

***Enterobius vermicularis* Infestation Presenting as Acute Appendicitis in Children**

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Abstract

Objective: To find the incidence along with specific presenting symptoms and signs of children with EV in their appendix found after undergoing emergency appendicectomy.

Methods: Retrospective case note review of all children aged 15 years and less, who underwent emergency appendicectomy for suspected appendicitis at our institution over a period of 2 years.

Results: During the study period, 287 children underwent emergency appendicectomy. Among these patients 167 patients were male and 120 patients were female. *Enterobius vermicularis* was noted in 11 (3.8%) patients (6 male, 5 female) on histology. Of these 11 patients, the mean age was 9.45 (5 - 14 years) years. The presenting symptoms included Right iliac fossa (RIF) pain (n = 10), anorexia (n = 9), vomiting (n = 5), pyrexia (n = 3) and diarrhea (n = 1). All 11 patients had RIF tenderness on pre-operative examination and RIF guarding was seen in 6 patients. The mean WBC count was 11.7 (6.2 - 20.8)/ μ L. The mean CRP was 22.3 (< 5 - 73) mg/L. Intra-operatively, the appendix appeared normal in 6, inflamed in 4 and perforated in 1 patient, which was confirmed on histology. Meckel's diverticulitis was seen in 1 patient with EV seen in a normal appendix as well as in the Meckel's diverticulum. Free fluid was noted in 4 patients intra-operatively. No complications were noted post-operatively in all these 11 patients.

Conclusion: The incidence of *Enterobius vermicularis* (EV) was 3.8% among the patients undergoing emergency appendicectomy with a clinical diagnosis of acute appendicitis. EV is usually seen in otherwise normal appendix but can also be found in inflamed and perforated appendix as well as in Meckel's diverticulitis.

Keywords: *Enterobius vermicularis*; Acute Appendicitis; Worm Infestation; Abdominal Pain; Children

Abbreviations

EV: *Enterobius vermicularis*; RIF: Right Iliac Fossa; LIF: Left Iliac Fossa

Introduction

Various parasitic infestations such as Taenia, Ascaris and *Enterobius vermicularis* [EV] have been reported in appendices of patients suspected with acute appendicitis [1]. *Enterobius vermicularis* [EV] (pinworm) infestation can present with symptoms and signs resembling acute appendicitis. In the UK, a literature search revealed an incidence of EV 1.5% and 2.6% among 1150 and 498 patients undergoing emergency appendicectomy, respectively [2,3]. However, these studies have included adult patients and incidence of EV in children undergoing emergency appendicectomy in UK is unknown. We looked at the incidence along with specific presenting symptoms and signs of children with EV in their appendix found among children after undergoing emergency appendicectomy.

Methods

This is a retrospective case note review of all children aged 15 years and less who underwent emergency appendicectomy for suspected appendicitis at our institution between January 2007 and December 2008. Patients who had interval appendicectomy and appendicular mass treated conservatively were excluded from the study. A proforma was created and all data collected and incorporated on Microsoft Excel spreadsheet [Version 2007©Microsoft Inc]. Data was collected on patient demographics, symptoms and signs, operative details, histological findings, complications and outcomes.

Results

During the study period, 287 children underwent emergency appendicectomy. Among these patients 167 patients were male and 120 patients were female. Normal appendix was seen in 39 patients and EV was noted in 11 (3.8%) patients (6 male, 5 female). Of the 11 EV patients with, the mean age was 9.45 (5 - 14) years.

The presenting symptoms included abdominal pain in all 11 patients of which, right iliac fossa (RIF) pain (n = 9), RIF with Left iliac fossa (LIH) pain (n = 1) and peri-umbilical pain (n = 1) were noted. The other presenting symptoms included, anorexia (n = 9), vomiting (n = 5), fever (n = 3) and diarrhea (n = 1). All 11 patients had RIF tenderness on pre-operative examination and RIF guarding was seen in 6 patients. Pyrexia was noted in 3 patients. All presenting symptoms and signs are tabularized and shown in figure 1.

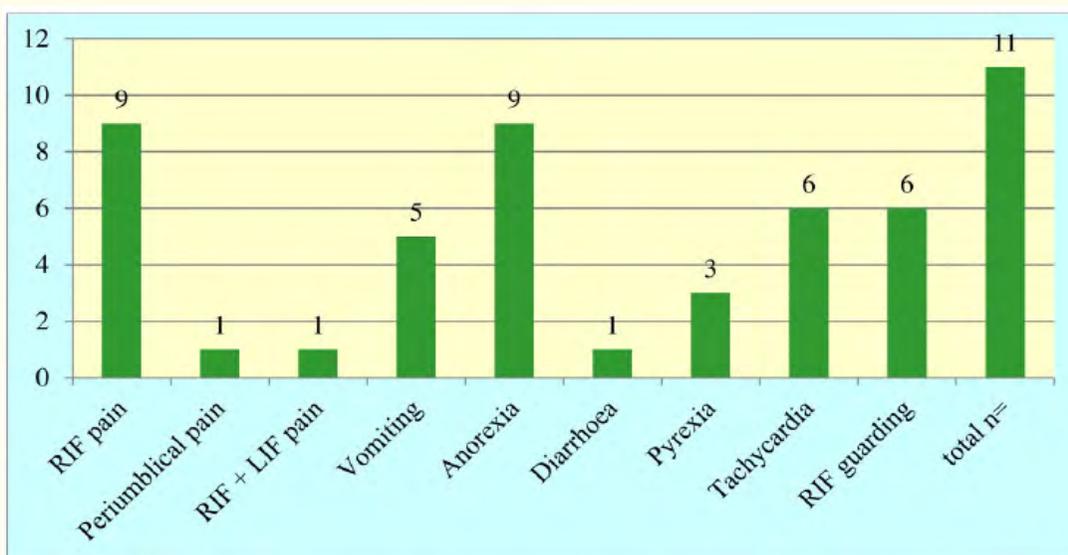


Figure 1: Graph of paediatric patients who had *Enterobius vermicularis* noted in the histology of their appendix removed and corresponding presenting symptoms and clinical signs.

The mean WBC count was 11.7/ μ L (6.2 to 20.8). This was compared with the rest of the patients who had normal, inflamed and perforated appendicitis without EV on histology (Figure 2). The resulting graph suggested the mean WBC count among the EV was slightly higher than the patients with normal appendix without EV. CRP was available for 10 of the 11 patients with EV. The mean CRP was 22.3 mg/L (< 5 to 73) among these 10 patients. In comparison to the patients with Normal appendix without EV (mean CRP - 21.9) CRP was higher. Intra-operatively the appendix appeared normal in 6 patients, inflamed in 4 patients and perforated in 1 patient with EV on histology. Meckel’s diverticulitis was seen in 1 patient (6 yr old male) with EV seen in the normal looking appendix as well as in the Meckel’s diverticulum (Figure 3). Free fluid was noted in 4 patients with EV, intra-operatively. No complications were noted post-operatively in all 11 patients with EV.

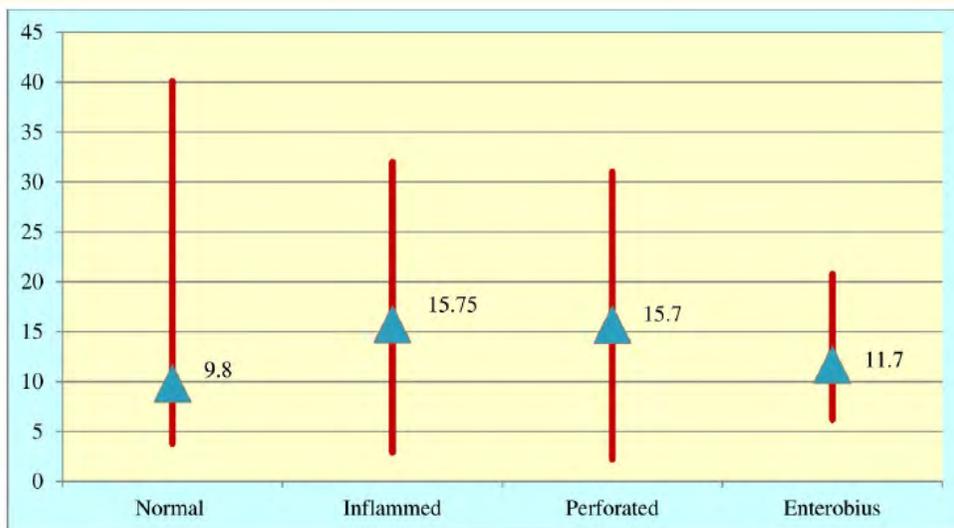


Figure 2: Graph of Mean and range of pre-operative white cell count of paediatric patients who underwent appendicectomy for a clinical diagnosis of acute appendicitis.

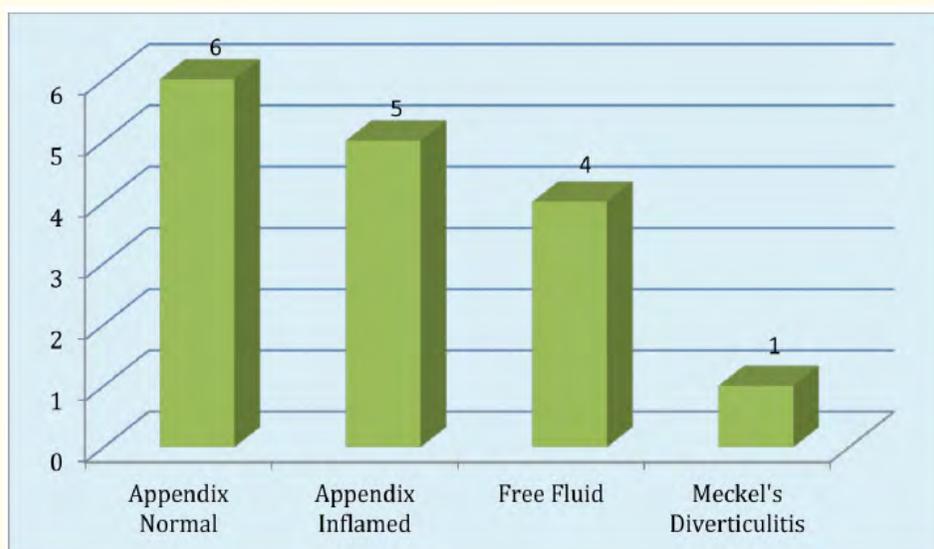


Figure 3: Graph of paediatric patients who had Enterobius vermicularis noted in the histology of their appendix removed and corresponding intra-operative findings.

Discussion

In Tropical countries like India, where parasitic infections are quite common, parasitic infections were reported in 2.5% (of 2921 appendix specimens) after appendicectomy and EV was reported only in 1.4% of these patients [4]. In UK, the incidence of EV was reportedly 1.5% to 2.6% among 1150 and 498 patients undergoing emergency appendicectomy, respectively [2,3]. Although these studies included children, adult patients were predominant and the incidence of EV in paediatric appendicitis remains elusive with very few stud-

ies reporting so far [5-8]. These studies reported a variable EV incidence of 4%, 7% 9.8% and 1.4% among paediatric appendicectomies, from different parts of the world – New Zealand, Ireland, Iran and Wisconsin (USA) respectively [5-8]. Our study showed EV incidence of 3.8% among 287 paediatric emergency appendicectomies and represents the only study from UK among children.

EV is an obligate parasite, transmitted by faecal-oral route and colonizes usually in the human ileum, caecum and ascending colon [9]. The pathophysiology of clinically suspected appendicitis is similar to that associated with a faecolith or luminal lymphoid hyperplasia of the appendix [10]. Although in our study we found 4 (36%) children with EV on histology along with inflamed appendix and 1 child with EV in perforated appendix, it cannot be established for sure if EV was simply present in the inflamed/perforated appendix or if EV was the cause of the appendicitis. This theory of EV with simple colonization vs being the etiology of appendicitis is long debated. By obstructing the appendiceal canal/lumen, EV can produce colicky RIF pain (“appendiceal colic”) but unusually can lead to inflammation of the appendix as well [8].

EV infestation of the appendix should be considered in patients who present with recurrent RIF pain but do not have a significantly raised WCCs, or high Alvarado scores [2]. However, in children only female sex, lower WBC count and high Eosinophil count at presentation; have been shown to be significantly associated with EV infestation in appendix [6]. In our study, among EV patients, none of the clinical features including, vomiting, RIF pain, tenderness, pyrexia and anorexia were different from the appendicitis patients without EV. However, the mean WBC count as well as mean CRP was lower in comparison to both inflamed and perforated appendicitis patients without EV.

The largest series of EV in children (116 of 2923 children aged 3 - 15 yrs) reported EV in normal, inflamed and perforated appendix in children [5]. However, EV found in Meckel’s diverticulitis has been reported only once before in an 11 year old boy [11] and we describe the second such case in our series of EV patients. Although multiple parasitic infestations of the appendices are reported in children, EV seems to be reportedly more common [12]. Some of the negative appendicectomies could be the result of possible EV infestation where the pathological examination of specimens may not have revealed EV; hence it is prudent to consider anti-helminthic treatment of EV in all negative appendicectomies without any obvious cause. EV ova are rarely seen on stool examination and scotch-tape test is recommended for diagnosis [13].

Conclusion

The incidence of *Enterobius vermicularis* (EV) was 3.8% among the patients undergoing emergency appendicectomy with a clinical diagnosis of acute appendicitis. EV is usually seen in otherwise normal appendix but can also be found in inflamed, perforated appendix as well as in Meckel’s diverticulitis.

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