Seroprevalence of Toxocara spp Among Epileptic Patients in Iraq/Basra

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Abstract: To study seroprevalence of Toxocara antibody Immunoglobulin G (IgG) and epidemiological risk factors as well as assessment the immunological pattern including cytokines, interleukin-6 (IL6) and interleukin-10 (IL-10) and immunoglobulin E (IgE) among epileptic patients in Basra province . Subjects and **Methods:** Forty seven epileptic patients, their ages range from 2.5 - 45 years (22 females and 25 males) and 109 apparently healthy volunteers as a control group with ages range between 2 - 80 years (59 females and 50 males) were enrolled in this study. The study was done during the period from December 2017 to November 2018 at The Pediatric and Neurology Consulting Clinic of Basra Teaching **Hospital.** The risk and epidemiologic factors were assessed by a special questionnaire which was completed by the patients themselves or their relative. Immunoglobulin G (IgG) and cytokines were assessed by using ELISA while IgE by immunoturbidimetric assay by using the Abbott ARCHITECT c System for every epileptic patient as well as control group. Results: Sixteen (34.04%) of epileptic patients were seropositive for Toxocara antibody (IgG) in comparison with 2 (1.83%) of control group with significant difference between them (p=0.0001). There was no significant association between seropositive and seronegative epileptic patients in regard to characteristic features of the studied population (sex and age) and risk factors (residence, exposure to soil, animal ownership, presence of home garden, onychophagia, thumb sucking, medicine intake, family history, duration of epilepsy and occupation) except geophagia . But interestingly, there were elevated in risk ratio for 5 variables including onychophagia (1.7), thumb sucking (2.1), geophagia (3.4), medication intake (1.1)

and family history (1.7), when it is evaluated by Chi-squared “Fisher exact test” (risk ratio >1). The immunological assessments reveal an elevation IgE and IL-10 level in seropositive group in comparison seronegative group without a significant difference, while IL-6 concentration is elevated in theseronegative group. Conclusion: In epileptic patients in Basra province, infection with Toxocara spp may play role as a risk factor for idiopathic epilepsy. Risk factors such as onychophagia, geophagia, thumb sucking, medication intake and family history may increase risk infection with Toxocara spp in epileptic patients. Also toxocariasis may lead to elevation of IgE and IL-10 levels in these patients but it appears has a weak influence on concentration of IL-6.

Keywords: Toxocara spp ;Neurotoxocariasis ;Epilepsy; IL- 10 ;IL-6

1. INTRODUCTION

Toxocariasis is caused by nematodes(roundwarm) belong to the genus Toxocara, which is consist of more than 30 species[21]. Human toxocarasis caused byToxocara canis and Toxocara cati [22].Toxocara canis is the nematode most frequently of Canidae [5],and Toxocara cati for cats [18]. while other animal species represent a reservoir for these nematodes such as rats, birds,while human represent an accidental host[5]. These parasites can infect other paratenic hosts like invertebrates [24].T. canis and T. cati like other Soil-transmitted nematodes are neglected in the international public health importance when they are comparing with other helminthic diseases [22].

The symptomatic toxocariasis gives 3 clinical features including ocular larva migrans (OLM), visceral larva migrans (VLM) and neurological toxocariasis(NT) [17].

While covert or common toxocariasis is a subclinical form of Toxocara infection [23].

Neurotoxocariasis (NT) can be defined as manifestation of Toxocara infection when Toxocara larvae reach to CNS for invading the brain and spinal cord. Neurotoxocariasis may be influenced by several factors, like number of swallowed ova, host genetic factors and previously exposure to infection [37,15]and it is rare which mainly attack people with middle-aged. (NT) can lead to induction of meningitis, encephalitis, myelitis and cerebral vasculitis including also relatively non-specific clinical symptoms such as fever and headache [16,8,11]. Epilepsy is considered as one of the clinical manifestations of NT [16].

Early researchers have found that epileptic patients are highly exposure to infection with T.canis [36,9]. Other researchers work on numerous populations and communities for studying the correlation between toxocariasis and epilepsy found the possibility of occurrence especially in endemic areas [6,7, 39].

This is the first study on toxocariasis among epileptic patients in Basra Province, which designated to record

Toxocara spp seroprevelence and to assess the

immunology among epileptic patients in comparison to apparently healthy persons.

Subjects and Methods.

Studied population:

This study was carried out at Basra Teaching Hospital from December 2017 to November 2018, on 47 epileptic patients (25 males and 22 females). Their ages range between 2.5 - 45 years attending Pediatric and Neurology Consulting Clinic at Basra Teaching Hospital. Patients with history of diabetic mellitus, rheumatic diseases, diarrhea and abdominal pain were excluded from the study. In addition, 109 apparently healthy persons were volunteered as a control ,their ages range between 2 - 80 years. Epileptic patients underwent a thorough clinical examination. Cranial imaging studies (CT scanning and MRI) were done to all patients in addition to standard EEG recording, blood

investigation in order to confirm diagnosis.

Questionnaire:

A questionnaire was applied to all patients and controls to obtain socioeconomic and epidemiological information e.g. sex, age, animal ownership, presence of garden at home, exposure to soil, onychophagia or geophagia habit, thumb sucking, occupation, medicine intake, family history of the disease, residence, and duration of disease.

Collection of samples:

five milliliter blood was taken from every patients and controls under aseptic conditions by plane tube with gel and clot activator without EDTA. Sera was later separated from clotted blood by centrifugation and immediately frozen at- 80oC until used.

Measurement of seropositivity for toxocariasis:

Toxocara antibodies were detected by the commercial human IgG Toxocara microwell serum and plasma ELISA Kits (T8072,usbiological life science, united states)with sensitivity 87.5% and specificity 93.3% According to the protocol, the

result is positive when the absorbance reading ≥ 0.3 OD units while the negative < 0.3 OD unites.

Measurement of total IgE in serum:

Serum IgE levels were evaluated in all seropositive group against 16 of seronegative group and 30 of control taken by using kits QUANTIA IgE Reagent Kit (6k42-01) (biokit S.A. Can Male, s/n08186 Llica d Amunt Barcelona Spain distributed by Abbott). This kit intended for quantitative determination of IgE (IU/mL) in plasma or serum by immunoturbidometric assay by using the Abbott ARCHITECT c System using standard protocol as mentioned in the kit through using Architect c4000 system apparture (Japan).

Discussion

Toxocara infection is prevalent among stray dog in Basra province . Findings of [1] suggested that 26.5% of stray dogs in different regions of Basra were infected with *Toxocara canis*. The present study on epileptic patients has revealed an elevated titer of *Toxocara spp* antibody in those patients with significant difference as compared with control group .These result agree with previous studies of [25, 26, 39, 4] in rural Bolivia,Italy and Iran respectively. There were several mechanisms for explaining the mechanism of epileptogenesis of *Toxocara* infection like, Larvae of *Toxocara* could be surrounded by granuloma which can lead to acute symptomatic seizures. Then may leave fibrous scars and chronic granulomatous lesions after resolution which may cause epilepsy [34] However, others didn't find significant correlation between epilepsy and *Toxocara* seropositivity such as [13,14] in Egypt.

One of present findings is absence significant

correlation regarding characteristic features of population (sex and age) with *Toxocara* infection and this is in agreement with findings of [32] in Egypt, while [13] found increasing rate of toxocariasis among epileptic males.

Present study hasn't shown significant effect of residency regarding *Toxocara* seropositivity in accordance with findings of [39] and also it doesn't represent a risk factor for infection and this is maybe explained by exposure of epileptic patients to the same predisposing factors for infection

with toxocariasis. In contrast with findings of [13] who found a significant relationship between rural areas and *Toxocara* infection.

\Conclusion: In idiopathic epileptic patients in Basra province, infection with Toxocara spp may play a role as a risk factor for epilepsy. Risk factors such as geophagia, onychophagia, thumb sucking, medication intake and family history may increase infection risk with Toxocara spp in epileptic patients. Also toxocariasis may leads to elevation in the concentrations of IgE and IL- 10 in these patients but it appears to have a weak influence on the concentration of IL-6.

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