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The role of parasites in acute appendicitis of pediatric patients.

Saul Dorfman[1], José Cardozo[2], Denny Dorfman[1] y Alonso Del Villar[3].

[1]Departamento de Cirugía, Hospital Dr. Manuel Noriega Trigo, Instituto Venezolano de los Seguros Sociales, [2]Departamento de Patología, Hospital General del Sur y Escuela de Medicina, [3]Departamento de Estadística, Facultad de Agronomía, Universidad del Zulia. Maracaibo, Venezuela.

Key words: Parasites, acute appendicitis, etiology.

Abstract. There is little evidence regarding the relationship between parasites and acute appendicitis. In order to determine such a relationship, if any, 830 appendectomy specimens were studied. Age, sex, pathological findings and the presence and type of parasites and the type of parasite were analyzed. Parasites were present in 62 cases (7.46%). *Ascaris lumbricoides* and *Trichuris trichiura* were the most frequently encountered parasites. These were observed, alone or in combination, in 45 cases (72.5%). Appendix perforation, peritonitis, necrosis and flegmonous appearance, were more frequent in the cases of acute appendicitis without parasitic infestation ($p < 0.05$). There were no differences between the cases with or without parasitic infestation ($p > 0.05$) In cases of peritonitis. The low incidence of parasites among the appendectomy specimens and the failure to demonstrate its relationship with all events derived of appendicitis, do not support the hypothesis that parasites are a major cause of appendicitis in pediatric patients.

Papel de los parásitos en la apendicitis aguda en pacientes pediátricos.

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Palabras clave: Parásitos, apendicitis aguda, etiología.

Resumen. Existe poca evidencia con respecto a la relación entre parásitos y apendicitis aguda. Con el objeto de clarificar dudas, se estudiaron 830 muestras de especimenes apendiculares. Se analizaron la edad, el sexo, los hallazgos histopatológicos, la presencia o no de parásitos y el tipo de parásito presente. Se observaron parásitos en 62 casos (7,46%). *Ascaris lumbricoides* y *Trichuris trichiura* fueron los parásitos mas frecuentemente visualizados, solos

Corresponding Author: Saul Dorfman, PO Box 10317, Maracaibo, Venezuela. E-mail: sdorfman@cantv.net.

o en combinación en 45 casos (72,5%). La perforación apendicular, la peritonitis, la necrosis apendicular y las características flegmonosas del apéndice, fueron observados con mayor frecuencia en los casos sin infestación parasitaria ($p < 0,05$). En los casos de peritonitis, no se observó diferencia significativa entre los casos con o sin infestación parasitaria. La baja frecuencia de la presencia parasitaria en las biopsias estudiadas y la imposibilidad de demostrar una relación entre los parásitos y todas las manifestaciones histopatológicas de la apendicitis aguda, impiden afirmar que los parásitos constituyen una causa importante en la etiopatogénia de la apendicitis aguda en pacientes pediátricos.

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INTRODUCTION

Appendectomy is the most common surgical operation in children (1). The etiology, the initiating events, and the role of parasitic infestation remain obscure. Parasitism is most common in schoolchildren of lower socioeconomics groups, who usually live in overcrowded conditions; its prevalence could reach 80-90% (2,3). Gender frequency is equal. No social class is exempted. Personal hygiene and exposure to infected subjects is important. Ever since Still (4) found pinworms in the lumen of the vermiform appendix, the presence of parasites in human appendices has been scarcely reported in the literature. In tropical countries, parasitic infestation is quite common, but appendiceal disease is not as frequent as would be expected (5).

The purpose of this paper is to determine the relationship, if any, between acute appendicitis, its pathological and demographic characteristic of the patients, and appendicceal parasitic infestation.

MATERIAL AND METHODS

The bioptic material evaluated consisted of appendices removed at the Hospitals General del Sur and Manuel Noriega Trigo, of Maracaibo, Venezuela, from pediatric patients suspected of having acute appendicitis, obtained during the period january 1979 and december 2001. The study includes only those removed at simple appendectomy, and excludes the specimens obtained during other surgical procedures. All appendices were subjected to a histopathological examination. Macroscopic features such as peritonitis, necrosis, flegmonous appearance and perforation were recorded. The microscopic examination included haematoxilyn and eosin staining of a 2-cm longitudinal section from the free end, and a transverse section from the middle and the base of the appendix of each specimen. The diagnosis of acute appendicitis was made when a polymorphonuclear neutrophil infiltrate was observed in the mucosa or the muscularis, associated with mucosal ulceration (6-8). Chi-square test was used to calculate the statistical significance.

RESULTS

Of the 923 appendices studied, 75 (8.13%) showed chronic alterations, and in 18 cases (1.95%) the histology was considered normal. In 830 cases (89.92%) the histology indicated acute appendicitis. These were the cases object of this study. Parasites were found in 62 cases (7.46%). Among parasites found, *Ascaris lumbricoides* and *Trichuris trichiura* were the most

frequent, and were observed alone or in combination in 46 cases (74,1%). Other parasites found were, *Entamoeba hystolytica* (n=3), *Balantidium coli* (n=2), *Enterobius vermicularis* (n=7), and in 4 cases the parasite was not identified. There were no significant differences in relation to age-gender and the presence or not of parasites ($p > 0.05$). The majority of patients belonged to 7-12 age group. Table I, disclose the pathological findings related to the presence or absence of parasites. Appendix perforation, necrosis and flegmonous appearance, were more frequent in the cases of acute appendicitis without parasitic infestation ($p < 0.05$). In cases of peritonitis, there were no differences between the two groups ($p > 0.05$).

DISCUSION

Acute appendicitis is one of the commonest surgical conditions in pediatric patients (1). Although 0.2-41.8% of the appendices reveal parasitic infestation, there has been little evidence regarding the relationship between appendicitis and parasites (5, 9-11). *Enterobius vermicularis* generally appears to be the most common parasite of the appendix (10, 11). However, *Trichuris trichiura* and *Ascaris lumbricoides* were the more common parasites in our series, present alone or in combination in 46 cases (74.1%). These findings are in accordance with the prevalence of intestinal parasites in the population in this geographic area (2, 3).

The etiology of appendicitis remains largely unknown. The condition is thought to be initiated by obstruction of the lumen and secondary infection. Obstruction is usually due to follicular hyperplasia, edema or faecalith formation (7, 12). However, obstruction may be due to extraluminal adhesion or to other causes, as stated by Chang and Fw (11) who did not find faecolith in a significant number of cases in which acute appendicitis was confirmed. The lymphoid hyperplasia may well be secondary to the primary inflammation of the appendix. Schmidt and Robert (13) thought appendicitis as a result of initial mucosal injury or destruction of tissue by mechanical or chemical means. The casual association of

TABLE I
PARASITIC INFESTATION IN PEDIATRIC PATIENTS WITH ACUTE APPENDICITIS. RELATIONSHIP TO PATHOLOGICAL FINDINGS

	With parasites	Without parasites	Total
Flegmonous			
Yes	7	169	176
No	55	599 (*)	654
Necrosis			
Yes	10	328	338
No	52	440(*)	492
Perforation			
Yes	4	154	158
No	58	614(*)	672
Peritonitis (**)			
Yes	20	311	331
No	42	457	499

(*) $p<0.05$; (**) NS.

parasites and obstruction and acute appendicitis in children is unlikely, as they are seldom present in sufficient numbers to cause obstruction (11).

In our series we did not find a considerable obstruction of the lumen due to parasites. This does not support the idea that parasites are the causative agent in acute appendicitis. The present paper discloses that the events observed in our series, such as peritonitis, flegmonous appearances, necrosis and perforation, were not related to parasites ($p < 0.05$). Worms may contribute to obstruction, but most parasites found within the lumen of the appendix, surgically removed from children with clinical appendicitis, in our experience, are insignificant.

The low frequency of parasites in the appendiceal specimens, and the failure to demonstrate its relationship with all the events derived from appendicitis, do not support the hypothesis that they are a major cause of appendicitis in pediatric patients.

REFERENCES

1. **Lintula H, Kokki H, Vanamo K**. Single-blind randomized clinical trial of laparoscopic versus open appendectomy in children. Br J Surg 2001; 88: 510-514.
2. **Rivero Z, Acevedo C, Casanova I., Hernandez S, Malaspina A**. Enteroparasitosis de dos unidades educativas rurales en el Municipio La Cañada, Estado Zulia-Venezuela. Kasmera 1996; 24: 135-150.
3. **Calchi MLC, Chourio GL, Diaz IA.** Helmintiasis intestinales en niños de una comunidad marginal del Municipio Maracaibo, Estado Zulia-Venezuela. Kasmera 1996; 24: 17-38.
4. **Still GF**. Oxyuris vermicularis in children. Br Med J 1899; 1: 898-900.
5. **Dorfman S, Talbot IC, Torres R, Cardozo J, Sanchez M**. Parasitic infesttion in acute appendicitis. Ann Tro Med Parasitol 1995; 89: 99-101.
6. **Nordback I, Harju E**. Inflammation parameters in the diagnosis of acute appendicitis. Acta Chir Scand 1988; 154: 43-48.
7. **Butler C**. Surgical pathology of acute appendicitis. Human Pathol 1981; 12: 870-878.
8. **Dymock RB**. Pathological changes in the appendix: a review of 1000 cases. Pathology 1977; 9: 331-339.
9. **Rodriguez Loeches J, Echevarria Romero R, Gonzalez Martinez P, Linares Delgado J, Kessel Bauza E**. Apendicitis y parasitismo. Análisis de 1030 apendicectomías. Rev Cubana Med Trop 1983; 35: 276-283.
10. **Cerva L, Schrottenbaum M, Kliment V**. Intestinal parasites : a study of human appendices. Folia Parasitol (Praha) 1984; 38; 5-9.
11. **Chang W, Fu KH**. Value of routine histopathological examination of appendices in Hong Kong. J Clin Pathol 1987; 40: 429-433.
12. **Williams RA, Gilmour HM**: The appendix. In Whitehead R. Gastrointestinal and oesophageal pathology. 2nd edition. Edinburgh. Churchill Livingstone 1995 ; 633-640.
13. **Schmidt GD and Robert LS**. Foundations of Parasitology. St. Louis. Times-Mosby College, 1985.