

# Pinworm And Appendicitis In Children

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## Citation

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## Abstract

**BACKGROUND/PURPOSE:** *Enterobius vermicularis* (pinworm) is a widespread parasitic infection and its association with acute appendicitis varies from 0.2 to 41.8% worldwide. Appendiceal pinworms can cause symptoms of acute appendicitis irrespective of microscopic evidence of acute inflammation. Our purpose was to determine the significance of pinworm-associated appendicitis.

**METHOD:** Retrospective review of appendectomies performed on 382 children in a regional hospital over a 5-year period.

**RESULTS** A total of 382 appendectomies were carried out and twelve cases of histologically proven *Enterobius vermicularis* including seven males and five females were seen. The mean age was  $10.2 \pm 3.10$  (range: 5-14) years. An infection rate of 3.14% was noted. The average weight was  $41.32 \pm 17.5$  (range: 18-69) kg, while the mean length of stay was  $3.20 \pm 1.42$  (range: 1-9) days. Five cases were associated with acute appendicitis, while four were associated with a normal appendix. The majority of them had clinical features of appendicitis.

**CONCLUSION:** *Enterobius* infestation is an uncommon cause of acute appendicitis in children in Ireland and may be associated with acute appendicitis or normal appendix. It is imperative that these patients should be investigated with fecal sampling and night-time application of cellophane tape. Also they should receive antihelminthic treatment because appendectomy treats the consequence and not the root cause. Contact tracing may also be beneficial because this is a public health issue.

## INTRODUCTION

*Enterobius vermicularis*, also known as pinworm or seat worm, is a widespread parasite estimated to affect up to 209 million people worldwide both in temperate and tropical climates; it occurs most frequently in children aged 5 to 10 years and is relatively uncommon in those under the age of two years<sup>1</sup>. It is also the most common intestinal parasite of man with the widest geographical distribution, particularly in the primary care setting regardless of race and socio-economic circumstances<sup>2</sup>. The association of pinworm infestation with acute appendicitis varies from 0.2 to 41.8%<sup>3</sup>. The role of *E. vermicularis* in clinical appendicitis has been disputed since its discovery in the appendiceal lumen in 1898<sup>4</sup>. However, reviews of the literature do agree that *E. vermicularis* infestation of the appendix can produce clinical features of acute appendicitis referred to as appendiceal colic<sup>4</sup>.

In colder climates, some factors such as less exposure to sunlight, heavy clothing and fewer baths lead to higher prevalence of *Enterobius vermicularis* and it can inhabit the large intestine but be of low pathogenicity. Sometimes,

however, ova can be found in ectopic sites in the peritoneal cavity and the appendix<sup>5</sup>. Several authors have studied the relationship between pinworm infestation and clinical appendicitis, for instance studies carried out in England have demonstrated a prevalence of pinworm appendicitis from 1.4% to 4.2% in specimens removed for presumptive acute appendicitis<sup>6</sup>.

It is an accepted fact that one of the possible causes of acute abdomen in children may be parasitic infections; *E. vermicularis* is the commonest parasite in man infecting about 10% of the population; in the developed countries the infection rate is even higher in children<sup>7</sup>. The aim of this study is to evaluate and ascertain the significance of pediatric appendicitis due to histologically proven *Enterobius vermicularis* infection in patients operated on for suspected appendicitis.

## METHODOLOGY

During the five-year period between January 2005 and December 2009, a retrospective chart review was performed on 382 consecutive patients who underwent either

laparoscopic or open pediatric appendectomy for diagnosis of acute appendicitis and their consequent histology examined in Midwestern Regional Hospital, Limerick, Ireland. Hospital in-patient enquiry (HIPE) was used to identify the total number of these pediatric surgical patients who were aged from 2 to 14 years. This tertiary care facility is one of the busiest acute surgery units in Ireland providing acute surgical services among others.

Included were children aged from 2 to 14 years who had histologically proven *Enterobius vermicularis* following either open or laparoscopic appendectomy. Excluded were patients above 14 years and those without *E. vermicularis* on histology report. Data collected include age, gender, weight, symptoms and signs, length of hospital stay, histology report and complications. Measures of central tendencies and variance were used to describe the data.

### RESULTS

A total of 832 appendectomies were carried out; twelve cases of *Enterobius vermicularis* were histologically proven including seven males and five females. The mean age was 10.2

### DISCUSSION

Gastrointestinal infection due to *Enterobius vermicularis* is considered to be the commonest helminthic infection<sup>8</sup>. Pinworms have been present for thousands of years. *Enterobius* ova have been found in human coprolites from 7800 BC<sup>9</sup>. Fabricius Hildanus was the first to describe appendiceal pinworms in 1634<sup>10</sup>. Since 1899, when the association of *Enterobius* infestation was first described<sup>11</sup>, there have been several case reports and retrospective studies on this subject.

*Enterobius vermicularis* of the appendix presenting with pediatric appendicitis continued to be a rare surgical presentation of this widespread parasitic infestation with a reported frequency of 1.52%<sup>12</sup>

*Enterobius vermicularis* was associated with pathologic changes ranging from lymphoid hyperplasia and acute and suppurative appendicitis to normal appendix, confirmed by our findings.

Studies support the hypothesis that appendiceal lumen obstruction by *E. vermicularis* gives rise to symptoms indistinguishable from suppurative appendicitis<sup>13</sup>. More recently, a study reviewing 2267 cases of appendicitis showed that there was a highly significant difference in the

incidence of *E. vermicularis* in normal and in inflamed appendices, which may indicate that the presence of *E. vermicularis* in the appendix can cause symptoms of acute appendicitis<sup>14</sup>.

Appendectomy should be done with caution if the appendix is not acutely inflamed; worms in the vermiform appendix could be resident. Pharmacological eradication with antihelminthics (e.g. Mebendazole) and meticulous extraction of released worms are important to avoid chronic complications<sup>15</sup>. Saxena et al. reported three cases in which pinworms were released into the abdominal cavity during laparoscopic appendectomy<sup>15</sup>. It is important that surgeons should exercise maximum caution during laparoscopic appendectomy, especially when the endoloop is in use, to avoid the release of pinworms into the peritoneum upon amputation of the appendix, thereby re-infecting the patients.

In conclusion, *Enterobius vermicularis* is a possible cause of appendicitis in children. Patients not undergoing appendectomy can benefit from fecal sampling and night-time application of cellophane tape in the perianal area as a means of detecting the parasite as well as empirical antihelminthic therapy. Appendectomy treats the consequence and not the root cause. Family members and persons with close contact should also be treated once the diagnosis of *Enterobius* infestation has been confirmed.

### References

1. Goldman DA, Wilson CM: Pinworm Infestation In: Hoekelman Ra, Primary Pediatric Care, 3ed. St Louis: Mosby, 1997. p 1519.
2. Russel LJ: Pinworm, *Enterobius vermicularis*. Prim Care; 1991; 18: 13-24.
3. Marjorie JA, Robert LG, Jonathan IG, et al.: Clinical manifestation of appendiceal pinworms in children: an institutional experience and a review of the literature. *Pediatr Surg Int*; 2004; 20: 372-375.
4. Wiebe BM: Appendicitis and *Enterobius vermicularis*. *Scand J Gastroenterol*; 1991; 26: 336-8.
5. Listoro G, Ferranti F, Mancini G, et al.: The role of *Enterobius vermicularis* in aetiopathogenesis of appendicitis. *Minerva Chir*; 1996; 51: 293-296.
6. Budd JS, Armstrong C: Role of *Enterobius* in the etiology of appendicitis. *Br J Surg*; 1987; 78: 74-89.
7. Hwang KP, Tsai WS, Lincy Lee N: Detection of *Enterobius vermicularis* eggs in the submucosa of the transverse colon of a man presented colon carcinoma. *Am J Trop Med Hygiene*; 2002; 67: 546-48.
8. Symmers WS: Pathology of oxyuris with special reference to granuloma due to presence of *Oxyuris vermicularis* and its ova in tissues. *AMA Arch Path*; 1950; 50: 475-516.
9. Fry FG, More JG: *Enterobius vermicularis*: 10,000 year-old human infection. *Science*; 1969; 166: 1620.
10. Sterba J, Vxcek M, Noll P, et al.: Contribution to the question of relationships between *Enterobius vermicularis* and inflammatory processes in the appendix. *Folia Parasitol (Praha)*; 1985; 32: 231-235.

11. Still GF: Oxyuriasis vermicularis in children. *Br Med J*; 1899; 1: 898-900.
12. Arca MJ, Gate RL, Groner JI, Harmond S, Carniano DA: Clinical manifestation of appendiceal pinworm in children: an institutional experience and review of literature. *Pediatr Surg Int*; 2004; 20: 372-5.
13. Sah SP, Bhadani PP: Enterobious vermicularis causing symptoms of appendicitis in Nepal. *Trop Doct*; 2006; 36: 160-2.
14. Wiebe K: Appendicitis and Enterobious vermicularis. *Scand J Gastroenterol*; 1991; 26: 336-8.
15. Sexana AK, Springer A, Tsika J, Willital GH: Laparoscopic appendectomy in children with Enterobious vermicularis. *Surg Laparosc Endosc Percutan Tech*; 2001; 11: 284-6.

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