LYME DISEASE-CERTAINTY AND CONTRADICTIONS

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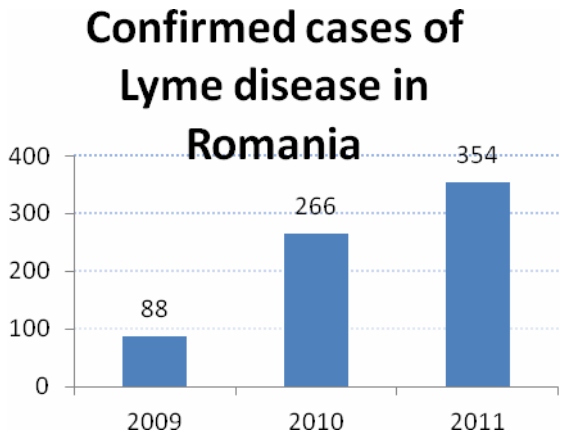
Abstract
Lyme disease is an infectious disease produced by inoculation of infected ticks' spirochete by one Borrelia species. After producing the infection within several weeks, the pathogens can spread by blood-to other areas of the body (nervous system, joints, heart device) producing nonspecific symptoms. The hosts of the ticks are wild and domestic animals found all over our country. Knowing the disease symptoms and its impact on the population health, we appreciate the importance of controlling and monitoring the distribution of ticks and wildlife carriers, and the prophylactic and therapeutic measures. By the end of the century is assumed that the global average temperature will rise by 1.0 to 3.5 ˚ C that will cause changes in the mode of transmission by vector-borne diseases. Lyme disease is the most common vector-borne disease in Europe and, according to the studies conducted over the past three years, there is a growing trend of the confirmed cases in Romania.

Key words:
Tick, Lyme disease, Borrelia Burgdorferi, symptoms, Ixodes ricinus

INTRODUCTION

Romania is included in the spread area of Lyme disease. *Borrelia Burgdorferi* has as natural reservoir the wildlife (deer, deer, rodents, wild boar). Due to the spread area of these wild species may bear Borrelia, there is likely to find the disease caused by this spirochete in any geographic area. Romania is included in the spread area of Lyme disease. *Borrelia Burgdorferi* has as natural reservoir the wildlife (deer, deer, rodents, wild boar). Due to the spread area of these wild species may bear Borrelia, there is likely to find the disease caused by this spirochete in any geographic area of the country.

In 2010, in our country, have been confirmed 47% of the 566 suspected cases of borreliosis. The incidence of the disease in 2010 was 1.5 ‰ to 0.5 ‰ in 2009, almost 3 times higher. (Fig.1) In 2011 there were 861 suspected cases of borreliosis and were confirmed 41.1%, more with 52% from a year earlier. The number of confirmed cases increased by 34.6% and of those probable by 47%. (Fig.2).



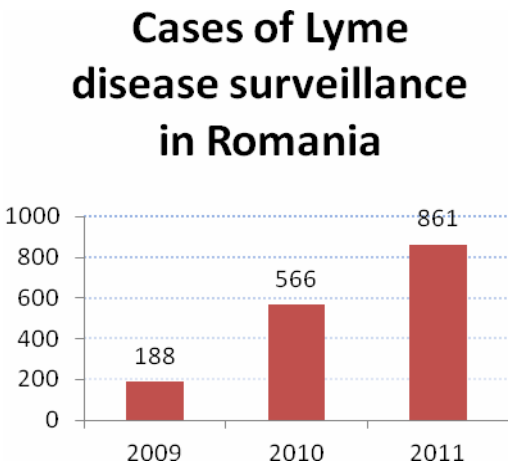


Fig. 1 Supervised cases

Fig. 2 Confirmed cases

The increasing of the disease incidence in our country is due to the following factors: reforestation and increasing the deer population, withdrawal of people in the suburban and rural areas, spread of the infected ticks into the new geographical areas and, finally yet importantly, the global average warming. There has been no fatal case of Lyme disease. The analysis of the cases by age, gender, revealed that Lyme disease occurred predominantly in the patients between 25-65 years, the women exceeding about 3 times the number of men, about 70% from urban areas. (National Center for Surveillance and Control of Infectious Diseases). In Romania are granted certain *endemic areas*: Sibiu, Harghita, Alba, Botosani, Iasi, Satu Mare, Salaj. (Fig. 3)

MATERIAL AND METHODS

They performed a systematic research of PubMed (1990-2011), Medline and Medscape (until 2010) using as search terms: Lyme disease, *Borrelia Burgdorferi*, symptoms, *Ixodes ricinus*. They have included in evaluation the significant prospective studies that analyze Pathogenesis, psychopathology, symptoms, and prevention of infection with *Borrelia Burgdorferi*, and medical approaches that can be made for borreliosis and aspects of its impact on human life.

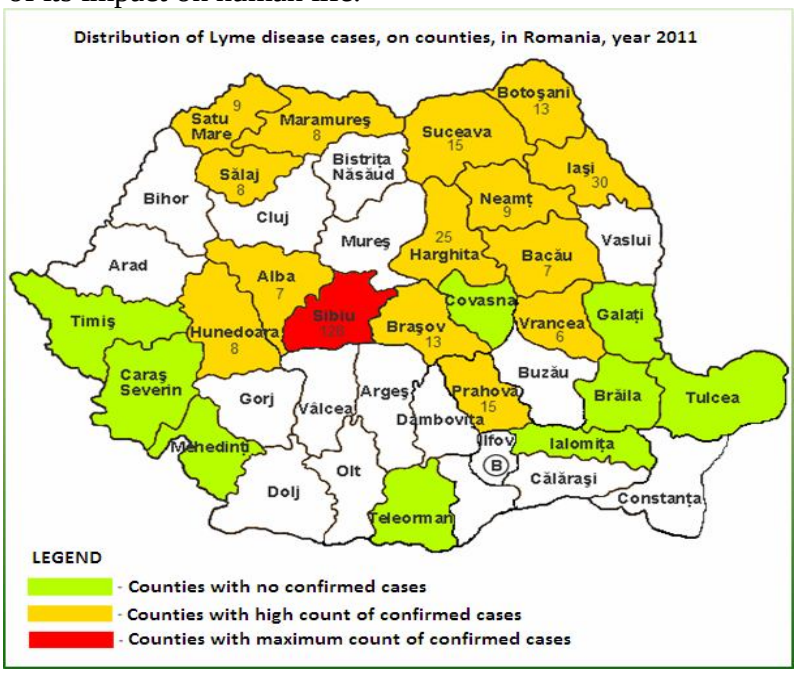


Fig. 3 Distribution on counties of the confirmed cases of Lyme disease in 2011 (source CNSCBT)

RESULTS AND DISCUSSION

From a pathogenic point of view, there are three genomic groups characteristic for certain geographical areas and predominant clinical manifestations: *Borrelia Burgdorferi* (North America and Europe-arthritis), *Borrelia Garinii* (Bannwarth-meningitis syndrome, polyneuritis), *Borrelia Afzelii* (Africa-African chronic dermatitis, Europe). The vectors carrying Borrelia are the *Ixodes ricinus* ticks that are presenting three development stages: larva, nymph, adult, and its life during are 2 years.

Nymphs most often infect people in spring and early summer and the adult forms infect fewer in autumn, winter, and early spring. The disease is not contagious, is not transmitted from person to person and only 1-3% of all tick bites are followed by the emergence of Lyme disease.

Humans are accidental hosts of *Borrelia Burgdorferi* and do not contribute to their maintenance in nature. The statistics data of the National Center for Surveillance and Control of Infectious Disease (Fig. 4) reveals that borreliosis occurs predominantly between 30-70 years, but seen in children, too, especially between 5 and 9 years.

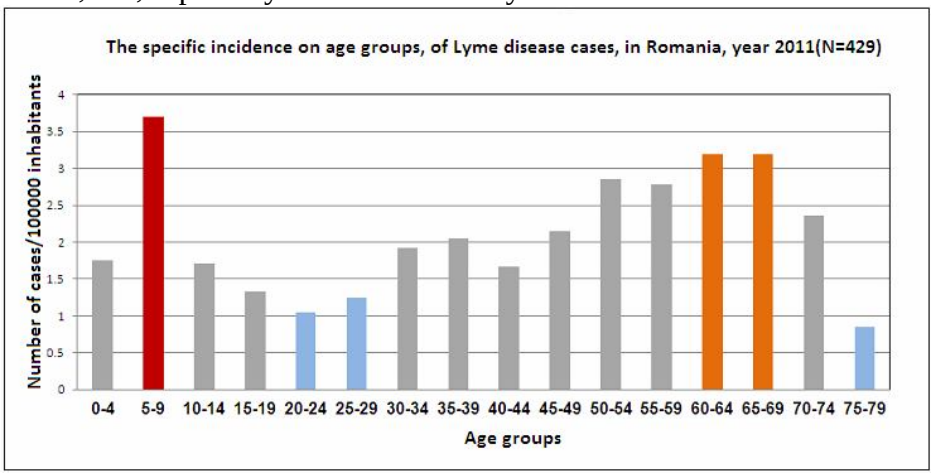


Fig. 4 Age distribution of Lyme disease (Source CNSCBT)

Lyme disease distribution analysis for 2011 (Fig. 5), reveals that women are more affected than men, the specific incidence of borreliosis being 2.5 ‰ $_{0\ 0}$ in urban, almost double that in rural areas (1.4 ‰ $_{0\ 0}$) (Fig. 6).

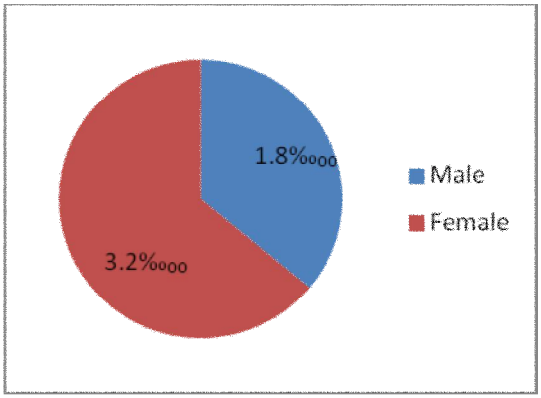


Fig. 5 Gender distribution of Lyme disease (Source

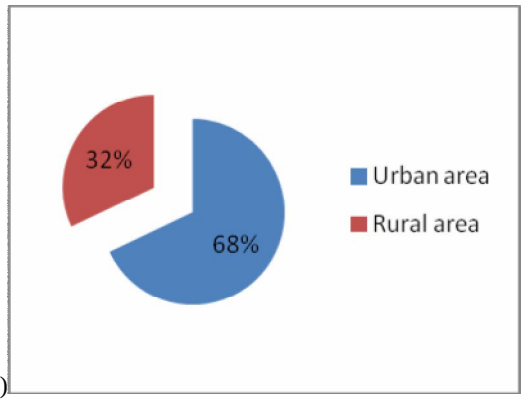
CNSCBT) 

Fig.6. Zonal incidence of Lyme disease in Romania

Contacting borreliosis ***risk factors*** are the following: living conditions in nature or visiting the areas with high density of infected ticks, recreation activities or outdoor occupations, presence of pets. The tick species vary in appearance and distribution: Ixodes scapularis, Ixodes scapularis, Ixodes pacificus, Ixodes ricinus, Ixodes persulcatus.

A study by Coipan E.C. and Vladimirescu A.F. (3) reveals that of 200 cases of tick bites examined in Sibiu, *Borrelia Burgdorferi* was identified in 19% of patients, the subtypes *Borrelia Garinii* in 20% and *Borrelia Afzelii* in 80% of cases. A survey of USAMV Cluj-Napoca (11) is the first in Romania that indicates the infection with *Borrelia Burgdorferi* to hedgehogs, dogs and horses. The vertebrate species involved as hosts-tank for Borreliain in Romania, according to this study are: reptiles (*Lacerta agilis, Lacerta viridis, Zootoca vivipara*), birds (*Crex crex, Parrus major, Sturnus vulgaris, Turdus merula, Turdus philomelos*) and mammals: rodents (*Arvicola terrestris, Sciurus vulgaris*), insectivore (*Erinaceus europaeus*), carnivores (*Canis aureus, Canis familiaris, Canis lupus, Felis Catus, Vulpes vulpes*), ungulates (*Capra hircus, Capreolus capreolus, Equus caballus, Sus scrofa ferus)* , bats *(Myotis alcathoe, Rhinolophus Euryale)* and man *(Homo sapiens).* Two studies performed in Bulgaria and Czech Republic (5) (I.S. Zarkov and M.M. Marinov, 2003), (6)(K. Pejchalová, A. Žákovská, K. Fučík, et all.,2006) have brought new data on this B. burgdorferi in dogs, sheep and cows.

Lyme disease is also called the "*disease of a thousand faces*" because it mimics a number of other conditions such as chronic fatigue syndrome, fibromyalgy, flu, arthritis, multiple sclerosis, Parkinson's disease, Alzheimer's disease, inflammatory rheumatic or other serious diseases.

Fig. 7 Ixodes ricinus tick

The early-located stage I lasts 3-30 days after the tick bite (Fig. 7), and the incubating period of the disease is up to a month. Of the symptoms and signs characteristic of this period are as follows: fatigue, chills, fever, headache, neuralgia, lymph nodes, arthralgia, rash (80-90%).

The disseminated early stage (days or weeks after the tick bite) shows the following characteristics: erythema migrans in other areas of the body, palpitations, insomnia, dizziness, hearing loss, Bell's palsy (loss of muscle tone on one or both sides of the face), severe headache and neck stiffness due to the secondary meningitis, pain and swelling at the large joints level, heart damage. The disease symptoms may disappear after weeks or months without treatment, but untreated can cause additional complications.

The serological tests are often diagnostic confusion factors. The serological results are often negative, if tested in the first weeks of evolution of the infection, subsequent the serological tests become positive due to the emergence in the circulation of the specific antibodies directed against *Borrelia Burgdorferi* (2)(Centers of Disease Control, 1995).

They are sometimes asking the following question: ***is there the Lyme disease post syndrome (PTLDS)?***

Yet we cannot answer for sure because about 10-20% of the patients with Lyme disease have symptoms that persist for months or years after the initial treatment with antibiotics: muscle pain, cognitive defects, sleep disturbance or fatigue.

An often-quoted study (7)(Phillips SE, Mattman LH, Hulinska D, Moayad H, 1998) supports the hypothesis of persistent of the infection with *Borrelia Burgdorferi*. They have indicated that *Borrelia Burgdorferi* was detected in the blood samples of 43 of 47 patients who received prolonged treatment with antibiotics for the chronic Lyme disease (91%). The good news is that the patients with PTLDS usually feel better in time; the less good news is that it may take time to feel better.

Another question remains undecided: ***is there chronic Lyme disease?***

Some studies (1)(Cameron D, Gaito A, Harris N, 2004) show that it is possible that the patients diagnosed with chronic Lyme disease is actually repeated cases infected through repeated bites of ticks, which leads, of

course, to persistent symptoms. The supporters of the chronic Lyme disease diagnosis (8)(Reid MC, Schoen RT, Evans J, et all. 1998), (9)(Steere AC, Taylor E, McHugh GL, et all. 1993), and (10)(Sigal LH, 1990) do not consider necessary the objective clinical or laboratory evidences as a diagnostic criteria. Other studies (4)(Henry M. Feder, Jr., M.D., Barbara J.B. Johnson, Ph.D, et all. 2007) argue that the chronic Lyme disease symptoms can be the consequences of the initial infection, rather than the persistence of the bacterial infection. Certainly, more data and extended monitoring of patients diagnosed with borreliosis are necessary. The risk to develop the Lyme disease after a tick bite is statistically low, so that the routine antimicrobial prophylaxis is not indicated for the people bitten.

The vaccination against the Lyme disease is not included in the traditional vaccination schemes applied in our country; the vaccine is usually made on request. Such a vaccine is "Merilym" obtained from cultures of inactivated borrelis administered subcutaneously at doses of 1 ml at 12 and, respectively 17 weeks, with annual booster before the activity season of ticks. The ticks control as prophylactic means may be achieved by several methods: wildlife-monitoring (food source and host for ticks), the control of the environment (vegetation cleared, grass cut, gathered leaves, wood kept away from home, stone walls without vegetation), biological control (protection *Hunterellus hookers* - small wasp, natural enemy, well studied, the deer tick).

The Lyme disease prognosis is favorable. The most common reason for the lack of response to the antimicrobial therapy in the patients with borreliosis is usually a misdiagnosis. The symptoms (fatigue, arthralgia, myalgia) may persist for several weeks after completion of the antimicrobial therapy and are resolved spontaneously without additional antimicrobial therapy.

The early treatment can be effective, but the disease is more difficult to treat in the advanced stages when mobility deficits can occur due to the chronic pain, inability to concentrate or think clearly, mood swings and psychosis, leading to a rift in the family life, job loss, and impaired quality of life.

C O N C L U S I O N S

Following the epidemiological studies carried out in Romania, they found that the ticks of the species *Ixodes ricinus* are predominant; the main vector of the Lyme disease in our country, data that were confirmed by the R. C. Party and the most commonly genotype involved in the disease etiology is *Borrelia Afzelii.* The endemic areas in Romania are the counties of Sibiu, Harghita, Alba, Botosani, Iasi, Cluj, Satu-Mare, Salaj, but the

R.C.P.and serological results indicate as areas with the Lyme disease also the following localities: Cluj-Napoca (CJ), Arini (BV), Cuca (AG), Goleşti (VL), Sfântu Gheorghe (CV), Ceatalchioi, Sălcieni, Maliuc, Satu Nou, Visterna (TL), Nuntaşi, Săcele (CT).

The number of the confirmed cases of borreliosis in our country has increased statistically significantly over the past three years. The analysis by age-specific incidence of Lyme disease revealed that the disease is more common in children aged 5-9 years and adults between 60-69 years. Borreliosis incidence is higher in the urban areas (2.5% □ □ □), almost double as that of the rural areas (1.4% □ □ □) and higher in the northern half of the country from the south zone. The patients, who were once sick of borreliosis, will remain seropositive for a period of several years, even if they have received appropriate treatment. The Lyme disease prognosis is favorable. There was no fatal case of borreliosis. The laboratory tests for detecting the presence of infection with spirochetes are imprecise and inaccurate, and, in both animals and people, the clinical picture is inconclusive and the symptoms that appear are contradictory.

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