

## ASSESSMENT OF CORRELATION BETWEEN ULTRASONOGRAPHIC AND SURGICAL FINDINGS IN ACUTE APPENDICITIS PATIENTS

Sholy K V<sup>1</sup>, Don Paul Mathew<sup>2</sup>, Farzin N Abdu<sup>3</sup>, Aarif Latheef<sup>4</sup>, Sajay Alias<sup>5</sup>

Received : 26/09/2022

Received in revised form : 28/10/2022

Accepted : 07/11/2022

**Keywords:**

Acute abdominal pain, acute appendicitis, Ultrasonography.

Corresponding Author:

**Dr. Don Paul Mathew,**

Email: donpaulm@yahoo.com

ORCID: 0000-0001-8470-917X

DOI: 10.47009/jamp.2022.4.5.80

Source of Support: Nil,

Conflict of Interest: None declared

*Int J Acad Med Pharm*

2022; 4 (5); 396-398



<sup>1</sup>Professor, Department of Radiodiagnosis, SNIMS, Chalakka, Kunnukara, Kerala, India

<sup>2</sup>Associate Professor, Department of Radiodiagnosis, SNIMS, Chalakka, Kunnukara, Kerala, India

<sup>3</sup>Senior Resident, Azeezia Medical College Hospital, Adichanalloor, Kerala, India

<sup>4</sup>Radiologist, NSS Medical Mission Hospital, Pandalam, Kerala, India

<sup>5</sup>Consultant Radiologist, Marsleeva Medicity, Pala, Kerala, India.

### Abstract

**Background:** To assess correlation between ultrasonographic and surgical findings in acute appendicitis patients. **Materials and Methods:** Eighty- four adult patients age ranged 18- 50 years of either gender reporting with acute appendicitis were selected. Ultrasonographic examination was performed with a handheld 3.5 MHZ sector probe and with a 5 MHZ sector probe scan of the right lateral quadrant using graded compression technique. **Result:** Out of 84 patients, males comprise 50 and females 34. Complaints were fever reported in 14 patients, nausea/ vomiting in 68, RLQ tenderness in 75, rebound tenderness in 42, shift in pain in 23 and loss of appetite in 54. Position of appendix was pelvic in 16, retrocecal in 54, subcecal in 6, pre- ileal in 3, post- ileal in 3 and subhepatic in 2 patients. The difference was significant ( $P < 0.05$ ). Sonographic diagnosis was positive in 80 and negative in 4 cases. The difference was significant ( $P < 0.05$ ). **Conclusion:** Ultrasonography has a definite role and best non-invasive method in acute appendicitis in addition to clinical findings.

## INTRODUCTION

Acute abdominal pain remains a challenge to surgeons and physicians. One of the most frequent causes of surgical emergencies and abdominal pain is acute appendicitis.<sup>[1]</sup> Patients with appendicitis present with a wide variety of clinical manifestations, which may mimic symptoms of other diseases. In young men, limited number of alternative diagnosis usually permits a high degree of diagnostic accuracy.<sup>[2]</sup> In contrast, young women commonly present with acute gynecological illnesses that closely mimic acute appendicitis. Appendicitis is a surgical emergency, and if it is left untreated, the appendix may perforate and cause potentially fatal complications, especially in children and the elderly.<sup>[3]</sup>

Patients with acute appendicitis typically present with central abdominal pain shifting to the right lower quadrant (RLQ) or may present with generalized abdominal pain. Vomiting is common in children. Clinical examination reveals signs of acute intra-abdominal process, for example, local and rebound tenderness, muscle guarding, rigidity, cutaneous hyperesthesia, and tenderness on rectal examination.<sup>[4]</sup>

There have been numerous publications on the use of ultrasound as a diagnostic tool in patients with

acute appendicitis.<sup>[5]</sup> Ultrasonographic criteria of acute appendicitis include blind-ended, non-compressible, aperistaltic tube, with diameter more than 6 mm, arising from the tip of cecum with a gut signature.<sup>[6]</sup> Visualization of an appendix with an appendicolith, regardless of appendiceal diameter, is also regarded as a positive test. However, a normal appendix can also be visible on ultrasound.<sup>[7]</sup> We planned present study to assess correlation between ultrasonographic and surgical findings in acute appendicitis patients.

## MATERIALS AND METHODS

Eighty- four adult patients age ranged 18- 50 years of either gender reporting with acute appendicitis were selected. Patients with hollow viscous perforation with peritonitis were excluded. Approval from ethical review committee of the institute was obtained. A valid written consent was also obtained from all patients.

Demographic data such as name, age, gender etc. was recorded. Parameters such as presenting complaints, their duration, severity, sequence of onset of symptoms, mode of onset, progression, change in pattern at the time of presentation etc. was recorded. Ultrasonographic examination was performed with a handheld 3.5 MHZ sector probe

and with a 5 MHZ sector probe scan of the right lateral quadrant using graded compression technique.

The results were compiled and subjected for statistical analysis using Mann Whitney U test. P value less than 0.05 was set significant.

## RESULTS

Out of 84 patients, males comprise 50 and females 34 [Table 1].

**Table 1: Patients distribution**

Total- 84		
Gender	Male	Female
Number	50	34

**Table 2: Assessment of parameters**

Parameters	Variables	Number	P value
Complaints	Fever	14	0.05
	Nausea/ vomiting	68	
	RLQ tenderness	75	
	Rebound tenderness	42	
	Shift in pain	23	
	Loss of appetite	54	
Position of appendix	Pelvic	16	0.01
	Retrocecal	54	
	Subcecal	6	
	Pre- ileal	3	
	Post- ileal	3	
	Subhepatic	2	

**Table 3: Sonographic diagnosis**

Sonographic diagnosis	Number	P value
Positive	80	0.01
Negative	4	

## DISCUSSION

The classic presentation of a patient with appendicitis has a typical sequence of symptoms (poorly localized periumbilical pain).<sup>[8]</sup> This classic presentation occurs in only 50–60% of patients, and the diagnosis may be missed or delayed when atypical patterns of disease are encountered.<sup>[9]</sup> About one third of patients with acute appendicitis present with atypical symptoms.<sup>[10,11]</sup> Differential diagnosis is diverse and includes gastroenteritis, mesenteric lymphadenitis, ovarian and tubal disorder, renal colic, peptic ulcer, and acute cholecystitis.<sup>[12,13]</sup> We planned present study to assess correlation between ultrasonographic and surgical findings in acute appendicitis patients. Our study revealed that Out of 84 patients, males comprise 50 and females 34. Ali et al,<sup>[14]</sup> performed correlation between ultrasonographic and surgical findings in 60 acute appendicitis cases. Out of 60 total cases, 48 cases were acute appendicitis histopathologically, out of them, 39 (81.25%) were male and 09 (18.75%) were female. An increased leukocyte count was found in 65% of cases of histopathologically diagnosed acute appendicitis. Self-localization was found to be useful in diagnosis by ultrasound in our study. About 80% (48 cases)

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showed ultrasound findings suggestive of acute appendicitis

Our study demonstrated that complaints were fever reported in 14 patients, nausea/ vomiting in 68, RLQ tenderness in 75, rebound tenderness in 42, shift in pain in 23 and loss of appetite in 54. Position of appendix was pelvic in 16, retrocecal in 54, subcecal in 6, pre- ileal in 3, post- ileal in 3 and subhepatic in 2 patients. Franke et al,<sup>[15]</sup> assessed the performance and clinical benefit of ultrasonography of the appendix in the routine clinical examination. Ultrasonography of the appendix was performed in 870 (38%) of the patients (range 16-85%). The overall sensitivity of ultrasonography of the appendix was 55% (13-90%), the specificity 95% (range 82-100%), positive predictive value 81% (50-100%), and negative predictive value 85% (68-96%). With respect to single ultrasound scan findings, adequate sensitivity (44%) was achieved only with the target phenomenon, not with the other criteria. There were no correlations between the ultrasound findings of the appendix and the diagnostic accuracy of the clinician, the negative appendectomy rate, or the perforated appendix rate. We found that sonographic diagnosis was positive in 80 and negative in 4 cases. Patra et al,<sup>[16]</sup> evaluated diagnostic accuracies of clinical and

ultrasonographic in acute appendicitis in 38 patients. Acute appendicitis was found more commonly among patients of 20-29 years of age with 37% in prospective and 42.9% in retrospective studies respectively. Modified Alvarado score (MAS) had sensitivity of 47.7% and 59.6%, specificity of 87.5% and 91.6% in both prospective and retrospective studies respectively. Ultrasonographic findings showed sensitivity of 82.1% and 92.7%, specificity of 76.4% and 72.7% in prospective and retrospective studies respectively.

Incesu et al,<sup>[17]</sup> assessed and compared the accuracy, advantages, and limitations of MR imaging and sonography in revealing appendicitis. The study included 60 consecutive patients suspected of having appendicitis who underwent abdominal sonography and MR imaging. Fat-suppressed T2-weighted fast spin-echo and gadolinium-enhanced fat-suppressed T1-weighted spin-echo axial and coronal images were obtained. Surgical, histopathologic, and follow-up results revealed that 34 patients had appendicitis. Of the 26 patients without appendicitis, 15 with symptoms of acute appendicitis had no pathologic diagnoses and the remaining 11 had another diagnosis. Comparison of the sensitivity, accuracy, and negative predictive values for MR imaging and sonography was found to be statistically significant indicating that MR imaging was superior to sonography in revealing appendicitis. Authors found no statistical difference in specificity and positive predictive value for MR imaging and sonography.

Puylaert et al,<sup>[18]</sup> studied prospectively the diagnostic accuracy and clinical impact of abdominal ultrasonography in 111 consecutive patients thought to have appendicitis. Ultrasonography was performed with small high-resolution, linear-array transducers, with the abdomen compressed to displace or compress bowel and fat. Among 52 patients later shown in surgery to have appendicitis, ultrasonography was unequivocally positive in 39 (sensitivity, 75 percent). Of 31 patients in whom appendicitis was definitely excluded, none had a positive ultrasound examination (specificity, 100 percent). The sensitivity in those with a perforated appendix (28.5 percent) was much lower than in those with acute non-perforating appendicitis (80.5 percent) or appendiceal mass (89 percent), but the low sensitivity did not influence clinical management, since the need for surgery in patients with a perforated appendix was clinically obvious. Ultrasonography resulted in changes in the proposed management in 29 of the 111 patients (26 percent). It also led to the correct diagnosis in the 16 patients who were found to have a disease other than appendicitis. They concluded that ultrasonography is a useful aid in the diagnosis of appendicitis.

## CONCLUSION

Ultrasonography has a definite role and best non-invasive method in acute appendicitis in addition to clinical findings.

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