



Seroprevalence and risk factors of *Toxocara* infection among children in Shandong and Jilin provinces, China



Wei Cong^{a,b,1}, Qing-Feng Meng^{c,1}, Hai-Long You^d, Na Zhou^e, Xiao-Yan Dong^f, Wei Dong^g, Xiang-Yang Wang^h, Ai-Dong Qian^b, Xing-Quan Zhu^{a,*}

^a State Key Laboratory of Veterinary Etiological Biology, Key Laboratory of Veterinary Parasitology of Gansu Province, Lanzhou Veterinary Research Institute, Chinese Academy of Agricultural Sciences, Lanzhou, Gansu Province 730046, PR China

^b College of Animal Science and Technology, Jilin Agricultural University, Changchun, Jilin Province 130118, PR China

^c Jilin Entry–Exit Inspection and Quarantine Bureau, Changchun, Jilin Province 130000, PR China

^d The First Affiliated Hospital of Jilin University, Changchun, Jilin Province 130000, PR China

^e Affiliated Hospital of Medical College, Qingdao University, Qingdao, Shandong Province 266000, PR China

^f Wendeng Stomatological Hospital, Weihai, Shandong Province 264400, PR China

^g Weihaiwei People's Hospital, Weihai, Shandong Province 264200, PR China

^h Wendeng Municipal Hospital, Weihai, Shandong Province 264400, PR China

ARTICLE INFO

Article history:

Received 20 March 2015

Received in revised form 5 September 2015

Accepted 12 September 2015

Available online 15 September 2015

Keywords:

Toxocara

Toxocariasis

Children

Seroprevalence

Risk factors

Eastern and northeastern China

ABSTRACT

This cross-sectional study was aimed to investigate the *Toxocara* serology in children in Shandong and Jilin provinces, China using an enzyme-linked immunosorbent assay (ELISA). The overall *Toxocara* seroprevalence among the study population ($n = 1458$) was 19.3%, sick children (26.4%) had significantly higher seroprevalence than clinically healthy children (14.4%) ($P < 0.05$), and the highest *Toxocara* seroprevalence was found in children suffering from chronic cough (40.6%), followed by recurrent abdominal pain (40.0%), recurrent headache (38.1%), slight fever (36.2%), and recurrent vomiting (31.6%). Place of residence, education level, type of school, keeping dogs at home, contact with dogs and cats and exposure with soil were found to be associated with *Toxocara* infection. Our findings show that children infection with *Toxocara* is common in Shandong and Jilin provinces, eastern and northeastern China, indicating an immediate need for implementing strategies and measures to prevent and control *Toxocara* infection in children in China.

© 2015 Elsevier B.V. All rights reserved.

1. Introduction

Toxocariasis is caused by the intestinal roundworms *Toxocara canis* and *Toxocara cati* (Mendonça et al., 2012; Lee et al., 2014). It is a neglected and underestimated tropical disease affecting mainly the communities with poor sanitary condition in developing countries. Often, human infections with *Toxocara* are asymptomatic; however, infective *Toxocara* larvae may migrate into internal organs through the blood and can lead to various clinical syndromes including ocular larva migrans (OLM), visceral larva migrans (VLM), neurotoxocarosis (NT), covert toxocarosis (CT) or eosinophilic meningoencephalitis (EME) (Chen et al., 2012; Manini et al., 2012; Alvarado-Esquivel, 2013).

In China, with the accelerated process of urbanization and the improvement of living standard, the number of pets raised (both in urban and rural areas) is increasing rapidly, and a series of problems are gradually emerging due to the lack of quarantine and vaccination, ineffective market administration, non-standard pet hospital and environment contamination (Wang et al., 2008; Cong et al., 2014). Moreover, the stray dogs and cats can be seen everywhere in much of China, which increases the risk for *Toxocara* infection in humans.

China is the largest country in terms of the population in the world, however, epidemiological knowledge regarding the prevalence and risk factors of associated with *Toxocara* infection is limited (Luo et al., 1999; Cong et al., 2014). The effect of such knowledge is an underestimation of global disease problem and current situation in China, thus affecting the formulating of effective health policies nationally and globally. In a previous study, we reported the prevalence of *Toxocara* infection among clinically healthy individuals, pregnant women and psychiatric patients in Shandong province, eastern China (Cong et al., 2014), yet little is

* Corresponding author. Fax: +86 931 8340977.

E-mail address: xingquanzhu1@hotmail.com (X.-Q. Zhu).

¹ WC and QFM contributed equally to this work.

Table 1
Socio-demographic characteristics and prevalence of anti-*Toxocara* IgG antibodies in children in Shandong and Jilin provinces, China, from October 2013 to August 2014.

Characteristic	No. tested	Prevalence of IgG antibodies (%) (95%CI)	OR (95%CI)	P Value
Age groups				
1–5 years	248	11.7 (7.69–15.69)	Reference	
5–10 years	611	19.8 (16.64–22.96)	1.87 (1.21–2.88)	0.005
11–15 years	489	20.7 (17.07–24.24)	1.97 (1.26–3.07)	0.003
15–18 years	110	27.3 (17.87–26.64)	2.83 (1.60–5.01)	<0.001
Gender				
Male	751	18.6 (15.86–21.43)	Reference	
Female	707	19.9 (17.00–22.89)	1.09 (0.84–1.41)	0.529
Residence place				
Changchun (Northeastern China)	500	14.0 (10.96–17.04)	Reference	
Qingdao (Eastern China)	472	22.3 (18.49–26.00)	1.76 (1.26–2.45)	0.001
Weihai (Eastern China)	486	21.8 (18.14–25.48)	1.71 (1.23–2.39)	0.001
Residence area				
Urban	915	18.5 (15.96–20.98)	Reference	
Suburban or rural	543	20.6 (17.22–24.03)	1.15 (0.88–1.50)	0.313
Education level				
Preschool	524	14.3 (11.31–17.31)	Reference	
Primary school	546	23.1 (19.54–26.61)	1.80 (1.31–2.46)	<0.001
Middle school	388	20.6 (16.59–24.64)	1.56 (1.10–2.02)	0.012
Type of school				
Private	443	11.5 (8.54–14.48)	Reference	
Public	1015	22.7 (20.09–25.24)	2.25 (1.62–3.12)	<0.001

OR: odds ratio. 95% CI: 95% confidence interval.

known about *Toxocara* infection in children in China, especially in northeastern and eastern China. Although the seroprevalence of *Toxocara* infection in children from Chengdu, southwest China was reported in 1999 (Luo et al., 1999), it is necessary to estimate the *Toxocara* infection in children once again due to soaring number of pets in the past 16 years. Thus, the aim of this study was to evaluate the frequency of anti-*Toxocara* antibodies in children in Shandong and Jilin provinces, China for the first time and analyze the protective and risk factors associated to toxocariasis.

2. Materials and methods

2.1. Ethics statement

This study was approved before its commencement by the ethical committee of the Affiliated Hospital of Medical College, Qingdao University; Wenhaiwei People's Hospital; Wendeng Municipal Hospital; Wendeng People's Hospital, and the first Affiliated Hospital of Jilin University. The purpose and procedures of the study were explained to all participating children and/or their parents/guardians, and written informed consent was obtained from parents/guardians on behalf of the children enrolled.

2.2. Study design and study population

A cross-sectional study was conducted in two provinces (Shandong and Jilin) with different living environments of eastern and northeastern China. Two representative cities were selected in Shandong province, Qingdao and Weihai, respectively. Qingdao is located at the southern tip of Shandong province, eastern China (35°35'–37°09'N, 119°30'–121°00'E), and it is a key economic center and port city in China for its cultural heritage and picturesque scenery. Weihai is located at the eastern tip of Shandong province, eastern China (36°41'–37°35'N, 121°11'–122°42'E) across the sea from Korea, and it is the closest city to Korea. The annual average temperature is 12 °C. And the average precipitation is over 800 mm. As the typical representative of northeast China, Changchun has very different climate and eating habits compared with Qingdao and Weihai. Changchun (43°05'–45°15'N, 124°18'–127°05'E) is the

capital of Jilin province, which has a north temperate zone continental monsoon climate with hot and humid and rainy summer, long and cold winter, and the annual average temperature is 4.8 °C, the highest temperature is 39.5 °C, and the lowest temperature is –39.8 °C.

The collection of samples is a convenience sampling. A total of 1458 study participants were randomly recruited between October 2013 through August 2014, including 592 sick children and 866 clinically healthy children who participated in health screenings in the hospitals. The healthy children mean that they were asymptomatic before the health screenings. All of the sick children were admitted to the disease diagnosis and therapy in outpatient departments and inpatient wards at local hospitals.

2.3. Data collection

A structured questionnaire was used to assess risk factors, which included: study area, age, gender, residential place, residential area, education level, type of school, presence of cats and dogs at home, contact with cats and dogs, consumption of raw vegetables and fruits, source of drinking water, exposure to soil and hand washing habit. Moreover, data of sick children were obtained from the patients, medical examination records, and informants. The clinical symptoms of sick children and respective categories were as follows: fever (slight/moderate/high), recurrent vomiting (yes/no), recurrent headache (yes/no), recurrent abdominal pain (yes/no), cough (acute/chronic), anorexia (infantile anorexia/adolescence anorexia/anorexia nervosa), and pneumonia (yes/no).

2.4. Sample collection and laboratory tests

Approximately 2–3 mL of venous blood samples were drawn from the participants in this study. Blood samples were left overnight at room temperature to allow clotting and centrifuged at 1000 × g for 10 min. The sera were collected in Eppendorf tubes and stored at 4 °C until transported in an ice box to the State Key Laboratory of Veterinary Etiological Biology, Lanzhou Veterinary Research Institute, Chinese Academy of Agricultural Sciences, Lanzhou, Gansu province, where they were kept at –20 °C

Download English Version:

<https://daneshyari.com/en/article/6126692>

Download Persian Version:

<https://daneshyari.com/article/6126692>

[Daneshyari.com](https://daneshyari.com)