Streszczenie w języku angielskim

Introduction:

Podlaskie voivodeship for years has been an endemic region for tick borne diseases: Lyme disease and tick borne encephalitis. Morbidity of these diseases is several times higher than in rest of Poland. Ticks can also transmit other rare pathogens such as *Coxiella burnetii* and SFG *Rickettsia spp.* Foresters and farmers are groups with frequent exposition to tick bites and therefore are especially endangered to tick borne diseases development.

Aim:

The aim of the study was epidemiological and clinical assessment of risk of infection with rare tick-borne pathogens (*Coxiella burnetii* and SFG *Rickettsia* spp.) in inhabitants of north-eastern Poland with proffesional exposure to tick bites.

The aim of the study was achieved through:

1. Evaluation of the anti-*Coxiella burnetii* antibodies and anti-SFG *Rickettsia* spp. antibodies presence in inhabitants of the Podlaskie Voivodeship: foresters and farmers exposed to ticks.

2. Evaluation of the incidence of symptomatic infections caused by *Coxiella burnetii* and SFG *Rickettsia* spp. in patients hospitalized at the Department of Infectious Diseases and Neuroinfections, Medical University of Bialystok after tick bites.

3. Evaluation of the incidence of *Coxiella burnetii* and SFG *Rickettsia* spp. co-infections with other known tick pathogens: tick-borne encephalitis virus, *B. burgdorferi* sl and *A. phagocytophilum* among patients treated at the Department of Infectious Diseases and Neuroinfections, Medical University of Bialystok.

Research results will allow to assess the legitimacy of including these diseases in the routine differential diagnosis of fever after tick bites.

Materials and methods:

The study was carried out in two stages:

Stage I: serological tests aimed at assessing the presence of anti-*C. burnetii* and anti-SFG *Rickettsia* spp. antibodies in persons exposed to frequent tick bites

Stage II: molecular tests for *C. burnetii* and *Rickettsia* spp., which included patients hospitalized at the Department of Infectious Diseases and Neuroinfections, Medical University of Bialystok.
Serological tests were performer in 184 people:

- • Group Ia - 82 foresters from the Podlaskie Voivodship: 4 women and 78 men in the mean age: 47.2 ± 15.7 years.

- • Group IIa - 82 patients, farmers from the Podlaskie Voivodship, hospitalized at the Department of Infectious Diseases and Neuroinfections, Medical University of Bialystok in 2015-2018 with various symptoms after tick bites: 36 women, 46 men in the mean age: 50.2 ± 16.7 years.

- • Group IIIa - 20 honorary blood donors from the Regional Blood Donation and Blood Medicine Center in Bialystok, who were never bitten by ticks in the mean age: 34.2 ± 12.2 years.

Molecular research was carried out among 560 people:

- • Ib group - 540 patients, hospitalized in the Department of Infectious Diseases and Neuroinfections in 2015-2018.

- • The control group for molecular studies were patients from Group IIIa.

Results:

Group Ia

- • The presence of anti-*C. burnetii* IgG antibodies was stated in 6 foresters - only men (7.3%).

- • The presence of anti-SFG *Rickettsia* spp. was stated in 42/82 foresters (51.2%): 3 women and 39 men.

- • All foresters with anti-*C. burnetii* IgG antibodies and anti-SFG *Rickettsia* spp. IgG antibodies had also anti-*B. burgdorferi* IgG antibodies and anti-TBEV IgG antibodies detected. Five out of six foresters with anti-*Coxiella burnetii* IgG antibodies had also anti-SFG *Rickettsia* spp. antibodies detected.

Group IIa

- • The presence anti-*C. burnetii* IgG antibodies was observed in 5/82 (6%) farmers: 2 women and 3 men.

- • The presence of anti-SFG *Rickettsia* spp. IgG antibodies was observed in 22/82 (26.8%) persons: 10 women and 12 men.

- • Three farmers with anti-*Coxiella burnetii* IgG antibodies had anti-*Borrelia burgdorferi* antibodies and one farmer had anti-TBEVIgG antibodies detected.

- • In 26.8% (11/41) farmers hospitalized because of TBE and in 34.2% (13/38) patients with anti-*B. burgdorferi* antibodies, anti-SFG *Rickettsia* spp. IgG antibodies were detected as well.

- • No co-occurrence of anti-*Rickettsia* spp. antibodies and anti-*Coxiella burnetii* antibodies was observed.

Group Ib

- • In PCR study, all the samples (540 patients) were negative for *C. burnetii* and *Rickettsia* spp. DNA.

In control group results of all serological and molecular tests were negative.

Conclusions:

1. *C. burnetii* infection in the inhabitants of north-eastern Poland occurs rarely, although it is possible.
2. Infection with bacteriae *Rickettsia* spp. causing spotted fever in north-eastern Poland is asymptomatic or oligosymptomatic and does not induce patients to seek for medical help.
3. Risk of exposure to bacteriae *Rickettsia* spp. causing spotted fever is higher than to *Coxiella burnetii*.
4. Occupational exposure to tick bites promotes the coexistence of antibodies against several pathogens, including *Coxiella burnetii*, SFG *Rickettsia* spp., *Borrelia burgdorferi*, tick-borne encephalitis virus.
5. Rickettsiosis should be included in the routine differential diagnosis of feverish diseases, especially in patients professionally exposed to tick bites.