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DIAGNOSTIC ACCURACY IN ACUTE APPENDICITIS: COMPARISON BETWEEN CLINICAL IMPRESSION AND ULTRASOUND FINDINGS

Tariq S Mufti, Saleem Akhtar, Khalid Khan, Fazle Raziq, Zia-ur-Rehman & Ijaz Ahmed

A cross-sectional study to determine the diagnostic accuracy of clinical impression and graded compression abdominal ultrasonography in acute appendicitis used individually or complementary to each other was conducted in a busy surgical unit. Eighty-nine cases subjected to categorized clinical impression and ultrasonography preoperatively achieved fairly high sensitivity (84.3% and 81.81% respectively) but low specificity (23.68% and 38.23%) with an overall negative predictive value of 31%, implying it to be a poor indicator to avoid negative appendectomies.

INTRODUCTION

Appendicectomy continues to be the commonest operation amongst emergency abdominal procedures. The prevalence of appendicectomy as high as 16% in a study population of 5 million has been reported in Europe [1]. Exact prevalence in Pakistan is not available; however, it remains the most frequent cause of acute abdomen[2,3] and the commonest operation performed in the general surgical operation theatre [4].

The accuracy of diagnosis of acute appendicitis has been reported [5-10] to be 59-97% with negative appendicectomy rates of 7-38% [5-11]. Negative appendicectomies may cause complications in 6-18 % of the cases.

There have been increasing efforts to improve the diagnosed accuracy of acute appendicitis. Various procedures including invasive investigatory diagnostic methods like laparoscopy have been recommended to reduce the rate of negative appendicectomies [13,14]. However, reservations to this effect have been documented by some [15].

Graded compression abdominal ultrasonography has been claimed to be a non-invasive, inexpensive and useful tool to increase the diagnostic accuracy [16-22]. The objective of this study is to compare the accuracy of diagnosis between clinical impression in patients undergoing appendicectomies and ultrasonographic findings and to find out the predictive value on combining both the tests together.

MATERIALS AND METHODS

The study was performed prospectively on 106 consecutive cases undergoing appendicectomies with preoperative diagnosis of acute appendicitis. On the basis of clinical impression, the cases were divided into strongly suspected (SS) case (typical history, rebound tenderness ± guarding) or poor suspected cases with equivocal findings (Eqv). Patients' clinical evaluation was done by junior registrars or house officers and baseline laboratory examinations (Hb, TLC, DLC, Urine examination, etc.) were performed.

All the patients were subjected to ultrasonography by a single experienced ultrasonologist. The Aloka SSD-280 LS with T- shaped 3.5 and 5 MHz Linear Array Transducers

From: Ayub Medical College & DHQ Hospital, Abbottabad.
PROF DR TARIQ S MUFTI, Head, Surgical **B** Unit.
DR SALEEM AKHTAR, Assistant Professor, Department of Radiology.
DR FAZLE RAZIQ, Associate Professor, Department of Pathology.
DR KHALID KHAN, Assistant Professor, Department of Surgery'.
DR ZIA-UR-REHMAN, Assistant Professor, Department of Surgery'.
DR IJAZ AHMED, Medical Officer, Surgical C Unit.
Corresponding Author: PROF DR T S MUFTI

was used with a standard graded compression technique. The following criteria were considered diagnostic for acute appendicitis:

1. Lumen diameter > 10mm.
2. No compressible lumen of appendix.
3. Fluid collection in RIF and/or pelvis.
4. Thickened, asymmetrical, hyperechoic finger like appendix.

All patients were subjected to laparotomy for appendicectomy after informed consent, the appendix was observed visually for evidence of inflammation and records were made by the surgeon. All appendices were subjected to histopathological examinations and were categorized as normal or acutely inflamed appendices.

2x2 method for evaluation of diagnostic accuracy in individual tests and Bayes Theorem for predictive values of combination of tests was applied. P value at 95% confidence interval was calculated by Z-test for positive predictive value.

RESULTS

Out of a total 106 consecutive cases, 17 were excluded for various reasons (autolyzed histopathology samples, incomplete documentation, mass formation at operation or those not operated).

89 cases were therefore studied. 72 of 89 (80%) of these were observed to be strongly suspected on clinical impression, while 17 (20%) had equivocal findings. 51 (57.3%) were histologically proven as acute appendicitis while 38 were reported as normal.

Mean age for histologically positive disease was 19.21+7.89 with age range from 6-50 years, and for histologically normal cases was 16.21 + 8.02 with age range of 6-48 years. Overall male to female ratio was 57:36; 38:12 for disease group and 13:25 for normal group. Correlation of histopathological results with clinical impression and ultrasound findings were determined by using 2x2 tables.

Histopathological Disease Clinical Impression			Histopathological Disease Ultrasound Findings		
	Yes	No		Yes	No
SS	43	29	+	45	21
Eqv	8	9	-	10	13

The sensitivity for individual tests (i.e. clinical impression and ultrasonography) was 84.3 % and 81.81% while specificity was calculated as 23.68% and 38.23% respectively.

Over all diagnostic accuracy in case of clinical impression was 54 % while in case of ultrasound it was 60%. Positive predictive value for clinical impression was 59% in case of clinical impression. A significant improvement of 10% on positive predictive value (i.e. 69%) by using the combination of both the tests was observed ($P<0.05$). However, the negative predictive value was only 31 % for the prevalence of this sample size.

DISCUSSION

The management of right iliac fossa pain can be a difficult clinical problem. High rate of negative appendicectomies has been accepted in view of the risk of appendiceal perforation. No satisfactory universally acceptable diagnostic strategy has been evolved as yet to avoid negative laparotomies.

In this study rather poor diagnostic accuracy- on clinical impression is mainly because of the fact that the diagnosis is made by junior medical staff and mostly at odd hours. The doctors are usually pressed for time to operate on the emergency cases within the following few hours. However, this figure is still within conformity of the wide range for negative appendicectomies cited by other [5-7,8-11] authors.

Sensitivity in both type of tests i.e. clinical impression and ultrasonography remains fairly high (i.e. 84.3 % and 81.81 %) while specificity of both the tests stands rather poor (i.e. 23.68% and 38.23%). Therefore, it is not expected to contribute in the management of patients with equivocal clinical findings. Inspite of tall claims [22] of success, ultrasonography in equivocal clinical impression has been cited as having poor specificity by some other workers too[23]. This discrepancy may indicate individual variations in expertise and perhaps the technique.

Overall accuracy of diagnosis of ultrasonography in comparison with clinical impression in this study remains superior.

Positive predictive value for diagnosis in our study improved when ultrasonography was used in addition to the clinical impression. However, because of poor negative predictive value the combination of tests does not change the situation for negative laparotomies.

CONCLUSIONS

Although ultrasonography is a useful adjunct in diagnosing acute appendicitis, however, its value in reducing negative appendicectomies remains unclear.

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