

Seroprevalence of IgG anti-*Toxocara canis* antibodies and anti-*Fasciola* sp. antibodies in patients with urticaria

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Abstract

Aims. Chronic urticaria (CU) is defined by recurrent episodes occurring at least twice a week for 6 weeks and generally characterized by the rapid appearance of wheals and/or angioedema and may be associated with parasitic infections. We aimed to investigate the seroprevalence of *Toxocara canis* and *Fasciola* species in patients with CU.

Materials and Methods. We included 55 patients (in age 16-55) with urticaria admitted in study. As a control group we recruited 30 healthy volunteers they had no history of urticaria, rhinitis, asthma, atopic eczema/dermatitis syndrome (AEDS), or other relevant diseases. IgG antibodies to *Toxocara canis* and *Fasciola* species were investigated by ELISA method.

Results. In a total of 55 patients (mean age: 31.85±8.92), 8 patients (14.5%) were positive for IgG antibodies to *Toxocara canis*. Among seropositive patients (mean age: 38.62±12.46) 6 patients were female. No patient was positive for *Fasciola* by ELISA. Six of *Toxocara canis* seropositive cases were frequently visited or lived in rural areas and had contact with pets.

Conclusions. Patients with urticaria, should be tested for *Toxocara canis* and treated with anthelmintic drugs in endemic areas for toxocarasis. Clin Ter 2013; 164(4):315-317. doi: 10.7417/CT.2013.1579

Key words: chronic urticaria, ELISA, *fasciola* species, seroprevalence, *Toxocara canis*

Introduction

Urticaria, commonly referred to as hives, is a kind of skin rash notable for pale red, raised, itchy bumps. Urticaria has two forms including acute and chronic urticaria (CU). Acute urticaria lasts less than 6 weeks. Once or more during a lifetime, 15-20% of the population are encountered with urticaria. CU is defined by recurrent episodes occurring at least twice a week for 6 weeks with different clinical presentations. It is generally characterized by the rapid appearance of wheals and/or angioedema. A wheal has three typical features including central swelling, itching or burning and fleeting duration of usually 1-24 h. Angioedema is defined

as a sudden, pronounced swelling of the lower dermis and subcutis. Angioedema is sometimes painful. Establishing the cause of CU is difficult and at times almost impossible. Degranulation of mast cells with release of histamine is main mechanism for the development of wheals and angioedema. Urticaria is due to a local increase in permeability of capillaries and venules.

Some external and internal causes are responsible from urticaria including physical (35%), idiopathic (30%), autoimmune (25%), vasculitic (5%), pseudoallergic (3%) and infectious (2%) causes (1).

It is known that *Toxocara canis* causes human infection when embryonated eggs excreted in dog feces are ingested. They may even cause symptoms similar to viral infections or allergy-like symptoms. Symptoms can be mild, including fever, recurrent hacking cough, dyspnea, recurrent bronchitis, pleuritis, bronchopneumonia, asthma, skin afflictions like nodules and CU, recurrent labial and eyelid angioedema and eczematous dermatitis, enteric symptoms, or even symptoms limited to the eye causing conjunctiva hyperemia and recurrent conjunctivitis (2).

The other tissue parasite, *Fasciola* species is a trematode affecting the liver. In humans, the infection begins with the ingestion of watercress or contaminated water containing encysted larva. Common signs and symptoms of the hepatic phase are abdominal pain, fever, eosinophilia, urticaria, and abnormal liver function tests. The biliary phase of the disease usually presents with intermittent right upper quadrant pain (3-5).

In present study we aimed to investigate the seroprevalence of *Toxocara canis* and *Fasciola* species in patients with CU by Enzyme-linked immunosorbent assay (ELISA).

Materials and Methods

We included 55 patients (36 females, 19 males) diagnosed with urticaria admitted to Dicle University Dermatology Department between June 2011 and June 2012 in study. We defined CU by recurrent episodes occurring at least twice a week for 6 weeks. As a control group we recruited 30 healthy volunteers (20 females, 10 males) they had no his-

tory of urticaria, rhinitis, asthma, atopic eczema/dermatitis syndrome (AEDS), or other relevant diseases. The study cases and controls ranged in age from 16 to 55. A questionnaire was constituted for the subjects, which included demographic features such as age, sex, history of direct contact with dog or cats, living in a rural area, or visit.

Exams on the etiologic diagnosis of CU including examination of intestinal parasites in stool samples, complete blood count, routine biochemical tests, thyroid function tests and antithyroid autoantibody tests, complete urine test, autologous serum skin test were performed. Also complement factor C3, C4 and C1 inhibitor, antinuclear autoantibodies (ANA, ENA), rheumatoid factor, serology for viral, bacterial and parasite antibodies were executed.

For Enzyme-linked immunosorbent assay (ELISA) blood samples were taken from the study group by venipuncture into polystyrene tubes. Sera were separated and stored at -20°C until used. Enzyme-linked immunosorbent assay (Ridascreen R-Biopharm GmbH®, Darmstadt, Germany) was measured in optical density (OD) with a range from 0.9 to 1.1 tests for IgG antibodies to *Toxocara canis*.

Fasciola species IgG antibodies were also measured in optical density (OD) with a range from 0.9 to 1.1 by ELISA (DRG instruments GmbH, Germany).

Statistical analysis

The statistical method used to show the differences between the groups were Fisher's Exact test and a P-value ≤ 0.05 was considered statistically significant.

Results

In a total of 55 (mean age: 31.85 ± 8.92) patients with CU, 8 patient (14.5%) was positive for IgG antibodies to *Toxocara canis*. No patient was tested positive for *Fasciola species* by ELISA. *Blastocystis hominis* cysts were observed in stool examination of one patient. *Giardia intestinalis* cysts were observed in another patient.

Among a total of 8 patients found toxocariasis seropositivity, 6 patients were female and 2 patients were male. The mean age of toxocara seropositive patients were 38.62 ± 12.46 . In present study 6 of *Toxocara canis* seropositive cases were frequently visited or lived in rural areas and had contact with animals. One of the seropositive cases was a man who had four cats. 15 patients were from urban and 40 patients from rural.

Discussion

Infections can be responsible from CU which has been associated with helminth infections. However, these associations are not strong and may be spurious (1).

There was limited data, relationship between urticaria and toxocara and fasciola infections in literature (1). Humbert et al. investigated toxocariasis by ELISA test in patients suffering from different skin conditions. They found a positive result for 20% of patients with urticaria and for

3% patients with prurigo. In their study, there was statistical excess of risk for patient with urticaria (6). Oteifa et al. investigated the association of *Toxocara* infection with two common allergic diseases (idiopathic bronchial asthma and CU) in children. The frequency of *Toxocara* seropositivity was 26.6%, 13.3% and 30% in asthmatic, CU and control children respectively (7). In another study, frequency of antibodies to *T. canis* was 64.7% in cases with CU and 21% in controls (8). In our country toxocariasis seropositivity was found to be 29.0% in cases of CU (9).

In present study we found 14.5% seropositivity for *Toxocara canis* in urticaria group. We did not encounter seropositivity for *Toxocara canis* in control group and for *Fasciola species* in cases with urticaria and control group. *Toxocara canis* seroprevalance of our study was lower than the other studies but our results were in substantial level ($p < 0.05$).

Demirci et al. were analyzed for antibodies against *Toxocara canis* and *Fasciola hepatica* by ELISA in cases with urticaria and control group. The excretory/secretory products of *Toxocara* and *Fasciola* were used as antigens (ES-ELISA) in the test. In their study, the highest toxocariasis seropositivity (29.0%) rate and the highest fasciolosis seropositivity (14.5%) rate were found in patients with CU. Fasciolosis seropositivity and total seropositivity of toxocariasis and fasciolosis in patients with CU were significantly higher than in healthy controls. According to their study toxocariasis seropositivity in patients with CU was not significantly higher than that in healthy controls (9). In a different study belong to the same research group, 6.1% of the eosinophilic patients were found to be positive for fascioliasis by ELISA. Abdominal pain (84%), weight loss (63%), fever (47%) and urticaria (21%) were the most common signs and symptoms (10). Our data contrasts with these studies because we did not encounter fasciolosis seropositivity in cases with urticaria.

In general, population toxocara positivity was frequently seen in male but urticaria was in female worldwide (11-18). Six of the toxocara seropositive individuals of our study were female. The reason for this may be the big majority of the patients included in our study were female.

There was limited data about seropositivity of toxocariasis in southeast Turkey. Çiçek et al. detected toxocariasis seropositivity in 15.25% of human with complaints such as abdominal pain, hypereosinophilia and urticaria who were inspected in various outpatients' clinics (18). Our study could not give precise information about the prevalence of toxocariasis in our region, but gave the idea that toxocariasis was common in our region. Human infection with the roundworm *Toxocara canis* is acquired by ingestion of fully embryonated ova. Transmission to humans occurs by ingestion of viable eggs from contaminated soil, hands or other objects. Direct contact with infected dogs where the adult stage of the worm lives in the small intestine may be less important because of the time from embryonation of the ova to infectivity. Wolf from et al. reported that urticaria cases with antibodies to *Toxocara canis* were more frequently (50%) in contact with pets. Of the 33 cases of CU with antibodies to *Toxocara canis*, 14 cases treated with thiabendazole or ivermectin and 19 patients not specifically treated. After a one-year follow-up 65% of patients receiving treatment were

cured or had improvement. No improvement occurred in 63% of untreated patients (8). In present study 6 of toxocara seropositive cases were frequently visited or lived in rural areas and had contact with animals. One of the seropositive cases was a man who had four cats. Studies both in Turkey and some other developing countries have been reported in rural areas where a higher rate of toxocariasis (18). Our study was also consistent with these studies.

In the light of our data and literature data, higher seropositivity of toxocara in cases with a history of contact with animals and observation of improvement in most patient received anthelmintic treatment were suggested that this parasite had a role in pathophysiology of urticaria.

In conclusion, according to the current study, the strong relationship between the presence of antibodies to *Toxocara canis* and CU was unlikely to be due to chance but it was difficult to establish a causal association. It was necessary further investigation of a role for *Toxocara canis* in CU. In endemic areas for toxocariasis, we conclude that patients with urticaria should be tested for *Toxocara canis* and these patients should be treated with anthelmintic drugs.

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