Presence of Anti-*Toxocara* Antibodies in Children Population of District Anantnag and Pulwama of Kashmir Valley

Dear Editor,

Toxocariasis is a zoonotic disease caused by the ascarid of dogs and cats and the main representative of which is a *Toxocara canis*. The eggs of *T. canis* are unembryonated when passed in the faeces of dogs into the environment. Under optimal temperature and humidity the eggs develop into embryonated eggs that are infective to both final and paratenic hosts. Distribution of the disease is worldwide and is more prevalent in children. There is no definitive

method to diagnose *Toxocara* infection. As the larvae of *T. canis* are arrested in the paratenic host during migration and they do not mature into adults, hence a stool examination of the patient will not give any clue about the infection. However, numerous studies have shown that immunoassay for detection of antibodies using a purified excretory-secretory antigen from the larval stage significantly improves sensitivity and specificity compared to assays using crude antigens. The most widely used test, because of its high sensitivity and specificity, is the enzyme linked immunosorbent assay (ELISA) in which antibodies to *T. canis* larval excretory secretory antigens[1] or to larval extracts are measured. In India, human toxocariasis have been reported,[2] but there are limited studies from Kashmir valley. Therefore, the present study was conducted to determine the seroprevalence of toxocariasis in school children of the Anantnag and Pulwama districts.

A total of 110 school going children (68 males, 42 females) in age group of 5-16 years were randomly selected from different schools. Sixty two children were from Anantnag and 48 from Pulwama in the Kashmir valley. A short questionnaire to obtain data concerning their age, sex, habits was filled for each child. Blood samples were collected using disposable syringes and sera were separated and stored in - 20^0 C until tested. Antibody (IgG) specific to *Toxocara* purified excretory secretory (ES) antigen was detected by ELISA in all serum samples using kit obtained from IVD research Inc. Carlsbad, CA 92008. The test was performed as per manufacturer's instructions. Optical density (OD) value was recorded in an automatic ELISA reader (Anthos) at 450 nm. The samples were considered positive if absorbance reading was equal to or greater than 0.3 OD units and negative if absorbance reading was less than 0.3 OD units. Fisher's exact test was used for statistical analysis.

Out of 48 children from Pulwama, 20 were in age group of 5-10 years and 28 were 11-16 years. The male to female ratio was 1.4:1. Fathers of 20 children were educated and 28 illiterate. Mothers of 16 were educated and 32 illiterate. Houses of 28 children were fenced and 20 not fenced. None of the children had a pet in house. Out of 62 children from Anantnag, 20 were in the age group of 5-10 years and 42 in the age group of 11-16 years. Forty were male and 22 were female with male to female ratio of 1.8:1. Fathers of 30 children were educated and 32 illiterate where as mothers of only 12 children were educated and rest were illiterate. Houses of only 26 were fenced and none of the children had a pet in house. Seroprevalence among different age groups, sex, parent's education and risk factors are depicted in the Table 1. The overall prevalence in district Anantnag was 20/62 (32.25%). Out of which 18/40(45%) were males and 2/22(9%) were females. Similarly, in district Pulwama the over all prevalence was16/48(33.33%), out of which 12/28(42.85%) were males and 4/20(20%) were females (Table 2). The total seroprevalence of *T. canis* antibodies in children of two different districts was 36/110 (32.72%). The results showed no statistically significant (p>0.05) association between education of parents or risk factors.

Table 1: Epidemiological analysis for *Toxocara* seroprevalence in the children of district Anantnag, Kashmir

	No. of samples analyzed	No. of +ve (%)	No. of -ve (%)
Age group (years)			
5-10	20	06 (30)	14 (70)
11-16	42	14 (32.33)	28 (66.06)
Sex			
Male	40	18 (45)	22 (55)
Female	22	2 (9.09)	20 (90.09)
Father's education			
Yes	30	6 (20)	24 (80)
No	32	14 (43.75)	18 (56.25)
Mother's education			
Yes	12	2 (16.66)	10(83.330
No	50	18 (360)	32 (64)
House fenced			
Yes	26	6 (23.07)	20 (61.11)
No	36	14 (38.88)	22 (61.11)
Pet in house			
Yes	nil	nil	nil
No	62	20 (32.25)	42 (67.74)

Table 2: Epidemiological analysis for *Toxocara* seroprevalence in the children of district Pulwama, Kashmir

	No. of analyzed samples	No. of (%) +ve	No. of (%) -ve
Age group(years)			
5-10	20	4 (20)	16 (80)
11-16	28	12 (42.85)	16(57.14)
Sex			
Male	28	12 (42.85)	16 (57.14)
Female	20	4 (20)	16 (80)
Father's Education			
Yes	20	4 (20)	16 (80)
No	28	12 (42.85)	16 (57.14)
Mother's Education			
Yes	16	3 (18.75)	13 (81.25)
No	32	13 (40.62%)	19 (59.37)
House Fenced			
Yes	28	8 (28.57)	20 (71.42)
No	20	8 (40)	12 (60)
Pet in House			
Yes	nil	nil	nil
No	48	16 (33.33)	32 (66.66)

However there was a significant difference ($p<0.05$) in seroprevalence between male and female children of Anantnag district of our study.

Serological studies are of immense importance in the detection of infection by *T. canis*, as the clinical symptoms of toxocariasis are variable and non specific. The use of *Toxocara* ES antigen to detect antibodies against *T. canis* does not require the preabsorption of sera with embryonated *Ascaris*_egg antigen[1] and further no cross reaction between purified ES antigen and sera from individuals with *A. lumbricoides*, Hook worm, *E. coli* or *Gardia lamblia* were observed.[3]

The present study reports for the first time serologically proven human toxocariasis in school going children of the two districts of Kashmir valley. In different parts of the world, serological studies have demonstrated a variation in *Toxocara* seroprevalence ranging from 2.3% to 86%.[2] However the present study showed a higher rate of infection (33.33%) than that of (6.4%) subjects residing in a rural area near Chandigarh,[3] Slovak Republic[4] which may be due to low standards of hygiene, frequent contact with the contaminated soil and less parental education. In our study higher prevalence of infection was found among males than females. The difference among male and female was found significant in district Anantnag, a result similar to that reported by Havasiova.[4] But the difference between male and female was not statistically significant ($P>0.05$) in district Pulwama..[5] The present study also revealed no significant difference between the age groups as reported earlier.[4,5] In previous epidemiological studies association of several risk factors for toxocariasis has been reported such as exposure to dogs, socio economic status.[1] In our study, the prevalence was higher in children whose parents were illiterate indicating the effect of economic situation on seropositivity. The present study thus reveals the high percentage of *T. canis* infection in humans and the possible complications to *Toxocara* infection represent a potential public health problem. The high prevalence of *Toxocara* in Kashmir could be due to high prevalence of infection in large untreated and unconstrained dog population and low standards of hygiene among children. Health promotion by means of a school based programme improving standards of hygiene and control of infection in dogs, are necessary for control and prevention of the disease.

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