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RESEARCH ARTICLE

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STUDY THE PARASITIC REASONS WHICH CAUSE APPENDICITIS AT BASRAH CITY

ABSTRACT:

The appendix a blind end tube connected to the caecum near it's junction to small intestine and appendicitis is the term applied to inflammation of the vermiform appendix which, in humans, has unknown function. A total of 100 male and female from different localities with appendectomy were investigated for the parasites which may cause appendicitis and histopathological process has been performed. The results found that no significant differences between people with appendectomy and state; married or not, drinking coffee or tea and smoking cigarette. While, there was clear differences between the percentage of infection in male and female with parasites, and *Entamoeba histolytica* was the commonest parasite found in the appendix. Also, many pathological changes were noticed ranging from marked inflammation in the lamina propria to erosion of mucosal epithelial lining and peritonitis. Also, appendicitis with ulceration in the lamina propria, submucousa and muscularis externa was observed.

KEY WORDS:

Parasitic Reasons, Appendicitis, Basrah, Iraq

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INTRODUCTION:

The appendix is a blind end tube lined with mucous membrane, with a muscle similar to that of the caecum with which it communicates. It varies greatly in size, the average length being 3 inches (7.5 cm). It may turn upwards behind the caecum, pointing out towards groin-the retro-caecal position or it may lie on the front of the caecum immediately under the anterior abdominal wall (Nash, 1969).

Appendicitis is the term applied to inflammation of the vermiform appendix which, in humans, has unknown function. It is rich in lymphoid tissue which gradually atrophies with advancing age. In the vast majority of cases, appendicitis is an acute condition. Acute appendicitis is the most common abdominal surgical emergency, apart from trauma (Weatherall *et al.,* 1996). It may occur at any age, affecting males more often than females, but the majority of patients are between 10 and 40 years old. Typically, the patient has central abdominal pain which may be associated with loss of appetite, nausea and/or vomiting, mild fever and leucocytosis. After a few hours pain is felt in the right lower abdomen (Kozar, 1999).

Appendicitis sometimes resolves without treatment, and may then be referred to as subacute appendicitis, but more often develops into an abdominal emergency requiring operation. Recurrent low-grade appendicitis is sometimes called chronic appendicitis, but the existence of chronic appendicitis as a separate entity is very doubtful. The most frequent complication of acute appendicitis is perforation of the appendix, causing peritonitis (Schrock *et al.,* 1993). This may become localised, forming an appendix abscess (not always in the same part of the abdomen), or generalized which is more serious. Perforation causes a 2% risk of mortality. Rare complications include thrombosis in the portal veins and bacteraemia (Thompson, 1994). Some studies have shown increased frequency of appendicitis among immediate family

members, suggesting that a genetic factor may play a part in some cases. A possible explanation is an hereditary abnormality in the position of the appendix with comparatively poor blood supply (Kozar, 1999). Another factor could be shared dietary habits (Kozar, 1999). Although chronic "nonspecific" appendicitis is probably not a separate entity, the appendix can be a seat of chronic inflammation in some specific chronic inflammatory disorders such as Crohn's disease, tuberculosis and schistosomiasis (Kionti, 1971). The incidence of appendicitis has declined dramatically by about 50% from its peak, reached about 50 years ago. The reasons for this are not clear, but unproven theories include improved nutrition, decrease in dysenteric and parasitic diseases and changes in intestinal flora, possibly associated with the widespread use of antimicrobial therapy (Singh *et al.,* 2010).

Some intestinal nematodes such as *Ascaris lumbricoides*, *Trichuris trichuria, Enterobius vermicularis, Ancylostoma duodenale, Necator americanus, Strongyloides stercoralis* and some species of *Schistosoma* as well as *Entamoeba histolytica* have been incriminated in the cause of appendicitis. They are large intestinal worms of man and are by far known to be the most widespread and commonest parasites of man in tropical Africa (Ukoli, 1990; Cheesbrough, 1998).

This study aimed to determine the extent to which intestinal parasites are found in the appendix and to know whether they are aetiologically associated with the inflammation of the organ and their roles in the causation of appendicitis. This entailed examination of appendix specimens for parasites and/or their ova/cysts.

MATERIAL AND METHODS:

Samples Collection:

Tissues of appendix specimens were collected from patients presenting with appendicitis at General Hospitals in Basrah city after the surgical operation has been performed by the surgeons. The specimens were collected in a sterile container and fixed in 10% formal-saline solution (FSS) to prevent them from autolysing, post-mortem changes and spoilage which occur shortly after removal from the body. The samples were obtained by informed consent of the patients involved in this study and the permission to the effect was obtained from the ethical committee.

Histopathology:

The contents for each appendix were examined according to the method of (Al-Kurayshi, 2009) for detected ova or cyst of parasites which marked as positive or negative, then appendix specimens were processed for histopathological studies as described by the method of Luna (1968).

The prepared slides were stained with Haematoxyline and eosin and examined under the microscope at x10 to x40 objectives lens.

Questioner:

A simple questioner was done to the people before operation including:

Name, Sex, Age, Social State, Drinking Tea, Coffee as number/ day, Smoking Cigar and N. of Pain Waves/ hour.

The percentage infection was measured according to the equation:

The number of positive/ Total number examined X 100%

The incidences of infection were measured according to the equation:

The number of infected (each parasite alone) / Total number infected

RESULTS:

Subtitle A total of 100 cases were examined under this study and divided randomly into 52 males and 48 females with different ages from different Basrah's hospitals. Table 1 shows the total number for each age groups (male and female) which were examined.

Table 1. Cases examined (male and female) divided according to age groups.

Sex	Age							Total
	5-15	16-25	26-35	36-45	46-55	56-65	66-75	
Males	13	20	13	4	2	---	---	52
Females	11	15	13	5	3	---	1	48
Total	24	35	26	9	5	---	1	100

Table 2 shows the number of examined cases (males and females) according to their status (married or not) which underwent appendectomy under this study.

Table 2. The male and female with appendectomy and their status (single or married)

Sex	State		Total
	Single	Married	
Males	34	18	52
Females	28	20	48
Total	62	38	100

Table 3 shows the number of cases drinking coffee or tea/ day and smoking cigarette which underwent appendectomy.

Table 3 The total number of people examined with number of drinking tea or coffee and smoking cigarette.

Sex	Drinking tea, coffee	Smoking cigar
Males	52	20
Females	40	--
Total	92	2

Table 4 illustrates the percentage of parasitic infections (*Entamoeba histolytica* and *Enterobius vermicularis*) in patients with appendectomy. In general the high percentage of infection was in people infected with *Entamoeba histolytica* (65.625%) in male and in people infected with *Enterobius vermicularis* (54.054%) in female.

Table 4. The percentage of parasitic infection in appendectomized patients

parasite	No. infected		Infection %	
	Male	Female	Male	Female
E. histolytica	21	17	65.625	45.945
E. vermicularis	11	20	34.375	54.054
Total	32	37	46.376	53.623

Many pathological changes occurs in all appendectomized appendices such as: erosion of mucosal epithelial lining and infiltration of mixed inflammatory cells in lamina propria (Fig. 1), mixed inflammatory cells possibly with peritonitis the inner layer of muscularis externa and serosa (Fig. 2) and appendicitis with ulceration and severe infiltration of inflammatory cells in the area of ulceration and in the lamina propria (Fig. 3).

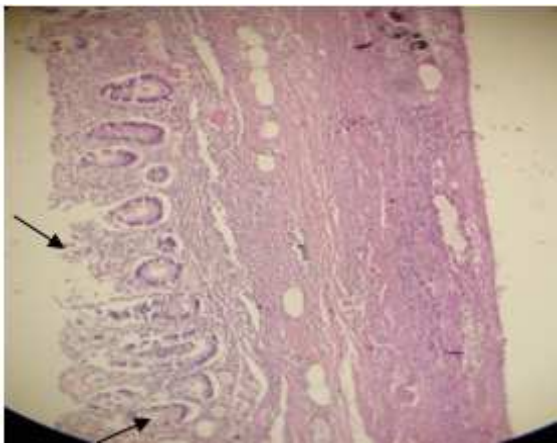

Fig. 1. Photomicrograph of T. S. of appendix with erosion of mucosal epithelial lining. X 10.

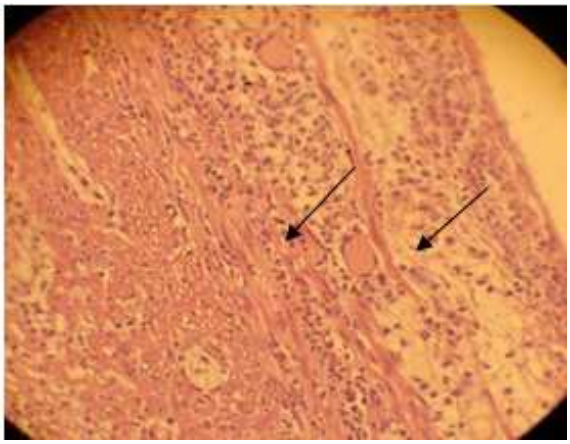

Fig. 2. Photomicrograph of T. S. of appendix showing appendicitis with ulceration and severe infiltration of inflammatory cells in the lamina propria. X 40.

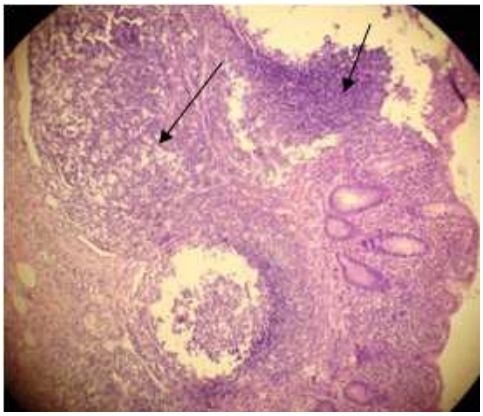

Fig. 3. Photomicrograph of T. S. of appendix with ulceration and infiltration of inflammatory cells. X 10.

Figure 4 shows a serosa with prominent adipose tissue with few inflammatory cells and edema. A severe ulceration extending into serosa is seen in figure 5. Figure 6 illustrates prominent adipose tissue, edema, and inflammatory cells, while figure 7 demonstrates severe peritonitis associated with masses of suppurative inflammatory cells. Figure 8 confirms appendicitis with inflammatory cells in lamina propria extending to sub mucosa and muscularis externa and serosa with edema and some inflammatory cells. Furthermore, ulceration, severe inflammation in the lamina propria and sub mucosa extending into muscularis externa are noticed in figure 9.

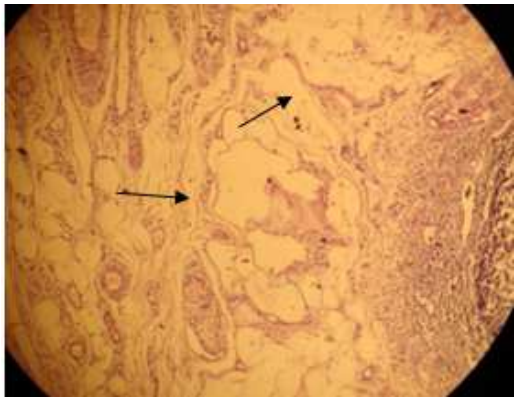

Fig. 4. Photomicrograph of T. S. of appendix showing serosa with prominent adipose tissue and few inflammatory cells and edema. X 40.

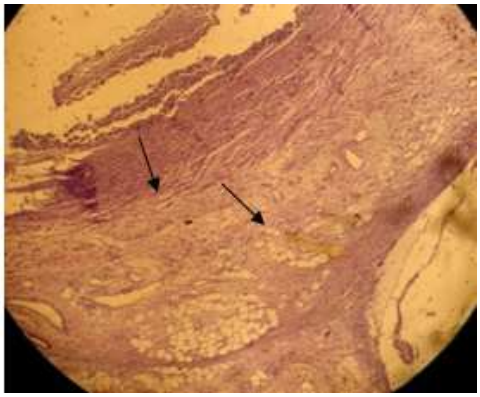

Fig. 5. Photomicrograph of T. S. of appendix showing a severe ulceration extending into serosa and associated with peritonitis. X 40.

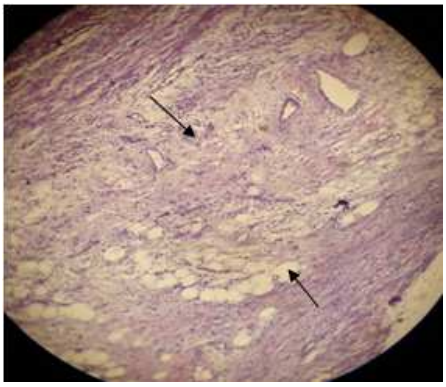

Fig. 6. Photomicrograph of T. S. of appendix wit prominent adipose tissue, edema, inflammatory cells and peritonitis. E & H. X 40.

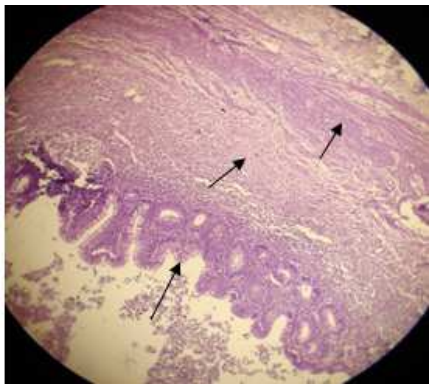

Fig. 7. Photomicrograph of T. S. of appendix showing a severe peritonitis associated appendicitis with masses of suppurative inflammatory cells. X 40.

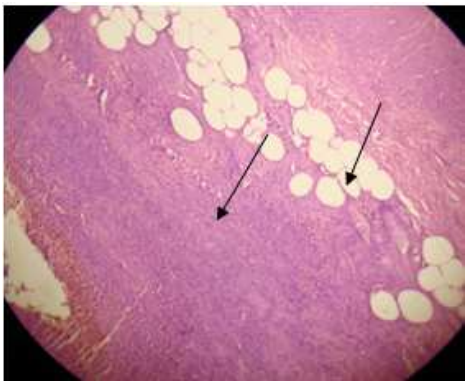

Fig. 8. Photomicrograph of T. S. of appendix showing appendicitis with inflammatory cells in lamina propria. X10.

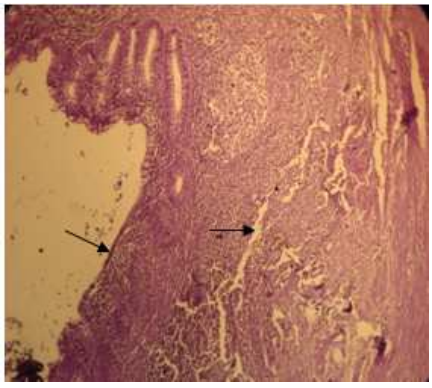

Fig. 9. Photomicrograph of T. S. of appendix with ulceration, severe inflammation in lamina propria and sub mucosa extending into muscularis externa. X 10.

Figure 10 shows appendicitis with severe inflammation extending from lamina propria, sub mucosa, muscularis externa and serosa with evidence of peritonitis. Appendicitis showing marked inflammation in lamina propria with severe edema in sub mucosa, muscularis externa and serosa are seen in figure 11. In figure 12 clear marked inflammation in lamina propria and prominent lymph follicles with germinal center and proliferation of mucosal glands.

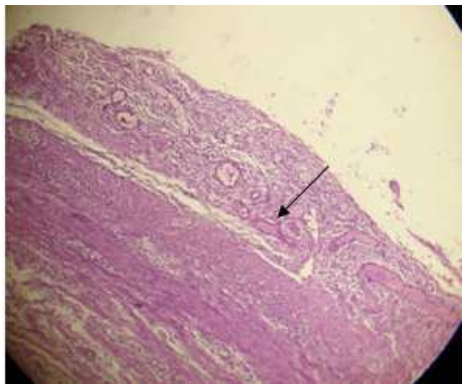

Fig. 10. Photomicrograph of T. S. of appendix with severe inflammation extending from lamina propria, sub mucosa, muscularis externa and serosa. X 10.

Fig. 11. Photomicrograph of T. S. of appendix showing marked inflammation in lamina propria with edema in sub mucosa, muscularis externa and serosa. X 4.

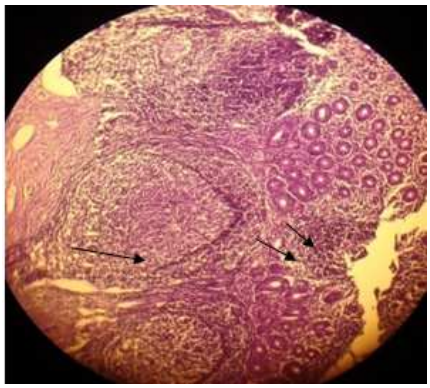

Fig. 12. Photomicrograph of T. S. of appendix showing marked inflammation in lamina propria and prominent lymph follicles with germinal center and proliferation of mucosal glands. X 40.

DISCUSSION:

Appendicitis is the term applied to inflammation of the *vermiform appendix* which, in humans, has unknown function. It is

rich in lymphoid tissue which gradually atrophies with advancing age. In the vast majority of cases, appendicitis is an acute condition (Woolf, 1998).

The parasitic infections cause a negative effect in health, nutrition, growth and led to pathological complications with surgical interference as appendicitis in addition to competition with host food (Gillesse *et al.,* 1987).

Under this study there was no significant differences between people with appendectomy and their statement (married or not), drinking coffee or tea and smoking cigarette. So, these factors haven't any effect on the induction of appendicitis.

While, there was a clear differences between the percentage of infection in male and female with parasitic infections, and the high percentage of *Entamoeba histolytica* infection was found in both sexes. This may be that *Entamoeba histolytica* can enter cells causing many effects like; ulceration and appendicitis. The same results were recorded by Okolie *et al.* (2008) and Al-Kurayshi (2009) who showed that the appendicitis was precipitated by parasitic worms and protozoans.

Anyone can get appendicitis, but it is more common among people 10 to 30 years old. Appendicitis leads to more emergency for abdominal surgeries than any other cause (NDDIC, 2011). The result disagrees with the current result which found that appendicitis more common in people with age group 16- 25 years old.

The Medical appendix (2011) reported that the incidence of appendicitis has declined dramatically by about 50% from its peak, reached about 50 years old. The reasons for this are not clear, but unproven theories include improved nutrition, decrease in dysenteric and parasitic diseases and changes in intestinal flora, possibly associated with the widespread use of antimicrobial therapy.

A case of a 15 years old female with *Enterobius vermicularis* in the appendix presented clinical features of acute appendicitis (Efraimidou *et al*., 2008). Kionti (1971) reported that the combination of *Ascaris* and hookworm, *Ascaris* and *Trichuris*, *Ascaris*, hookworm and *Trichuris* accounted for more than 76% of all multiple infections school children in the Kano plain in Kenya.

The histopathological study recorded many clear changes and all these clinical finding may be that the appendix can be infiltrated by a lot of materials including faecal material, microbes and parasites. Some of these transients' materials which find their way into the organ may remain there for a while without causing any disease. At times, few of them can initiate a disease process which may lead to inflammation of the appendix. This is the case with some parasites and worms especially when they stay too long in the lumen or when their ova/cysts block or are lodged within the wall of appendicular lumen. This opinion was recorded by Okolie *et al.* (2008) and the current results agree with it. Aydin (2007) recorded that the presence of parasites in the appendix may cause appendiceal colic even without eliciting an acute inflammation. This colic due to a parasitic infestation is explained by the hypothesis of appendiceal lumen obstruction.

Singh *et al.* (2010) reported an acute appendicitis of amebic origin with fever, severe pain in the right lower quadrant of the abdomen and rebound tenderness and a lab investigations revealed neutrophilic leukocytosis. Histopathological examination revealed numerous *Entameba histolytica* trophozoites in the mucosa of the appendix, an acute appendicitis of amebic origin does not appear frequently. Appendicular amebiasis can give the clinical features of acute appendicitis.

In conclusion appendicitis is an abdominal condition which is usually acute and potentially dangerous. In many cases, its cause is unknown although various factors which contribute to its development have been identified; parasitic infection especially The protozoan *Entamoeba histolytica* may be the main reason for appendicitis with many pathological effects and changes.

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دراسة المسببات الطفيلية المؤدية إلى التهاب الزائدة الدودية في مدينة البصرة

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تمتاز الزائدة الدودية ببروزها الإصبعي والمغطى بطبقة مخاطية بوظائف غير معروفة في الإنسان. إلا أن الإصابة بالطفيليات ممكن أن تحدث بها تعقيدا يؤدي إلى استئصالها. هدف البحث الى التحري عن الإصابات الطفيلية التي من الممكن أن تؤدي الى التهاب الزائدة الدودية و إستئصالها لدى الناس. تضمنت الدراسة فحص 100 مريض من كلا الجنسين اجري لهم عملية استئصال الزائدة الدودية في مستشفيات مختلفة في مدينة البصرة. ثم فحص محتواها و أخذت مقاطع نسيجية للتعرف على المسببات التي أدت إلى التهابها واستئصالها. كان الـ 100 مريض المفحوصين عشوائيا مقسمين إالى 52 ذكر و 48 أنثى وبأعمار مختلفة. لوحظ أن الاصابات الطفيلية ظهرت في 69 زائدة دودية مستأصلة جراحيا مقسمة إلى: 32 ذكر وبنسبة 61,5% و 37 أنثى وبنسبة 77,1%. كانت نوع الاصابة الطفيلية متمثلة بأميبيا النسيج الحالة وبنسبة 38,5% والديدان الدبوسية بنسبة 31,45% مقسمة الى 40,4% للذكور و 35,4% في الإناث بالنسبة للطفيلي الأول, و 21,5% و 41,7% بالنسبة للطفيلي الثاني على التوالي. أما التغيرات الامراضية فتمثلت بتغيرات نسيجية في خلايا الطبقات الطلائية المخاطية, العضلية والمصلية و ارتشاح ل خلايا التهابية. عادة ما يكون التهاب الزائدة الدودية حادا ويشكل خطر ممكن ان يكون مميت للناس, هنالك عدة عوامل ممكن أن تظهر التطور حالة الالتهاب. وعادة ما يكون الناس الذين لديهم تاريخ بإصابات طفيلية سابقة أو حالية كالإصابة بأميبيا النسيج الحالة و الإصابة بالديدان الدبوسية معرضين لالتهاب الزائدة الدودية بشكل أكثر من إقرانهم والذي عادة ما يكون مصاحبا لتغيرات مرضية نسيجية كأرتشاح الخلايا الالتهابية واستسقاء.

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