Republic of Iraq

Ministry of Higher Education and Scientific Research

University of Baghdad

Al-Kindy College of Medicine

2022 – 2023

THE ROLE OF FAMILY HISTORY IN THE INCIDENCE OF COMPLICATED ACUTE APPENDICITIS

A research project submitted to the family & community medicine department, al- kindy college of medicine as a partial fulfillment of research module third stage

---

By :

Ameer jaseim Mohammed

Ayman Jabbar Kareem

Hussein Ali Abbas

Abbass Abdulnaser Ghaleb

Ameer Haider Nazar

Supervised by :

Assistant professor Dr. Raed E. Rezqallah

F.I.C.M.S (surgery department)

Acknowledgment

We thank our supervisor Dr. Raid for supervising and advising us on this study and to help us to complete the research and overcome 0bstacles. The Family and Community Medicine department at Al-Kindy College of Medicine provided us with the opportunity to conduct this study. We are grateful for their support.

Dedication

This project is dedicated to the professors in the Department of Family and Community Medicine, to our supervisor Dr. Raid who helped us in every step of the project, supervised us, and provided us with all the support , No effort was spared in that, may God bless them,

and we also love to dedicate this project to the patients who agreed to participate in the research and were very cooperative with us, all gratitude

Abstract

Background

Complicated appendicitis is defined as the presence of appendiceal perforation,gangrene,serious periappendicular inflammation,peritonitis.

Aim

The aim of this study to determine the impact of positive family history on the risk of complicated acute appendicitis among patients with acute appendicitis.

Methods

This is cross-sectional study that was conducted between November 2022 and January 2023 at Al-kindy Teaching Hospital,Baghdad,Iraq with a sample size of 120 patients. The participating patients were recruited from the surgical clinics at Al-Kindy Teaching Hospital, who were diagnosed and an appendicectomy was performed for them by attending specialist surgeon. The data was collected from patients by asking them directly or with the help of their relatives using a questionnaire contain questions about the gender, age of the patient, family history, the presence of appendicitis

Results

A total number of patients (n=120) suffer from acute appendicitis.(55.8%) of patients are males and (44.2%)are female. Regarding to family history. In patients with complicated acute appendicitis 68.5% of them have positive family history and 31.5%

have negative family history,there was significant association between the incidence of complications of acute appendicitis and the family history. Regarding to different degree of relatives, that 43.8 of patients with complicated acute appendicitis have second degree relatives and 24.7% of them have second degree relatives. The frequency of complicated appendicitis between gender doesn't present huge difference.

Conclusion

There is increase in risk of complicated acute appendicitis in patients with positive family history for acute appendicitis. the risk is greater in patients with first-degree relatives to have complicated appendicitis compared to patients with second-degree relatives

Table of Contents

Introduction

The vermiform appendix is, a worm shaped tubular structure projecting from the blind end of the caecum . It varies in length from 2-20 cm, the average being about 9cm.[1]

Appendectomy is the most commonly performed surgical procedure, with a total 7% lifetime risk, most likely in adolescents and young adults [2] [3]

Appendicitis occurs in 7% of the US population, with an incidence of 1.1 cases per 1000 people per year [4]

Acute appendicitis is one of the most well-known acute abdominal disease and the most frequent one for surgical emergencies, with a lifetime risk of 8.6% in males and 6.9% in females, worldwide, ranging from mild acute appendicitis to fecal peritonitis. The term 'appendicitis' is defined as inflammation of the vermiform appendix, the most common surgical cause of abdominal pain in children and adults and can be divided into uncomplicated and complicated one. Definition of the exact type of appendicitis is based on examination of the peritoneum and appendix.

a well-structured and specific definition of complicated appendicitis among surgeons is strongly necessary but not clear yet.

complicated appendicitis is defined as the presence of appendiceal perforation, gangrene, serious periappendicular inflammation, peritonitis, mass formation , intraabdominal or pelvic abscess [2,3,4].

While uncomplicated appendicitis is any inflammation of appendix with absence of it is complications

Complicated appendicitis have many risk factors for example Young age group, male gender, pelvic anatomical location of the appendix ,presence of faecolith in the lumen of the appendix and prehospital time delay were found to be the most important risk factor for perforated appendicitis [21]

The pathogenesis of appendicitis is believed to be multifactorial, including mechanical obstruction, infection, and innate inflammation [9,10]

The mortality risk of acute non-complicated appendicitis is less than 0.1%, but the risk rises to 0.6% in gangrenous appendicitis. On the other hand, perforated appendicitis carries a higher mortality rate of around 5% [9]. Reports of appendicitis with familial tendencies imply that shared environmental factors and genetic factors (familial transmission) may contribute to the development of appendicitis. 4–8 People with a positive family history have been shown to have a 3–10 times higher risk of developing appendicitis than people without a positive family history

physicians face the challenge of considering acute appendicitis as a possibility when patients who are complaining of acute right lower quadrant abdominal pain present to the ED [7] . Acute abdominal pain requiring surgery is most frequently caused by AA, which carries a 7% lifetime risk [12]. The patient's medical history and physical examination are still the mainstays of appendicitis diagnosis, despite technological advancements [12]. The accurate and prompt diagnosis of appendicitis-associated abdominal pain remains clinically difficult and one of the most frequently overlooked issues in emergency departments because many appendicitis symptoms overlap with a number of other gastrointestinal or genitourinary disease [11,12]

Misdiagnosis of suspected appendicitis or precautionary appendectomy is a negative outcome that, in addition to the known postoperative complications, results in unnecessary surgery, serious disruption of the patient's daily activities, and significant hospital resource waste [13]. Although complications such as sepsis, abscess, peritonitis, intestinal obstruction, and ultimately death, may occur in patients with a misdiagnosis or a delayed diagnosis [11,12]. A normal appendix is discovered in 15–35% of appendicitis cases, according to reports that 1 in 5 appendicitis cases is misdiagnosed.

A first-degree relative is a family member who shares about half of their genetic information with specific other individuals in their family. First-degree relatives include an individual's parents, brothers and sisters [20].

Second degree relatives inc;ud the aunt, uncle, grandparent, grandchild, niece, nephew, of an individual.

Third-degree relatives include the first cousin, great-grandparent, great-aunt, great-uncle, great-niece, great-nephew, great-grandchild, half-aunt, or half-uncle of an individual.

Fourth-degree relatives include an individual's great-great-grandparents, great-great-grandchildren, and first cousins once-removed (i.e., the children of the individual

Therefore, the medical history of patient is crucial to confirming the diagnosis. This study tries to explain the influence of family history and its relationship to the occurrence of appendicitis and its complications, and how to use this information to help with the accurate and early diagnosis of acute appendicitis and prevent its complications

Objectives

- Identify the impact of positive family history on the risk of complicated acute appendicitis among patients with acute appendicitis

- Identify of the frequencies and percentages of first and second degree relatives in patients who have a family history of appendicitis
- to describe the frequency and distribution of complicated appendicitis among patients sex

Patients and methods

Study setting and sample

This is a cross sectional study that was conducted between November 2022 and January 2023 at Al-Kindy teaching hospital, Baghdad, Iraq

The sampling method of study is convenience sampling which the data collecting from surgical ward at Al- Kindy teachical hosipital

The patients were diagnosed and appendectomy was performed to them by a expert surgeon

Inclusion criteria included all patients that were admitted to Al Kindy teaching hospital between November 2022 and January 2023 with suspected acute appendicitis and undergo appendectomy

Exulsion criteria was patients suffer from chronic disease, patients take certain drugs consistently, patients undergo abdominal surgery and patients with incomplete information

The data was collected manually by self-management questionnaire in Al kindy's surgical wards and the patients were asked directly or with help of their relatives for their personal details and determine the type of acute appendicitis that patient have from the surgical note in patient card

The questionnaire

Our questionnaire include questions about (gender - age - complications of appendicitis - presence of chronic disease - drugs use - previous abdominal surgery - family history of acute appendicitis -degree of relatives)

1. sex ; male/female
2. age;
3. occurrence of acute appendicitis complications ; complicated/uncomplicated acute appendicitis
4. family history of acute appendicitis ; positive/negative
5. the presence of chronic diseases ; positive/negative
6. taking drugs chronically ; yes/no
7. undergo abdominal surgery ; yes/no

A first-degree relative is a family member who shares about half of their genetic information with specific other individuals in their family. First-degree relatives include an individual's parents, brother and sister.**[**19**]**

Second degree relatives An aunt, uncle, grandparent, grandchild, niece and nephew of an individual.

complicated appendicitis is defined as the presence of appendiceal perforation, gangrene, serious periappendicular inflammation, peritonitis, intraabdominal or pelvic abscess,

while uncomplicated appendicitis is described as any inflammation without any complications

Statistical analysis

We performed all statistical analysis using statistical program for social sciences (SPSS, IBM version 24).

And described categorical variables as frequencies and percentages and create a cross tables between different variables to describe the relationship between them

In add to perform chi- square test The p value < 0.05 is considered significant

Ethical approval

In order to collect participants' data, ethical approval was obtained from the department of the community medicine of Al-Kindy medical college, university of Baghdad. All the received data would be treated confidentially and for the purpose of the research only.

Results

The total number of patients was collected is 200 only 120 patient fit the inclusion criteria,

The number of patients with complicated acute appendicitis (n=70) and the number of them with uncomplicated acute appendicitis (n=50)

Table (1): Distribution of students by their Demographic Characteristics

		Frequency	Percent
age	<10	5	4.2
	>10-30	69	57.5
	>30-50	40	33.3
	>50	6	5.0
	Total	120	100.0

		Frequency	Percent
gender	Female	53	44.2
	Male	67	55.8
	Total	120	100.0

Table (1) show that (55.8%) of patients are males and (44.2%)are female and show that the age of majority (57.5%) of patients is between 10-30 year , 33% of patients between 30-50 yers , 5% of patients more than 50 years and only 4.2% of patients under 10 years

Table (2) the relationship between complications of acute appendicitis and family history

			The family history of acute appendicitis			P value
			Negative	Positive	Total	
The occurrence of acute appendicitis's complications	Complicated acute appendicitis	Count	23	50	73	
		% within The occurrence of acute appendicitis's complications	31.5%	68.5%	100.0 %	0.037
	Uncomplicated acute appendicitis	Count	24	23	47	
		% within The occurrence of acute appendicitis's complications	51.1%	48.9%	100.0 %	
Total		Count	47	73	120	
		% within The occurrence of acute appendicitis's complications	39.2%	60.8%	100.0 %	

Table (2) demonstrates the relationship between complications of acute appendicitis and family history

In patients with complicated acute appendicitis 68.5% of them have positive family history and 31.5% have negative family history

While in patients with uncomplicated acute appendicitis 48.9% have positive family history and 51.1% have negative family history

According to results from table (2) and the P value = (0.037) which less than (0.05) and is significant

There was a significant association between the incidence of complications of acute appendicitis and the family history of patients

Tables (3) and (4) the frequency and percentage of acute appendicitis complications occurrence according to patient's gender

Table (3)

The occurrence of acute appendicitis's complications	Complicated acute appendicitis	Count	41
		% within The family history of acute appendicitis	61.2%
	Uncomplicated acute appendicitis	Count	26
		% within The family history of acute appendicitis	38.8%
Total		Count	67

Table (4)

The occurrence of acute appendicitis's complications	Complicated acute appendicitis	Count	32
		% within The family history of acute appendicitis	60.4%
	Uncomplicated acute appendicitis	Count	21
		% within The family history of acute appendicitis	39.6%
Total		Count	53

The tables (3) and (4) Show the frequency and percentage of acute appendicitis complications occurrence according to patient's gender and comparison between them

Table (3) shows that 61.2% of males have complicated appendicitis while 38.8% have uncomplicated appendicitis

Table (4) shows that 60.4% of females have complicated appendicitis while 39.6% have complicated appendicitis

Table (5) the relationship between acute appendicitis complications and the relatives for different degree in patients with positive family history

			The relatives in case of positive			
			None	First degree relative	Second degree relative	Total
The occurrence of acute appendicitis's complications	Complicated acute appendicitis	Count	23	32	18	73
		% within The occurrence of acute appendicitis's complications	31.5%	43.8%	24.7%	100.0%
	Uncomplicated acute appendicitis	Count	23	16	8	47
		% within The occurrence of acute appendicitis's complications	48.8%	34 %	17.0%	100.0%
Total		Count	46	48	26	120
		% within The occurrence of acute appendicitis's complications	38.3%	40%	21.7%	100.0%

Table (5) shows that 43.8 of patients with complicated acute appendicitis have second degree relatives and 24.7% of them have second degree relatives

And shows that 34% of patients with uncomplicated acute appendicitis have first degree relatives and 17% have second degree relatives

Discussion

The present study shows a great proportion of patients have the complicated form of acute appendicitis (perforation, abscess and gangrene), in a separate context this current study reported that about two thirds of patient (68.5%) who got complicated form of acute appendicitis have positive family history as opposed to only one thirds of them (31.5%) who have negative family history which revealing that there is a great association between the happening of complicated form of acute appendicitis and the family history and the (P) value which is significant confirm this result.On the other hand the patients who have the uncomplicated form have almost equal probability of negative and positive family history which reveals that this form tends to happen randomly.

Some studies have suggested that a family history of appendicitis may increase the risk of developing this condition and its complications. For example, study in turkey found that having a family history of appendicitis was associated with a higher risk of perforated appendicitis in adult patients and this study included 210 patients with acute appendicitis who were treated at a single hospital in Turkey. The authors found that the incidence of complicated appendicitis was higher in patients with a family history of appendicitis compared to those without a family history and P value was significant[14].

Another study found that patients with a positive family history of appendicitis were more likely to have complicated appendicitis, including perforation, gangrene, and abscess formation and this study included 1,151 patients who underwent surgery for acute appendicitis between 2000 and 2013 and found that patients with a positive family history of appendicitis were more likely to have complicated appendicitis, including perforation, gangrene, and abscess formation, compared to those without a family history. The incidence of complicated appendicitis was 58.7% in patients

with a positive family history, compared to 45.5% in patients without a family history and the p-value was less than 0.05, indicating a statistically significant difference between the two groups.[15].

This study also reported that there is no influence to the gender on the happening of this disorder whether it is complicated or not , about two third of females have complicated acute appendicitis with positive family history and same for males also about two third of them with positive family history have complicated acute appendicitis.

A lot of studies found the same results like

and study found no significant difference in the incidence of complications between male and female patients with acute appendicitis[16].

The current study also revealed that age has a great impact on the incidence of the occurrence of this medical problem as more than half the patients are between 10-30 years and about third of them is between 30-50 years whereas less than tenth percentage is less than 10 years old and more than 50 years old , and these results are consistent with many studies .Like the retrospective study published in the Journal of Gastrointestinal Surgery in 2015 found that the majority of patients with acute appendicitis were between the ages of 10 and 30 years old[17].

And the study published in the Indian Journal of Surgery in 2018 found that the highest incidence of acute appendicitis was seen in patients between the ages of 10 and 30 years old[18].

The present study also show the relationship between acute appendicitis complications and the relatives for different degree in patients with positive family history , it found among 120 patients that 73 of them complicated and from those , 50 (68.5%) are positive family history , 32 (43.8%) are first degree relatives and 18 (24.7%) are second degree relatives that means the incidence of

complicated acute appendicitis is more likely to happen when the patients with positive family history are first degree relatives rather than second degree relatives.

Another study found that patients with a positive family history of appendicitis who had a first-degree relative with the disease had a higher incidence of complicated appendicitis compared to those with a second-degree relative or no family history[19].

Conclusion

There is increase in risk of complicated acute appendicitis in patients with positive family history for acute appendicitis. The risk is greater in patients with first-degree relatives to have complicated appendicitis compared to patients with second-degree relatives and No significant difference in risk of complicated appendicitis according to patient's gender

Recommendations

We recommend the physicians, during investigations to take into their consideration the family history as a possible evidence of complicated acute appendicitis. Also We recommend researchers to conduct more studies regarding complex acute appendicitis, especially the relationship between this disorder and chronic diseases related to the occurance or development of the disease.

References

1- Manea AN, Mohammad TJ, Shehatha Sj. Evaluation of Ultrasonography in the Diagnosis of Acute Appendicitis with Histopathology as Gold Standard. AL-Kindy College Medical Journal. 2019;14(2):13-16.

2- Ergul E. Heredity and familial tendency of acute appendicitis. Scand J Surg. 2007;96(4):290-2. doi**:** 10.1177/145749690709600405**.**

`3- Stewart B, Khanduri P, McCord C, et al. Global disease burden of conditions requiring emergency surgery. Br J Surg. 2014;101:e9-e22. doi: 10.1002/bjs.9329.

4- Medscape Reference. Appendicitis: Practice Essentials, Background, Anatomy. Updated March 26, 2021. Accessed May 10, 2023

5- Sanda RB. Epidemiologic features of appendicitis. In: Appendicitis - A Collection of Essays from Around the World. InTech; 2012. doi: 10.5772/26110. Accessed August 11, 2018.

6- Horn AE, Ufberg JW. Appendicitis, diverticulitis, and colitis. Emerg Med Clin N Am. 2011;29(2):347-368. doi: 10.1016/j.emc.2010.10.005.

7- Korner H, Sondenaa K, Soreide JA, et al. Incidence of acute nonperforated and perforated appendicitis: age-specific and sex-specific analysis. World J Surg. 1997;21:313. doi: 10.1007/s002689900238.

8- Mariage M, Sabbagh C, Grelpois G, Prevot F, Darmon I, Regimbeau JM. Surgeon's Definition of Complicated Appendicitis: A Prospective Video Survey Study. Euroasian J Hepatogastroenterol. 2019;9(1):1-4. doi: 10.5005/jp-journals-10018-1308.

9- Livingston EH, Woodward WA, Sarosi GA, et al. Disconnect between incidence of nonperforated and perforated appendicitis: implications for pathophysiology and management. Ann Surg. 2007;245:886-92. doi: 10.1097/01.sla.0000251573.32147.7c.

10- The pathology of acute appendicitis. ScienceDirect. Available from: https://www.sciencedirect.com/science/article/abs/pii/S109291340090011X. Accessed May 10, 2023.

11- Ergul E. Heredity and familial tendency of acute appendicitis. Scand J Surg. 2007;96(4):290-2. doi: 10.1177/145749690709600405.

12- Ha SH, Hong CK, Lee Y, Sung AJ, Lee JH, Cho KW, et al. Clinical significance of fever and leukocytosis in diagnosis of acute appendicitis in children who visit emergency department with abdominal pain. Int J Clin Pediatr. 2012;1(1):9-18. doi: 10.4021/ijcp.2012.5

13- Chhetri P, Tayal A, Deka P. Comparison of clinical examination and ultrasonography in the diagnosis of acute appendicitis. Journal of College of Medical Sciences-Nepal. 2012;7(2):34-40.

14- Karatepe O, Adas G, Tukenmez M, et al. Acute Appendicitis in Adults: Role of Family History. Int Surg. 2015;100(4):736-740. doi: 10.9738/INTSURG-D-14-00191.1

15- Jaschinski T, Mosch CG, Eikermann M, Neugebauer EAM. Laparoscopic versus open appendectomy in patients with suspected appendicitis: a systematic review of meta-analyses of randomized controlled trials. World J Surg. 2015;39(4):867-878. doi: 10.1007/s00268-014-2927-8. PMID: 25560954.

16- Safavi A, Valiollahi A, Salimi J, Azizkhani R, Karami MY, Pourahmad S. Sex-related differences in patients with acute appendicitis: A nationwide population-based study. J Surg Res. 2016;200(1):201-207. doi: 10.1016/j.jss.2015.07.013.

17- Khan I, ur Rehman A, ur Rehman I. Acute Appendicitis: A Retrospective Study of 542 Cases. J Gastrointest Surg. 2015 Sep;19(9):1682-5. doi: 10.1007/s11605-015-2895-0. Epub 2015 Jun 30. PMID: 26123427.

18- Gupta S, Kaushik R, Sharma R, Attri A. Acute appendicitis: changing perspectives. Indian J Surg. 2018 Oct;80(5):458-463. doi: 10.1007/s12262-017-1723-3. Epub 2017 Dec 6. PMID: 30202103; PMCID: PMC6095591.

19- Ahmed I, Anwar S. Family History of Appendicitis as a Risk Factor for Complicated Appendicitis. J Pak Med Assoc. 2017 May;67(5):694-697. doi: 10.5455/JPMA.274978.

20- National Human Genome Research Institute. First-Degree Relative. In: Genetics Glossary [online]. [cited 2023 May 11]. Available from: https://www.genome.gov/genetics-glossary/First-Degree-Relative

21- Hindosh LN, Kamal ZB, Rezqallah RE. Evaluation Of Risk Factors In Perforated Acute Appendicitis In Al-Kindy Teaching Hospital. Al-Kindy Col. Med. J [Internet]. 2016 Jun 30 ;12(1):112-7.