

AWARENESS OF LYME BORRELIOSIS OF THE PATIENTS OF TERNOPIL REGIONAL TB DISPENSARY

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Background. Lyme disease has many clinical features similar to those in sarcoidosis and tuberculosis. Epidemiological data in the world, in particular in Ukraine, proves the increase in Lyme borreliosis incidence. Ternopil region is endemic with Lyme borreliosis.

Objective. The research was aimed to investigate the prevalence of infection with *Borrelia burgdorferi* and epidemiology features of borreliosis among the patients of Ternopil Regional TB Dispensary.

Methods. In total, 29 patients were admitted to Departments of Differential Diagnostic, TB Therapy and TB Surgery of Ternopil Regional TB Dispensary in October 2016-January 2017. All the surveyed answered the questions of an integrated international questionnaire, where they noted the area and a number of tick bites, described the removal method, noted the survey for borreliosis pathogen and complaints after tick bites.

Results. It was established that 5 respondents had a history of tick bites episodes, but only in one case the patient was examined of borreliosis. Tick bites were noticed in 3 patients with sarcoidosis and 1 with tuberculosis (TB) and exudative pleurisy, respectively.

Conclusions. The absence of appeals for medical care, lack of sufficient information on Lyme borreliosis and disuse of preventive measures for tick bites by the interviewed patients of Ternopil regional TB dispensary departments proves the need of improvement of health education on Lyme borreliosis (LB) among this category of population. 24 (82.7%) of 29 respondents did not remember the tick bite. The symptoms of (LB) are similar to those in sarcoidosis and tuberculosis (pleural lesions, heart, joints, nervous system, skin), and the presence of tick bites gives the reasons to examine these patients of *Borrelia burgdorferi* *senso lato*.

KEY WORDS: Lyme borreliosis; survey; sarcoidosis; tuberculosis; granulomatous diseases; Lyme disease; *Borrelia burgdorferi*.

Introduction

Lyme disease (systemic tick borreliosis, Lyme borreliosis, chronic migrating erythema, clip erythema) is defined as the natural cell transmissible disease that is caused by *Borrelia burgdorferi* and is manifested with erythema migrans, fever, lesions of the central and peripheral nervous systems, heart and large joints [1, 3] Spirochetes are carried by Ixodes tick. The epidemiological features of LB in the world, in particular in Ukraine, proved the annual incidence increase [5, 12, 15, 17]. Due to the location in the zone of moderate continental climate with warm humid summers and mild winters, chernozem, broadleaf and mixed fo-

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rests, the territory of Ternopil region is endemic with LB.

Spring-summer seasonality is usual for tick bites. But in recent years for Ixodes ticks winter diapause takes place earlier, and seasonal activity continues till the third week of November, which leads to an increase in the number of ticks and, consequently, a large number of attacks on people. In 2016 the first tick bite in Ternopil happened on the third week of February. During 10 months of 2016 1,211 cases of tick bites (in all districts of Ternopil region) were compared to 1289 in the same period of 2015. According to the primary urgent messages in 2016 135 cases of Lyme disease were registered compared to 100 in the same period in 2015 [11].

According to the literature, *Borrelia burgdorferi* can act as a potential cause of systemic granulomatous disease such as sarcoidosis [2,

4, 13, 14]. However, sarcoidosis can be caused by other etiological factors: infections (viruses: herpes, Epstein-Barr, retrovirus, coxsackie B virus, cytomegalovirus, bacteria: Propionibacterium acnes, Mycobacterium tuberculosis and other mycobacteria, Mycoplasma), inorganic (beryllium, zirconium and aluminum) and organic (pollen, clay) agents [2, 4, 7, 10, 16]. Lyme disease has many symptoms similar to those in sarcoidosis and tuberculosis (lesions of pleura, heart, joints, nervous system, skin) [6, 8, 9, 18]. Assumptions about of borreliosis and sarcoidosis connection are based on the geographical spread of both diseases and family manifestations of these diseases [2, 4, 13]. Therefore, the accuracy of sarcoidosis diagnosis depends on the thorough surveys of the patients with potential contact to organic and inorganic antigens [2, 10].

The objective of the study was to investigate the prevalence of Borrelia burgdorferi infection and epidemiological features of borreliosis among the patients of Ternopil Regional TB Dispensary. The survey is a part of a joint Ukrainian-Polish project "Research on the epidemiology, pathogenesis, clinical manifestations and prophylaxis of borreliosis" together with the Pope John Paul II State School of Higher Education in Biala Podlaska (Poland) within the research projects of the European Union.

Methods

In total, 29 patients were admitted to the Departments of Differential Diagnostic, TB Therapy and TB Surgery of Ternopil Regional TB Dispensary in October 2016-January 2017. The age of the respondents ranged from 20 to 65 years old. There were 17 (58.6%) men, 12 (41.4%) women. All the surveyed answered the questions of an integrated international questionnaire, where they noted the area and a number of tick bites, described the removal method,

noted the survey for borreliosis pathogen and complaints after tick bites. The patients of Ternopil Regional TB Dispensary departments also informed about the use of repellent at the entrance to the forest zone and the checking the skin after leaving it. The analysis of patients' awareness and media data about borreliosis, according to the questionnaires, proved the need of enhancement of their knowledge of Lyme disease or other diseases associated with tick bites.

Results

Among the respondents city residents prevailed: 18 men (62.1%), 11 (37.9%) rural residents. Due to the nosology there were 17 (58.6%) of the patients submitted with sarcoidosis, 5 (17.2%) with pulmonary tuberculosis and 7 (24.1%) with pulmonary tuberculosis complicated with exudative pleurisy. 23 (79.3%) of the respondents suffered from chronic diseases.

Among the surveyed 29 patients 5 (17.3%) of the respondents noted the tick bites, 24 (82.7%) did not remember the episode of bite. One respondent noticed the appearance of the erythema on the site of the bite within 12 hours.

5 respondents described the localization of tick bites. It should be noted that the most common tick bites the patients noticed on the trunk (2) and lower limbs (2). Only one person noticed tick bites on the abdomen. Most of the bites took place in the forest - 4, in rural areas - 1.

All the patients removed the tick by themselves (with fingers) within to 12 hours after the bite. The patients with erythema migrans or other symptoms did not ask for medical aid. According to the survey, only one respondent was examined to borreliosis. The diagnosis was confirmed by western blot and the patient was treated with macrolide antibiotics.

According to the results of the survey the awareness of borreliosis in patients of Ternopil Regional TB Dispensary is insufficient.

Table 1. Characteristic features of the patients

| Nosology | Number of patients | Number of patients % | Information about episode of tick bite | Information about the mites (patients) surveyed on Lyme borreliosis |
|--|--------------------|----------------------|--|---|
| Sarcoidosis | 17 | 58.6 | 3 | 1 |
| Pulmonary tuberculosis | 5 | 17.2 | 1 | - |
| Pulmonary tuberculosis complicated with exudative pleurisy | 7 | 24.2 | 1 | - |
| Total | 29 | 100 | 5 | 1 |

Table 2. Multiplicity of tick bites

| Multiplicity of tick bites | Number of tick bites (n=5) | Number of tick bites, % |
|----------------------------|----------------------------|-------------------------|
| 1 time | 2 | 40 |
| 2 times | 1 | 20 |
| many (3 and more times) | 2 | 40 |

Table 3. Localization of tick bites

| Localization of bite | Number of bites (n=5) | Number of bites,% |
|----------------------|-----------------------|-------------------|
| hands | - | - |
| legs | 2 | 40 |
| trunk front back | 2 | 40 |
| abdomen | 1 | 20 |
| neck | - | - |

Quality medical history of illness and examination of patients is important for differential diagnosis of granulomatosis and LB for timely adequate therapy. Incorrect or late diagnosis of LB may cause the development of complications in patients [3, 5, 15].

Discussion

According to the literature, tuberculosis and sarcoidosis histologically belongs to granulomatous diseases, which are based on caseous and non caseous granuloma. While tuberculosis agent is verified, sarcoidosis is a systemic disease which aetiology is still unknown [2]. However, according to the literature, the probable causes of sarcoidosis may be *Mycobacterium tuberculosis*, *Borrelia burgdorferi*, *Propionibacterium acnes* and others [13].

Epidemiological data in the world, in particular in Ukraine, prove the increase in Lyme borreliosis incidence. The situation concerning TB also remains difficult, especially due to the spread of drug resistant TB. Ternopil region is endemic with Lyme borreliosis, due to the location in the zone of broad leaf and mixed forests. [3, 5, 15].

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However, Ukraine has no data determining *Borrelia burgdorferi* infection in patients with granulomatous respiratory diseases, including sarcoidosis and tuberculosis. Thus, it is an urgent matter to examine the prevalence of *Borrelia burgdorferi* infection in patients with sarcoidosis and tuberculosis, because Lyme disease has many clinical features similar to sarcoidosis and tuberculosis (pleural lesions, heart, joints, nervous system, skin) [7, 8, 14].

Conclusions

The absence of appeals for medical care, lack of sufficient information on Lyme borreliosis and disuse of preventive measures for tick bite by the interviewed patients of Ternopil regional TB dispensary departments, proves the need of improvement of health education on Lyme borreliosis among this category of population. 24 (82.7%) of 29 respondents did not remember the tick bite.

Lyme borreliosis symptoms are similar to those of sarcoidosis and tuberculosis (pleural lesions, heart, joints, nervous system, skin), and tick bites give the reasons to examine these patients of *Borrelia burgdorferi* *senso lato*.

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