

Original Research Article

Causes and Prevention of Missing a Diagnosis and Late Management of Acute Appendicitis

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Abstract

A delay in diagnosis and late management of appendicitis with appendectomy is still high with subsequent some serious sequelae. This study is to identify and prevent a causes of delay in diagnosis of appendicitis. A prospective cross section study includes 308 appendectomies performed in a Hilla teaching hospital from January 2013 to July 2015 by same surgical team; 143 (46%) male and 165 (54%) female. Delayed diagnoses was considered when the duration of pain was more than 48 hours, or operative finding show obvious features of delay, like perforation, gangrenous appendix, abscess collection or mass formation. Average duration of symptoms for delayed patients was 96 hours and for early diagnosed was 29 hours, Reasons for delay were sought and divided into two groups; the first is patient behavioral reason, and the second is medical assessment reason. Twenty one percent of appendectomised patients show delayed management despite more than 48 hours abdominal pain (3-10 days, average 4 days), 69% of them was male, and, 31% female. Average duration of hospitalization in a delayed cases was 3.5 days, while average duration of admission for early treated cases was 1.3 day. Mortality rate was zero.

As a reason for delay in diagnosis; patient assessment was the main reason for delay diagnosis (44 patients, 68%); while patient behavior cause was 32% (21 patients). The patient assessment is the main cause of delay in diagnosis and should be improved by examining patients with abdominal pain by expert surgical team considering atypical presentation with proper follow up and investigations. Quality improving program is advised to reduce missed diagnosis of appendicitis.

Key words: Appendicitis, delayed diagnosis, medical assessment, hospitalization.

الخلاصة

لا يزال التأخير في تشخيص وعلاج التهاب الزائدة الدودية يحصل بنسبة عالية مؤدياً الى عواقب وخيمة. الغرض من هذه الدراسة هو تحديد ومنع الاسباب المؤدية لهذا التأخير في التشخيص والعلاج. اجريت هذه الدراسة على 380 مريض تم إجراء عملية رفع الزائدة الدودية لهم للفترة ما بين كانون الثاني 2013 و تموز 2015 من قبل فريق جراحي واحد. كان عدد الذكور منهم 143 مريضاً (46%) وعدد الاناث 165 (54%). كان عدد المتأخر تشخيص وعلاجهم هو 65 مريضاً (21% من مجموع المرضى). تم اعتبار المريض متأخراً بالتشخيص والعلاج اذا كان يعاني من ألم البطن لمدة أكثر من 48 ساعة او ان المشاهدات اثناء العملية كانت تشير الى التأخير مثل انفجار او تعفن الزائدة او خراج الزائدة او كتلة الزائدة. تم تقسيم أسباب التأخير الى قسمين، القسم الأول متعلق بتصرف المريض تجاه مرضه وعدم الاستشارة الطبية او رفض العملية، والقسم الثاني بسبب التقييم الطبي الخاطئ لحالة المريض. وكنت النتيجة هي ان التقييم الخاطئ كان يشكل 68% من اسباب تأخير التشخيص. التوصيات هي تحسين تقييم اي مريض يعاني من الام البطن و فحصه من قبل فريق جراحي او إدخاله المستشفى تحت المشاهدة لفترة ساعات او ابلاغه بضرورة اعادة الفحص خلال الساعات القادمة لتفادي اغفال التشخيص.

Introduction

Appendicitis is one of the main common causes of abdominal pain presented in emergency departments [1]. About 7-8% of people affected by appendicitis at some stage in their life in the US [Mayo Clinic] with an annual incidence of 0.25%. Surprisingly, delay in diagnosis and correct management with appendectomy is still high with subsequent serious sequelae. Appendectomy is relatively a safe procedure if performed early with a mortality rate for non-perforated appendicitis of 0.8 per 1,000 that increase to 5.1 per 1000 if delayed with perforation [2]. Missing or delay in diagnosis of acute appendicitis is one of the top five most frequent malpractice claims against clinicians of emergency department in UK, Australia and Korea [3-5]. Diagnosis of acute appendicitis is still challenging subject in emergency unite. The challenge is to reduce the number of unnecessary negative appendectomy without missing a diagnosis of appendicitis. The typical presentation [6] is a central abdominal pain which gets progressively worse and localised to the right iliac fossa. This usually associated with nausea, anorexia, vomiting and a low grade pyrexia. Initially there is a central abdominal pain that described as dull and becomes sharp when localised to the right iliac fossa where it is exacerbated by coughing, sneezing or movement. One or two episodes of loose stools may passed. Vomiting usually occur after abdominal pain in appendicitis while it usually occurs before pain in gastroenteritis. On examination there is low grade pyrexia, oral fetor, mild dehydration and tachycardia. Tender right iliac fossa with rebound tenderness indicates localised peritonitis. There may be increased urinary frequency with a puss cells in urine [7,8]. Atypical presentation of acute appendicitis is a common presentation. In children only 50% of patients with appendicitis presents with right lower abdominal pain [9]. Blood tests like a raised

leukocyte count above 10500/ml and elevated inflammatory mediators like C reactive protein and Interleukin-6 may support diagnosis [10]. Ultrasound is operator dependent with a diagnostic accuracy to identifying an inflamed appendix varies between 71% and 97% [11-13]. Many scores applied to achieve diagnosis of appendicitis like Alvarado Score (MANTRELS; Migration of pain, Anorexia, Nausea/vomiting, Tenderness and Rebound tenderness in right iliac fossa, Elevated body temperature, Leukocytosis, Shift to the left) may help diagnosis [14]. In spite of high prevalence of appendicitis and many assessment scores, still an expert clinical assessment has the main diagnostic role in appendicitis. There are many causes of delay in diagnosis and treatment of acute appendicitis like delaying at home (home remedies), local doctors, quacks, medical practitioners, etc. [15,16]. Higher morbidity with prolonged hospitalizations are documented with late appendectomy. Many symptoms of appendicitis has a considerable overlap with other clinical conditions like urinary tract infection, gastro-enteritis and pelvic inflammatory disease and there is no specific test to differentiate among all these diseases. Negative appendectomy rate (normal appendix) of 15% to 25% of patients is considered acceptable [17], with an even higher rate in women [18, 8]. In other studies negative appendectomy rates reduced from 14.7% in 1998 to 8.47% in 2007 [19]. This reduction is achieved because of proper assessment of patients without missing a diagnosis.

Materials and Methods

A prospective cross section study includes three hundred eight (308) patients under went appendectomy by the same surgical team in Hilla teaching hospital from period of January 2013 to July 2015. All patients are received in emergency department. Proper history taken includes duration of pain onset in hours, any medical

consultation taken in public institutes or private clinics, with a details of their primary diagnosis. Patients are assessed by the surgical team members by clinical examination and investigations. All are admitted to hospital for 1 to 7hours before operation for observation and further evaluation of general condition of patients and follow up with pain assessment. Nill by mouth, parenteral fluid rehydration, and antibiotics are started preoperatively. A decision of operation is taken upon final clinical assessment after admission with a support of investigations like leukocyte count, urinalysis, and ultrasound scan. All patients operated appendectomy with their operative findings documented.

Delay in diagnosis is considered when: 1- the duration of pain is more than 48 hours plus operative obvious inflammation of appendix, or, 2- when there is a gross per-operative features of delay like perforation, gangrenous appendix, localised abscess collection or mass formation.

Duration of hospital admission recorded with any other complications.

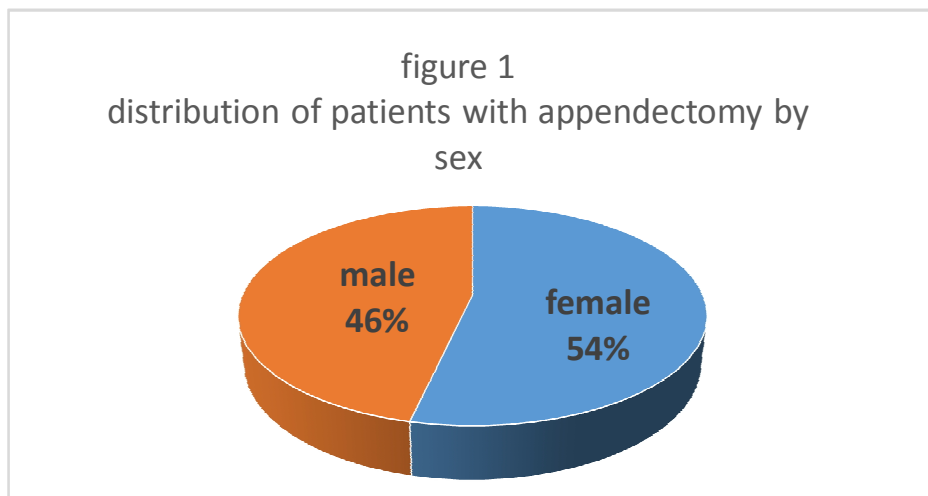
As a reason of patient delay in diagnosis and surgery we considered two groups:

First group: patient behavioral group; those who did not made medical consultation regarding their pain, who consult a non-medical people, or whom refused surgery despite medical advice.

Second group: medical assessment group; this includes patients whom take one or more medical advice in a public or private institutes with or without investigation, or even admitted to hospital to treat abdominal pain without early detection of diagnosis of appendicitis.

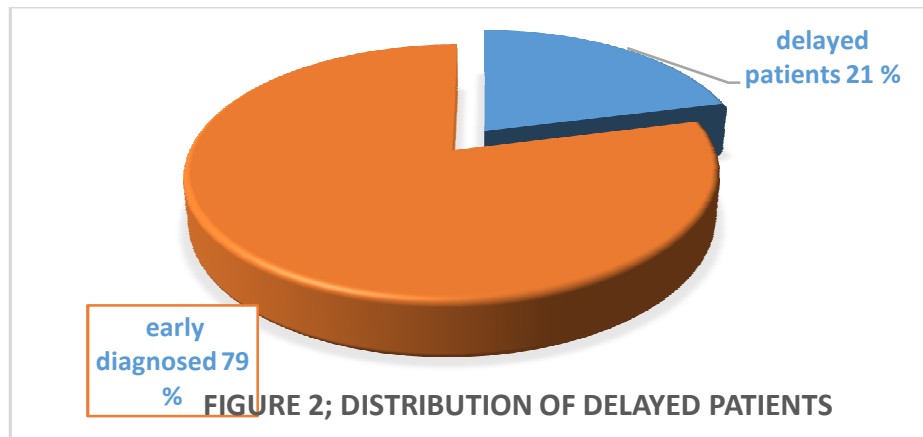
Results

The total number of patients included in this study are 308 managed by same surgical team in a period from January 2013 to July 2015. 165 (54%) were female and 143 (46%) were male [Figure 1].

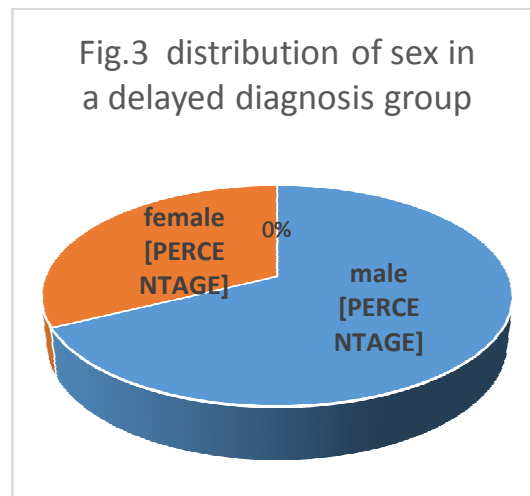


Age of patients are from 5 to 65 years old, with a peak lie in a second and third decade [Table 1].

The number of delayed patients more than 48 hours before operation are 65 patients (21% of whole operated patients). [Figure 2].

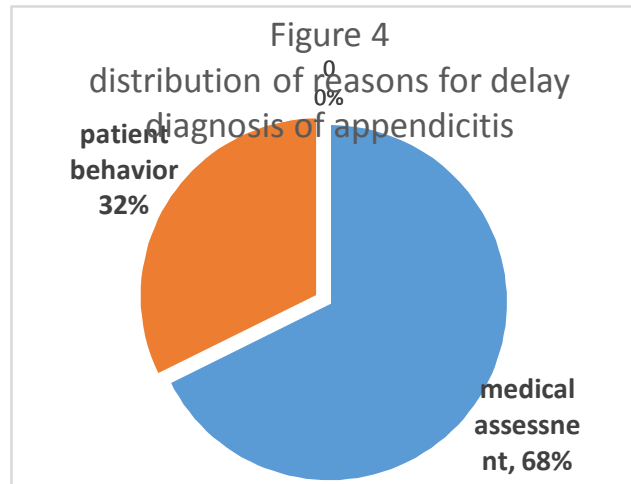


The delayed 65 patient includes 45 male (65%) and 20 female (35%). [Figure 3]



As a reason for delay, a medical assessment reason (second group) comprise 68 % (44 patients), while a patient behavioral reason

(first group) was 32% (21 patients) [figure 4].



Four patients from a second group was already admitted in a medical ward or intensive care unit for abdominal pain treatment or organ failure support with a missed diagnosis of appendicitis as a cause. The duration of symptoms for a delayed diagnosis patient was from 48 hours to 8 days, with an average of 96 hours; while the duration of symptoms for early diagnosed patients was from 10 to 48 hours with an average of 29 hours.

Duration of hospitalization; for early managed patients was from 1 to 3 days with

an average of 1.3 days, while for delayed patients it was 2 to 14 days with an average of 3.5 days. Three patients admitted to intensive care unit after surgery for respiratory support because of sepsis. Mortality rate was zero.

Surgical wound infection is significantly high, (with a p value less than 0.01), in a 23 patients belong to delayed diagnosis group (35%) in comparison with 14 patients belong to early diagnosed group (5.7%).

Table 1: age distribution of patients with acute appendicitis

Age group	No. of patients	% of patients
5 – 10 years	21	6.8 %
11- 20	87	28,2%
21- 30	71	23%
31- 40	57	18.5%
41-50	49	16%
51- 60	19	6 %
61-70	4	1.2 %
total	308	100 %

Discussion

Acute appendicitis comprises the most common cause of surgical abdominal disease with a major errors in management made frequently that associated with significant morbidity and mortality. The high rate of complicated appendicitis with its subsequent sequelae of increased morbidity is primarily the direct result of patient's delay. The number of hours for symptoms preoperatively is more for appendicitis patients with gangrene, perforation and mass than for uncomplicated appendicitis. In this study there was a deference of 96 hours vs 29 hours. Brender et al. found that there was a difference of 66 hours vs 35 hours [20]. Schere and Coil found it was a difference 55 hours vs 22 hours [21]. Eldar et al. found a difference of 69 hours vs 54 hours [22] and Lewis et al. found it was a difference of 34 hours vs 16 hours [23].

The sex distribution of appendicitis, in a sum to all age groups, in this study was near equal that approximates textbooks data [24]. 53% of patients in this study were belong to second and third decade age groups, goes with a textbooks results [24]. One of each 5 patients operated appendectomy was found to be diagnosed late, and the main cause of delayed diagnosis is improper initial medical assessment (68%) while in other studies the medical assessment comprise 21% and 23% of all causes for delay [25,26]. In this study many other differential diagnosis of appendicitis are claimed to miss a diagnosis of appendicitis. Irritable bowel syndrome, urinary tract infection, gastroenteritis, and peptic ulcer are the main false initial diagnosis to victims of missed appendicitis. Because of the initial presenting symptoms of early appendicitis are nonspecific, a proper and correct preoperative assessment with a diagnosis early enough is important to avoid unnecessary appendectomies and reduce the risk of delay in diagnosis. 65% of delayed cases are male which is in accordance with other studies [27,28]. This higher percentage

of male delay than female may be due to pain tolerance difference between them and early medical seek of female. Some other studies showed that the diagnosis of acute appendicitis relies mainly on clinical experience, and, the performance of complementary tests in most instances are unnecessary [29, 30]. In other studies showed that a surgical team assessment of abdominal pain are more sensitive to diagnose appendicitis than teams of other medical branches as the surgeons depends mainly on clinical examination while other medical doctors depends on investigations to reach diagnosis [31]. We showed that a delay in diagnosis and surgery for acute appendicitis was associated with advanced stage of disease and a higher morbidity with prolonged hospitalization of average 3.5 days vs 1.3 days for early diagnosed and wound infection of 35% vs 5.7% respectively, these results if compared with other studies show about same duration of stay in hospital but a higher incidence of wound infection in both delayed and early cases (27.3% vs 2.2%) [32].

In Iraq acute appendicitis subject is also one of the leading causes of litigation against physicians.

Conclusion

Early features of appendicitis are misleading, and a delay in diagnosis of appendicitis due to improper medical assessment is still a challenge. Despite many clinical scores and advanced investigations, still the interpretation of data by expert surgical team with a high index of suspicion is the best way to reach early diagnosis of appendicitis. Admission for observation and advising patient for reassessment in next few hours is a safe way to avoid missing diagnosis of appendicitis. Quality improving programs to juniors and trainees skills, and non-surgical doctors about presentation of appendicitis with a need for proper assessment for patients with abdominal pain by a surgical team or even

by a specialist surgeon. Public and community education about early medical consultation if there is any abdominal symptoms avoiding the symptomatic treatment by non-medical personnel.

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