Relationship between Ascaris lumbricoides Infection and Bronchial Asthma in Juhayna City, Sohag, Upper Egypt

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ABSTRACT
Bronchial asthma is a chronic inflamatory disorder of the airways characterized by airway hyperresponsiveness and reversible airflow obstruction that fluctuates over time. Parasitic infection is one of the environmental factors associated with a small increase in bronchial asthma risk. In the present study, 200 stool samples were collected from patients suffering from bronchial asthma and 200 stool samples from non-asthmatic healthy volunteers as control group. The collected samples were preserved in 10%formalin and examined macroscopically, microscopically by direct smear and formol ether sedimentation test. It was found that 12 out of 200 cases (6**%**) wereinfected with *Ascaris lumbricoides* in asthmatic group and 2 out of 200 cases (1**%)** in control group with **P-value** = 0.007 * indicating statistically significant difference between cases and control group

Key words:
Bronchial asthma, Ascaris lumbricoides

Introduction

Bronchial asthma is a chronic inflamatory disorder of the airways characterized by airway hyperresponsiveness and reversible airflow obstruction that fluctuates over time **(Anderson, 2008).** Asthma is caused by a combination of complex and incompletely understood environmental and genetic interactions (**Martinez**, **2007)**.Many environmental factors have been associated with development of asthma and exacerbation including allergens, air pollution and other environmental chemicals (**Kelly and Fussell, 2011)**. Asthma is associated with exposure to indoor allergens. Common indoor allergens include dust mites, cockroaches, animal dander (fragments of fur or feathers), and mold **(Arshad, 2010).**Infection with any parasite is the one of environmental factors which associated with a small increase in asthma risk **(Leonardi-Bee *et al.*, 2006).**

The T helper 2 (Th2) immune response occurs in the reaction to helminth infections and in allergic diseases such as asthma, rhinitis, and eczema **(Kay, 2001).**It has been proposed that helminthic infections stimulate preferentially inflammatory Th2 type immune responses among parasitized populations **(Cooper *et al.*, 2009)** characterized by the production of high levels of serum specific IgE and allergic reactivity toward parasite soluble antigens **(Hagel *et al.*,1993)** which may lead to the development of bronchial hyper reactivity and asthma particularly among atopic individuals **(Hagel *et al.*, 2007).**

It is important to point out that there are close similarities between the allergic inflammatory responses stimulated in the host by environmental allergens with the immune responses elicited by parasite

antigens **(Hopkin, 2009).**Hence, the aim of the present work was to study the relation between ascariasis infection and the development of bronchial asthma in Juhayna City, Sohag Governorate.

MATERIALS AND METHODS

In the present study, 200 stool samples were collected from patients suffering from bronchial asthma and 200 stool samples from non-asthmatic healthy volunteers as control group from outpatient clinic of Juhayna Hospital from March to October 2016. All sampleswere subjected to stool examinations.Written consent was taken from all patients participating in the studyand approval of the ethics committee of scientific research in the college.

Fresh stool samples were collected in clean, dry, plastic containers, labeled,examined macroscopically to determine the consistency, presence of blood or mucus and presence of possible organisms (round worms or tapeworm proglottids or others) and the fresh stool samples were preserved in formalin 10% and examined microscopically by direct smear and Concentration technique (by formol ether sedimentation method).

Data were organized, tabulated, and statistically analyzed using SPSS version, 16. For quantitative data, mean and standard deviation were calculated. Chi-square test (χ^2) was used to compare the frequency data.

$P < 0.05$ indicates significant values.

$P < 0.001$ indicates highly significant values.

Results

In the present study, 200 stool samples were collected from patients suffering from bronchial asthma and 200 stool samples from non-asthmatic healthy volunteers as control

It was found that 12 out of 200 case(6%) were infected with *Ascaris lumbricoides* in asthmatic group and 2 out of 200 cases (1%)in control group with **P-value** = 0.007

* indicating statistically significancant difference between cases and control group

Table (1)

Parameter	Asthmatic group (N= 200)	Control group (N= 200)	P-value
Ascaris lumbricoides			**0.007***
Positive	**12 (6%)**	**2 (1%)**	
Negative	**188 (94%)**	**198 (99%)**	

* P- value was calculated by Chi square test

** P- value was calculated by Fisher's Exact Test

Table (1):*Ascaris lumbricoides* infection among the studied cases (N. = 400).

It was found that Ascaris lumbricoides infection was associated with significantly increased odds of bronchial asthma (OR= 6.3) **Tables (2)**

Characteristics	OR (CI 95%)	P - value
Ascaris lumbricoides	6.3 (1.4 – 28.6)	0.017

Table (2): Univariate logistic regression analysis.

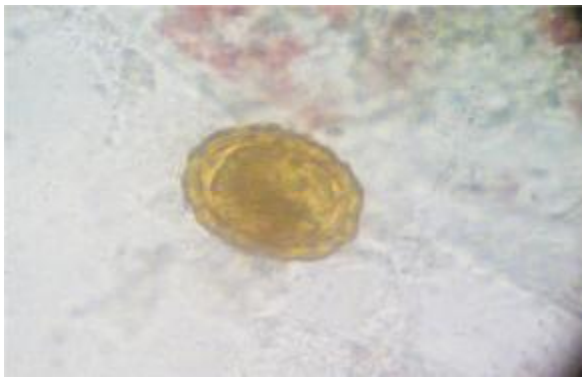

Figure: ***Ascaris lumbricoides*** **egg(X 40).**

DISCUSSION

The present results showthat theprevalenceof *Ascaris lumbricoides* in asthmatic group (6**%**) and in control group (1**%)** was highly significant as **P-value** = 0.007 indicatingthat*Ascaris lumbricoides* infection is risk factor for development of bronchial asthma as odds ratio = 6.3

The present study agreed with**Leonardi-Bee*et al.*,(2006)** who found that *Ascaris lumbricoides* was associated with significantly increased odds of bronchialasthma.Study from China by **Lyle *et al.*, (2002)**has reported an increased risk of childhood asthma in association with *Ascaris lumbricoides* infection.**Hunninghake*et al.*, (2007)**found thatascariasis may contribute to an increased risk of asthma either by causing inflammation in the airways (i.e. migrating larvae) or through increased atopy**.Gary*et al.*, (2007)** found that whereas in areas with low endemicity, *A. lumbricoides* infection is associated with increased risk of atopy and asthma.

The Present study disagreed withStudy done by **Dagoye *et al.*, (2003)** which revealed that *Ascaris* infection associated with statistically significant decreased wheezing risk**.** In another study in Singapore done by **Cheah and Kan(1972)**found that*Ascaris* and hookworm infections were slightly more common in the asthmatic group while *Strongyloides* infection was slightly more common in the control group; these differences were not significant as **P-value> 0.05.**

In conclusion the present study severaed significant relations between *Ascaris lumbricoides*infection and bronchial asthma.

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