on public health in national territory [2]. LD can be associated with involvement of cranial nerves and otolaryngologic manifestations [3,4]. The most commonly affected cranial nerve is the facial nerve, causing facial palsy [3,4]. Nevertheless the VIIIth cranial nerve can also be affected, provoking sudden sensorineural hearing loss (SSNHL) [3,4].

This case report aims to describe a case of Lyme

disease where the main manifestation was unilateral SSNHL.

### Case Description

A 41-year-old woman presented with a 3 day history of left SSNHL and tinnitus with no other symptomatology. Pure tone audiometry revealed average hearing thresholds of 80 dB in the symptomatic ear, which was in accordance with criteria for SSNHL. The patient was medicated with prednisolone 1 mg/kg/day for 8 days, followed by a tapering dose. Additionally, she received 20 sessions of hyperbaric oxygenation. Taking into account that the patient has travelled recently to a foreign country it was requested the laboratory test for *Borrelia burgdorferi*. The magnetic resonance imaging revealed no abnormalities of the cranial nerves and cerebrum.

*Borrelia burgdorferi* antibodies blood tests showed positive findings for immunoglobulin M (IgM) and negative findings for immunoglobulin G (IgG). These findings were then confirmed by Western Blot. LD was then assumed and the patient started treatment with doxycycline 200 mg/day for 14 days.

Post treatment assessment showed marked audiologic recovery with no residual symptoms. The re-evaluation of serologic test showed IgM negative and IgG positive for *Borrelia burgdorferi* corresponding to a past infection.

### Discussion/Conclusion

SSNHL is a frightening symptom that often prompts an urgent or emergent visit to a clinician [5]. The most

frequently used audiometric criterion for SSNHL is a decrease in hearing of 30 decibels affecting at least 3 consecutive frequencies [6]. SSNHL affects 5 to 27 per 100000 people annually, with about 66 000 new cases per year in the United States [7]. Much of the literature indicates that 32% to 65% of cases of SSNHL may recover spontaneously [8]. Clinical experience, however, shows that these numbers may be an overestimation [5].

*Borrelia burgdorferi* infection can be asymptomatic. Symptomatic cases are potentially progressive and the clinical course has customarily been considered in terms of three stages: early, localised disease; early, disseminated disease; and late disease [1]. The initial phase usually sees erythema migrans at the site of the tick bite, characterised by an erythematous, annular and expansive rash. The patient typically experiences 'flu-like' symptoms of malaise, headache, myalgia and arthralgia. However, erythema migrans can be absent in 20 to 50 per cent of cases, with neuroborreliosis or arthritis being the first manifestation of LD. *Borreliae* can disseminate haematogenously or directly to other organs and tissues. It can cause general systemic symptoms and signs, affecting the nervous system causing facial palsy, skin, joints and heart [9]. In Portugal, neuroborreliosis is the most common clinical manifestation of Lyme disease [2].

The correlation between LD and SSNHL is not well known. However, SSNHL can be seen in neuroborreliosis. In a group of 165 patients with a diagnosis of sudden hearing loss, serology was positive for *Borrelia burgdorferi* in 12 per cent of cases and *Borrelia burgdorferi* was 6 times more prevalent in this patient group than in the general population residing in the same area [10].

In the presented case, blood tests revealed recent Lyme infection, a positive IgM result, which was confirmed by Western blotting. Consequently, doxycycline was prescribed as the SSNHL was

considered a symptom of the initial stage of Lyme disease. Nevertheless, the patient started corticosteroid and hyperbaric oxygen treatment immediately, in order to prevent excessive delay until blood tests results were available and confirmed the infection. Our case report provides evidence for the relationship between SSNHL and Lyme disease and its recovery after properly treatment.

Recently published guidelines regarding SSNHL do not recommend obtaining routine laboratory tests [5]. However, LD should be considered in higher risk individuals and/or in areas where incidence is high.

SSNHL is a rare symptom of LD and it can occur without neuropathy. In this study blood tests were positive for *Borrelia burgdorferi*.

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