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Prospective Study to Know Sensitivity & Specificity of Ultrasound Establishing the Status of Appendix in Clinically Suspected Acute Appendicitis & Its Correlation with Intra-Operative Findings

Venkata Teja Guddati[1*] & Praveen Agrawal[1]

[1]Department of General Surgery, Kanti Devi Medical College Hospital and Research Centre, Mathura, India

HIGHLIGHTS

- USG predicts severity
- High negative predictive value
- Diameter predicts complications
- USG matches operative findings
- Reliable preoperative assessment

Key Words:
Acute Appendicitis
Ultrasonography
Intra-operative Findings
Sensitivity
Specificity
Diagnostic Accuracy

ABSTRACT

Introduction: Acute appendicitis is a common surgical emergency. Imaging, particularly ultrasound (USG), plays a crucial diagnostic role, but its accuracy in predicting intra-operative findings requires further validation in local populations. **Aims & Objectives:** The aim was to determine the sensitivity and specificity of USG in establishing appendiceal status in suspected acute appendicitis and correlate it with intra-operative findings. Objectives included studying clinical, USG, and intra-operative findings. **Materials & Methods:** An interventional prospective study was conducted on 87 adult patients with suspected acute appendicitis at a tertiary hospital. All underwent clinical evaluation, Alvarado scoring, abdominal USG, and subsequent surgery (laparoscopic or open). Intra-operative findings were recorded. Statistical analysis was performed using SPSS version 26. **Results:** The mean age was 35.54±13.70 years, with male predominance (60.92%). Retrocecal was the most common appendiceal position on USG (37.93%) and intra-operatively (27.59%). Complicated appendicitis (gangrenous/perforated) was found in 27.59% of cases. USG findings of free fluid and peri-appendiceal collection showed high specificity (77.78%) and negative predictive value (92.45%) for complicated disease, with a significant association ($p<0.001$). Appendiceal diameter >6mm was significantly associated with complicated pathology ($p<0.001$). USG findings also correlated significantly with higher Alvarado scores, open surgery, and postoperative complications. **Conclusion:** USG is a valuable, non-invasive tool with good diagnostic performance, particularly its negative predictive value for ruling out complicated appendicitis. It correlates well with intra-operative severity, surgical approach, and postoperative outcomes, supporting its integral role in preoperative assessment.

*** Corresponding Author:** Venkata Teja Guddati, e-mail: venkattejanaidu@gmail.com
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INTRODUCTION

Acute appendicitis is one of the most common surgical emergencies worldwide and results from inflammation of the vermiform appendix, usually following obstruction of its lumen by fecaliths, lymphoid hyperplasia, foreign bodies, or, less commonly, neoplasms. Luminal obstruction leads to increased intraluminal pressure, bacterial proliferation, venous congestion, ischemia, and progressive inflammation, which may ultimately result in gangrene or perforation if left untreated. Since the appendix is located deep within the abdominal cavity, early clinical manifestations are often nonspecific, making prompt diagnosis challenging. Delayed recognition significantly increases the risk of complications such as perforation, peritonitis, intra-abdominal abscess, sepsis, prolonged hospitalization, and mortality. Therefore, timely diagnosis and intervention remain crucial for reducing morbidity and improving patient outcomes [1].

Globally, acute appendicitis accounts for nearly 17 million new cases annually, with an age-standardized incidence of approximately 200–250 cases per 100,000 population. Considerable geographic variation exists, with the highest incidence reported in developed regions such as the high-income Asia-Pacific countries and comparatively lower rates in sub-Saharan Africa. The disease predominantly affects adolescents and young adults, with a slight male predominance observed across most populations. In India, epidemiological studies have similarly reported the highest incidence among individuals aged 11–30 years. Besides its clinical burden, appendicitis imposes a significant economic burden due to emergency admissions, surgical intervention, diagnostic investigations, hospital stay, and postoperative care. Delayed diagnosis in resource-limited settings further contributes to increased healthcare costs and adverse outcomes [2,3].

Clinical diagnosis of acute appendicitis primarily relies on a detailed history, physical examination, and laboratory investigations. Classically, patients present with migratory abdominal pain beginning in the periumbilical region and localizing to the right iliac fossa, accompanied by anorexia, nausea, vomiting, and low-grade fever. Examination typically reveals tenderness at McBurney's point, guarding, rebound tenderness, and occasionally positive Rovsing's, psoas, or obturator signs depending on the anatomical location of the appendix. Laboratory findings frequently demonstrate leukocytosis and neutrophilia. To improve diagnostic accuracy, clinical scoring systems such as the Alvarado and RIPASA scores have been developed. While both are valuable diagnostic aids, several studies have demonstrated superior sensitivity and overall diagnostic accuracy of the RIPASA score, particularly in Asian populations. Nevertheless, clinical scoring systems should complement rather than replace comprehensive clinical assessment because atypical presentations, especially among children, pregnant women, elderly patients, and obese individuals, often reduce diagnostic reliability [4,5].

Imaging plays an indispensable role when clinical findings are equivocal. Ultrasonography (USG) is generally recommended as the initial imaging modality because it is non-invasive,

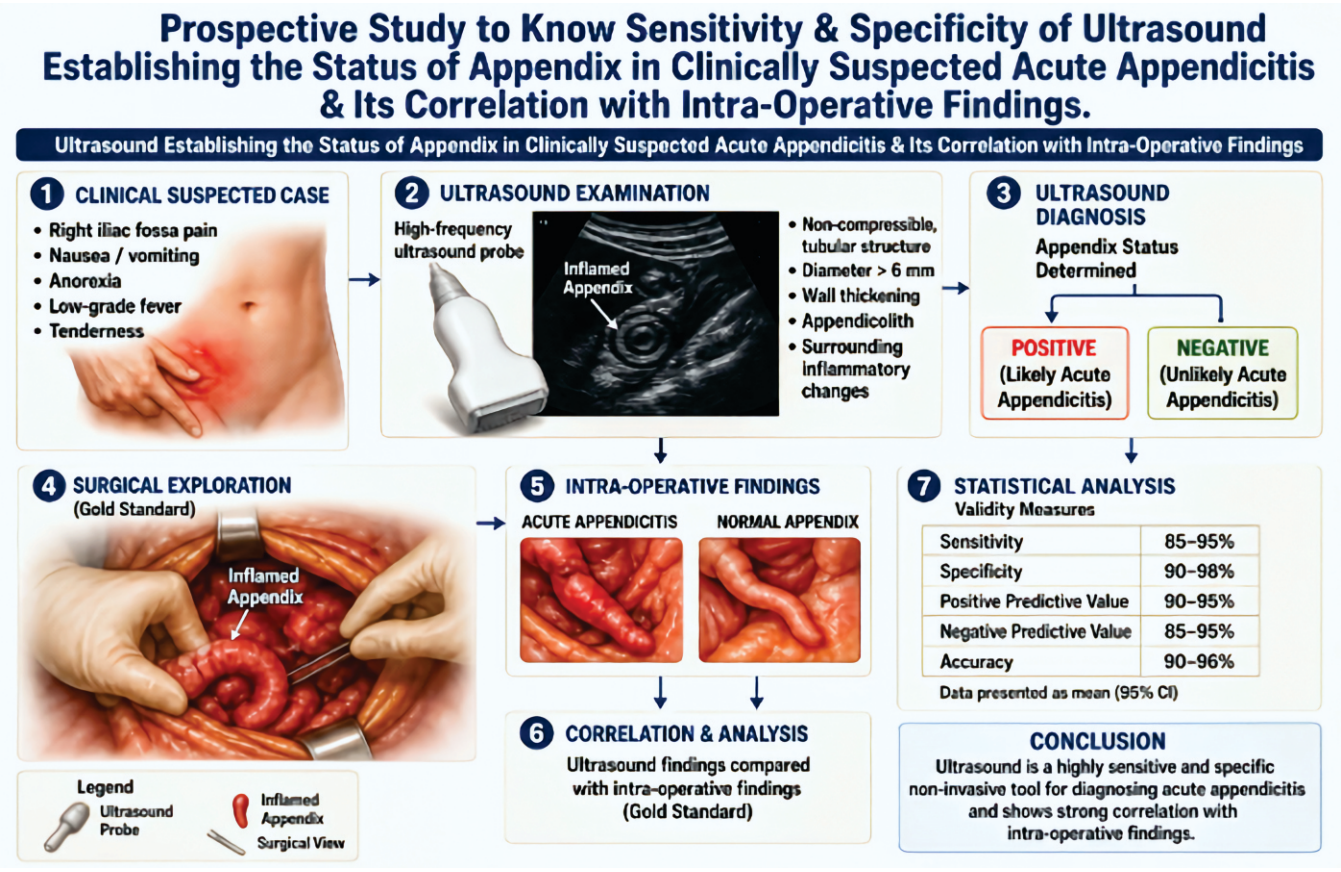

Figure 1: Diagnostic workflow for ultrasound assessment of acute appendicitis.

inexpensive, readily available, and free from ionizing radiation making it particularly suitable for children and pregnant women.However, its diagnostic accuracy depends greatly on operator expertise and patient-related factors such as obesity and excessive bowel gas. Computed tomography (CT) offers higher sensitivity and specificity, frequently exceeding 90%, and provides excellent visualization of appendiceal pathology and associated complications. Despite its superior accuracy, CT exposes patients to ionizing radiation and requires intravenous contrast in many cases. Magnetic resonance imaging (MRI) provides diagnostic accuracy comparable to CT without radiation exposure but is more expensive, less accessible, and time-consuming. Consequently, current practice generally recommends a stepwise imaging approach, utilizing ultrasonography initially and reserving CT or MRI for inconclusive cases [6,7]. Ultrasonography remains a valuable first-line investigation because it not only establishes the diagnosis but also provides important information regarding disease severity. The graded compression technique is the standard examination method, enabling improved visualization of the inflamed appendix. Characteristic sonographic findings include a blind-ending, non-compressible tubular structure with an outer diameter greater than 6 mm, wall thickening, luminal fluid, appendicolith, peri-appendiceal fat inflammation, free fluid, & increased vascularity on Doppler examination. Secondary findings such as peri-appendiceal collection and disruption of wall stratification may indicate perforation or gangrenous appendicitis. Nevertheless, ultrasonography has limitations, including reduced visualization in retrocecal or pelvic appendices, obesity, excessive bowel gas, and perforated appendicitis, necessitating additional imaging in selected patients [8,9]. Correlation between preoperative ultrasonographic findings & intraoperative observations remains essential for assessing the diagnostic performance of imaging. Surgical and histopathological findings continue to represent the gold standard for confirming appendicitis and determining disease severity. Comparative studies have demonstrated that ultrasonography possesses good sensitivity and specificity, although false-negative examinations may occur, particularly in complicated or atypically located appendicitis. The integration of clinical assessment with imaging has significantly reduced negative appendectomy rates while improving identification of complicated disease. Evaluating diagnostic indices such as sensitivity, specificity, positive predictive value, and negative predictive value enables clinicians to optimize surgical decision-making, minimize unnecessary operations, and ensure timely intervention for patients with true appendicitis [10,11]. The **Figure 1** depicts key ultrasound diagnosis and intraoperative correlation in acute appendicitis. The present study aims to evaluate the sensitivity and specificity of ultrasonography in establishing the status of the appendix in clinically suspected cases of acute appendicitis and to correlate these findings with intra-operative outcomes. The objectives are to assess the clinical presentation of acute appendicitis, analyze the ultrasonographic features of the appendix in such cases, and compare them with intra-operative findings to determine diagnostic accuracy and reliability in guiding surgical decision-making.

MATERIALS & METHODS

This prospective observational study was conducted at the Department of General Surgery and the Department of Radiodiagnosis, K.D. Medical College and Hospital (KDMCH). Ethical approval has been obtained from the Ethical Approval Committee of K.D. Medical College and Hospital (KDMCH).

Study Population

The study population comprised adult patients aged over 18 years presenting to the Outpatient or Emergency Department of KDMCH with clinical features suggestive of acute appendicitis who underwent ultrasound examination followed by open or laparoscopic appendectomy. Patients with appendicitis managed surgically were included, while pediatric patients, pregnant females, individuals with inflammatory bowel disease, hemodynamically unstable patients, and those unwilling to provide informed consent were excluded from the study.

Data Analysis

Data were entered into Microsoft Excel and analyzed using SPSS version 26. Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies & percentages. Associations between ultrasonographic and intraoperative findings were assessed using the Chi-square test. Diagnostic performance of ultrasonography was evaluated by calculating sensitivity, specificity, positive predictive value, negative predictive value, and accuracy. A p-value of <0.05 was considered statistically significant.

RESULTS

A total of 87 patients with clinically suspected acute appendicitis were included in the study. The mean age was 35.54 ± 13.70 years (range: 18–72 years), with a median age of 31 years, indicating a predominantly young adult population. Males constituted 60.92% of participants, while 58.62% belonged to rural areas. Private-sector employees formed the largest occupational group (34.48%), followed by students and housewives (24.14% each). Most patients presented within 6–24 hours (34.48%) or 24–48 hours (27.59%) of pain onset. Nausea (68.97%) and fever (62.07%) were common associated symptoms, whereas probe tenderness was present in all patients (100%). The mean total leukocyte count was 13,595.28 ± 4,016.53 cells/mm^3, indicating significant inflammatory response. Based on the Alvarado score, 56.32% of patients were classified as intermediate risk, 26.44% as low risk, and 16.09% as high risk, emphasizing the need for adjunctive imaging in most cases. Ultrasonography demonstrated a mean maximum appendiceal diameter of 8.89 ± 2.91 mm (range: 2.9–15.2 mm),

with most patients exhibiting diameters above the diagnostic threshold of 6 mm, supporting the usefulness ofultrasonography in the evaluation of suspected acute appendicitis. Among 87 patients, ultrasonography demonstrated free fluid in 39.08%, with the retrocecal appendix being the most common position on both ultrasonography (37.93%) and intra-operatively (27.59%). Most appendices were inflamed (66.67%), peri-appendiceal collection was present in 39.08% of cases, and laparoscopic appendectomy was the predominant surgical approach (67.82%) **(Table 1)**.

The mean operative time was 66.52 ± 25.11 minutes, ranging from 26 to 118 minutes, with a median duration of 67 minutes. Most appendectomies were completed within approximately 40–80 minutes, while a smaller proportion of patients required longer operative times, likely reflecting increased disease severity, complicated appendicitis, difficult appendiceal location, or the need for open surgical intervention.

Overall, the findings indicate that operative duration was generally within the expected range, with variability influenced by intraoperative complexity and surgical approach. Most patients (87.36%) had no postoperative complications, while ileus (5.75%), wound infection (4.60%), and intra-abdominal abscess (2.30%) occurred infrequently, indicating favorable postoperative outcomes **(Table 2)**.

The mean duration of hospital stay was 3.66 ± 2.06 days (range: 2–10 days), with a median of 3 days, indicating that most patients experienced an uncomplicated postoperative recovery requiring short hospitalization, while a small proportion had prolonged stays due to complicated appendicitis or post-operative complications. Intraoperative assessment revealed uncomplicated appendicitis in 63 patients (72.41%) and complicated appendicitis, including gangrenous and perforated cases, in 24 patients (27.59%).

Although the proportion of complicated appendicitis increased progressively from the low-risk (13.04%) to intermediate-risk (32.65%) and high-risk (35.71%) Alvarado categories, this association was not statistically significant ($\chi^2 = 3.91$, $p = 0.27$), indicating that the Alvarado score alone was not a reliable predictor of intraoperative disease severity. In contrast, ultrasonographic findings showed a strong correlation with operative findings. Patients with ultrasonographic free fluid demonstrated a significantly higher incidence of complicated appendicitis (58.82%) compared with those without free fluid (7.55%) ($\chi^2 = 26.84$, $p < 0.0001$).

Similarly, peri-appendiceal collection was present in 58.82% of patients with complicated appendicitis but in only 7.55% of those with uncomplicated appendicitis, indicating a highly significant association with disease severity ($\chi^2 = 26.84$, $p < 0.0001$).

These findings indicate that ultrasonographic free fluid and peri-appendiceal collection are valuable predictors of complicated appendicitis and provide superior prognostic information compared with the Alvarado risk score alone. Ultrasonography and intra-operative findings showed good agreement for retrocecal and pelvic appendiceal positions. However, USG overestimated retrocecal cases & underesti-mated subcaecal, pre-ileal, and paracaecal positions, indicating limited accuracy for less common anatomical locations **(Table 3)**.

A significant association was found between the type of surgery and intra-operative disease severity ($\chi^2 = 8.12$, $p = 0.004$). Laparoscopic appendectomy was predominantly performed in uncomplicated cases (49/63), whereas open appendectomy was more common in complicated appendicitis (14/24), reflecting surgical preference based on disease severity **(Table 4)**.

A highly significant association was observed between intra-operative disease severity and postoperative complications ($\chi^2 = 13.84$, $p < 0.001$). Complications occurred more frequently in complicated appendicitis (33.33%) than in uncomplicated cases (4.76%), indicating that advanced intra-operative pathology strongly predicts adverse postoperative outcomes **(Figure 2)**. USG free fluid showed 83.33% sensitivity, 77.78% specificity, 58.82% PPV, 92.45% NPV, and 79.31% accuracy for detecting complicated appendicitis, but its ROC performance was limited (AUC = 0.52), indicating poor standalone discriminatory ability. Peri-appendiceal collection demonstrated similar diagnostic performance (83.33% sensitivity, 77.78% specificity, 79.31% accuracy), while combining free fluid and peri-appendiceal collection improved the ROC performance (AUC = 0.62), suggesting better predictive value than individual USG parameters **(Table 5)**.

A highly significant association was found between ultrasono--graphic appendiceal diameter and intra-operative disease severity ($p < 0.001$). All patients with an appendiceal diameter ≤6 mm had uncomplicated appendicitis, while a diameter >6 mm was significantly associated with complicated disease (34.29%), supporting its value as a marker of disease severity **(Table 6)**.

Ultrasonography & intra-operative findings showed comparable distributions of appendiceal position, with the retrocecal location being the most common in both modalities, although USG underestimated some less common positions. The difference was not statistically significant ($\chi^2 = 4.71$, $p = 0.58$), indicating good overall agreement between USG and surgical findings **(Figure 3)**. Ultrasonographic free fluid and peri-appendiceal collection showed significant associations with higher Alvarado risk category, open appendectomy, and post-operative complications (all $p \leq 0.002$), whereas appendiceal diameter >6 mm was not significantly associated with Alvarado risk category ($p = 0.065$) **(Table 7)**.

Table 1: Summary of Ultrasonographic and Intra-operative Findings (n = 87)

Parameter	Category	Frequency (n)	Percentage (%)
Ultrasonographic Free Fluid	Present	34	39.08
	Absent	53	60.92
Ultrasonographic Position of Appendix	Retrocecal	33	37.93
	Pelvic	15	17.24
	Post-ileal	11	12.64
	Subcaecal	10	11.49
	Pre-ileal	7	8.05
	Paracaecal	6	6.90
	Other positions	5	5.75
Intra-operative Position of Appendix	Retrocecal	24	27.59
	Subcaecal	17	19.54
	Pelvic	14	16.09
	Pre-ileal	10	11.49
	Post-ileal	9	10.34
	Paracaecal	9	10.34
	Other positions	4	4.60
Intra-operative Changes of Appendix	Inflamed	58	66.67
	Gangrenous	16	18.39
	Perforated	8	9.20
	Normal/Edematous	5	5.75
Peri-appendiceal Collection	Present	34	39.08
	Absent	53	60.92
Type of Surgery Performed	Laparoscopic appendectomy	59	67.82
	Open appendectomy	28	32.18

Table 2: Postoperative Complications

Postoperative Complication	Frequency (n)	Percentage (%)
None	76	87.36
Ileus	5	5.75
Wound infection	4	4.6
Intra-abdominal abscess	2	2.3
Total	**87**	**100**

Table 3: Comparison of USG Position and Intra-operative Position of Appendix

Position	USG n (%)	Intra-operative n (%)
Retrocecal	33 (37.93)	24 (27.59)
Pelvic	15 (17.24)	14 (16.09)
Subcaecal	10 (11.49)	17 (19.54)
Post-ileal	11 (12.64)	9 (10.34)
Pre-ileal	7 (8.05)	10 (11.49)
Paracaecal	6 (6.90)	9 (10.34)
Other	5 (5.75)	4 (4.60)

Table 4: Type of Surgery in Relation to Intra-operative Findings

Intra-operative Finding	Laparoscopic n (%)	Open n (%)	Total
Uncomplicated	49	14	63
Complicated	10	14	24
Total	**59**	**28**	**87**
$\chi^2 = 8.12$, p = 0.004			

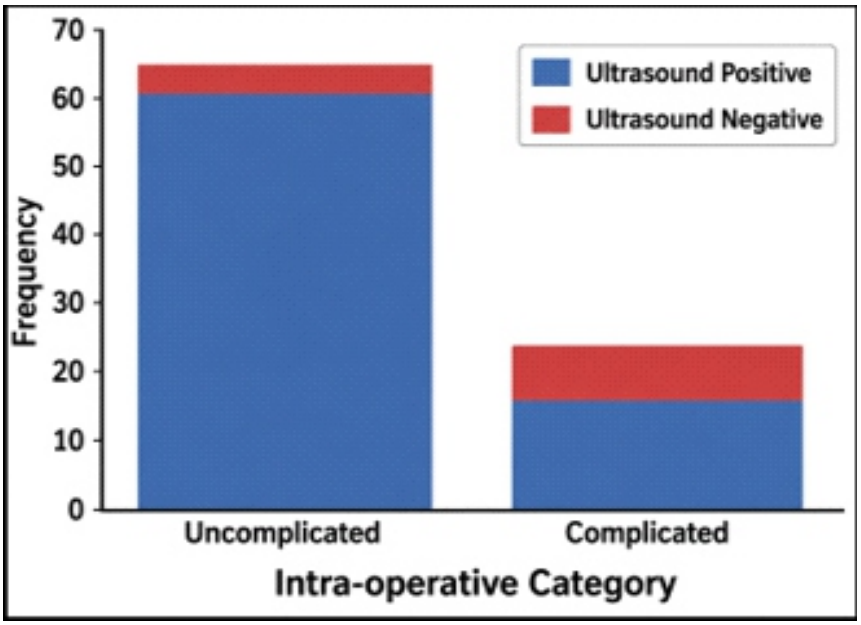

Figure 2: Postoperative Complications vs Intra-operative Findings (n = 87)

Table 5: Diagnostic Performance of Ultrasonographic Predictors for Detecting Complicated Appendicitis (n = 87)

Diagnostic Measure	USG Free Fluid	Combined USG Predictor (Free Fluid + Peri - appendiceal Collection)
Sensitivity (%)	83.33	83.33
Specificity (%)	77.78	77.78
Positive Predictive Value (PPV) (%)	58.82	58.82
Negative Predictive Value (NPV) (%)	92.45	92.45
Overall Accuracy (%)	79.31	79.31
ROC–AUC	0.52	0.62

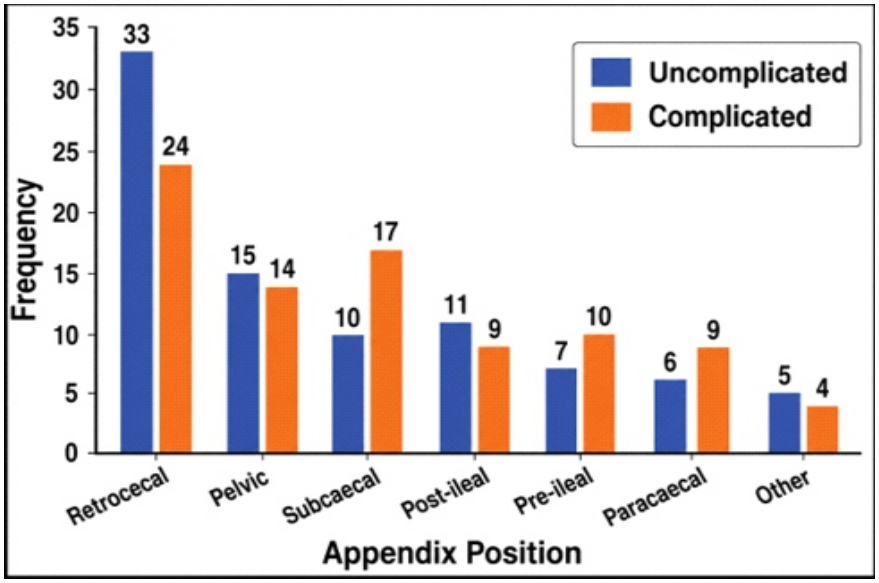

Figure 3: USG Position vs Intra-operative Position of Appendix

Table 6: USG Appendiceal Diameter vs Intra-operative Findings

Appendiceal Diameter	Uncomplicated n (%)	Complicated n (%)	Total
≤ 6 mm	17 (100)	0 (0)	17
> 6 mm	46 (65.71)	24 (34.29)	70
Total	**63**	**24**	**87**
p-value < 0.001			

Table 7: Association of Ultrasonographic Findings with Clinical Outcomes and Surgical Management (n = 87)

Outcome	USG Finding	Category/Status	n (%)	p-value
Alvarado Risk Category	Free fluid present	Low risk	3 (13.04)	<0.001
		Intermediate risk	19 (38.78)	
		High risk	12 (85.71)	
	Peri-appendiceal collection present	Low risk	3 (13.04)	<0.001
		Intermediate risk	19 (38.78)	
		High risk	12 (85.71)	
	Appendix diameter >6 mm	Low risk	15 (65.22)	0.065
		Intermediate risk	43 (87.76)	
		High risk	12 (85.71)	
Type of Surgery	Free fluid present	Laparoscopic	16 (27.12)	0.002
		Open	18 (64.29)	
	Peri-appendiceal collection present	Laparoscopic	16 (27.12)	0.002
		Open	18 (64.29)	
Postoperative Complications	Free fluid present	Complication	9 (26.47)	<0.001
		No complication	25 (73.53)	
	Free fluid absent	Complication	2 (3.77)	—
		No complication	51 (96.23)	
	Peri-appendiceal collection present	Complication	9 (26.47)	<0.001
		No complication	25 (73.53)	

DISCUSSION

Acute appendicitis is one of the most common causes of acute abdominal pain requiring emergency surgical intervention. It results from inflammation of the vermiform appendix, most commonly following luminal obstruction by fecoliths or lymphoid hyperplasia, leading to bacterial overgrowth, vascular compromise, ischemia, & if untreated, gangrene or perforation. Early diagnosis remains challenging because initial symptoms are often nonspecific, yet delayed management substantially increases the risk of perforation, peritonitis, sepsis, prolonged hospitalization, and mortality. Consequently, prompt recognition and appropriate intervention are essential to minimize morbidity and improve patient outcomes. The disease predominantly affects adolescents and young adults, with a slight male predominance reported globally, & continues to impose a considerable clinical & economic burden on healthcare systems because of emergency admissions, surgical treatment, diagnostic imaging, and postoperative care [12,13].

Clinical diagnosis continues to rely on a combination of patient history, physical examination, and laboratory investigations. Typical manifestations include migratory abdominal pain to the right iliac fossa, anorexia, nausea, vomiting, fever, localized tenderness, guarding, and leukocytosis. Clinical scoring systems such as the Alvarado and RIPASA scores improve diagnostic consistency by integrating symptoms, clinical findings, and laboratory parameters. However, these scoring systems are not sufficiently accurate to differentiate uncomplicated from complicated appendicitis, particularly in patients with atypical presentations. Therefore, imaging has become an indispensable adjunct to clinical evaluation, especially in patients with equivocal clinical findings [14,15].

The present study evaluated 87 adult patients with clinically suspected acute appendicitis and demonstrated demographic characteristics consistent with previous epidemiological reports. Most patients belonged to the younger adult age group, with a predominance of males and individuals from rural backgrounds, findings that agree with studies by **Guan L, et. al; 2023** and **Echevarria S, et. al; 2023**. Most patients presented within 6–48 hours after symptom onset, allowing timely diagnosis and surgical management. Right iliac fossa tenderness was universally present, while nausea, fever, vomiting, and leukocytosis were common accompanying findings, supporting previous observations that these clinical features remain valuable indicators of appendiceal inflammation [16,17].

More than half of the patients in the present study belonged to the intermediate-risk Alvarado category, emphasizing the diagnostic uncertainty frequently encountered in routine clinical practice. **Noori IF, et. al; 2023,** supported the previous evidence recommending adjunctive imaging for patients with equivocal clinical scores. Ultrasonography demonstrated a mean appendiceal diameter exceeding the accepted diagnostic threshold of 6 mm, while free intraperitoneal fluid was identified in a considerable proportion of patients, suggested more advanced inflammatory disease. These observations correspond closely with previous reports emphasized the importance of ultrasonographic assessment in improving diagnostic confidence beyond clinical scoring systems alone [18].

Ultrasonography successfully identified the appendix in most patients, with the retrocecal position being the most frequently observed anatomical location, consistent with published literature. Intraoperative findings predominantly revealed uncomplicated acute appendicitis, although gangrenous and perforated appendicitis were also encountered, reflecting delayed or advanced disease. The presence of peri-appendiceal collection in nearly two-fifths of patients indicated severe inflammation and correlated well with operative findings. Laparoscopic appendectomy remained the preferred surgical approach in most cases, whereas open surgery was more frequently required in complicated appendicitis. The average operative duration reflected efficient surgical management facilitated by appropriate preoperative imaging assessment [19,20].

Postoperative outcomes were favorable, with most patients experiencing an uncomplicated recovery and a relatively short hospital stay. Although patients with higher Alvarado scores tended to demonstrate more severe disease, the association between clinical score and intraoperative severity was not statistically significant**. Ingraham AM, et. al; 2010** and **Kularatna M, et. al; 2017** and **Haak F, et. al; 2022,** reported indicated that the Alvarado score is useful for diagnosing appendicitis but has limited ability to predict disease severity or postoperative complications [21-23].

The most important finding of the present study was the strong association between ultrasonographic markers and complicated appendicitis. Peri-appendiceal free fluid and collection showed significant correlations with gangrenous or perforated appendicitis, greater need for open surgery, and increased postoperative complications. Similarly, an appendiceal diameter greater than 6 mm was significantly associated with complicated disease, whereas appendiceal position showed no significant relationship with disease severity. **Haak F, et. al; 2022** and **Cvejić S, et. al; 2024,** demonstrated that secondary ultrasonographic features provide greater prognostic value than clinical scoring systems alone and are highly effective for identifying patients at increased surgical risk [23,24].

Overall, the findings confirm that ultrasonography is not merely a diagnostic modality but also an important prognostic tool in acute appendicitis. When interpreted alongside clinical assessment, ultrasonographic parameters such as appendiceal diameter, peri-appendiceal free fluid, and collection significantly improve preoperative risk stratification, facilitate selection of the appropriate surgical approach, and help predict postoperative outcomes. These observations are consistent with recent evidence showing that combining clinical evaluation with targeted ultrasonographic markers provides superior diagnostic accuracy, reduces unnecessary appendectomies, and supports personalized, evidence-based surgical decision-making in patients with suspected acute appendicitis [24,25].

CONCLUSION

This prospective study of 87 patients demonstrated that abdominal ultrasonography is a valuable first-line imaging modality for evaluating suspected acute appendicitis and predicting disease severity. Sonographic findings, including peri-appendiceal free fluid, collection, and appendiceal diameter greater than 6 mm, were significantly associated with complicated appendicitis, open surgery, and postoperative complications. Although the Alvarado score was useful for initial assessment, it poorly predicted disease severity. Integrating clinical evaluation with ultrasonographic findings improves preoperative planning, surgical decision-making, patient safety, and overall management outcomes.

opic evaluations of keratoderma [17].

LIMITATIONS & FUTURE PERSPECTIVES

The study was limited by its single-centre design, relatively small sample size, and short duration, which may restrict generalizability. Future research could focus on multicenter studies with larger cohorts to validate findings, evaluate long-term outcomes, and explore innovative diagnostic and management strategies for appendicular perforation, improving patient prognosis and reducing complications.

CLINICAL SIGNIFICANCE

The clinical significance of this study lies in its potential to bridge the gap between research findings and practical healthcare applications. It emphasizes the importance of translating scientific observations into meaningful improvements in patient care, diagnosis, and treatment outcomes. By highlighting realworld relevance, the study contributes to evidence-based medical practice and supports informed clinical decision-making. Ultimately, the findings aim to enhance patient quality of life, optimize therapeutic strategies, and promote better disease management in clinical settings.

ABBREVIATIONS

AA: Acute Appendicitis
USG: Ultrasonography
NPV: Negative Predictive Value
PPV: Positive Predictive Value
APP: Appendix

AUTHOR INFORMATION

Dr. Venkata Teja Guddati:
Dr. Praveen Agrawal:

AUTHOR CONTRIBUTIONS

All authors significantly contributed to the study conception and design, data acquisition, or data analysis and interpretation. They participated in drafting the manuscript or critically

revising it for important intellectual content, consented to its submission to the current journal, provided final approval for the version to be published, and accepted responsibility for all aspects of the work. Additionally, all authors meet the authorship criteria outlined by the International Committee of Medical Journal Editors (ICMJE) guidelines.

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CONFLICT OF INTEREST

Authors declared that there is no conflict of interest.

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None

ETHICAL APPROVAL & CONSENT TO PARTICIPATE

All necessary consent & approval was obtained by authors.

CONSENT FOR PUBLICATION

All necessary consent for publication was obtained by authors.

DATA AVAILABILITY

All data generated and analyzed are included within this research article. The datasets utilized and/or analyzed in this study can be obtained from the corresponding author upon a reasonable request.

USE OF ARTIFICIAL INTELLIGENCE (AI) & LARGE LANGUAGE MODEL (LLM)

The authors confirm that no AI & LLM tools were used in the writing or editing of the manuscript, and no images were altered or manipulated using AI & LLM.

AUTHOR'S NOTE

This article serves as an important educational tool for the scientific community, offering insights that may inspire future research directions. However, they should not be relied upon independently when making treatment decisions or developing public health policies.

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