

ORIGINAL ARTICLE

IMPORTANCE OF CLINICAL ASSESSMENT IN DIAGNOSIS OF ACUTE APPENDICITIS AND ITS ROLE IN DECREASING NEGATIVE APPENDICECTOMY RATE

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Background: Appendicitis is a common diagnosis, but is by no means a simple one to establish. It is impractical to have a definitive preoperative diagnosis, which leads to an appreciable rate of negative appendicectomy as reported in world literature varying from 20–40% with its morbidity around 10%. This retrospective study investigated the value of clinical assessment and medical imaging (ultrasonography) for patients with suspected appendicitis. Negative appendicectomy rate and appendiceal perforation with or without medical imaging were used as end points for this investigation.

Methods: This study reviewed all patients admitted in Sheikh Khalifa Bin Zaid Hospital with suspected acute appendicitis. The patient cohort was identified from the unit registry and review of medical records. The medical records were analysed, and the outcomes of patients were followed up.

Results: Between June 2010 to June 2012, 375 patients' medical records were audited. These included 56.3% males and 43.7% females. The negative appendicitis rate was 7.2% and appendiceal perforation rate was 5.3%. Ultrasound was done in 103 (27.4%) patients in whom diagnosis of appendicitis was doubtful. Medical imaging had a 50% prediction rate for acute appendicitis, 40% false-negative rate, and 10% false-positive rate. Overall, the prediction rate for appendicitis by clinical assessment supplemented by laboratory tests and medical imaging at clinician's discretion was 92.8%.

Conclusions: Despite studies advocating routine use of medical imaging for patients with suspected acute appendicitis, this study showed that the clinical evaluation is still paramount to the management of patients with suspected acute appendicitis before considering medical imaging.

Keywords: Acute appendicitis, pain RIF, Clinical assessment, CT scan, Ultrasonography

INTRODUCTION

Appendicitis is a very common disease with a lifetime occurrence of 7 percent.¹ Acute appendicitis is traditionally understood to be a clinical diagnosis. Despite the frequency of the disease, the clinical diagnosis of appendicitis remains a diagnostic challenge.² Routine history and physical examination still remains most practical diagnostic modalities. Absolute diagnosis is of course possible at operation and histopathological examination of specimen. The dilemma in the clinical diagnosis of acute appendicitis is to balance diagnostic accuracy with appendiceal perforation. Centres with the most accurate diagnosis (89%) have a higher rate of appendiceal perforation (29%), and vice versa, presumably due to earlier operation.³ In order to reduce the negative appendicectomy rate various techniques including different scoring systems and modern radiological techniques have been applied. But proper clinical assessment still remains most reliable and basic method to apply. We aimed to analyse retrospectively the diagnostic efficiency of proper clinical assessment preoperative tests in relation with histopathologic results. Objectives of the study were to assess the accuracy of clinical assessment and its role in decreasing the negative appendicectomy rate.

MATERIAL AND METHODS

This retrospective study was conducted in the Department of Surgery, Sheikh Khalifa Bin Zaid Hospital Muzaffarabad from Jun 2010 to Jan 2012. All patients operated for appendicectomy during that period were included. All had clinical findings such as, history of anorexia, pain followed by nausea, right lower quadrant pain, vomiting, rebound tenderness, guarding, rigidity and conventional appendectomies were carried out.

Ultrasound was selectively performed in patients specially female group with doubtful clinical diagnosis. A radiologist performed a graded compression with a 3.5 MHz convex and 7.5 MHz linear probe. Primary criterion for diagnosing acute appendicitis (AA) by USG was the evidence of a non-compressible appendix and a measured diameter of greater than 7 mm. Data for age, sex, white blood cell count, abdominal USG results, histological findings and hospital stay were collected.

White blood cell count higher than 11,000/mm³ was taken as leukocytosis. Criteria of histological acute appendicitis accepted as infiltration of the muscularis propria with polymorphonuclear leukocytes. Pathology results as 'appendix with congestion' without any additional finding were accepted as negative appendectomy (NA). White

blood cell counts, USG findings, and hospital stay were compared between AA and NA group. Statistical analysis was performed using SPSS-18, and $p < 0.05$ were accepted as significant.

RESULTS

In this study 375 patients were included. There were 211 male (56.3%) and 164 female (43.7%) patients (range 7–65 years). White blood cell counts were found to be high ($>1100/\text{mm}^3$) in 80% while it was 83% for AA group and 51% for NA group ($p > 0.05$). Ultrasound was done in 103 (27.4%) patients in whom diagnosis of appendicitis was doubtful. Out of these, 66 (64%) patients had no USG findings for acute appendicitis. Of these, 33 (50%) patients were observed to have histologically proved AA.

The histopathology reports diagnosed 84 (22.3%) patients as acute appendicitis, 88 (23.4%) as acute appendicitis with peri-appendicitis, 156 (41.5%) as acute suppurative appendicitis, 20 (5.3%) as gangrenous/perforated appendix, whereas 27 (7.2%) cases were histological normal (Table-1).

All those patients having gangrenous/perforated appendix had a delayed presentation after onset of pain and usual presentation in this group was 24 hours after the onset of pain in the RIF. Ultrasonography had a sensitivity of 50% and a specificity of 58%. There was no statistically significant differences between the length of postoperative hospital stay for AA and negative appendectomy group (2.79 ± 1.9 and 2.66 ± 1.7 days, $p > 0.05$).

Table-1: Histopathology report of appendicectomies

Histopathology	No.	%
Negative appendix	27	7.2
Acute Appendicitis	84	22.2
Acute Appendicitis with periappendicitis	88	23.4
Acute Suppurative appendicitis	156	41.5
Gangrenous perforated appendix	20	5.3

DISCUSSION

Surgery for pain in the right lower quadrant of the abdomen remains a clinical dilemma. Acute appendicitis is traditionally a clinical diagnosis; however, not all patients present with the ‘classical’ symptoms and signs of acute appendicitis. Although patients with atypical symptoms and signs can be admitted to hospital for a period of observation, laboratory tests and medical imaging that may culminate in a diagnostic laparoscopy. This approach can be associated with its own morbidity and financial costs. Recent studies advocating ultrasound scan and CT scan (with or without rectal contrast), and ultrasonography for diagnosis of appendicitis have appeared in the medical, paediatric, radiological, emergency and surgical literature and have demonstrated a decrease in

the negative appendectomy rate from 12–29% to 3–11% with use of preoperative CT.⁴⁻⁶ These reports have had a large influence on practice and with claims of reducing negative appendectomy and costs of admitting patients for observation without additional co-morbidity to the patients.⁷ However, other studies, including a large population-based study, found no significant change in the negative appendectomy rate with increased availability and use of preoperative CT.^{8,9} Studies advocating the use of medical imaging to diagnose appendicitis were mostly conducted at tertiary or specialist centres where professional and technical expertise can be difficult to replicate in other situations.¹⁰

Despite its superior sensitivity, there are at least three problems with abdominal CT. The first is that the test involves subjecting the patient to iatrogenic ionising radiation, which carries a notable, though theoretical risk of cancer. The second problem is that the scanners are expensive and not available in all medical practice environments, particularly in developing countries. Finally, at some facilities, administration of oral and/or rectal contrast is preferred, leading to prolonged emergency department (ED) length of stay, and when IV contrast is administered, there is a risk of allergic reaction or nephrotoxicity.^{11,12}

In our study negative appendectomy rate was comparable to many international studies where the CT scan were routinely used to diagnose a case of RIF pain.¹³ However we had a slightly higher rate of appendicular perforation (5.3% vs 3.2%). More than 90% of these patients had a delayed presentation to the hospital after the onset of pain in the RIF. It should also be noted that there was no delayed appendectomy because of undue observation. A diagnostic strategy based on the clinical acumen of a general surgeon supplemented with laboratory a test at clinician discretion has shown to be satisfactory. This strategy may be more generalisable to a regional centre than at a tertiary referral centre where the protocols, technology, and technical expertise of radiologists and technicians might be unique.

The sensitivity and specificity of the medical imaging were not as convincing as suggested by some. The result was obviously due to only 27.5% of cases having medical imaging in this series which was not statistically significant. Nevertheless, the medical imaging may only be needed for clinically equivocal presentations. For patients with ‘classical’ symptoms and signs of acute appendicitis or ‘acute abdomen’ requiring operation, the additional benefit from medical imaging is debatable.¹⁴ Because appendicitis is an evolving pathological process, and early appendicitis can be impossible to differentiate from other causes of abdominal pain, clinical re-evaluation after a period of observation and supportive care could be appropriate.

However, cost analysis may be biased towards rapid testing and medical imaging to make the diagnosis.

If acute appendicitis is ruled out (by testing and/or medical imaging), the patient can be sent home from the emergency department. In a tertiary care setting, this strategy may be successful, especially where patients do not live far from the hospital. However, in smaller level setups, discharging a patient with a clinical suspicion of appendicitis and normal medical imaging might not be a safe option.¹⁵

Although these medical imaging modalities might not be considered as a diagnostic routine for patients with suspected appendicitis, they still have roles in patients with right iliac fossa pain where other pathology is suspected. Ultrasonography scans can be useful to rule out gynaecological pathology, such as ovarian cysts, can be the sole cause of patients symptoms. Also, a CT scan can be useful when other causes of right iliac fossa are suspected, such as inflammatory bowel disease, intestinal tuberculosis and ureteric calculi. In addition, both medical imaging modalities were found useful in demonstrating peritoneal fluid which might explain a patient's symptoms and signs. Subsequently, the finding might lead to diagnostic laparoscopy with clinical correlation.

We believe that there is definitely a role for medical imaging, in doubtful and equivocal cases as long as its result is correlated with clinical assessment. However it will be inappropriate to go for the medical imaging in every patient presenting with RIF pain.

CONCLUSIONS

Despite studies advocating routine use of medical imaging for patients with suspected acute appendicitis, this study showed that the clinical evaluation is still paramount to the management of patients with suspected acute appendicitis before considering medical imaging. Protocols on the routine use of medical imaging need to be investigated and standardised further before implementation as a part of work-up for patients with suspected acute appendicitis.

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