

التهاب الزائدة الدودية الطفيلي: دراسة استثنائية سريرية وتشريحية مرضية لـ 665 حالة التهاب زائدة دودية حاد

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الملخص

خلفية البحث: يعدُّ التهاب الزائدة الدودية أكثر حالات البطن الحادة شيوعاً التي يتم استقبالها في ردهات الطوارئ في المستشفيات الجراحية. وعلى الرغم من كثرة هذه الحالات إلا أن السبب الحقيقي للغالب الأعم منها ما يزال غير معروف على وجه الدقة والوضوح. إنَّ الاعتقاد السائد في الوقت الحاضر هو أن الحدث الأول الذي يبدأ به التهاب الزائدة هو انسداد لمعتها بجسم غريب أو طفيلي معوي أو ورم في جدارها. ان الطفيليات المعوية تتسبب في عدد من الاعراض والعلامات تشابه تلك التي تصاحب التهاب الزائدة. أن أكثر الطفيليات المعوية مصاحبة لحالات التهاب الزائدة هي الدودة دبوسية وإنَّ الأعراض والعلامات السريرية للزائدة الدودية في هذه الحالات تكون غير مصحوبة بعلامات تشريحية مرضية التهابية في الغالب منها.

المرضى وطرائق البحث: تضمنت هذه الدراسة 665 مريضاً من كلا الجنسين استقبلوا في ردهات الطوارئ لثلاثة مستشفيات جراحية رئيسية في محافظة بابل من تشرين الأول 2000 حتى كانون الأول 2001.

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وكانت أعمارهم تتراوح بين 10-50 سنة. جميع المرضى كانوا يشكون من أعراض وعلامات زائدة دودية حادة تم على إثرها إخضاعهم لعملية استئصال الزائدة. قمنا بجمع الزوائد المستأصلة من هؤلاء المرضى وإخضاعها للفحص العياني والمجهري بهدف التحري عن الأجسام الغريبة فيها و التغييرات النسجية المرضية في جذرها.

النتائج: من أصل 665 نموذج زائدة دودية كان هناك 64 (9.6%) نموذجاً يحتوي على طفيليات معوية هي: الدودة الدبوسية، دودة الصقر الخراطيني وامبيبا الزحار وبواقع 40(62.5%) و 17 (26.5) و 7(10.9%) على التوالي. كما وجدنا أن 41(6%) نموذجاً من أصل 665 خال من أية علامة من العلامات المرضية العيانية أو المجهرية لالتهاب الزائدة. جميع الحالات غير المصحوبة بالتهابات حادة (التهاب زائدة كاذب) كانت مصابة بإحدى الديدان المعوية. ظهر من خلال الفحص المجهري أن 17 (26%) حالة من الحالات المصحوبة بإصابة طفيلية فيها علامات التهاب الزائدة التقليدي و أن 4(6%) حالات فيها التهاب تقيحي و 1(1.2%) حالة فيها تضخم جريبي لمفاوي و 41 (62%) كانت طبيعية. لم نجد انسداداً في لمعة الزائدة بواسطة طفيلي أو جسم غريب من أي نوع في أي نموذج من النماذج الـ 665 التي خضعت للفحص التشريحي المرضى.

الاستنتاجات: إنّ حالات التهاب الزائدة الكاذب غالباً ما تكون مصحوبة بإصابة طفيلية في الزائدة. إنّ العلامات والأعراض السريرية لالتهاب الزائدة ناتجة عن ألم مغمي في الزائدة تسببه الطفيليات الموجودة في لمعتها. الحدث الأول في إمرضية الزائدة هو التهاب مخاطيتها وليس انسداد لمعتها كما هو سائد في الأوساط العلمية.

Parasitic Appendicitis: A Prospective Clinical and Histopathological Study of 665 Cases of Acute Appendicitis

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Abstract

Background: Acute appendicitis is the most common abdominal surgical emergency. There is no clear cause of acute appendicitis. It is believed that the initial event in the pathogenesis of most cases is the obstruction of the outflow of the appendix by foreign body or intestinal parasite or neoplasm. Intestinal parasites can cause signs and symptoms of acute appendicitis by infesting the appendix. The commonest parasite associated with acute appendicitis was found to be *E. vermicularis*. In some of these cases appendicitis can occur independent of microscopic evidence of acute inflammation (false appendicitis).

Patients and Methods This study included 665 patients of both sexes that have been operated upon for appendectomy. All patients presented with signs and symptom of acute appendicitis. The period of the study extended from October 2000 to December 2001. The ages of the patients ranged between 10-50 years. The specimens of appendectomy were examined macroscopically for the presence of adult parasites or foreign bodies. Microscopic examination was done for detection of parasites, ova, larvae, and cysts, and for histopathologic features of acute appendicitis.

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Results Of 665 specimens of appendectomy, 64 (9.16%) specimens were found to contain parasites in form of ova, larvae, cysts or adult parasites. These parasites were, *E. vermicularis*, *A. lumbricoides*, and *E. histolytica*. Microscopic examination of appendectomy specimens associated with parasitic infestation revealed that, 17 (26%) cases have the classical histopathologic feature of acute appendicitis, 4(6%) cases have suppurative appendicitis, one(1.2%) case has lymphoid hyperplasia, and 41(62%) cases were normal. No one of the 665 specimens showed gross obstruction of the lumen of the appendix by adult parasite or foreign body of any kind.

Conclusions Cases of false appendicitis are usually associated with parasitic infestation. Signs and symptoms in false appendicitis are most probably due colic pain induced by the parasites. The initial event in pathogenesis of acute appendicitis seems to be the invasion of the mucosa of the appendix by bacteria or viruses and not the obstruction of its outflow.

Introduction:

Intestinal parasitic infestation constitutes a major public health problem (1). They are prevalent in populations where sanitary conditions are low. Intestinal protozoa and helminthes cause many symptoms and disorders such as; vomiting, diarrhea, abdominal pain, intestinal obstruction, appendicitis, rectal prolapsed, and, intestinal ulcerations (1, 2).

The most common portal of entry is the mouth through ingestion of contaminated food and water. The degree of intestinal tract illness and the severity of symptoms are related to the total number of worms that infest the intestine (1). Since worm infestations are seldom the direct cause of death, they tend to be regarded as relatively unimportant (3). Helminthiasis can cause serious pathological and surgical sequel (4), and can be the source of errors in some surgical diagnosis such as, intestinal obstruction, acute appendicitis and, intestinal ulcerations (1).

Acute appendicitis is the most common abdominal surgical emergency. It affects approximately 10% of the population(5). It is believed that the initial event in most cases is the obstruction of the outflow of the appendix by fecalith, inflammation, foreign body or neoplasm(6, 7, and 8).

It has been reported that parasites within the resected appendix specimens is generally an incidental finding and accompany a non inflamed appendix(7).

Cases of appendicitis associate with parasitic infection are very rare. In one of the studies in Egypt(9), it has been found that out of 1920 cases of appendectomy; only 15 cases were found to be associated with schistosomiasis. In Baghdad, a study of 150 case of appendectomy showed that only 6% of the cases were associated with parasitic infection (10). In Puerto Rica, one case of appendicitis has been reported to be associated with *E.histolytica* which was the seven reported case of isolated amoebic appendicitis (11, 12). Ozgur Aydin(7) found, in a retrospective study, that of 190 appendectomy specimens, 6 (3.5%) were containing parasites and 15% of the removed appendices were histologically normal. The problem of acute appendicitis in Iraq has been reported by some investigators (13, 14, and 15)), in one study (13), it has been found that 6% of the resected appendices were containing parasites. Diagnosis of intestinal parasitic diseases depends on the history of exposure, clinical signs and symptoms, and the identification of the

parasite in the excreta especially the stool. Other methods for laboratory diagnosis are serological and immunological such as complement fixation and immune fluorescence. Diagnosis of acute appendicitis and parasite associated appendicitis is made only after microscopic examination of the resected specimens (7).

The aim of this study is to reevaluate the magnitude of the problem of parasitic appendicitis on prospective bases. It is designed to include a large number of cases whose clinical histories and operative data are well known and precisely documented.

Patients and methods:

1. After admission to the hospital, information about each patient was recorded in the patient's case sheet. Case history and information about the present illness were also recorded. Stool samples were collected and sent for laboratory examination. Blood sample were also send for blood picture.

2. Examination of resected appendices; after appendectomy, each appendix was examined by hand lens and then opened longitudinally and the interior was also examined by the hand lens for detection of foreign bodies or mature worms. The contents of each appendix were washed with 10% formal saline. The wash was centrifuged at 3000 r.p.m for three minutes and the sediment was examined microscopically for detection of ova, larvae, cysts or trophozoites.

3. Histopathological examination. After fixation with 10% formalin solution for 72 hours, longitudinal and transverse sections from each specimen were taken and embedded in paraffin. Two 5µm- thickness sections were done for each case, stained with E.H, and examined under light microscope for histopathological evaluation.

Results:

A total of 665 appendectomy were done in the three major surgical hospitals in Babel; Al-Hilla teaching hospital (375 cases), Al-fayha' private hospital (185 cases) and, Al-Shifa' private hospital (105 cases).

Only 64 (9.6%) cases were associated with parasitic infestation. According to the clinical records of the patients with parasitic Appendicitis, patient's age ranged between 10-50 years. 36 cases were females and 28 were males. The majority of cases (73%) occur between age 11 and 40 years table (1).

Table (1) the number of parasitic infections that associated with number of appendectomies and their percentages according to sex and age

Age groups (Years)	Sex	Surgical Operations		Total No.	Percentage
		Number	%		
5-10	M	2	3.2	5	7.8
	F	3	4.6		
11-20	M	8	12.5	13	20.3
	F	5	7.8		
21-30	M	5	7.8	12	18.75
	F	7	10.9		
31-40	M	9	14.06	22	34.3
	F	13	20.3		
41-50 and more	M	4	6.25	12	18.75
	F	8	12.5		
Total No.	M	28	43.75	64	100%
	F	36	56.25		

Macroscopic and microscopic examination of the contents of all appendices showed the presence of ova and adult forms of 3 types of parasites in 64 (9.6%) specimens out of 665, table (2). These parasites were *E. vermicularis* 40 cases (62.5%), *A. lumbricoides* 17cases (26.5%)

and, *E. histolytica* 7 cases (10.9%). There were no evidences of acute inflammatory reaction in 41(64%) cases despite of the presence of mature worms or ova in their lumens Table(3). Adult worms and ova of *E. vermicularis* were detected, while only ova of *A. lumbricoides* and, cysts of *E. histolytica* were demonstrated.

Isolated parasites	Number of appendectomy
Enterobuis vermicularis	40 (62.5%)
Ascaris lumbricoidis	17 (26.5%)
Entamoeba histolytica	7 (10.9%)
Total No.	64 (100%)

No gross obstruction of the lumen of the appendices by worms was seen, in spite of their presence in the lumen, nor by foreign body of any kind table (2). Of 64 specimens containing parasites, 23 (35.9%) cases showed the pathognomonic criteria of acute appendicitis, while 41(64%) cases were normal, table (2). As to microscopic findings, of the 23 positive cases, one case was lymphoid hyperplasia, 4 cases were suppurative appendicitis and, 11 cases were classical appendicitis consisting of transmural acute inflammatory reaction table (3).

Table(2): Prevalence of isolated parasites associated with appendicitis
Table(3) Histopathological picture of appendicitis in relation to parasites

Histopathological Diagnosis	<i>Enterobius vermicularis</i>	<i>Ascaris lumbricoides</i>	<i>Entamoeba histolytica</i>
Lymphoid follicular hyperplasia	1	0	0
Acute suppurative appendicitis	4	0	0
Acute appendicitis	11	5	2
Normal appendices	24	12	5
Total No.	40	17	7
Percentage%	6.01	2.55	1.07

Discussion:

Causative agents of acute appendicitis are numerous and different in their sources such as; bacteria, viruses, and parasites (15). Among the pathogens which may be the most common causative agent of acute appendicitis are *E. vermicularis* (16, 17, and 18), *E. histolytica* (11), and *A. lumbricoides* (19). In our study we have demonstrated these parasites in our specimens table (1). The problem of acute appendicitis in Iraq has been reported by some investigators (10, 12, and 13) in one study (13) it has been found that 6% of the resected appendices were containing

parasites. Our study showed that about (9%) of the specimens contained parasites.

Clinical diagnosis of acute appendicitis is usually made on the basis of symptom and laboratory results (20). However, our present study and other studies showed that clinical diagnosis is not always reliable, and therefore, the final diagnosis of acute appendicitis is only made on the bases of microscopic examination.

The degree of intestinal tract illness and the severity of symptoms are related to the total number of worms that infest the intestine. Since worm infestations are seldom the direct cause of death, they tend to be regarded as relatively unimportant (3). Helminthiasis can cause serious pathological and surgical sequelae, and can be the source of errors in some surgical diagnosis such as, intestinal obstruction, acute appendicitis and intestinal ulceration. It has been reported that parasites within the resected appendix specimens is generally an incidental finding and accompany a non inflamed appendix (7). This finding is in agreement with our results which showed that 41(64%) of appendectomy specimens associated with parasitic infestation were normal.

Our study showed that the commonest parasitic infestation was *E. vermicularis*. This finding is in agreement with other studies (16, 17, and 18). Intestinal infestation by *E. vermicularis* is world wide and is considered to be the most common helminthes infestation (7). Our study shows that 62% of parasitic infestations of the appendix were due to *E. vermicularis*.

It should be recalled that appendectomy does not necessarily mean acute appendicitis, because there are confusing signs and symptom associated with some cases that can lead to misdiagnosis. Therefore, increased vigilance in recognizing potential cases of appendicitis is required for very young and old patients since they have a high rate of complications (4).

The present study has shown that the rate of misdiagnosis of acute appendicitis was 6% and, that all the misdiagnosed cases (false appendicitis) were associated with parasitic infestation. This finding is also reported by other investigators (7, 10) and leads us to believe that parasitic infestation of the appendix may induce appendiceal colic pain similar to that of acute appendicitis (21). This may hold true in cases of

false appendicitis (cases not associated with microscopic evidence of acute inflammation). Regarding cases of parasitic appendice infestation which are associated with acute inflammation, we believe that signs and symptoms are due to irritation and injury to the mucosa by the infesting worms, larvae, or the deposited ova. This injury will predispose for bacterial invasion and subsequent acute inflammatory response.

The present study has also shown that no gross luminal obstruction was seen in any of 665 appendectomy specimens, neither by adult parasite nor by foreign body of any kind. This finding leads use to raise the question about the validity of the obstruction theory which has been proposed as the most accepted pathogenic mechanism for acute appendicitis (5, 6). It seems that obstruction of the lumen of the appendix by foreign bodies is not the initial event in the pathogenesis of acute appendicitis. It is most probable that inflammation of the appendice mucosa is the initial event. Congestion and edema resulting from the inflammatory response are the cause of obstruction that leads to the most severe pathological changes associated with advanced cases of acute appendicitis.

Conclusions:

1. All cases of false appendicitis are associated with parasitic infestation of the appendix.
2. Signs and symptoms of acute appendicitis in parasitic infestation are most probably due to appendix colic pain.
3. The initial event in the pathogenesis of acute appendicitis seems to be the inflammation of the mucosa due to invasion by bacteria or viruses after injury by the infesting parasite.

References

1. Bhasin, DK.; Batti, HS, Das, G.; Sing, K.; & Sharma BC. (2000) *Gastrointestinal bleeding due to worm infestation with negative upper gastrointestinal endoscope finding*. Endoscope. 32(4): 314- 316. 2000.
2. Ernest Jawetz and Warren, EL., (1992), *Medical microbiology & Immunology, 2nd ed., Appleton and Lang*, Connecticut: 453pp. 1992.
3. Amin, AB, et al., (1979). *Incidence of helminthiasis and protozoal infections in Bombay*. Journal of the Indian Medical Association. 72(10), PP225-227, 1979
4. Bredensen, J.; Laritzen, AF.; Kristiansen, BV; Sorensen, C; & Kjersgaard, D; *A ppendicitis and Enterobiasis in children*. (1988), Acta, Chirirgica Scandinavia., 154:10, 585-587., 1988.
5. Kraemer M., et al: *Acute appendicitis in late adulthood: incidence, presentation, and outcome, Results of a prospective multicenter acute abdominal pain a study and review of the literature*. (2000), Langenbecks Arch Surg; 385:470. 2000.
6. Burnham BA, Wilson SR: (2000); *Appendicitis at the millennium*; Radiology 215:337, 2000.
7. Ozgur Aydin.; Saray Mah.; (2007): *Incidental Parasitic Infestation in Surgically Removed Appendices: A retrospective analysis*. Diagnostic pathology 2007, 2:15 doi: 10, 1186/1746-1596-2-16.
8. Current Medical Diagnosis and Treatment CMDT (2004): Ed, Lawrence M.; Tierneg, Jr. Lang, 2004. PP 590.
9. Sidky, H.A.; Maksaud.; Azia, H.A.; & Saleh A. (1981); *acute appendicitis as a complication oh helminthic infection among some Egyptian patient*: J. Egypt Soc. Parasitol., 11: 469.
10. Husain.; M.H (1995). *Microbial causative agents of appendicitis*; M.Sc. Thesis.Univ. Baghdad: pp77.
11. adler, S.; Cappel, M.S.; Batt, B.; Matono, S. & Kure, N. (1990) *Appendiceal infection by E. histolytica*. Dig. Dis. Sci.; 35(5):603.
12. Majeed, A.; Al-Bakri, H. (1984). *Acute appendicitis in Nineveh province*. J.Fac. Med. (Bagh.0, 26(1):71.
13. Salmo, N.A.; Al-Saman, A.M.; Al-Koutagi, N.D. & Ali, A.H. (1974). *Parasites of the vermiform appendix; their importance in the etiology of acute appendicitis in Iraq*. J.Fac. Med. (Bagh.), 16(1):13.

14. Dalimi, A.; Khoshzaban, F.(1993). *Comparative study of two methodsfor diagnosis of Enterobius vermicularis in the appendix.* Journal of helminthology. 67:1, 85-86.
15. Larner, J.A. (1988). *The etiology of appendicitis.* Br. J. Hosp. Med.; 39(6):540.
16. Mogensen, K.; Pable, E. & Kowalski, K. (1985). *Entrobilus vermicularis and acute appendicitis.* Acta. Chir. Scand., 151:757.
17. Weibe, B.M. (1991), *Appendicitis and Enterobius vermicularis.* Scand. J. gastroenterol., 26(3):336.
18. William,D.J.; Dixon, M.F. (1988). *E. vermicularis and the appendix.* Br. J. of Surg. 75:12. 1225-1226.
19. Dorfman, S.; Talbot, I.C.; Torres,R.; Cordozo, J.; Sanchez, M.(1995): *P arasitic infestation in acute appendicitis-* Annals- of Tropical- Medicine and Parasitology89:1, 99-101.
20. Wang, C.H.; Trench, T.M.;Robnnis, A.N.; Rowan, O.J. & Cohen, A. J. (1993) *Diagnosis of appendicitis. Imaging finding in patients with atypical clinical features.* AM. J. Roentgen, 161(6) 1199.
21. Brewster. D.H. (1989). *Enterobius vermicularis: a possible cause of intestinal colic.* Journal of Royal College ofGeneral Practitioners. 39;326. 387-388.

تاريخ ورود البحث إلى مجلة جامعة دمشق: 2008/4/24.

تاريخ قبوله للنشر: 2008/6/17.