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

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ABSTRACT
Bronchial asthma is a chronic inflammatory 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 inflammatory 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 samples were subjected to stool examinations. Written consent was taken from all patients participating in the study and approval of the ethics committee of scientific research in the college.

**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 cases (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 significant difference between cases and control group.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Asthmatic group (N= 200)</th>
<th>Control group (N= 200)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Ascaris lumbricoides</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>12 (6%)</td>
<td>2 (1%)</td>
<td>0.007*</td>
</tr>
<tr>
<td>Negative</td>
<td>188 (94%)</td>
<td>198 (99%)</td>
<td></td>
</tr>
</tbody>
</table>

*P-value was calculated by Chi square 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)**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>OR (CI 95%)</th>
<th>P - value</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Ascaris lumbricoides</em></td>
<td>6.3 (1.4 – 28.6)</td>
<td>0.017</td>
</tr>
</tbody>
</table>

**Table (2): Univariate logistic regression analysis.**
DISCUSSION
The present results show that the prevalence of *Ascaris lumbricoides* in asthmatic group (6%) and in control group (1%) was highly significant as P-value = 0.007 indicating that *Ascaris lumbricoides* infection is a risk factor for development of bronchial asthma as odds ratio = 6.3.

The present study agreed with Leonardi-Beeet al., (2006) who found that *Ascaris lumbricoides* was associated with significantly increased odds of bronchial asthma. 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 that ascariasis 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 with Study 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 severed significant relations between *Ascaris lumbricoides* infection and bronchial asthma.
REFERENCES


