

The significance of preoperative white blood cells count and ultrasonography for diagnosis of acute appendicitis

Majeed H. H.AL-amiri*

الخلاصة

تمت الدراسة على 588 مريض مصاب باعراض التهاب الزائدة الدودية، جميعهم تم لهم استئصال الزائدة الدودية بعملية جراحية، خلال اربعة سنوات من كانون الثاني 2006- الى كانون الثاني 2010 . 366 مريض ذكر و222 مريضة انثى، اعمارهم تتراوح بين 7-76 سنة. جميعهم يشكون من اعراض التهاب الزائدة الدودية مثلا الم حول السرة او الم اسفل الجهة اليمنى من البطن مع تقيء وعدم الشهية للاكل الخ. وتم اجراء فحص سونار البطن لجميعهم واجراء فحص عدد كريات الدم البيضاء لهم في شعبة الاشعة وشعبة المختبر التابعين للمستشفى. الهدف من هذه الدراسة لمعرفة اهمية اجراء فحص سونار البطن واجراء الفحص المختبري لعدد كريات الدم البيضاء لغرض تشخيص التهاب الزائدة الدودية. وتم استئصال الزائدة الدودية لكل المرضى وارسلت الزائدة للفحص النسيجي للتأكد من حقيقة التهابها من عدمة. وكان هناك 102 مريض، كانت نتيجة الفحص النسيجي سالبة اي بنسبة%34.6. 17. وكانوا 42 مريض ذكر و60 مريضة انثى. وتبين ان نسبة اجراء عملية سالبة تقل كلما كان هناك ارتفاع في عدد كريات الدم البيضاء وهناك دلائل على التهاب الزائدة الدودية بواسطة السونار. وتبين وجود نتيجة للفحص النسيجي موجبة في 486 مريض اي بنسبة%65.3. 82 . زيادة عدد كريات الدم البيضاء في الدم للحالات الموجبة للزائدة الدودية كانت في 388 مريض اي بنسبة%83.5. 79. وكانت عدد كريات الدم البيضاء في الدم للحالات السالبة في 52 مريض اي بنسبة%98.0. 50. في 198 مريض اي بنسبة%67.3. 33 كان فحص السونار سالب. ومن 198 مريض كان 89 مريض اي بنسبة%94.9. 44 كانت نتيجة الفحص النسيجي موجبة. و390 مريض اي بنسبة%32.6. 66 كان فحص السونار موجب والفحص النسيجي ل 45 مريض منهم اي بنسبة%53.8. 11 سالب .

Abstract

Background: Appendicectomy is still the most common surgical procedure; but diagnostic failure may still occur & leads to delay in treatment or negative appendicectomy.

Objectives of this study: to evaluate value of preoperative white blood cells count & ultrasonography in diagnosis of acute appendicitis

Patients and methods: This study had been carried on 588 cases of acute appendicitis. Appendicectomy done for all cases.

Over period of 4 years from January 2006-january 2010. the range of age was between 7-76 years.

*Consultant surgeon Al-yarmouk teaching hospital

With mean age of (41.5 years).and median age 25 years old. 366 males (62.244%) and 222 females (37.755). ultrasonography done for all patients by our radiologists. white blood cells count performed in our lab.

Results:Negative appendectomy rate was 102 patients (17.346%) this rate was 42 patients (11.475%) for male and 60 patients (27.027%) for female patients. positive appendicitis in 486

Increase white blood cells count for acute appendicitis (histological positive result) in 388 patients (79.835%) from the 486 patients.

And increase white blood cells count for non-acute appendicitis (i.e. negative histological result) in 52 patients (50.980) from the 102 patients.

Conclusion:In spite of the improvement tests for acute appendicitis we could not sufficiently reduce the negative appendectomy rate. If there is doubt about the diagnosis although leukocyte levels and ultrasonographic result are normal, especially for female patients performing further radiologic examination such as CT can be favorable.

Key word: AA acute appendicitis; NA :negative appendectomy; NAR: negative appendectomy rate;USG;ultrasonography.

Introduction

Acute appendicitis the most common surgically correctable cause of abdominal pain. The diagnosis of acute appendicitis remains difficult in many instances. Some of the signs and symptoms can be subtle to both the surgeon and the patient and may not be present in all the instances. Arriving at the correct diagnosis is essential, however, as a delay in diagnosis may allow progression to perforation and significantly increased morbidity and mortality .incorrectly diagnosing patient with appendicitis, although not catastrophic, often subjects the patient to an unnecessary operation. The classical presentation of acute appendicitis is not present in all patients. Laboratory studies can be helpful in the diagnosis of appendicitis, but no single test is definitive. White blood cells count is perhaps the most useful laboratory test. Typically the white blood cells count is slightly elevated in non perforated appendicitis.

Abdominal ultrasonography is a popular imaging modality for acute appendicitis. findings that suggest appendicitis include thickening of the appendiceal wall, loss of wall compressibility, increased echogenicity of the surrounding fat signifying inflammation, and loculated pericecal fluid. The advantages of ultrasound include its widespread availability, as well as the avoidance of ionizing radiation. Ultrasound is highly operator-dependent.

Patients and methods

This study had been carried on 588 cases of acute appendicitis. Appendectomy was done for all cases. Over period of 4 years from January 2006-january 2010. The range of age was between 7-76 years. With mean age of (41.5 years).and median age 25 years old. 366 males (62.244%) and 222 females (37.755).

All had clinical finding e.g anorexia, nausea, pain in right iliac fossa, pain in paraumbilical area, vomiting, tenderness, guarding, rebound tenderness, ultrasonography done for all patients by the same sonarist, with Siemens sonoline G50 with a 3.5 MHZ convex and 7.5 MHZ linear probe. White blood cells count performed in our lab. All patients with perforated appendicitis or patients operated on without investigation or patients whose laboratory tests done at other centre were excluded from this study. Age of patients, sex of patients and hospital stay all were studied. Appendectomy done for all patients and appendix send for histopathological study .the histopathological results either acute appendicitis(AA).or non acute appendicitis(NAA).ultrasound evidence for diagnosis of acute appendicitis e.g. measurement of the diameter of the appendix greater than 7mm.other findings were echogenic periappendiceal mesenteric or omentum or periappendiceal fluid collection and mesenteric lymphadenopathy.

White blood cells count more than 10000/mm was accepted as leukocytes.

Results

Negative appendicectomy rate was 102 patients (17.346%) this rate was 42 patients (11.475%) for male and 60 patients (27.027%) for female patients. Negative appendicectomy rate decrease when white blood cells count was high & ultrasonographic finding were confirming appendicitis, where as negative appendicectomy rate increasing when patients had normal white blood cells count & normal ultrasonographic finding. Positive appendicitis in 486 patients (82.653%) as shown in Table 1

Table 1:

	negative	positive	total
male	42(11.475%)	324(88.524%)	366(62.244%)
female	60(27.027%)	162(72.972%)	222(37.755%)
total	102(17.346%)	480(82.653%)	588(100%)

Increase white blood cells count for acute appendicitis (histological positive result) in 388 patients (79.835%) from the 486 patients.

And increase white blood cells count for non-acute appendicitis (i.e. negative histological result) in 52 patients (50.980) from the 102 patients. One hundred ninety eight (33.673%) out of 588 patients had no positive finding by ultrasonography. and 89 patients out of 198 patients (44.949%) were observed to have histologically proved acute appendicitis. Three hundred out of 588 patients had positive ultrasonographic finding, from those only 45 patients (11.538%) had histologically normal appendix as shown in the following

	+Ve biopsy(AA)	-Ve biopsy(NAA)
Increase W.B.C	388 (79.835%)	52(50.980)
U/S +ve	89(44.949%)	45(11.538%)

Ultrasonography had sensitivity of 70.324% and specificity of 56.253%.

Table 2: Indices of diagnostic values

Diagnostic method	Diagnostic accuracy %	Sensitivity %	Specificity %
W.B.C	68.401	65.532	66.623
u/s	71.9	70.324	56.253

Discussion

Appendicitis is a very common disease with occurrence of 7% (1). Radiology with the help improving technology gets more space in the diagnosis & differential diagnosis for acute abdominal pain. Our study found that ultrasonography had sensitivity 70.324% and specificity of 56.253% the failure to identify a normal appendix on ultrasound is major factor in low sensitivity in our study. Rajeev gave these ratios at his study on 118 preoperative ultrasonography performed appendectomy patients as 63.3% & 82.14 %.(1).

Another study comparing 200 ultrasonography negative patients to 200 ultrasonography positive, negative appendectomy rate was found 4.7% for positive group.(2).

Suma evaluate 1447 suspicious acute appendicitis patient with ultrasonography 368(25%) were positive for appendicitis & 7 were false positive.

Other study 1079 patients, 173 patients(12%) had an other diagnosis due to ultrasonography & 906 patients complain regressed during follow up. this study gave a sensitivity of 98% & specificity of 99%.(3).

Hannah et al analyzed the imagination studies as a factor of a delay in surgery and could not show any difference between non-imaging and imaging group except reduction of non appendectomy rate from 10% to 3 %.(4).

Today emergency service practitioners are using computerized tomography (CT) for acute abdomen patients more and this may cause reduced rate of negative appendectomy rate. Motoki used CT for acute appendicitis and published sensitivity and a specificity of 98.9% and 75%.(5).

Differences in the course for acute appendicitis and non acute appendicitis groups seem to be that non acute appendicitis patients re-admit emergency services more due to their unsolved problem although appendicitis patients meet more septic complications.(6).

Another CT technique uses rectal gastrografin, advantages of this technique are, causing no delay for surgery due to oral intake, no need for intravenous contrast and ability to show not only inflamed appendix but also periappendicular inflammatory changes such as mesenteric edema.(7).

Kuzma showed no difference between complication rates for acute appendicitis and non acute appendicitis groups (8). Unfortunately, the white blood cell is elevated in up to 70% of patients with other causes of right lower quadrant pain. (9).

Elangovan et al found high levels of white blood cell count in acute appendicitis patients 80%.(10).

Kyuseok et al studies 339 patients in two groups as preoperative no imaging and imaging studies and they found their negative appendectomy rate as 20.6% and 6.6%.(11).

Hassan et al found, being younger than 21 years old, female gender, lower levels of polymorphonuclear leukocyte and lower rates as a risk factor for negative appendectomy. (12).

Conclusions

In spite of the improvement tests for acute appendicitis we could not sufficiently reduce the negative appendectomy rate. Data from present study showed that clinical signs were still the most sensitive diagnostic method. white blood cells count are of low accuracy and have only supportive role in diagnosis of acute appendicitis .ultrasonography has the highest diagnostic accuracy and should be added to the investigation in acute appendicitis.

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