ORIGINAL ARTICLE

Appendectomy in Appendiceal Parasitosis: A Retrospective Analysis

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ABSTRACT

Objective To evaluate the role of parasitic infestation in the etiology of acute appendicitis.

Study design Descriptive case series.

Place & Duration of study Department of Surgery, Pakistan Institute of Medical Sciences Islamabad, Pakistan, from January 2012 to June 2014.

Methodology A retrospective analysis of histopathology reports of 1617 appendix specimens of patients of all ages and gender who underwent appendectomy for acute appendicitis was done. Detail histopathology reports of 65 cases with appendiceal parasitosis were examined. Data were analyzed through IBM SPSS version 20.

Results A total of 65 specimens of appendiceal parasitosis amongst 1617 appendectomy cases produced a frequency of 4.02%. Mean age group of patients with appendiceal infestation was 14.38 + 9.83 year with an overwhelming (50.76%) presenting in the second decade of life. Male to female ratio was 1.24:1. Normal histology (n=39, 60%) was most frequently reported followed by lymphoid hyperplasia (n=18, 27.6%) whereas only 07 (9.85%) cases of parasitic infestation had acute or acute suppurative appendicitis.

Conclusions Appendiceal parasitosis may result in symptoms mimicking acute appendicitis without causing acute inflammation of the appendix so it cannot be considered conclusively in the etiology of acute appendicitis. Medical therapy must be instituted for cases of parasitic infestations.

Key words Appendiceal parasitosis, Parasitic Infestations, Acute appendicitis, Histopathology, Enterobius vermicularis.

INTRODUCTION:

Appendectomy is one of the most frequently performed operations in the general surgery departments all over the world.[1] The incidence of appendectomy is 12 % for men and 25 % for women and the lifetime risk of acute appendicitis is 8.6 % and 6.7 % for men and women, respectively.[2] Appendicitis is primarily a disease of adolescents and young adults with a peak incidence in the second and third decades of life.[3] A variety of neoplastic and inflammatory conditions can mimic acute appendicitis.

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Clinical diagnosis of acute appendicitis is routinely done on history especially of migratory pain and elicitation of physical signs. Leukocytosis helps to reinforce the clinical diagnosis both in children and adults.[4] Out of reported 250,000 appendectomies performed worldwide annually, about 15% are carried out on non-appendiceal pathologies.[5]

In literature there is a consensus on luminal obstruction being the most common cause of acute appendicitis. Luminal obstruction is mostly caused by fecal impactions and lymphoid hyperplasia. Rare and uncommon causes include enterobiasis, ascariasis, balantidiasis, actinomycosis, taeniasis, schistosomiasis, ameobiasis, trichuriasis, blastocystis hominis, tuberculosis, etc.[3,6,7] Luminal obstruction by the parasites may be the cause of pain without acute appendicitis. Worldwide the rate of parasitic

infestation presenting as acute appendicitis varies from 0.2-41.8% and rates of inflammation in infested specimens ranged from 13-37%.[8] Appendiceal parasitosis is almost never suspected or diagnosed preoperatively so postoperative histopathology is the only definitive means to confirm the presence of parasites. Majority of appendectomies with parasitic infestations turn out to have no pathological evidence of acute inflammation.[4] The objective of this study was to determine the role of parasites in the etiology of acute appendicitis especially in children and adolescents.

METHODOLOGY:

This descriptive case series involved retrospective analysis of 1617 patients who underwent appendectomy for acute appendicitis at Pakistan Institute of Medical Sciences, Islamabad, from January 2012 to June 2014. The diagnosis of acute appendicitis was based on history and clinical examination, elevated white blood cell count, and in most cases strengthened by ultrasonography. All surgically removed specimens were sent for histopathology at the Pathology department of hospital where haematoxylin and eosin stained sections were made and studied. Detailed reports were generated and uploaded on Hospital Management Information System (HMIS). Data were retrieved from HMIS and collected on a proforma.

Demographics and detailed histopathology of shortlisted cases with parasite infestations were studied. The diagnosis of acute appendicitis on histopathology was made when a polymorphonuclear neutrophil infiltrate was observed in mucosa or deep layers. Histopathological classification of appendix specimens with parasites was; normal histology, lymphoid hyperplasia, acute appendicitis, acute suppurative appendicitis and eosinophilia. The cases with normal histology were reported as negative appendectomies. Collected data were coded, entered and statistically analyzed using International Business Machines Statistical Package for the Social Sciences (IBM SPSS) version 20.0. Data for continuous variable like age were reported as the mean ± standard deviation. Categorical variables were expressed as frequency and percentage. Bar graph and tables were used to present the data.

RESULTS:

A total of 1617 specimens were obtained at open and laparoscopic appendectomies. A total of 65(4.02%) contained parasites on histopathological examination. Out of 65 cases, 55.4% (n=36) were males and 44.6% (n=29) females. Male to female ratio was 1.24:1. Their ages ranged from 2 year to 60 year with a mean age of 14.38+9.83 year. Appendiceal parasitosis mostly occurred in second decade of life, accounting for 50.76 % (n=33) of the patients followed by those in first decade 36.76 % (n=24) (Figure I).

Sixty-two samples were reported to contain enterobius vermicularis worm while 3 had ova of enterobius vermicularis in the lumen. Normal histology was reported in majority (60%) of the patients followed by lymphoid hyperplasia (27.6%). Table I shows the breakdown of histopathology reports.

Faecolith was present in 39 out of 65 parasitic infestations. Table II gives the distribution of parasitic infested samples with or without faecolith in relation to the histopathology reports. Acute appendicitis was reported in 3 cases each with and without faecoliths.

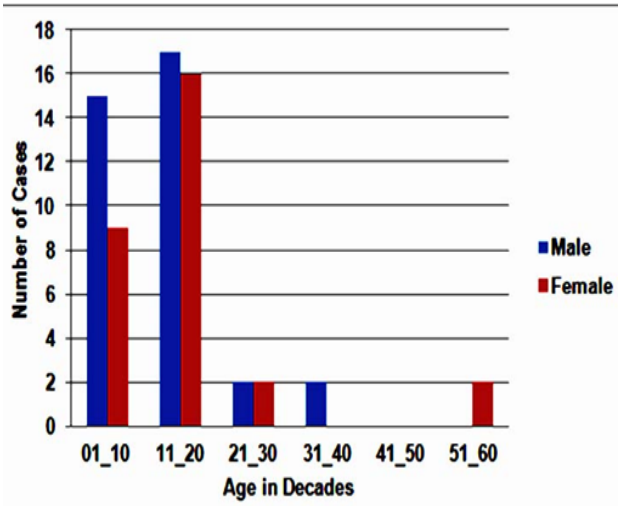

Fig 1: Gender distribution according to age in decades

DISCUSSION:

Enterobius vermicularis, commonly known as pinworm or threadworm, is estimated to affect up to 209 million people globally and is considered to be the most common helminth infection.[9] This parasite has the propensity to colonize people without causing much specific symptoms. It commonly causes benign symptoms like pruritis ani and restless sleep but can conveniently mimic acute appendicitis leading to negative appendectomy.[5,6,9] In a study from Islamabad's urban and suburban population sample of 1350, enterobius vermicularis was found amongst 13.5 % of the population.[10]

The documented infestation in appendix was first reported by Still in late 19th century.[11] The actual role of parasitic infestation as a co-factor in

Table I: Histopathology Reports of Infested Cases

Histopathology	Infestation		Total n(%)
	Worm(n)	Ova(n)	
Normal Histology	39	00	39 (60)
Lymphoid Hyperplasia	17	01	18 (27.6)
Acute Appendicitis	05	01	6 (9.2)
Acute Suppurative Appendictis	00	01	1 (0.65)
Eosinophilia	01	00	1 (0.65)
Total	**62**	**03**	**65(100)**

Table II: Histopathology Reports of Infested Cases and Their Association with Faecolith

Histopathology	Faecolith		Total n(%)
	Present (n)	Absent (n)	
Normal Histology	25	14	39 (60)
Lymphoid Hyperplasia	09	09	18 (27.6)
Acute Appendicitis	03	03	6 (9.2)
Acute Suppurative Appendictis	01	00	1 (0.65)
Eosinophilia	01	00	1 (0.65)
Total	**39**	**26**	**65 (100)**

appendicitis is still open to debate.[1,3,5] Acute appendicitis might be due to obstruction of the lumen by parasites or secondary inflammation by the presence of parasite and/or its ova in the lumen. The presence of parasitic infestation may create acute infection by obstructing the lumen or leading to a secondary inflammation.[12,13,14]

Akbulut S et al did a literature review using PubMed and Google Scholar to detect the unusual findings in the histopathologies of appendix specimens.[8] Amongst 128 studies published between January 2000 and November 2010, there were 389 cases of enterobius vermicularis (0.48%). Our study showed a higher frequency of appendiceal parasitosis as compared to other studies carried out internationally. Though normal histology (60%) has been predominantly reported, as is the case in our study, but the pathological spectrum ranged from acute appendicitis to acute suppurative appendicitis and can lead to serious complications like gangrene and life-threatening peritonitis. Lymphoid hyperplasia is common in children as well as in gastrointestinal obstructions.[3] In a study by Akbulut S et al there was evidence of acute inflammation in 12 cases while in 25 cases there was no pathological change.[9] Analysis by de Silva DF revealed acute neutrophilic inflammation in the appendix wall in 12 of the 24 specimens and lymphoid hyperplasia in 10 of the 24 appendices.[15] Gangrenous appendicitis was diagnosed in three cases in our study. Parasitosis may be a cause of symptoms resembling acute appendicitis without mucosal invasion by the parasite.[16]

We have also studied the presence of faecoliths along with parasites considering faecoliths as important etiology of acute appendicitis.[6,7,17] In our study, 25 cases of normal pathology had no faecoliths while 14 cases had both faecoliths and parasites, while equal number of acute appendicitis and lymphoid hyperplasia were reported in cases with or without faecoliths. In such cases, acute appendicitis can be attributed to luminal obstruction by either of the causes. One case of acute suppurative appendicitis had lumen filled with enterobius vermicularis ova.

Parasitic infestation must be kept in the differential diagnosis of appendicitis with high index of suspicion in patients with doubtful clinical findings, normal white cell count and increased eosinophils, especially if right iliac fossa pain is recurrent.[5,8,18] Patients should receive antihelminthic treatment in cases of appendiceal parsitosis. This study has limitations of being retrospective and single centered. In view of the important role of our findings in prevention of negative appendectomy and definitive

treatment of infestations, a prospective, longer duration and multicenter studies on this subject is thus warranted.

CONCLUSIONS:

Symptoms of infestation can mimic acute appendicitis. With a frequency of 4.02% of appendiceal parasitosis amongst our population therefore we should always keep parasitic infestation in differential diagnosis of acute appendicitis especially in children and adolescents.

REFERENCES:

1. Agresta F, Ansaloni L, Catena F, Verza LA, Prando D. Acute appendicitis: position paper, WSES, 2013. World J Emerg Surg. 2014;9:26.
2. Flum DR, Koepsell T. The clinical and economic correlates of misdiagnosed appendicitis: nationwide analysis. Arch Surg. 2002;137:799-804.
3. Karatepe O, Adas G, Tukenmez M, Battal M, Altiok M, Karahan S. Parasitic infestation as cause of acute appendicitis. G Chir. 2009;30:426-8.
4. Yabanoglu H, Caliskan K, Aytac HO, Turk E, Karagulle E, Kayaselcuk F, et al. Unusual findings in appendectomy specimens of adults: retrospective analyses of 1466 patients and a review of literature. Iran Red Crescent Med J. 2014;16:e12931.
5. Chamisa I. A clinicopathological review of 324 appendices removed for acute appendicitis in Durban, South Africa: a retrospective analysis. Ann R Coll Surg Engl. 2009;91:688–92.
6. Aydin O. Incidental parasitic infestations in surgically removed appendices: a retrospective analysis. Diagn Pathol. 2007; 2:16.
7. Jones AE, Phillips AW, Jarvis JR, Sargen K. The value of routine histopathological examination of appendicectomy specimens. BMC Surg. 2007;7:17.
8. Akbulut S, Tas M, Sogutcu N, Arikanoglu Z, Basbug M, Ulku A, et al. Unusual histopathological findings in appendectomy specimens: A retrospective analysis and literature review. World J Gastroenterol. 2011;17:1961-70.
9. Efraimidou E, Gatopoulou A, Stamos C, Lirantzopoulos N,Kouklakis G. Enterobius vermicularis infection of the appendix as a cause of acute appendicitis in a Greek adolescent: a case report. Cases J. 2008;1:376.
10. Chaudhry ZH, Afzal M, Malik MA. Epidemiological factors affecting prevalence of intestinal parasites in children of Muzaffarabad district. Pakistan J Zool. 2004; 36:267-71.
11. Still GF. Observation in Oxyuris vermicularis in children. Br Med J. 1899;1:898-900.
12. Ramezani MA, Dehghani MR. Relationship between Enterobius vermicularis and the incidence of acute appendicitis. Southeast Asian J Trop Med Public Health. 2007; 38: 20-3.
13. Zakaria OM, Zakaria HM, Daoud MY, Wadaani HA, Al Buali W, Al-Mohammed H, et al. Parasitic Infestation in pediatric and adolescent appendicitis: a local experience. Oman Med J. 2013;28:92-6.
14. Karaman U, Türkmen E, Iraz M, Karataº T, Çolak C. Parasirosis in appendectomy cases. Eur J Gen Med. 2010;7:317-20.
15. de Silva DF, da Silva RJ, da Silva MG, Sartorelli AC, Rodrigues MA. Parasitic infection of the appendix as a cause of acute appendicitis. Parasitol Res. 2007;102:99-102.
16. Sodergren MH, Jethwa P, Wilkinson S, Kerwat R Presenting features of Enterobius vermicularis in the vermiform appendix. Scand J Gastroenterol. 2009;44:457-61.
17. Abdul Gaffar B. Appendicitis: changing perspectives. Nonoperative treatment with antibiotics is safe as an initial treatment of uncomplicated appendicitis, with a significant decrease in complications but a high failure rate. Adv Surg. 2013;47:119-40.
18. Saxena AK, Springer A, Tsokas J, Willital GH. Laparoscopic appendectomy in children with Enterobius vermicularis. Surg Laparosc Endosc Percutan Tech. 2001;11:284-6.