



Republic of Iraq

Ministry of high education and scientific researches

University of Diyala /College of Medicine

Department Of Surgery

**Evaluation of patients with acute appendicitis
in Baquba teaching hospital**

**A project submitted to the council of College of Medicine /
University of Diyala in Partial fulfillment of the Requirements
for the Degree of bachelor in medicine and general surgery**

By

Hussian Ali Kareem

Supervisor

Assistant professor Dr: Ahmed Modher Khalaf

M.B.ch.B/F.I.C.S/FACS GENERAL SURGERY

2022 _ 2023



Acknowledgement

First and foremost, I would like to express my sincere appreciation to my supervisor, **Dr. Ahmed Modher** for her patience, insightful comments, and helpful information, all of which have been invaluable to me during my project.

My special thanks to the faculty of the University of Diyala /College of Medicine for everything they taught me as well as their encouragement and support.

Last but not least, I want to express my gratitude to my loving parents, who are the source of my strength and the reason I'm here today, and who continue to support me morally, spiritually, emotionally, and financially.



Contents

Abstract	4
Introduction	5
Pathology of acute appendicitis	5
Diagnosis of acute appendicitis	6
Method and Material	9
Results	10
Discussion	13
Conclusion	14
Reference	14

Abstract

Background : Acute appendicitis is the most common abdominal pathology in the world, and it represents the main cause of emergency abdominal surgery; it is the most frequent cause of surgery in teenagers patients , Its clinical picture is variable, and this fact should be considered in diagnostic studies for accurate diagnosis. The approach of acute appendicitis can be laparoscopic or open surgery.

Aim of study : The purpose of the study is to know relationships of age , gender, family history and IBS with acute appendicitis and to know the various symptoms of it. in addition to know finding of U/S and count of WBC in those patients

Patients and methods : A cross sectional study done in Baqubah teaching hospital from 1st October2022 to 28th February2023 .we collected 70 sample of patient randomly from different age groups . Source of Data from Patients undergo appendicectomy. collected the data using prepare written questionnaire

Result: 55.7% were male and 44.3% female . age group distribution among cases were 4.3% (1-10 years) , 45.7%(11-20years) , 22.8%(21-30years) , 17.1%(31-40 years) , 10.1%(>40years) . symptoms was 100% abdominal pain and anorexia , 77.1% fever , 67.1% vomiting , 91.4% nausea , 5.7% constipation . 72.9% of them were have high WBC . 37.1% of patient without US , 30 % negative to US and 32.9% were positive to US .20 % of patient with IBS and 54.3% of them have family history to acute appendicitis .

Conclusion

acute appendicitis it represents the main cause of emergency abdominal surgery . its slightly more common in men than female , more common in age group from 11-20 years . there is relationship between AA and IBS. all patients have abdominal pain and anorexia , most patients have high WBC count and ultrasound whenever available should be used to predict acute appendicitis . AA is present in more than half patients with positive family history.



Introduction

Appendicitis is a part of the inflammation condition inside the vermiform appendix [3]. It located 1.7 – 2.5 cm below the terminal ileum. The low part of appendix consists of three taeniae coli of the caecum, which fuses to form the outer longitudinal muscle of the appendix. The movement of majority appendix position such as 74% are retrocecal, 21% pelvic, 2% paracecal, 1.5% subcecal, 1% pre-ileal and 0.5% post ileal [2,4]. Patients may also have their appendix behind the ascending colon and liver, this position might occur atypical symptoms. Appendicitis will be complicated if not treating properly. That is why clinicians have to know well about the diagnosis and management of acute appendicitis [4].

Arterial Supply of Appendix

The appendicular artery, also known as the appendiceal artery, commonly arises from the terminal branch of the ileocolic artery, or less commonly from the posterior cecal artery or an ileal artery. It descends behind the termination of the ileum and enters the mesoappendix of the vermiform appendix. It runs near the free margin of the mesoappendix and ends in branches which supply the appendix

Histology

Mucosa columnar epithelium with goblet cells and crypts. Sub mucosa rich in lymphoid follicles which usually atrophy with age. Musculosa two layers of thin circular & longitudinal muscles. Serosa appendix is completely covered by peritoneum.

PATHOLOGY OF ACUTE APPENDICITIS

Appendicitis occurs when present of obstruction in the lumen with the accumulation of bacterial normal intestine [5]. The obstruction may be induced by many mechanisms and it will be retention of mucus. When bacterial infection supervenes, the intraluminal pressure increases, it leading to obstruction of lymphatic flow and blood circulation that will be appendiceal oedema condition. This process leading to acute appendicitis when present of distension in the appendix and vascular congestion. Appendiceal oedema and vascular congestion might be progress to be of multiple abscesses in the wall lumen and purulent. This condition is called as phlegmonous appendicitis. Dysfunction of the appendiceal



artery and veins leads thrombosis and infarct in the junction between the mesoappendix and appendix, where the blood supply is inadequate. As a result, the appendix becomes congested dark red with black necrotic tissues, this condition is designated as gangrenous appendicitis [6]. If perforation is present, appendicitis becomes complicated by peritonitis. Usually, peritonitis is localized, being confined to the ileocecal region. In young children, however, the omentum is not fully developed, so the clinical course is often complicated by diffuse peritonitis.

DIAGNOSIS OF ACUTE APPENDICITIS

Clinical Manifestations

Diagnosing acute appendicitis accurately by symptoms can reduce morbidity and mortality from perforation and further complications. The clinical manifestation of AA such as abdominal pain, fever, anorexia, vomiting, and mostly, the pain may occur in the upper abdomen at first, but it migrates to the right lower quadrant [7].

Finding on Physical Examination

Physical exam findings are often subtle, especially in early appendicitis. As inflammation progresses, signs of peritoneal inflammation

develop. Signs include Right lower quadrant guarding and rebound tenderness over Mc Burney's point. In 1894, McBurney described a new technique for the management of acute appendicitis, this method is still used when an open approach is required [8,9]. Rovsing's sign

(right lower quadrant pain elicited by palpation of the left lower quadrant), Dunphy's sign (increased abdominal pain with coughing). Other

associated signs such as psoas sign (pain on external rotation or passive extension of the hip suggesting retrocecal appendicitis) or obturator

sign (pain on internal rotation of the right hip suggesting pelvic appendicitis) are rare. The time course of symptoms is variable but typically progresses from early appendicitis at 12 to 24 hours to perforation at greater than 48 hours. 75% of patients present within 24 hours of the

onset of symptoms. The risk of rupture is variable but is about 2% at 36 hours and increases about 5% every 12 hours after that [10].



Laboratory Tests

The laboratory tests for acute appendicitis such as white blood cell count (WBC) and C-Reactive protein (CRP) are of diagnostic value. But WBC usually exceeds 10,000/mm [3]. In severe cases associated with diffuse peritonitis, however, the WBC may be decreased rather than increased, so, care must be taken. Although the CRP rises in appendicitis, the increase is not necessarily associated with the severity of inflammation [11].

The use of the Alvarado scoring system, which includes clinical examination findings and laboratory values, helps rule out appendicitis (Table 1). Score range from 1 to 10, with higher scores indicating a greater risk of appendicitis. When the score is less than 4, appendicitis is uncommon and imaging and other interventions can be avoided. When imaging is used, high quality ultrasonography (USG) should be considered the first approach, but only in practice settings where is accuracy is sufficiently high. If high-quality USG is not available or fails to visualize the appendix, Abdominal Computed Tomography (CT) with lower-dose radiation protocols is often used [12].

Table 1. Alvarado score

1-Migratory RIF Pain	1 point
2- Anorexia	1 point
3- Nausea and vomiting	1 point
4- Fever	1 point
5- Tenderness	2 point
6-Rebound Tenderness	1 point
7- Leukocytosis	2 point
8-shift to left	1 point



Imaging Diagnosis

1- Abdominal Ultrasonography

The ultrasound in the diagnosis of AA was the first invented by Puylaert in 1986, one hundred years after the publication of the first paper on acute appendicitis by Fitz [13,14]. A normal appendix is not visualized by USG, When the presence of inflammation condition and dilated, it can be visualized. The features of appendicitis include hypertrophy of the appendiceal wall, disturbance of the normal layered structure, destruction of purulent fluid or fecaliths within the appendiceal lumen. Appendicitis can be divided into three types depending on USG findings. The classification depended on the features of the high echo bands representing the submucosal layer, as well as the presence or absence of a visualized appendix and the length of the shorter diameter of the appendix.

2 - Abdominal Computed Tomography (CT)

Many studies are focusing on the examination technique of CT and optimal reconstruction parameters for the diagnosis of AA. In adolescent and adult patients, CT has become the most widely accepted imaging strategy. In the USA, it is used in 86% of patients, with a sensitivity of 92.3% [17]. For older patients at increased risk of malignancy, preoperative CT recommended identifying malignancy masquerading as (or causing) appendicitis. Selective CT based on clinical risk score is likely to target its use and justify radiation exposure [19]. According to the American College of Radiology and American College of Surgeon, the recommendation that CT examination is not indicated for evaluation of suspected appendicitis in children until after USG be done [20].



Method and Material

Subjects :

A cross sectional study done in Baqubah teaching hospital from (1st October2022 to 28th February2023) among 70 patients randomly . from different age groups and various socio-economic status who undergo appendectomy

Data collection :

History taking was the first part of data collection and included patient demographics age , gender and also asked about the clinical symptoms that appeared on the patient which include abdominal pain , fever . nausea , vomiting , anorexia , diarrhea as well as family history and history of IBS . the data collection also include WBC level and U/S finding . collected the data using prepare written questionnaire .

Result

Seventy sample of patient were included in this study . Their gender were 39(55.7%) male and 31(44.3%) were female as shown in table 1.

Table 1: acute appendicitis according to gender

Gender	Frequency	Percentage	P value
Male	39	55.7%	0.06
Female	31	44.3%	
Total	70	100%	

Table 2 show that were there was association between this disease and age group where 3(4.3%) were 1-10 t=years age group , 32 (45.7%) were 11-20 age group .16 (22.8%) were 21-30 year , 12(17.1%) were 31-40 years age group . 7(10.1 %) were more than 40 years .

Table 2: acute appendicitis according to age group.

Age(years)	Frequency	Percentage	P value
1-10	3	4.3%	0.05
11-20	32	45.7%	
21-30	16	22.8%	
31-40	12	17.1%	
>40	7	10.1%	
Total	70	100%	

Table 3 show the symptoms frequencies of acute appendicitis of patients included in this study were .all patients have abdominal pain and anorexia , 54(77.1%) fever , 47(67.1%) vomiting , 64(91.4%) nausea , 4(5.7%) constipation .



Table 3: symptoms frequency of acute appendicitis .

Symptom	Patient no.	%	P value
Abdominal pain	70	100%	0.00
Fever	54	77.1%	0.01
Vomiting	47	67.1%	0.04
Nausea	64	91.4%	0.01
Constipation	4	5.7%	0.14
Anorexia	70	100%	0.00

Table 4 show that the WBC has strong association with acute appendicitis , 51(72.9%) of patients has high WBC , 19(27.1%) has normal WBC .

Table 4 : WBC of acute appendicitis patients .

WBC	Frequency	Percentage	P value
Normal	19	27.1%	0.02
High	51	72.9%	
Total	70	100%	

Table 5 show there was no association between US findings and acute appendicitis where 26(37.1%) of them has no US and 21(30%) have –VE and 23(32.9%) have +VE .

Table 5: US findings of acute appendicitis patients.

US findings	Frequency	Percentage	P value
No US	26	37.1%	0.06
-VE	21	30%	
+ VE	23	32.9%	
Total	70		



Table 6 show that there association between IBS and acute appendicitis .
 56(80%) were absent of IBS and 14(20%) were present IBS .

Table 6 : IBS frequency of acute appendicitis .

I B S	Frequency	Percentage	P value
Absent	56	80%	0.12
Present	14	20%	
Total	70	100%	

Table 7 show that there was association between family history and acute appendicitis where 38(54.3%) of patients has family history of acute appendicitis.

Table 7 : family history frequency of acute appendicitis .

Family hx	Frequency	Percentage	P value
Negative	32	45.7%	0.05
Positive	38	54.3%	
Total	70	100%	

Discussion

Acute appendicitis is the most common abdominal surgical emergency in the world, , with around 50 000 and 300 000 acute appendicectomies performed annually in the UK and in the US respectively. However, its incidence is falling for unknown reasons.(1)

This clinical update provides information on how patients may present and what investigations and treatments are available . the study show that the gender were 39(55.7%) male and 31(44.3%) were female . and the age group were 3(4.3%) were 1-10 t=years age group , 32 (45.7%) were 11-20 age group .16 (22.8%) were 21-30 year , 12(17.1%) were 31-40 years age group . 7(10.1 %) were more than 40 years and this agree with findings Petroianu et al .(2)

The symptoms frequencies of acute appendicitis of patients included in this study were .all patients have abdominal pain and anorexia , 54(77.1%) fever , 47(67.1%) vomiting , 64(91.4%) nausea , 4(5.7%) constipation and this agree with the findings don in Ethiopia by Obsa et al .(3)

the WBC findings was 51(72.9%) of patients has high WBC , 19(27.1%) has normal WBC and the US findings was 26(37.1%) of them has no US and 21(30%) have –VE and 23(32.9%) have +VE and this agree with the finding done in UK by Ranvan et al.(4)

56(80%) were absent of IBS and 14(20%) were present IBS and 38(54.3%) of patients has family history of acute appendicitis and this agree with findings done in USA by Snyder et al .(5)

Conclusion

Throughout this study we concluded that acute appendicitis represents the main cause of emergency abdominal surgery . its slightly more common in men than female , more common in age group from 11-20 years . there is relationship between family history and history of IBS with acute appendicitis . all patients have abdominal pain and anorexia with variable frequency of other symptom . constipation is less common symptoms of AA , In addition around 2/3 of patients have high WBC count and ultrasound whenever available should be used to predict acute appendicitis .

References

1. Stewart B, Khanduri P, McCord C, Ohene-Yeboah M, Uranues S, Vega Rivera F, et al. Global disease burden of conditions requiring emergency surgery. *Br J Surg*. 2014;101:e9-22.
2. Lee JH, Park YS, Choi JS. The epidemiology of appendicitis and appendectomy in South Korea: National registry data. *J Epidemiol*. 2010;20:97-105.
3. Di Saverio S, Birindelli A, Kelly MD, Catena F, Weber DG, Sartelli M, et al. WSES Jerusalem guidelines for diagnosis and treatment of acute appendicitis. *World Journal of Emergency Surgery*. 2016; 11(34):1-25.
4. Lewis SR, Mahony PJ, Simpson J. Appendicitis. *Br Med J*. 2011;343:d5976.
5. El-Daou S, Adaimi F, Fakh A, El-Assaad R, Maasarani D, Kanj M, et al. A clinicopathological review of 655 appendices removed for acute appendicitis in a tertiary care medical center in Lebanon: A retrospective study. *J Gastro & Digestive Systems*. 2019;3(2):1-4.
6. Chandrasekaran TV, Johnson N. Acute appendicitis. *Surgery*. 2014;32(8):413-17.
7. Chandrashekar S, Lokesh MG, Avinash SR. Prevalence of perforated appendicitis and its determinants in pediatric appendicitis patients admitted in tertiary care centre, South India: A cross sectional study. *Int Surg J*. 2018;5(12):3926-29.

8. McBurney C.IV. The incision made in the abdominal wall in cases of appendicitis, with a description of a new method of operating. *Ann Surg.* 1894;20:38-43.
9. Semm K. Endoscopic appendectomy. *Endoscopy.* 1983;15:59-64.
10. Smith MP, Katz DS, Lalani T, Carucci LR, Cash BD, Kim DH, et al. Right lower quadrant pain-suspected appendicitis. *Ultrasound Q.* 2015;31(2):85-91.
11. Ebell MH, Athens, Georgia. Diagnosis of appendicitis: Part II. Laboratory and imaging tests. *Am Fam Physician.* 2008; 77(8):1153-55.
12. Jones RP, Jeffrey RB, Shah BR, Desser TS, Rosenberg J, Olcott EW. The Alvarado score as a method for reducing the number of CT studies when appendiceal ultrasound fails to visualize the appendix in adults. *AJR Am J Roentgenol.* 2015;204: 519-26.
13. Seal A. Appendicitis: A historical review. *Can J Surg.* 1981;24(4):427-33.
14. Puylaert JB. Acute appendicitis: US evaluation using graded compression. *Radiology.* 1986;158(2):355-60.
15. Yamashita Y, Nishino Y, Hirakawa K. Radiographic diagnosis of acute appendicitis, a disease commonly treated by emergency surgery. Establishment of the diagnosis depending on characteristic findings. *Shokaki Geka (Intestinal Surgery).* 2000;23:1903-10
16. Hanafi MG, Shiri A. Diagnostic accuracy of acute appendicitis by ultrasound in Hospital Emergency. *IJP.* 2018;7(1):8787- 93.
17. Cushieri J, Florence M, Flum DR, Jurkovich GJ, Lin P, Steele SR, et al. Negative appendectomy and imaging accuracy in the Washington State Surgical Care and outcomes assessment program. *Ann Surg.* 2008;248:557-63.
18. Kim K, Kim YH, Kim SY, Kim S, Lee YJ, Kim KP, et al. Low dose abdominal CT for evaluating suspected appendicitis. *N Engl J Med.* 2012;366:1596-605.
19. Terasawa T, Blackmore CC, Bent S, Kholwes RJ. Systematic review: Computed tomography and ultrasonography to detect acute appendicitis in adults and adolescents. *Ann Intern Med.* 2004;141: 537-46

20. Snyder MJ, Guthrie M, Cagle S. Acute appendicitis: Efficient diagnosis and management. *AFP*. 2018;98(1):25-33

21- Sitter, H., Hoffmann, S., Hassan, I., & Zielke, A. (2014). Diagnostic score in appendicitis: validation of a diagnostic score (Eskelinen score) in patients in whom acute appendicitis is suspected. *Langenbeck's Archives of Surgery*, 389, 213-218.

22- Petroianu, A., & de Oliveira Neto, J. E. (2016). Prevalence of acute appendicitis in a mixed population. *Digestive Surgery*, 14(3), 195-197.

23- Obsa, M. S., Adema, B. G., Shanka, G. M., Lake, E. A., Azeze, G. A., & Fite, R. O. (2020). Prevalence of acute appendicitis among patient admitted for acute abdomen in Ethiopia: systematic review and meta-analysis. *International Journal of Surgery Open*, 26, 154-160.

24- Ranvan G J, Adrienne H S,. Acute appendicitis: meta-analysis of diagnostic performance of CT and graded compression US related to prevalence of disease. *Radiology*, 2008, 249.1: 97-106.

25- Snyder, M. J., Guthrie, M., & Cagle, S. (2018). Acute appendicitis: efficient diagnosis and management. *American family physician*, 98(1), 25-33.