



Fund “Nauka” Project № 18002 Resume – Competitive-based Session 2018:
“Seroprevalence of toxocariasis in risk groups of the population of North-eastern Bulgaria”

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Toxocariasis is a globally significant zoonosis, insufficiently studied worldwide. For Bulgaria, seroepidemiological studies have been performed only in several areas, and this parasitosis is practically unknown in the North-eastern region. The disease is prevalent in countries like ours, where control over the population of stray dogs and cats is insufficient. Estimation suggests that the invasion is more common in children and the population with lower socioeconomic status (minority groups and others). One of the little-studied forms is neurotoxocariasis, which has been linked to cognitive impairment and epilepsy. The project aims to determine the unknown seroprevalence levels for toxocariasis in certain risk groups and North-eastern Bulgaria's general population. Serum samples for the presence of anti-Toxocara IgG (by ELISA) and verification of positive results with Western blot in the risk groups of children (2-7 years), Roma and Turkish population, and persons with cognitive impairment and epilepsy will be tested. Through a subsequent epidemiological study of the newly discovered cases and a statistical analysis of the results, the importance of certain factors contributing to higher exposure will be determined. The concretization of the different clinical forms in the newly discovered patients and their subsequent treatment will raise awareness among medical professionals in the region about the various symptoms of toxocariasis and its importance as an etiological cause in some neurological, allergic and others.

Expected results:

1. To obtain a detailed picture of the spread of toxocariasis on the territory of Northeast Bulgaria by assessing the seroprevalence.
2. To determine the prevalence and the role of toxocariasis as an etiological cause in several conditions with various non-specific clinical symptoms among the risk group of children aged 2-7 years.

3. To determine the relative share and the role of toxocariasis as an etiological cause in persons from minority groups.
4. To determine the prevalence and the role of toxocariasis as an etiological cause in individuals with cognitive impairment and epilepsy.
5. To demonstrate the relationship of toxocariasis with certain risk factors after conducting an epidemiological study.
6. To apply the obtained results for developing a strategy for prevention, early detection of toxocariasis, and increasing the awareness of the medical professionals in the region about this unknown zoonosis.
7. To introduce in the Northeastern Bulgaria of a new confirmatory method (Western blot) in the diagnosis of toxocariasis, increasing the specificity and accessibility of the parasitological diagnostics.

The development of this project has led to the following scientific results:

The first large-scale epidemic study found a total seroprevalence for toxocariasis of 18.5% among the population of Northeastern Bulgaria. The relative share of seropositive children was 18.8%, and 18.4% in adults. The most affected children are in the age group 0-9 years – 22.2%. In adults, an increase in seroprevalence was found over 45 years of age, with the highest levels of 30.6% in 60-64 years and 31.7% in those over 65 years. A higher ratio of seropositivity was found among the inhabitants of the smaller settlements in the region (28.7%) compared to those living in the city of Varna (13.1%).

Antibodies against *Toxocara* spp. were found in 12.1% of the investigated children with allergic and other non-specific clinical symptoms in the risk group between 2 and 7 years. Toxocariasis was also confirmed in 12.3% of the adults with similar symptoms.

Among minority groups (Roma and Turkish ethnic groups) was confirmed the significant role of *Toxocara* spp. as an etiological agent with a registered seroprevalence of 32.6%, with high levels in both children (33.3%) and adults (32.0%).

High overall seropositivity of 44.4% (25.0% in children and 50.0% in adults) was also found among subjects with cognitive deficits and/ or epilepsy.

Hidden seropositivity levels were also detected in the control groups of healthy children (15.1%) and adults (13.2%).

From the conducted active survey among seropositive patients about the influence of risk factors on the spread of toxocariasis, the most important factors to increase the chance of infection are: living in small towns, minority background, ownership of pets that are not dewormed regularly, poor personal hygiene and primary levels of education of the patient or their parents.

An algorithm for testing a patient with suspected toxocariasis was developed as one of the scientific and practical results. To exclude non-specific cross-reactivity, it is recommended that all who test positive for ELISA (IgG) have to perform a mandatory confirmatory Western blot test before initiating etiological treatment.

Another scientific and practical result is the development of an algorithm for treatment and monitoring of its effect in a patient with toxocariasis. After the two-stage confirmation of the diagnosis, it is necessary to select an individual treatment regimen depending on the age and clinical form of the disease. Anthelmintic therapy (Albendazole 10 mg/kg) accompanied by antiallergic drugs for ten days in children is recommended. In adults with latent form, etiological treatment accompanied by antihistamines is required for seven days and in the cases of visceral and neurotoxocariasis, the course of treatment should be extended for ten days.

Specific monitoring is required to confirm the effectiveness of the treatment in patients with toxocariasis. At the end of the first month after the treatment concludes, clinical symptoms and the dynamics of some laboratory parameters (complete and differential blood count, total IgE) are monitored. In addition to monitoring the laboratory markers at the end of the sixth month, a decrease in the titer of anti-Toxocara antibodies should be recorded.

As a result of the research project, it was confirmed that toxocariasis is the most common helminthiasis in Northeastern Bulgaria. The epidemiological analysis identified the risk factors and increased the awareness of the medical specialists from different specialties regarding the problems of the diagnosis and treatment of this unknown disease. For prevention, public health attention was directed to the sources of the invasion – stray animals and non-dewormed pets.