

## Brief Communication

# Intestinal helminths cause or mimic acute appendicitis?

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## Abstract

### Background

Infestation with helminths is a recognized cause of acute appendicitis in both adults and children.

### Objective

To assess whether infestation with helminths is associated with inflammation of the appendix or whether it mimics symptoms of appendicitis leading to a negative appendectomy.

### Methods

A study using the histology reports of patients who underwent appendectomy at a surgical unit of a Teaching Hospital from January 2013 to July 2014 following a diagnosis of acute appendicitis. A total of sixty seven reports were reviewed for the presence of helminths and features of inflammation.

### Results

Five of the sixty seven histology reports were positive for infestation with helminths (7.24%). Nine (13.4%) appendices were not inflamed, of which three (33.3%) were infested with helminths. Only two (3.4%) of the fifty eight inflamed appendices had infestation with helminths ( $P=0.0151$ ).

### Conclusion

Helminthiasis can mimic acute appendicitis without causing inflammation by causing nonspecific abdominal pain, especially when confined to the right iliac fossa. The symptoms are due to the mere presence of helminths and not due to inflammation of appendix. We recommend mass scale eradication programs for intestinal helminths to prevent abdominal symptoms leading to unnecessary/ avoidable appendectomy.

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## Introduction

Acute appendicitis is a common surgical problem that presents as an acute abdomen to the general surgical casualty ward. Teaching Hospital, Karapitiya (THK), being the second largest hospital in Sri Lanka, receives a significant number of patients with this condition each month. Following a clinical diagnosis of appendicitis, most cases are managed surgically with appendectomy.

Sri Lanka is a tropical country with many parasitic infestations found in abundance. Intestinal helminths harbored and transmitted from soil are one such common group of parasites. Therefore any association between helminthic infestation and acute appendicitis will have an augmented impact within the Sri Lankan community.

The association between helminthic infestation and appendicitis has long been considered in other countries. In 1984, a study which analyzed pathological changes in appendixes, such as inflammation and granuloma formation, in the presence of *Enterobius vermicularis* was published. Having analysed over 30,000 samples they concluded that there was a higher incidence of granuloma formation in the presence of *E.vermicularis*, possibly due to chronic

inflammation<sup>1</sup>. However, in 1987, another group pointed out that the appendixes infested with *E.vermicularis* were rarely associated with histological changes of acute appendicitis<sup>2</sup>.

A group of researchers studied children undergoing surgery for acute appendicitis and the association with *E.vermicularis* infestation in 1988. According to the study there are a greater number of negative cases of appendicitis in the presence of the parasite. They concluded that the parasite causes symptoms resembling those of acute appendicitis<sup>3</sup>. Similar results were seen in a study in 1991 where they concluded that the parasite may be mimicking the symptoms of appendicitis or that the parasites leaves or does not enter an inflamed appendix<sup>4</sup>.

During the period 2005 to 2014, more researchers have concluded that intestinal helminths can mimic the symptoms of acute appendicitis<sup>5-9</sup>.

Having studied 1,600 surgically removed appendixes in 2008, it was concluded that parasitic infestation of the appendix is an uncommon cause for acute appendicitis in children and adolescents<sup>10</sup>.

Although these studies hinted of a possible association between parasitic infestation and the presentation of acute appendicitis, none of them had statistically significant results to back up their claims. Only one out of the ten studies was conducted in the South Asian region and none in the Sri Lankan community<sup>6</sup>. These reasons prompted us to design a study to determine whether there is an association between helminthic infestation and acute appendicitis.

## Methods

A retrospective study was conducted using the histology reports of patients who underwent surgery for acute appendicitis from January 2013 to July 2014 at a surgical unit of the Teaching Hospital, Karapitiya, Galle, Sri Lanka. These reports were analysed for the presence of intestinal helminths and whether the appendixes were inflamed or not. The data was analysed using the SPSS software for the mean, standard deviation and chi square association between the different data sets.

## Results

Five (7.24%) of the 67 histology reports were positive for infestation with helminths based on microscopy. Fifty eight (86.6%) appendixes were inflamed and nine (13.4%) were not inflamed.

**Table 1: Association between presence of helminths and inflammation**

	Helminths - present n(%)	Helminths - absent n(%)	Total n(%)
<b>Inflamed</b>	2(2.9)	56(83.7)	58(86.6)
<b>Not inflamed</b>	3(4.5)	6(8.9)	9(13.4)
<b>Total</b>	5(7.4)	62(92.6)	67(100.0)

There was a significant negative association between infestation with helminths (*Enterobius* and tapeworms), and the presence of inflammation. Only two of the 58 inflamed appendixes (3.4%) had infestation with helminths while three (33.3%) of the non-inflamed appendixes had

infestation. The calculated chi-square value for this association is 6.54 and yielded a p value of 0.0151 which is statistically significant.

## Discussion

Intestinal helminths have been considered to be a causative factor for acute appendicitis. Different studies have shown conflicting evidence. Sri Lanka has a very high prevalence of helminth infestation with a prevalence as high as 29% in the plantation sector, even after eradication programs. The prevalence is higher amongst the younger population<sup>11</sup>.

Our results show that intestinal helminths can lead to symptoms that closely mimic acute appendicitis resulting in surgical intervention. The statistically significant association between infestation with intestinal helminths and non-inflamed appendixes removed at surgery proves this point. Misdiagnosis is higher at the extremes of age, which has a higher operative risk than that of the rest of the population. To reduce misdiagnosis in clinical practice, we suggest a longer period of observation for the extremes of age and for those with atypical appendicitis, while carefully monitoring the patients. Anthelmintic medication can also be administered to such patients during the period of observation.

## Conclusion

Helminths can mimic acute appendicitis without causing inflammation leading to a misdiagnosis of appendicitis. It is well-known that infestation and infection of the gastro intestinal tract leads to abdominal pain. These symptoms are not due to inflammation of appendix but due to the mere presence of helminths. When abdominal pain is confined to the right iliac fossa, a misdiagnosis of appendicitis can be made leading to surgery with the associated risks and costs of surgery, anaesthesia and medication. Helminthic infestation can easily be eradicated with anthelmintic drugs which could prevent abdominal symptoms that lead to an unnecessary / avoidable appendectomy.

Based on the study, we would like to recommend that mass scale preventive methods to eradicate helminths would greatly benefit a population with a significant prevalence of infestation. We would also like to suggest the use of anthelmintic medication in atypical mild abdominal pain during the period of observation and to test faeces for amoebae ova and cysts. Using this as a pilot study, we plan to expand the research to the entire country which would help us to further evaluate our findings.

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