CASE REPORT

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Atypical eczema-like skin symptoms and joint swelling in a patient with Toxocara seropositivity – Case Report

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Abstract

Introduction. Toxocariasis is the most widespread zoonotic parasitic infection, shared between humans, dogs, and wild canids. Clinical manifestations vary widely, often leading to delayed diagnosis, with allergic skin reactions and joint swelling being less common.

Case Report. A 53-year-old man presented wityh unusual allergic skin symptoms, including a rash, blisters, and joint swelling. The symptoms occurred intermittently over several years.

Results. Extensive testing yielded negative results, with the exception of anti-Toxocara antibodies, suggesting that Toxocara infection may have contributed to the symptoms or triggered an inflammatory response in the host. Albendazole therapy was initiated, resulting in an improvement in the skin symptoms.

Conclusions. This cosmopolitan parasitic disease should always be considered in the diagnosis of allergic skin changes and joint swelling. Serological testing plays a crucial role in the diagnostics.

Key words

Albendazole, Toxocariasis, Uriticaria, Joint's oedema

INTRODUCTION

Toxocariasis is a parasitic disease caused by infection with the larvae of the canine nematode *Toxocara canis* and, to a lesser extent, the feline nematode *Toxocara cati*.

Toxocara parasites are distributed worldwide and toxocariasis represent the most prevalent zoonotic helminth infection in industrialized countries, theraby posing a substantial risk for public health. Estimated pooled contamination rates varies among continents from 13% in North and Central America, 18% in Europe, 21% in South-East Asia, 25% South America, 27% in Africa, and up to 35% in Western Pacific regions [1]. Infection occurs through the accidental ingestion of embryonated eggs or, less commonly, by consuming raw tissues of paratenic hosts, such as cows, sheep, or chickens that harbour Toxocara larvae [2]. Eggs are commonly found in soil, water, or contaminated food [3, 4]. Once ingested, the eggs release larvae, which penetrate the intestinal wall and spread to various organs via the circulatory system [5]. Depending on the parasite burden and the site of migration, the disease manifests in several clinical forms: covert toxocariasis, visceral larva migrans, ocular larva migrans, and neurotoxocariasis [6]. Visceral larva migrans is the most common presentation, with possible involvement of the liver, heart, lungs, kidneys, skin, and muscles [7]. Symptoms may include fever, fatigue, lymphadenopathy, abdominal pain, hepatomegaly, coughing, wheezing, and myalgia [8].

Many symptoms observed during the infection are connected to hypersensitivity reactions caused by long-term larvae survival in tissues, which modulate the immnune response of the host [9].

Toxocara canis and *Toxocara cati* are among the most widespread zoonotic pathogens shared between humans and companion animals, such as dogs and cats, posing a significant public health concern and economic burden [10]. Risk factors for *Toxocara spp.* infection include male gender, young age, living in a rural area, close contact with dogs, cats, or soil, consumption of raw or undercooked meat, and drinking untreated water [11].

The diagnosis of toxocariasis relies on clinical, epidemiological, and serological data. The enzyme-linked immunosorbent assay (ELISA) is the most commonly used serological test, utilizing *Toxocara canis* excretory-secretory (TES) antigens to detect specific IgG antibodies. Western blot is used as a confirmatory test for positive ELISA results [12].

CASE REPORT

A 53-year-old man, working as a truck driver, was admitted to the Department of Infectious Diseases, Hepatology, and Acquired Immunodeficiencies at the University of Medical Sciences in Poznań, Poland, due to disseminated skin lesions, general weakness, and joint swelling. Similar symptoms had occurred two years earlier and resolved following treatment with antibiotics and glicocorticosteroids.

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The patient's epidemiological history confirmed that he had no contact with animals at home, but as a truck driver he visited many places in European countries, indicating that during journeys he could be exposed for contact with parasite contaminated soil. The history of allergies was negative.

On the day of admission, physical examination revealed presence of a rash and blisters filled with dark, heamorrhagic fluid, localized mainly on the skin surface of both upper extremities. Bilateral hand joint swelling was noted.

Laboratory investigations showed mildly elevated CRP (C-reactive protein) level 18.4 mg/l (0.0–5.0 mg/l) and leukocytosis 17.1 G/l (4.0–11.0 G/l). WBC differential did not revealed any abnormalities (no eosinophilia), LC-1 and PGDH *(non-specific for skin allergies)* autoantibodies were detected in the plasma. However, anti-MPO and anti-PR3 antibodies were negative, as was the ANCA (anti-neutrophil cytoplasmic antibodies) profile (ELISA). QuantiFERON-TB Gold Plus (Mycobacterium infection) test was also negative.

Immunological and parasitological blood tests confirmed the presence of monoclonal IgG antibodies against Toxocara spp. Antigens 2.5 U (positive above 1.1 U) (ELISA, Euroimmun-Analyzer; sensitivity: 93.6%, specificity: 96.6%). Serological tests (ELISA IgG and IgM) ruled out CMV and Toxoplasma gondii infection. The level of immunoglobulin E was not evalueted. Results are shown in the Tab. 1.

Table 1. Laboratory findings of the Case Report

Parameter	Result	Reference Range
CRP	**18.4 mg/L**	0.0–5.0 mg/L
PCT	0.05 ng/mL	<0.10 ng/mL
WBCs	17.1 G/L	4.0–11.0 G/L
Eosinophils	5.5%	0.0-6.0%
AST	21 U/L	4–35 U/L
ALT	36 U/L	<45 U/L
Creatinine	80 µmol/L	53–115 µmol/L
Anti-Toxocara IgG (ELISA)	**2.5 U**	Positive above 1.0 U
Anti-CMV IgM / IgG	Negative	–
Anti-Toxoplasma IgM / IgG	Negative	–
QuantiFERON-TB Gold Plus	Negative	–
LC-1	Positive	–
PDGH	Positive	–
Anti-MPO / PR3 / ANCA (ELISA)	Negative	–

CRP, C-reactive protein; PCT, Procalcitonin; WBCs, White Blood Cells; AST, Aspartate transaminase; ALT, Alanine transaminase

Bacterial culture of the fluid obtained from the skin lesions revealed the presence of Coagulase-Negative Staphylococcus haemolyticus (with sensitivity for cloxacilline, amoxicicline, levofloxacine), a common saprophytic skin bacteria.

Doppler ultrasound examination of the upper extremities showed no abnormalities within the vessels. The patient was evaluated by both a dermatologist and a rheumatologist, but their decisions were unremarkable.

Ultimately, the patient was diagnosed with toxocariasis and undifferentiated connective tissue disease. Combined therapy with antibiotics (Cloxacilline 1.0g 4 times a day – to prevent development of infection due to glicokorticosteroids), steroids to alleviate allergic symptoms, and albendazole (15mg/kg of body weight- for 10 days) was initiated, leading to significant improvement in skin symptoms after day 3 of therapy. The treatment was further consolidated with mebendazole (100mg twice a day for 6 days). The patient was discharged from hospital after 2 weeks of treatment.

A follow-up examination performed 2 months after completion of the treatment revealed complete resolution of the skin lesions and joint swelling. The level of anti-Toxocara IgG had increased (3.5U), confirming the diagnosis. The patient was advised to contact the Out-Patient Parasitic Clinic if the symptoms re-occurred.

DISCUSSION

Toxocariasis is one of the most widespread zoonotic parasitic infections of public health and economic significance, shared between humans, dogs, and wild canids, with the worldwide prevalence of infection in dogs at more than 11%. It has an increasing adverse impact on human health [5], infection is common, and affects approximately 20% of the world's population. Although toxocariasis is already a common infection, its distribution is expected to increase in the future. Environmental and societal changes such as urbanization and climate change have been proposed as major drivers of this trend [13]. Warmer temperatures and increased rainfall may also enhance the survival and persistence of *Toxocara* eggs in the environment [14]. Furthermore, rapid urban growth contributes to high levels of soil contamination, particularly in densely populated urban centres [15, 16]. This is attributed to a combination of factors, including a high density of pets per area and inadequate control of stray animal populations, both of which contribute to the spread of *Toxocara* spp. eggs [17]. Controlling the population and de-worming of domestic dogs and cats is one of the most effective strategies to reduce Toxocara prevalence, as these animals are primary sources of environmental contamination, and are highly accessible to intervention [5].

While many Toxocara infestations are asymptomatic, moderate to severe systemic, neurological, and ocular infections can occur. Visceral larva migrans and ocular larva migrans are the most common clinical manifestations. Toxocara larvae can cross the blood-brain barrier, invading the central nervous system, leading to neurotoxocariasis [12, 18]. It can also trigger an inflammatory reaction with diverse clinical signs depending on the affected organ, including skin abnormalities such as Wells' syndrome, which has been documented in Indonesia [19]. Numerous experimental and epidemiological studies have revealed that toxocariasis contributes to the development of allergic symptoms [6, 20].

According to the literature, it is known that toxocara species can alter the host-parasite relationship. Chronic infections are associated in humans with the production of different modulators and cytokines (interleukin 4, 5, 13) which influence the immunologic response of the host. Moreover, this infection activates lymphocyte T-helper, which leads to enhanced expression of eosinophil degranulation products. All these pathogenetic mechanisms could be responsible for hosts allergic reactions, which give the picture of skin abnormalities [21]. The diagnosis of Toxocarosis is based mainly on serological IgG-ELISA techniques, and in doubtful cases – Western-blot IgG [22, 23].

Toxocara seropositivity appears to be a strong risk factor for allergic outcomes, particularly in younger populations.

Additionally, exposure to microorganisms may alter the subsequent risk of allergy [24].

The case report describes a previously healthy young man with allergic skin symptoms, which occurred twice in his life (2022 and 2024). Extensive testing yielded negative results, and only the presence of anti-Toxocara IgG antibodies in increasing levels suggested that Toxocara infection could have been responsible for the symptoms, or may have triggered an inflammatory response in the host. It is known that parasitic infections can activate the human immunologic system, which was the reason for introducing the antibiotic treatment to prevent the possibility of generalization of bacterial infection from the skin.

Usage of anthelmintics, due to their superior systemic absorption, tissue penetration and broad- spectrum activity, is required and recommended to shorten the time of infection and to prevent persistent immunological host response [25, 26] Albendazole and mebendazole are the most frequently prescribed anti-parasitic drugs for the treatment of tissue nematode infection [27].

Although the anti-Toxocara seropositivity in many populations is very high, there is a lack of descriptions about skin disturbances in such individuals; therefore, it is worth highlighting the possible relationship between skin changes and *Toxoaca spp. i*nfection.

Based on the literature and the presented findings, toxocariasis, a cosmopolitan parasitic infection, should always be considered in the differential diagnosis of chronic urticaria and persistent pruritus, although this is often neglected [28].

CONCLUSIONS

1. Toxocara spp infection should be taken into consideration in the differential diagnosis of skin changes, particularly in patients with recurrent allergy symptoms.
2. Specific treatment with anthelminthics (albendazole, mebendazole) influences the time of recovery.

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