

A CLINICO- RADIOLOGICAL STUDY OF ACUTE APPENDICITIS

Khursheed Durrani¹, Seema Tabassum²

¹Assistant Professor, Department of Radiology, Bhagwan Mahavir Institute of Medical Sciences, Pawapuri, Nalanda, Bihar, India

²Associate Professor, Department of Anatomy, Darbhanga Medical College, Laharia sarai, Darbhanga, Bihar

Received : 05/04/2023
Received in revised form : 08/05/2023
Accepted : 20/05/2023

Keywords:

Acute appendicitis, mimics of appendicitis, histopathological correlation.

Corresponding Author:

Dr. Seema Tabassum,

Email: drseemadurrani28@gmail.com

DOI: 10.47009/jamp.2023.5.3.492

Source of Support: Nil,

Conflict of Interest: None declared

Int J Acad Med Pharm

2023; 5 (3); 2515-2518



Abstract

Background: The primary objective of our investigation is to assess the sensitivity and specificity of Ultrasonography (USG) in the identification of acute appendicitis in patients experiencing symptoms of right iliac fossa pain, as well as its role in therapeutic management. **Materials and Methods:** A total of 100 patients presenting with symptoms of right iliac fossa pain were included in our study, all of whom sought treatment at the surgical outpatient department. These patients underwent both ultrasonography and appendectomy, followed by histopathological examination of the excised specimens. Exclusion criteria encompassed obese individuals, due to imaging difficulties, and patients requiring emergent surgery. Ultrasonography was performed in both the supine and left lateral oblique positions, utilizing the graded compression technique.

Result: Among the 100 patients enrolled in our study, 64 were male and 36 were female. Of the male patients, 49 were diagnosed with acute appendicitis, while 25 of the female patients were diagnosed with the same condition through USG. Additionally, 2 males and 2 females were found to have appendicular masses on USG. The age range of the patients varied from 3 to 67 years, with the majority falling within the 11-20-year range. Utilizing the Alvarado value (considering values above 5 as indicative of appendicitis), 73% of the patients were deemed likely to have appendicitis. On USG, 74 patients were diagnosed with acute appendicitis, with 73 of these cases being confirmed through histopathology. Furthermore, histopathological examination of all the removed appendix specimens revealed 76 cases of acute appendicitis. The sensitivity of USG in diagnosing acute appendicitis in our study was determined to be 96.05%, while the specificity was found to be 95.83%. The positive predictive value of our study was calculated to be 98.64%, with a negative predictive value of 88.46%. In terms of appendix position, the most common location observed in our study was retro-caecal (78.20%), followed by the pelvic region (16.66%).

Conclusion: Based on our findings, ultrasonography demonstrates a high level of sensitivity and specificity in the diagnosis of appendicitis, making it a suitable modality of choice whenever the appendix is identifiable. Computed tomography (CT) should be reserved for complex cases where the appendix cannot be visualized or when the presence or absence of perforation cannot be determined.

INTRODUCTION

One of the commonest causes of surgical emergencies and abdominal pain is acute appendicitis. Patients with appendicitis exhibit a wide range of clinical symptoms, which can resemble those of other diseases. Failure to diagnose it promptly and on time can lead to the rapid development of severe acute abdominal complications, including perforation, abscess formation, sepsis, bowel obstruction, and general peritonitis. Timely diagnosis is crucial in order to

minimize the associated morbidity and mortality. Consequently, surgeons have resorted to performing appendectomy even in cases where the diagnosis is only probable, resulting in an increased rate of removal of normal appendices. The classic presentation of a patient with appendicitis typically involves a specific sequence of symptoms, starting with poorly localized periumbilical pain, followed by nausea and vomiting, and eventually culminating in pain localized to the right lower quadrant. However, this classic presentation is observed in only 50%-60% of patients, and the diagnosis may be overlooked or

delayed when atypical patterns of the disease are encountered. Adopting a wait-and-see approach can heighten the risk of complications. Ultrasonography, utilizing graded compression, represents an accurate, non-invasive, and readily available imaging technique for diagnosing acute appendicitis without the use of ionizing radiation. The location of the appendix, which can vary between retrocecal, subcecal, retroileal, preileal, or pelvic sites, can significantly influence the clinical presentation in patients with appendicitis.^[1-3]

The primary objective of our study is to determine the sensitivity and specificity of ultrasonography in identifying acute appendicitis, as well as its role in guiding therapeutic management.

MATERIALS AND METHODS

A prospective study was conducted at Bhagwan Mahavir Institute of Medical Sciences, Pawapuri, in the departments of general surgery and Radiodiagnosis. The study, which was approved by the institutional research and ethical committee, spanned from October 2019 to October 2020 and included 100 patients who presented with symptoms suggestive of acute appendicitis.

Patients who underwent appendectomy and histopathological examination of the specimen were included in the study, while obese individuals and those with imaging difficulties were excluded. Ultrasonography was performed in the supine and left lateral oblique positions using graded compression technique. Diagnosis of acute appendicitis was based on specific abnormalities observed during the ultrasound, including lack of compressibility, parietal thickness greater than 3mm and outer-to-outer diameter greater than 7mm, loss of normal parietal stratification, hyperechoic periappendiceal fat, abscess collection in the appendix, and periappendiceal fluid collection. The study also calculated the Alvarado number using the obtained data.^[4-10]

RESULTS

In our study, a total of one hundred patients exhibiting symptoms suggestive of acute appendicitis were included. The main reason for visiting OPD is shown in [Table 1].

The Spectrum of diseases mimicking acute appendicitis is shown in [Table 2].

Out of these patients, sixty-four were male, with forty-nine of them being diagnosed with acute appendicitis through the use of ultrasonography (USG). On the other hand, thirty-six patients were female, and twenty-five of them were diagnosed with acute appendicitis through USG. Additionally, two males and two females were found to have appendicular mass through USG. [Table 3]

The age range of the patients varied, with the maximum age recorded as sixty-seven years and the minimum age as three years. Notably, the majority of patients fell within the age range of eleven to twenty years.

To determine the possibility of appendicitis, the Alvarado number was calculated using the formula provided in our methods. The highest Alvarado number obtained was nine, while the lowest was zero. Patients with an Alvarado value greater than five were considered to have appendicitis, while those with a value less than five were deemed to be without risk.

Based on this classification, it was found that approximately seventy-three percent of the patients were likely to have appendicitis.

In our study, a total of 100 cases were examined. Out of these, 74 cases were sonographically positive for acute appendicitis, while 26 cases were sonographically negative. Among the positive cases, 73 were confirmed to have acute appendicitis on histopathology. Interestingly, on histopathological examination of all the removed appendix specimens, 76 were diagnosed as acute appendicitis.

It is worth noting that there were a few discrepancies in our findings. Three cases were falsely diagnosed as negative on sonography, while one case was falsely diagnosed as positive. This indicates a sensitivity of 96.05% and a specificity of 95.83% for sonography in diagnosing acute appendicitis in our study. [Table 4]

Furthermore, the positive predictive value of our study was found to be 98.64%, indicating a high likelihood of a positive sonographic diagnosis being accurate. On the other hand, the negative predictive value was determined to be 88.46%, suggesting a relatively lower probability of a negative sonographic diagnosis being accurate.

Additionally, our study revealed some interesting insights regarding the position of the appendix. The most common position observed was retro-caecal, accounting for 78.20% of cases, followed by the pelvic position, which accounted for 16.66% of cases. [Table 5]

Table 1: Spectrum of Complaints

Reason for visiting hospital	n	%
Right lower quadrant tenderness	85	85
Rebound tenderness	41	41
Fever	22	22
Loss of appetite	53	53
Nausea, vomiting	78	78
Shift in pain	42	42
Leukocytosis	79	79
Left shift	76	76

Table 2: Spectrum of diseases mimicking acute appendicitis in our study.

Disease	Males	Females	Total
Acute Appendicitis	49	25	74
Appendicular Mass	2	2	4
RT. Acute Pyelonephritis	-	1	1
RT. Ureteric Calculus	3	-	3
PID	-	2	2
Twisted Ovarian Cyst	-	2	2
ILEO-CaecalTB	1	2	3
CA Caecum	3	-	3
NAD	6	2	8
Total	64	36	100

Table 3: Sex incidence of acute appendicitis and appendicular mass in our study.

Disease	Males	Females	Total
Acute Appendicitis	49	25	74
Appendicular Mass	2	2	4

Table 4: Spectrum of appendicitis and diseases mimicking acute appendicitis in our study.

Sonographic Diagnosis	Patients With Disease	Patients Without Disease
Positive	73	1
Negative	23	3

Table 5: Percentage of position of appendix in our study

Position of Appendix	No. of Cases	Percentage%
Retro-caecal	61	78.20
pelvic	13	16.66
Subcaecal	1	1.28
Pre ileal	1	1.28
Post ileal	1	1.28
subhepatic	1	1.28
Total	78	100

Overall, our study provides valuable information regarding the accuracy and predictive values of sonography in diagnosing acute appendicitis. These findings can contribute to the improvement of diagnostic practices and patient care in the future.

DISCUSSION

Our study included a cohort of one hundred patients who presented with symptoms suggestive of appendicitis. These individuals underwent an ultrasound examination (USG) and subsequently underwent an appendectomy. The removed appendiceal specimens were then subjected to histopathological examination. The Alvarado score was calculated based on the available data, with the maximum score obtained being 9 and the minimum score being 0. Based on this scoring system, 73% of the patients were suspected to likely have appendicitis.

The USG examinations were performed using a graded compression technique. In our study, out of the 74 cases diagnosed as acute appendicitis on USG, 73 cases were confirmed on histopathology. However, there were 3 cases that were false negative and 1 case that was false positive on USG.

The sensitivity of USG in diagnosing acute appendicitis in our study was found to be 96.05%, which is comparable to the findings of Harshada M. Joshi et al and RB Jeffrey et al. The specificity of USG was determined to be 95.83%, which is also

comparable to the results reported by RB Jeffrey et al and Monzer et al.

The positive predictive value of our study was calculated to be 98.64%, indicating a high likelihood of true positive results. On the other hand, the negative predictive value was determined to be 88.46%, suggesting a relatively lower accuracy in ruling out appendicitis.

In terms of the position of the appendix, our study found that the most common location was retro-caecal, accounting for 78.20% of cases. This percentage was higher than that reported in the study conducted by Wakeley. The second most common position was pelvic, which accounted for 16.66% of cases and was lower compared to the findings of the study by Wakeley.^[10]

CONCLUSION

Ultrasound is a highly sensitive and specific diagnostic tool for identifying appendicitis, making it the preferred modality for diagnosis when the appendix is detected. Clinical findings should be taken into consideration when deciding whether to perform an appendectomy or pursue conservative treatment. In cases where the appendix cannot be identified or the presence of perforation cannot be determined with ultrasound, CT should be reserved for complicated cases. Histopathology remains the gold standard for diagnosis.

REFERENCES

1. Rumack C. Diagnostic ultrasound. 5th ed. St. Louis: Elsevier Mosby, 2018.
2. Appendicitis: Practice Essentials, Background, Anatomy [Internet]. Emedicine.medscape.com. 2018
3. Baert A. Encyclopedia of diagnostic imaging. Berlin: Springer, 2008.
4. Lee J, Jeong Y, Hwang J, Ham S, Yang S. Graded Compression Sonography with Adjuvant Use of a Posterior Manual Compression Technique in the Sonographic Diagnosis of Acute Appendicitis. American Journal of Roentgenology. 2002;178(4):863-868.
5. E Yacoe, M & B Jeffrey, R. Sonography of appendicitis and diverticulitis. Radiologic clinics of North America 1994; 32:899-912.
6. Summa M, Perrone F, Piora F, Testa S, Quarati R, Spinoglio G. Integrated clinical-ultrasonographic diagnosis in acute appendicitis. Journal of Ultrasound. 2007;10(4):175-178.
7. Noguchi T, Yoshimitsu K, Yoshida M. Periappendiceal Hyperechoic Structure on Sonography. Journal of Ultrasound in Medicine. 2005;24(3):323-327.
8. Her JW, Hwang JS, Ahn SH, Park SK, Kim H. Epigastric Appendiceal Abscess with Spontaneous Drainage into the Stomach. The Korean Journal of Internal Medicine. 1999; 14(2):82-85.
9. Puylaert J. Ultrasonography of the acute abdomen. Radiologic Clinics of North America. 2003;41(6):1227-1242.
10. Wakeley CPG. The Position of the Vermiform Appendix as Ascertained by an Analysis of 10,000 Cases. Journal of Anatomy. 1933;67(Pt 2):277-283.