



DIAGNOSTIC ACCURACY OF ULTRASOUND PARAMETERS IN ACUTE APPENDICITIS

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ABSTRACT

Aims & Objective:- To estimate the accuracy of ultrasonography in diagnosis of acute appendicitis and its correlation with histopathological examination.

Materials & Methods:- Patients who were suspected having acute appendicitis and operated based on clinical and imaging findings were included in this study. Findings of histopathological examination of the operative specimen were then correlated with ultrasonography findings.

Results:- Out of the 141 patients included in this study 101 patients were found to have acute appendicitis on histopathological examination. Ultrasonography was shown to have sensitivity 70.29%, specificity 92.5%. Sensitivity was lower when cut off value for appendicular diameter was increased to 7mm (62.3%).

Conclusion:- Ultrasound should be considered first line investigation in suspected acute appendicitis because of its real time nature, availability and ease of interpretation. Cut off value for appendicular diameter should be 6mm to impart higher sensitivity.

KEYWORDS :

INTRODUCTION

Acute appendicitis is one of the most common causes of acute abdominal pain in both adults and children, requiring emergency surgical intervention. There is a 7% lifetime chance of developing appendicitis in the whole population. Failure to diagnose the condition early leads to development of complications such as perforation, peritonitis, abscess formation even death. This has led to acceptance of up to 20% of negative appendectomy in the clinical practice. However, role of imaging in appendicitis has changed significantly with the advent of newer imaging techniques. Multidetector CT and new generation ultrasonography machines have shown very promising specificity and sensitivity in this situation. However, the feasibility of MDCT is somewhat less due to high cost, lack of availability and intricate of operation along with high radiation dose. On the other hand, Ultrasonography is an excellent modality in this respect, due to its real time operation, lack of radiation, low cost, rapid interpretation and availability. Ultrasound findings of acute appendicitis includes a non-compressible, blind-ended, tubular structure arising from the caecum with diameter more than 6mm (or 7mm), mesenteric inflammation, abscess formation, free fluid collection in right iliac fossa, presence of appendicolith.

AIMS & OBJECTIVES

To estimate the accuracy of ultrasonography in diagnosis of acute appendicitis and its correlation with histopathological examination.

MATERIALS & METHODS

A total of 141 patients admitted and subsequently operated in the Burdwan Medical College & Hospital with the diagnosis of Acute Appendicitis were included in this study with correlation of findings in ultrasonography done in the Department of Radio-Diagnosis with the histopathological findings in the operated specimen of appendix. The study was conducted over the course of two years, from November 2015 to November 2017. Trans-abdominal ultrasound was performed in each patient HD7 ultrasound machine(Philips), using 2.5 -5MHz curvilinear transducer and 7-12MHz linear transducer.

RESULTS

Among the 141 patients included in our study, 73 were male and 68 females. The range of age was 10-57 years. Among the 141 patients that were operated, 101 patients were found to have features of

appendicitis on histopathological examination. Among these patients, 71 patients had one or more positive ultrasonographic findings of acute appendicitis. Among the patients without histopathological evidence of acute appendicitis, 37 had no positive ultrasonographic findings. The sensitivity and specificity were respectively 70.29%, 92.5%. Positive Predictive value was 95.94%, Negative Predictive Value 55.22%. This set of value was obtained with a cut off value of 6mm of appendicular diameter. When the cut off was raised to 7mm, sensitivity was 62.3%, specificity 95%, positive predictive value 96.92%, negative predictive value 50%. Among other findings, presence of appendicolith was found to have 100% specificity.

TABLE 1: Sensitivity and specificity of ultrasound parameters

	Positive Histopathological Examination	Negative Histopathological Examination	Total
Positive sonographic findings	71	3	74
Negative Sonographic findings	30	37	67
Total	101	40	141

FIGURE 1: MICROSCOPIC FEATURE OF APPENDICITIS

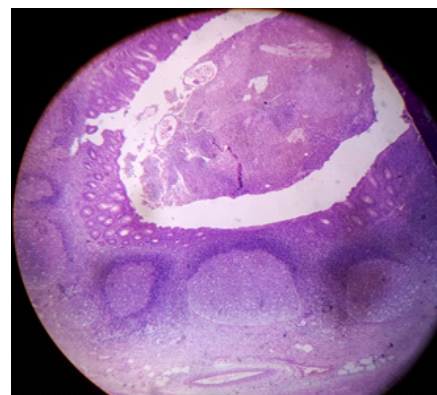


FIGURE 2: SONOGRAPHIC FEATURE OF ACUTE APPENDICITIS

DISCUSSIONS

Even though ultrasound has emerged as one of the most easily applicable study in the setting of acute appendicitis, its diagnostic value is hindered by its relatively low sensitivity. After Puyalart³ published his study on use of ultrasound with graded compression, numerous studies were conducted over the years. These studies placed the sensitivity of ultrasonography from 40% to 100%. However most of the studies have concluded that the sensitivity of ultrasound is somewhat lower than its sensitivity in diagnosing appendicitis. Major factors that limit visibility in ultrasonography include distended bowel loops, tenderness, abdominal rigidity.

The results of this study closely resemble the results of many previous studies with lower sensitivity and high specificity. Regarding the appendiceal diameter, it was found that a cut-off of 6mm yielded much higher sensitivity than a cut-off of 7mm. This was similar to the results from studies by Rao et al.⁴. The sensitivity and specificity of appendicular abscess and periappendiceal inflammation was similar to that found by Borushok et al.⁵. Jeffrey et al.⁶ also described appendiceal diameter as an important parameter in appendicitis. In a similar study by Kumar et al.⁷, researchers found a higher sensitivity of ultrasonography, while another study by Mondal et al.⁸, found these parameters closer to the study performed by us. Rettenbacher et al.⁹ described the importance of appendicular morphology in the diagnosis.

CONCLUSION

Ultrasound has a very high specificity but somewhat lower sensitivity in diagnosing acute appendicitis. However, due to its availability, simplistic operation, real time nature and lack of radiation makes it very useful in setting of acute abdomen. Its high specificity can help differentiating between other pathologies from appendicitis. Therefore, we recommend the use of ultrasound as first line imaging modality in suspected acute appendicitis in conjunction with clinical examination.

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