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## Original Research Article

## Lyme disease in Poland – A serious problem?



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## ABSTRACT

**Purpose:** We evaluated the clinical picture of patients hospitalized with Lyme disease (LD). Additionally, we analyzed the possible cause of sudden rise in LD incidence in Poland.

**Materials and methods:** We retrospectively analyzed medical documentation of patients admitted to the Department of Infectious Diseases and Neuroinfections, Medical University in Białystok in 2013 with suspicion of LD.

The collected data featured patients' age, gender, occupation, symptoms, clinical form of LD and final diagnosis. Additionally 38 patients with diagnosed LD and chronic joint pain, with no improvement after previous antibiotic treatment, completed the survey.

**Results:** In 2013 overall 378 patients were admitted to our Department with suspicion of LD. Neuroborreliosis (NB) was confirmed in 10 out of 42 patients. Acrodermatitis chronica atrophicans (ACA) was confirmed in 5 cases. As far as patients with joint pains are concerned – in 4 cases Lyme arthritis (LA) was diagnosed, in 174 the serology and clinical symptoms indicated possibility of active infection, in 153 patients no features of active infection were found.

The majority of surveyed patients had BMI over 25, they suffered from many chronic diseases, e.g. osteoarthritis, hypertension, diabetes.

**Conclusions:** The reported incidence of LD in Poland, in our opinion, may be biased by overreporting and overdiagnosis. Nonspecific musculoskeletal and joint pain are the most frequent cause of LD suspicion and hospitalization. There is a necessity of better tests for active LD confirmation (especially in patients with musculoskeletal pain) as seroprevalence of anti *Borrelia burgdorferi* antibodies is high in endemic regions.

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## 1. Introduction

Lyme disease (LD) is one of the most known tick borne diseases in USA and in Europe. The disease is caused by *Borrelia burgdorferi* sensu lato and transmitted by *Ixodes ricinus* or related ticks. There are many possible clinical manifestations of LD which can be divided into early localized LD (*Erythema migrans* – EM, Borrelial lymphocytoma), early disseminated LD (*Lyme arthritis* – LA, *Neuroborreliosis* – NB, *Lyme carditis*) and late LD (*Acrodermatitis chronica atrophicans* – ACA, late forms of NB and LA) [1–3].

Various *Borrelia* species possess different organotropisms and may preferentially cause distinct clinical manifestations of the disease. In Europe, where *B. afzelii* and *B. garinii* are the most common causes of LD NB is the most common manifestation of

disseminated LD, occurring in 10–15% of all LD cases [1,4,5] while the symptoms of arthritis are present in 3–15% of cases of LD [6].

In Poland the prevalence of *Borrelia* species varies depends on the region. Stańczak et al. who examined ticks in eight different Polish provinces reported *B. afzelii* to be the dominant species in Poland. However *B. burgdorferi* sensu stricto seems to be the most frequent species in Lubelskie Province and in Western Pomerania region [7–9].

There is no accurate data of LD epidemiology in Europe because few countries have made this disease mandatorily notifiable. It is estimated that the annual number of cases in Europe is 65,400 (incidence rates per country range from less than one per 100,000 population to about 350 per 100,000 population) [10,11].

In Czech Republic the average incidence is 29 per 100,000 population, in Germany – 25/100,000, Lithuania – 25/100,000, Slovenia – 150/100,000, Slovakia – 18.4/100,000, Norway – 2.8/100,000 [12].

In Poland LD is mandatorily notifiable to the Epidemiologic Station, therefore more precise data are available.

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According to National Hygiene Institute in 2013 there were 12,779 cases of Lyme disease reported (incidence 33.12) while in 2012 it was 8783 cases (incidence 22.8) and in 2011–9170 cases (incidence 23.8). On the base of these numbers one can conclude that LD is a serious problem in Poland. Moreover its incidence rose significantly between 2012 and 2013 [13].

Podlaskie Voivoidship is a region of highest incidence of LD in Poland (2013–100.2/100,000).

Bialystok is the main city in Podlaskie Voivoidship. Department of Infectious Diseases and Neuroinfections of Medical University of Bialystok is a reference center for tick-borne diseases. Each year a few hundred patients are admitted with a suspicion of LD for diagnosis and treatment (90–95% of these patients are inhabitants of Podlaskie Voivoidship).

Even though in Europe NB is a more frequent clinical form than LA, the majority of patients suspected of LD suffers from joint pain. Many of these patients have been previously treated for LD although they have not fulfilled diagnostic criteria. Also no differential diagnosis was performed even if patients did not improve after antibiotic treatment.

In our opinion, as these patients were reported to the Epidemiologic Stations, it is possible that it significantly biased the statistics of LD in Poland.

The main goal of the study was the evaluation of clinical picture of patients hospitalized with LD.

Additionally, we tried to analyze the possible cause of sudden rise in LD incidence in Poland.

## 2. Materials and methods

### 2.1. Patients and methods

We retrospectively analyzed the medical documentation of patients admitted to the Department of Infectious Diseases and Neuroinfections, Medical University in Bialystok in 2013 with a suspicion of LD. Podlaskie Region is an endemic region for tick borne diseases with the highest incidence of LD in Poland and most of these patients are at some point diagnosed and treated in – the Department or Outpatient Department.

All patients were tested for presence of anti *B. burgdorferi* IgM and IgG antibodies with ELISA (Biomedica) and positive results were confirmed with Western blot.

In patients with a history of LD the results were compared with previous examinations and in case of significant antibody titer rise reinfection was considered.

Lyme arthritis was diagnosed in patients with serological features of active *B. burgdorferi* infection with recurrent or long lasting large joint pain and swelling.

Neuroborreliosis was diagnosed in patients with positive serology, typical neurologic symptoms (meningitis, radiculitis, cranial nerves paresis) and intrathecal synthesis of antibodies (Immunoblot). Peripheral NB was diagnosed in cases with no inflammatory changes in the CSF, but with neurologic symptoms such as neuropathies and positive serology.

Acrodermatitis chronica atrophicans was diagnosed in patients with typical skin lesions (red or bluish-red lesions, usually on the extensor surfaces of the extremities), positive serology and typical histological appearance.

In patients with serological features of active infection and joint pain (but who did not fulfilled LA criteria) LD diagnosis was favored when there was no obvious alternative diagnosis.

All the patients admitted in 2013 with a suspicion of LD were included in the study. The collected data featured patients age, gender, occupation, symptoms, clinical form of LD and final diagnosis. Data about the number of patients with EM were obtained from the Outpatient department.

From this group we selected 38 patients with diagnosed LD and chronic joint pain (>1 year), with no improvement after previous antibiotic treatment. All patients that fulfilled the aforementioned criteria completed a survey. The questions included patient's age, sex, BMI, antibodies dynamics, number of times the patient was treated because of LD (antibiotics, rehabilitation), concomitant diseases and the symptoms patient connects with LD.

The data concerning LD and tick borne encephalitis (TBE) incidence in Poland and in Podlaskie Voivoidship were acquired from the National Hygiene Institute.

### 2.2. Statistical analysis

Two-sided test for a given proportions with Yates' continuity correction (Yates' chi-square test) was used to examine whether there were statistically significant differences in the diseases' occurrence when comparing consecutive years of the study.

## 3. Results

### 3.1. General results

The analysis of yearly changes in reported cases of LD and TBE shows that there are significant differences in the epidemiology of LD in Poland and either TBE in Poland or LD in Podlaskie Voivoidship (Table 1).

The number of patients with LD and past LD (discharged with ICD10 code A69.2 and reported to Epidemiologic Station) in 2013 was lower than in 2012 (328 vs 334 cases). The highest number of patients reported from our Department was in 2007 – 511 cases (Fig. 2).

### 3.2. Clinical results

In 2013 overall 378 patients were admitted to our Department with a suspicion of LD. In this group 42 patients presented with neurological symptoms and were suspected of NB, 5 patients were suspected of ACA and 331 presented with joint pains. NB was confirmed in 10 out of 42 patients. ACA was confirmed in all 5 cases. As far as patients with joint pains are concerned – in 4 cases LA was diagnosed, in 174 the serology and clinical symptoms indicated possibility of active infection, in 153 patients no features of active infection were found.

The number of EM patients treated in the outpatient Department was lower in 2013 than in 2012 (98 vs 109).

NB was diagnosed in 5.2% (10 patients) of patients who were diagnosed with LD (Fig. 3). The mean age of NB patients was  $58.7 \pm 12.1$  years. In this group 9 patients presented with meningitis, in 1 peripheral NB was diagnosed. Banwarth's syndrome (meningoradiculitis) was observed in 3 patients.

**Table 1**

Statistical comparison of yearly changes of LD incidence in Poland with either LD incidence in Podlaskie or TBE in Poland.

Years	2005/6	2006/7	2008/9	2009/10	2010/11	2011/12	2012/13	2013/14
LD Poland/LD Podlaskie	$p < 0.05$	$p = 0.21$	$p < 0.05$	$p < 0.05$	$p < 0.05$	$p = 0.83$	$p < 0.05$	$p < 0.05$
LD Poland/TBE Poland	$p = 0.09$	$p < 0.05$	$p < 0.05$	$p < 0.05$	$p = 0.076$	$p < 0.05$	$p = 0.26$	$p < 0.05$

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