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Research Article

Acute Appendicitis: Pattern of Presentation and Outcome of Management

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Abstract: A total of 273 patients admitted through the A/E department of BTH, with suspected diagnosis of acute appendicitis; between February 2013 and October 2014.The aim was to establish the pattern of presentation of patient with acute appendicitis and the outcome of their management in our context. Data were collected prospectively, through a data collection sheet that designed especially for the study. Out the total number 94(34.3%) patients had apendiceal mass. The classical presentation of acute appendicitis (early periumbilical pain that shifts to the RLQ of the abdomen and RLQ abdominal tenderness) was the common pattern of presentation. The rates of appendix perforation, negative appendicectomy and the post operative complications were comparable with other studies. The high incidence of appendiceal mass in our series can be explained by the late presentation of the patients, missed diagnosing the condition. A period of observation in patients with equivocal clinical picture can help in reducing the high rate of appendiceal mass.
Keywords: acute appendicitis, presentation, management outcome, developing context

INTRODUCTION

Acute appendicitis (AA) is the inflammation of the inner lining of the vermiform appendix that spreads to its other layers. The term acute appendicitis was first introduced by Ringald H Fitz in 1886, which attributed the disease called typhlitis to the acute inflammation of the vermiform appendix [1]. The pathological causes of AA include: faecoliths, lymphoid hyperplasia and caecal carcinoma, that can lead to luminal obstruction that gives rise to increased intra-luminal pressure; and the stasis that results provide a good medium for bacterial overgrowth. Diets and familial factors were also incriminated as aetiological factors of AA [2, 3]. AA is the commonest cause of acute abdominal pain, and appendicectomy is the most common abdominal operation performed on an emergency basis [4]. The life-time risk of AA is 8.6% for males and 6.7% for females [5].

The classical presentation of AA is a vague periumbilical or epigastric pain, followed by nausea, vomiting and shifting of the pain, after4-6 hours to the right iliac fossa (RIF). This classical presentation occurs in 50% -- 60% of patients. Unusual or atypical presentation is related to the different anatomical positions of the inflamed appendix and it is common in extremes of age and during pregnancy. The diagnosis of AA can be established clinically by the presence of periumbilical shifting pain, RIF's pain and tenderness. No single symptom or sign can rule out AA [1, 3]. The clinical diagnosis of AA is straight forward in young adult males, but it needs more attention and special consideration in women in child-bearing age and in patients at extremes of ages. The diagnosis of AA in children and elderly is difficult because of the delayed presentation and the difficulty of obtaining an accurate history and performing a thorough physical examination [4]. The overall accuracy of the clinical diagnosis of AA is 80% which gives a false negative appendicectomy rate of 20%. The accuracy of the clinical diagnosis of AA varies between males (75% - 92%) and females (55% - 85%). The difficulty and the lower diagnostic accuracy of AA in females are attributed to the similarity of the symptoms of acute gynecological conditions with those of acute appendicitis [1].

Laboratory investigations that are employed to enhance and support the clinical diagnosis of AA include: total and differential white blood cells count (TWBC), serum C-reactive protein (CRP) and Procalcitonin. The TWBC is not of help in establishing the diagnosis of AA, but a high TWBC and an elevated level of procalcitonin can be a reliable indicator of the severity of AA [6, 7]. Serum CRP measurements can support the clinical impression of an experienced surgeon, which remains (surgeon`s experience) a reliable and superior tool for diagnosing AA [8, 9].

Traditionally, early surgical exploration and appendicectomy is the treatment of choice of AA, even in the absence of a definitive accurate diagnosis. This approach is adopted to minimize the risk of complications of AA (appendiceal perforation and development of appendiceal mass). This traditional approach is behind the high rate of negative appendicectomy 20% which can approach 40% in females and elderly [1-4].

The common complications of AA include apendiceal perforation which ranges 16% - 30% and it is related to the age of the patient, and is highest in very young and elderly patients. Perforation of the acutely inflamed appendix is also related to the delayed presentation of the patients. Other complications of AA are wound infection (5% - 33%), intra abdominal abscess (2%), stump leakage, adhesive intestinal obstruction and incisional hernia.[5-10,11] Mortality rate of AA is less than 0.3%, but it reaches 1.7% following apendiceal perforation [11]. The traditional approach of treating AA with its high negative appendicectomy rate is not accepted today by many surgeons, because a period of clinical observation, use of laparoscopy and diagnostic images can reduce the rate of negative appendicectomy. Observation of patients with equivocal diagnosis for up to 10-12 hours may reduce the rate of negative appendicectomy without increasing the rate of complications of AA [4]. CT scan can reduce the negative appendicectomy rate to 7.7%, but it increases the risk of radiation especially in young patients [5].

Many diagnostic scores were described to increase the diagnostic accuracy of AA and reduce the rate of negative appendicectomy. Alvarado score with its modifications, which introduced other criteria to the original score aiming at improving its diagnostic accuracy, are well known [12-18]. Combination of diagnostic scores and radiological images were used to reduce the negative appendicectomies [1, 5, 19].

Although appendicectomy is the gold standard treatment for AA, Antibiotics have been used for treating AA since 1945. Antibiotics can be used successfully when surgery is contra indicated or when it is not possible, such as when the patient has a co morbidity that contraindicates surgery or in remote locations. Antibiotic treatment of AA can eliminate the risk associated with surgical operation, the post operative pain and reduce the overall hospital costs [20]. However, the rate of recurrence of AA in patients who had antibiotic treatment occurs in one third of patients. There is a significant lower clinical effectiveness of conservative antibiotic treatment in comparison to appendicectomy. The low clinical effectiveness of the conservative antibiotic treatment of AA is evident in the failure and recurrence rates of this modality of treating AA. Antibiotic treatment of AA, although can be used in special situations, successfully, still it cannot be recommended as an alternative to appendicectomy [20-23].

Bahri teaching hospital (BTH) is a tertiary health care facility with a capacity of 500 beds that comprise all medical subspecialties. It represents one of the main teaching hospitals that serve more than 5 million inhabitants of the capital of Sudan. There is Accident & emergency department that deals with all the emergencies with a separate operating theatre, where emergency surgical interventions of all surgical subspecialties are performed.

The aims of the present study were to describe the pattern of presentation of the patients suspected to have acute appendicitis; and the mode of diagnosing and the outcomes of management of acute appendicitis in a single teaching Hospital.

METHODS

This is a prospective clinical study conducted at the Accident and Emergency department of (A/E) Bahri Teaching Hospital, during November 1. 2013 to October 31. 2014. A special data collection sheet was designed to collect data prospectively, from patients presenting to the A/E department with symptoms suggesting acute appendicitis The data collection sheets included: Demographic information of the patients, presenting symptoms, elicited signs on physical examination, investigations requested and their results, mode of diagnosing of acute appendicitis, time elapsed after establishing the diagnosis of AA and the definitive treatment, type of anesthesia, incision and prophylactic antibiotics used and the operator and the operative findings.

Data collected were analyzed for descriptive statistics, and the frequency, percentage and mean ± standard deviation were obtained where appropriate.
The study was approved by the ethical committee of BTH and by the research committee of the faculty of medicine of Alzaeim Alazhari University All the included patients were consented by an informed written consent.

RESULTS

The number of the patients who were diagnosed with acute appendicitis, during the study period was 273 patients. Males were 196 (71.8%) and the Male **:** female ratio was 2.5**:**1 Age range was 13 to 65 years and more than 80% of the patients were under 30 years of age. Table 1 shows the age distribution of the patients with AA. Ninety four (34.3%) patients of the total number, had appendiceal mass. Out of the total number of patients 194 patients underwent surgical interventions; 15 patients had surgical treatment for their appendiceal mass, six patients were explored and closed after finding of appendiceal mass and the rest had appendicectomy.

Table-1: The age groups of the patients with suspected acute appendicitis (BTH 2014)

Age groups	Frequency	Percentage %
10-20 years	135	49.5
21-30 years	88	32.2
31-40 years	32	11.7
41-50 years	12	4.4
Above 50 years	6	2.2
Total	273	%100

The presenting symptoms of the patients with AA included periumbilical pain that shifted to Right lower quadrant of the abdominal (RLQ) in 55% of patients. RLQ pain 51%, right sided abdominal pain 21%, right iliac fossa mass 34.3%, nausea and vomiting 40% fever 69.3%. The signs detected on physical examinations of the patients with acute appendicitis are shown in table 2.

Table-2: Physical signs detected on examinations of patients with AA(BTH 2014)

Physical signs	Present		Absent	
	No.	%	No.	%
RLQ tenderness	218	79.5	55	20.5
Rebound tenderness	218	79.5	55	20.5
RLQ Rigidity	190	69.6	83	30.4
RLQ Mass	94	34.3	179	65.7

RLQ = Right lower Quadrant of the abdomen.

Acute appendicitis was diagnosed clinically by the classical periumbilical pain that shifted to the right lower quadrant of the abdomen , presence of tenderness and rebound tenderness at RLQ in 223 (81.7%) of the patients. Fifty (18.3%) patients were diagnosed by ultra sound.

Ultra sound was requested for 144(52.7%) patients. Out of these 94 patients had AM and 50 patients had AA that was diagnosed by Ultra Sound. Appendiceal mass was detected clinically in 57.4% of patients, by ultra sound only in 34%, CT scan in 3.2% and was discovered on abdominal exploration in 5.3% of patients. The total and deferential white blood cells count was requested in all patients; and leukocytosis with predominant neutrophils was present in 45% of patients. Urinalysis was done for all patients; and 21.2% of the results had significant count of pus cells (70% of them were females). Time elapsed between establishing the diagnosis of AA and performing surgery is shown in table 3.

Table-3: Time between diagnosis and surgery for patients with AA (BTH 2014)

Time (hours)	Patients	
	No.	%
1 - 5	64	23.4
6 - 10	50	18.3
11 - 15	27	9.8
16 - 20	13	4.7
21 - 24	24	8.8
>24 hours	16, 1 with AA + 15 with AM	5.8
Conservative treatment of AM	79	28.9

The total number of surgical interventions was 194 including 15 patients with AM. Out of the total number of the surgical interventions 93.3% were performed under General anaesthesia and the rest under Spinal anaesthesia. The surgery was performed by consultant Surgeons in 15 patients with AA in addition to all patients with AM who were treated surgically (No.15).Registrars performed 50 appendicectomies, medical officer performed 100 and house officers performed 14 appendicectomies. The approach to appendicectomy was through Grid Iron incision in158 (88.3%) patients, through Lans incision in 18 (9.5%) patients and through Lower right paramedian incision in 4 (1.5%) patients. All patients with AM which were treated surgically were approached through a lower right paramedian incision. All patients who underwent surgical interventions received prophylactic antibiotics in the form of Ceftriaxone 1gram+ Mitronidazole 500 mg intra-venously at induction of anaesthesia. The macroscopic (naked-eye) intraoperative appearance of the appendices is shown in table 4.

Table-4: The macroscopic intraoperative appearance of the appendices (BTH 2014)

Microscopic (naked-eye) appearance of the appendices	No	%
Perforated	27	13.9
gangrenous	8	4.1
Pussy	100	51.5
Look normal	38	19.6
Mass during explorations*	6	3.1
AM treated surgically	15	7.7

* Abdomen closed and patient treated conservatively

Complications encountered after appendicectomy included 15 patients developed surgical site infections; twelve patients developed superficial wound infection following surgical treatment of AM. One patient developed wound dehiscence from the AM group. All patients with wound infections were controlled by dressing only; and the patient with wound dehiscence underwent secondary suture.

DISCUSSION

Our aims as surgeons practicing surgery in a developing country, where financial constrains play an important role in providing high level of health care, are to reach an accurate diagnosis in a short time and with minimum cost; without subjecting the patients to unnecessary surgical interventions and investigations. Achieving these aims in relation to a common surgical condition like acute appendicitis necessitate good clinical experience that needs time to acquire. Clinical experience remains the main stay tool for diagnosing AA especially where resources are limited. The tools that we used to confirm the diagnosis of AA were total and differential white blood cells count, ultra sound and CT scan. The rate of using CT scan is low due to the cost and the hazards of radiation especially in young patients and the possible delay of definitive treatment of AA [24]. Ultra sound as a single tool for diagnosing AA in women is of limited value, instead a period of observation is safe in these group of patients [25] The pattern of presentation of AA in our series do not differ much from others reported studies [1,3]. The presenting symptoms and the elicited physical signs are inconsistence with the classical presentation of AA, with the exception of the high rate of presentation with fever and AM. One major difference of presentation of AA in our study is the high incidence of AM 34.3% compared to the world wide reported prevalence of 10%. [26] The possible explanation for this high incidence of AM is the late presentation of patients, miss diagnosing AA in its early stages and possibly fear of high rate of negative appendicectomies. The male **:** female ratio of 2.5**:** 1, in our study is in consistency with other similar studies [27].

Out of the total number of the operated patients 80 (29.1%) were operated on after 10 hours from presentation. Delaying appendicectomy for up to 12 – 24 hours seems not to affect the outcome of appendicectomy in relation to rate of perforation, operative time or length of hospital stay [10, 28]. A period of observation and frequent clinical reevaluation can increase the accuracy of diagnosing AA.

The necked eye appearance that we used for confirming the diagnosis of AA can be useful, but sometimes a normal looking appendix can prove to be inflamed on histological examination. We did not relay on histology for confirming the diagnosis of AA in order to reduce cost. In our series only removed AM were subjected to histopathological examination.

We have some limitations in our study; being a single hospital study and relying on the necked eye appearance of the appendices for confirming the diagnosis of AA, these limitations prevent generalization of the results. Further studies for evaluation of the role of ultrasound and the different scoring systems are warranted to establish the most cost-effective and safe mode of diagnosing AA and the way that improves the outcome of its management.

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