



Original Article

Clinical profile and management outcome of acute appendicitis in paediatric population: a Retrospective study

Dr Suvarna M T¹, Dr Hanumanthappa B N², Dr Suresh U Kadli³

¹Assistant professor, Paediatrics, HIMS, Haveri, India

²Associate professor, General surgery, HIMS, Haveri, India

³Professor, General surgery, HIMS, Haveri, India

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Corresponding Author:

Dr Suvarna M T

Assistant Professor, Department
of Paediatrics, HIMS, Haveri,
Karnataka, India

Email: suvusuvarna@gmail.com

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ABSTRACT

Background: Acute appendicitis is the most common cause of emergency abdominal surgery in children. Early diagnosis and prompt surgical intervention are crucial to prevent complications such as perforation, peritonitis, and prolonged hospital stay. This study aimed to evaluate the clinical presentation, diagnostic findings, management, and outcomes of acute appendicitis in children aged 6–18 years.

Methods: A retrospective observational study was conducted among 60 children aged 6–18 years who underwent appendectomy for acute appendicitis at District hospital. Medical records were reviewed for demographic characteristics, presenting symptoms, duration of symptoms, physical examination findings, laboratory investigations, ultrasonography findings, operative findings, histopathological diagnosis, postoperative complications, length of hospital stay, and clinical outcomes. Data were analysed using descriptive statistics.

Results: A total of 60 children were included, with a predominance of males. Mean age: 13.47 ± 3.06 years. Abdominal pain was the most common presenting symptom (100%), followed by anorexia (76.7%), vomiting (73.3%) and fever (66.7%). Right iliac fossa tenderness was the most common sign (91.7%). Guarding present in 16.7% cases and TLC raised in 66.7% cases and ultrasonography was suggestive of Acute appendicitis in 50(83%) cases and appendicular perforation noted in 10(17%) cases Simple inflamed appendicitis(53%) was the most common intraoperative finding, while complicated appendicitis {perforation(20%), gangrene(13.3%), abscess(8.3%) and mass(5%)} was observed in 46.7% of patients. Operative findings showed a significant association with histopathological diagnosis. Most of patients (80%) had an uneventful postoperative recovery. Surgical site infection occurred in 20% of patients.

Conclusion: Acute appendicitis remains the most common paediatric surgical emergency. Clinical assessment, supported by laboratory investigations and ultrasonography, enables timely diagnosis and effective management. Early surgical intervention results in favourable outcomes with low postoperative morbidity.

Keywords: Acute appendicitis, Children, Paediatric surgery, Appendectomy, Retrospective study, Clinical profile, surgical outcomes.

INTRODUCTION

Acute appendicitis is a common surgical emergency in children, accounting for 1%-8% of all abdominal pain cases^{1,2}. Globally, the occurrence of acute appendicitis in the paediatric age group has been estimated to range between 100 and 151 cases per 100,000 person-years, although the incidence may vary across worldwide³. The disease is less common in infants and toddlers; however, when present in this age group, it is associated with a higher rate of perforation and postoperative morbidity. The classical presentation of per umbilical pain migrating to the right lower quadrant, accompanied by fever,

vomiting, and anorexia, is not always evident in paediatric patients, making clinical evaluation alone insufficient in many cases⁴. Due to the atypical clinical manifestations and poor communication ability of children, it is difficult to diagnose acute appendicitis. At present, the clinical diagnosis is mainly based on the results of medical history, physical examination, laboratory examination and imaging examination². Traditionally, appendicectomy has been considered the standard treatment for paediatric appendicitis. Both open and laparoscopic approaches are practiced, with laparoscopic appendectomy increasingly favoured due to reduced postoperative pain, shorter hospital stay, faster recovery, and better cosmetic outcomes. However, the choice of surgical approach often depends on patient factors, disease severity, surgeon expertise, and institutional facilities⁵. However, in recent years, non-operative management using antibiotics has gained attention as a potential alternative treatment option in selected patients with uncomplicated appendicitis⁶. Despite its prevalence, controversy continues regarding management strategies for appendicitis with continued emergence of newer surgical techniques, a recent interest in potential non-operative therapy as an alternative in select cases, and on-going debate about the best management for complicated appendicitis⁷. Postoperative outcomes such as surgical site infection, duration of hospital stay, intraabdominal collections, and overall morbidity are important indicators of the quality of care provided⁵.

Research Question

What are the clinical characteristics, diagnostic findings, management patterns, and outcomes of acute appendicitis among children aged 6–18 years?

Aim

To study the clinical profile and outcomes of acute appendicitis in children aged 6–18 years.

Objectives

Primary Objective

- To describe the clinical presentation of acute appendicitis in children aged 6–18 years.

Secondary Objectives

- To evaluate laboratory and ultrasonographic findings.
- To determine intraoperative findings.
- To correlate operative findings with histopathology.
- To assess postoperative complications.
- To determine duration of hospital stay.
- To estimate the proportion of complicated appendicitis.

MATERIAL AND METHODOLOGY

Study Design

Retrospective observational study.

Study Setting

Department of General Surgery, HIMS Hospital, Haveri

Study Duration

Medical records from January 2025 to December 2025

Study Population

Children aged 6–18 years diagnosed with acute appendicitis.

Sample Size

60 children

Inclusion Criteria

- Children aged 6–18 years
- Diagnosed with acute appendicitis
- Underwent appendicectomy
- Histopathology available
- Complete medical records

Exclusion Criteria

- Age below 6 years
- Age above 18 years
- Incidental appendicectomy
- Chronic appendicitis
- Incomplete medical records

- Patients managed conservatively

Methodology

A retrospective observational study was conducted among 60 children aged 6–18 years who underwent appendectomy for acute appendicitis at District hospital during January 2025 to December 2025. Medical records were reviewed for demographic characteristics, presenting symptoms, duration of symptoms, physical examination findings, laboratory investigations, ultrasonography findings, operative findings, histopathological diagnosis, postoperative complications, length of hospital stay, and clinical outcomes. Data were analysed using descriptive statistics.

Statistical Analysis

Data entered into Microsoft Excel and analysed using SPSS version 26.

Descriptive Statistics and Inferential Statistics like chi-square test, Fisher's exact test, and Student's t-test were used.

p-value <0.05 considered statistically significant

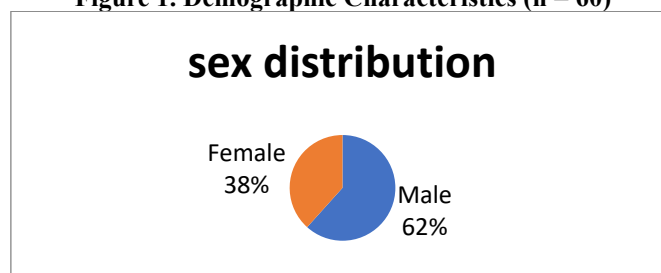
RESULTS

Table 1: Age Group Distribution(n=60)

Age Group (Years)	Number	Percentage (%)
6–8	3	5.0
9–11	15	25.0
12–14	15	25.0
15–18	27	45.0

Among 60 cases, Age ranges from 6-18years, were predominant age group was 15-18years, Mean age: 13.47 ± 3.06 years, Median age: 14 years. Acute appendicitis was more common among older children and adolescents, with 45% of cases occurring in the 15–18 year age group. Mean age of uncomplicated group is 13.81 years and complicated group is 13.07 years. There is very little difference in age between the two groups.

Figure 1. Demographic Characteristics (n = 60)



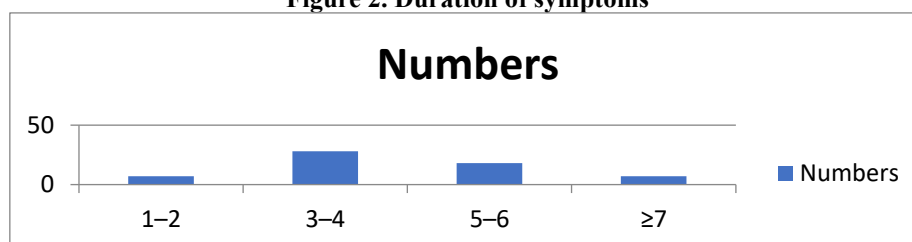
Among 60 cases, male (62%) were predominantly affected than female (38%), Male: Female ratio 1.6:1. Sex was not significantly associated with complicated appendicitis.

Table 2. Clinical Presentation

Clinical Feature	Present n (%)
Pain abdomen	60(100%)
Fever	40 (66.7)
Vomiting	44 (73.3)
Anorexia	46 (76.7)
RIF tenderness	55 (91.7)
Guarding	10 (16.7)
Raised TLC	40 (66.7)

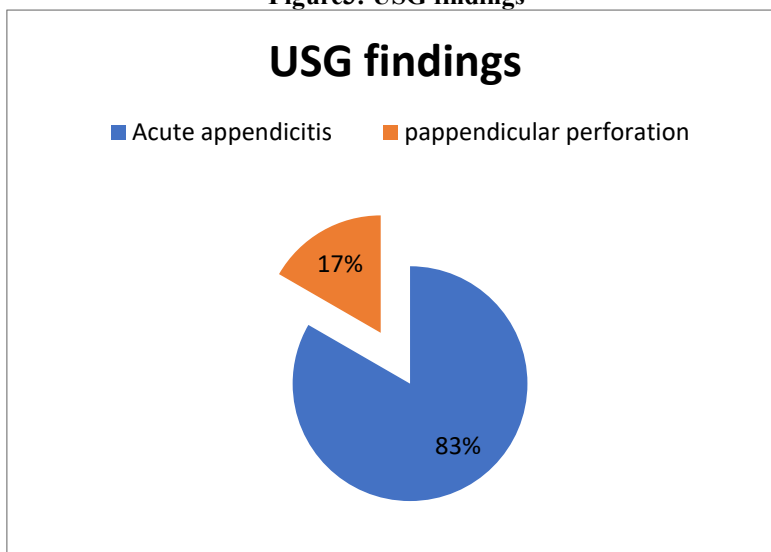
Among 60 cases, all case (60 cases (100%) presented with pain abdomen, followed by anorexia (76.7%), vomiting (73.3%) and fever (66.7%). Right iliac fossa tenderness was the most common sign (91.7%). Guarding present in 16.7% cases and TLC raised in 66.7% cases.

Figure 2. Duration of symptoms



In our study, Mean duration of symptoms: 4.5 ± 1.7 days

Figure3: USG findings



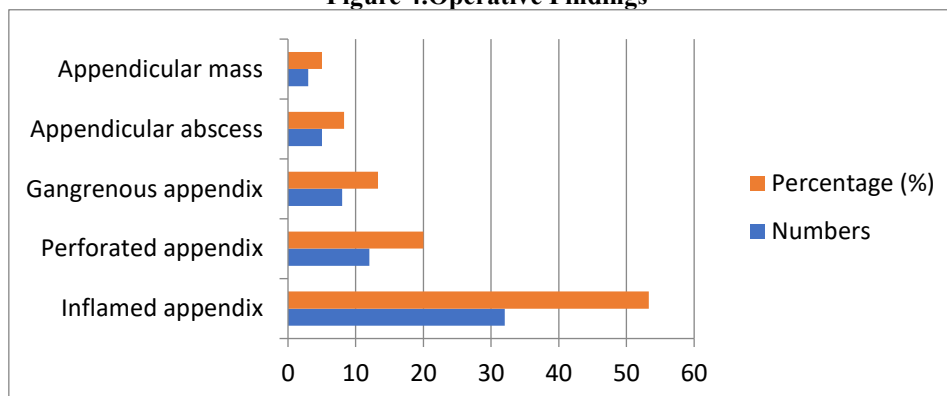
Among 60 cases, USG was suggestive of acute appendicitis in 50(83%) cases and appendicular perforation noted in 10(17%) cases.

Table 3. Type of Surgery

Surgery	Number	Percentage (%)
Open Appendicectomy (OA)	41	68.3
Laparoscopic Appendicectomy (LA)	19	31.7

Among 60 cases, majority (68.3%) underwent open appendicectomy and 31.7% cases underwent Laparoscopic appendicectomy.

Figure 4. Operative Findings



Among 60 cases, Simple inflamed appendicitis (53%) was the most common intraoperative finding, while complicated appendicitis {perforation (20%), gangrene (13.3%), abscess (8.3%) and mass (5%)} was observed in 46.7% of patients.

Table 4. Histopathology Findings

Histopathology	Number	Percentage (%)
Inflamed appendix	35	58.3
Perforated appendix	15	25.0
Gangrenous appendix	10	16.7

Among 60 appendicectomy specimens, inflamed appendix noted in 35(58.3%), perforated appendix noted in 15(25%) cases and Gangrenous appendix noted in 10(16.7%) cases.

Table 5. Association of clinical variables with complicated appendicitis

Variable	p value	Interpretation
Sex	1.000	Not significant
Fever	0.585	Not significant

Vomiting	0.077	Trend toward significance
Anorexia	0.770	Not significant
Guarding	0.491	Not significant
RIF tenderness	0.657	Not significant
Total leukocyte count	0.168	Not significant
USG diagnosis (Perforation vs Acute appendicitis)	0.004	Statistically significant

Fever, anorexia, guarding, right iliac fossa tenderness, and total leukocyte count also showed no statistically significant association with complicated appendicitis (all $p > 0.05$). Vomiting demonstrated a trend toward significance ($p = 0.077$). Ultrasonography suggestive of perforation was significantly associated with complicated appendicitis ($p = 0.004$).

Table 6. Delayed presentation (>2 days) and complicated appendicitis

Duration of pain	Uncomplicated	Complicated	Total
≤2 days	5	0	5
>2 days	27	28	55

Fisher's exact test, $p = 0.055$,

All 28 patients with complicated appendicitis presented after more than 2 days of abdominal pain. No child presenting within 2 days had complicated appendicitis. Delayed presentation is associated with more severe disease, although this represents a very strong clinical trend, the Fisher's exact test did not reach conventional statistical significance ($p = 0.055$), likely because only 5 patients presented within 2 days.

Table 7: Association of operative findings with histopathology (HPE diagnosis).

Operative finding	Inflamed (I)	Perforated (P)	Gangrenous (G)	Total
Inflamed (I)	31	1	0	32
Perforation (P)	2	8	2	12
Gangrene (G)	1	2	5	8
Abscess (A)	0	3	2	5
Mass (M)	1	1	1	3
Total	35	15	10	60

Operative findings showed a significant association with histopathological diagnosis ($\chi^2 = 52.38$, $df = 8$, $p < 0.001$). Cohen's kappa coefficient demonstrated moderate agreement between intraoperative and histopathological findings ($\kappa = 0.568$), indicating that operative assessment correlated reasonably well with the final histopathological diagnosis.

Table 8. Post-operative Complications

Complication	Number(60)	Percentage (%)
No complications	48	80.0
Post-operative fever	6	10.0
Post-operative vomiting	3	5.0
Fever + vomiting	3	5.0
Surgical site infection	12	20.0

In our study, most patients (80%) had an uneventful postoperative recovery. Surgical site infection occurred in 20% of patients, post-operative fever noted in 10%, post-operative vomiting noted in 5% and both fever and vomiting noted in 5% cases.

Table 9. Predictors of Complicated Appendicitis

Variable	Univariate Analysis	p value	Multivariable Analysis*
Age	NS	>0.05	NS
Sex	NS	1.000	NS
Fever	NS	0.585	NS
Vomiting	Borderline	0.077	Not retained
Anorexia	NS	0.770	NS
TLC Raised	NS	0.168	NS
Delayed presentation (>2 days)	Strong clinical association	0.055	Not estimable†
USG suggestive of perforation	Significant	0.004	Significant predictor

NS = Not Significant

* Standard logistic regression was inappropriate because of complete separation.

All complicated appendicitis cases occurred after >2 days of symptoms, preventing stable estimation using ordinary logistic regression.

Table 10: Hospital stay

Hospital stay(Days)	Cases (60)
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3-5	52(86.6%)
6-8	6(10%)
>8	2(3.33%)

Among 60 cases, 52(86.6%) cases had hospital stay of 3-5days, 6(10%) cases had hospital stay of 6-8days and 2(3.33%) case had hospital stay of >8days. Mean duration of hospital stay: 4.53 ± 1.50 days.

In our study all the cases have discharged by 10days without any mortality.

DISCUSSION

Appendicitis is rare under the age of five years and accounts for less than five percent of cases⁸. The relative rarity increases the diagnostic difficulty in these younger children, which is evident by an increased rate of perforated appendicitis. The rate of perforation declines as age increases, with rates of nearly 100% at the age of one year, 50-69% at the age of five, and more variably reported but generally less than 30% in older children^{8,9,10,11}

In our study, Among 60 cases, Age ranges from 6-18years, were predominant age group was 15-18years, Mean age: 13.6 ± 3.0 years, Median age: 14 years. Acute appendicitis was more common among older children and adolescents, with 45% of cases occurring in the 15-18 year age group. Mean age of uncomplicated group is 13.81 years and complicated group is 13.07 years. This is comparable with study by Saucier A et al. (2014) similarly reported a peak incidence between 10-14 years¹² and also comparable with Dr. Anjala Devi Kumar et al(2017) were the mean age of children with acute appendicitis was 10.8 ± 3.6 years¹³.

Among 60 cases of our study, male (62%) were predominantly affected than female (38%), Male: Female ratio 1.6:1. Sex was not significantly associated with complicated appendicitis. This can be compared with study by Dr. Anjala Devi Kumar et al (2017) were A significant male predominance (61.7%) was observed¹³.

In our study out of 60 cases, all 60 cases (100%) presented with pain abdomen, followed by anorexia (76.7%), vomiting (73.3%) and fever (66.7%). Right iliac fossa tenderness was the most common sign (91.7%). Guarding was present in 16.7% cases and TLC raised in 66.7% cases. Vomiting demonstrated a trend toward significance ($p = 0.077$). This is compare with the study by Albal M et al, where pain in abdomen was present in all cases (100%), while nausea and vomiting (57.53%) and fever (80.13%) also was seen in majority of patients. Burning micturition (7%) and menorrhagia was seen in two case¹⁴.

In our study, Mean duration of: symptoms was 4.5 ± 1.7 days which is comparable with study by Dr. Anjala Devi Kumar et al (2017) were the mean duration of symptoms before presentation was 31.6 ± 14.9 hours, indicating delayed presentation has been consistently identified as a key determinant of complicated appendicitis in children, particularly in low- and middle-income settings¹³. Delayed presentation is associated with more severe disease.

In our study Among 60 cases, USG was suggestive of acute appendicitis in 50(83%) cases and appendicular perforation noted in 10(17%) cases. Ultrasonography suggestive of perforation was significantly associated with complicated appendicitis ($p = 0.004$).

In present study, majority (68.3%) underwent open appendicectomy and 31.7% cases underwent Laparoscopic appendicectomy. This is compared with study Dr. Anjala Devi Kumar et al (2017) were Laparoscopic appendectomy was performed in 56.7% of patients and was significantly more common than open surgery¹³.

In our study Simple inflamed appendicitis (53%) was the most common intraoperative finding, while complicated appendicitis {perforation (20%), gangrene (13.3%), abscess (8.3%) and mass (5%)} was observed in 46.7% of patients. This is compare with the study by Albal M et al, where among 143 cases, majority 120 (83.91%) patients had intra-operatively an inflamed appendix, while 18 (12.85%) patients had perforated appendix. Only 5 (3.49%) had a gangrenous appendix intra-operatively¹⁴.

In present study, most patients (80%) had an uneventful postoperative recovery. Surgical site infection occurred in 20% of patients. This is compared with the study by Albal M et al where surgical site wound infection was the commonest complication observed in 18 (12.58%) patients, while prolonged ileus was found in 4 (2.79%). No complications were seen in 121 (84.61%) of patients¹⁴.

In our study, Mean duration of hospital stay: 4.53 ± 1.50 days. Cases with post-operative complications had prolonged hospital stay. In our study all the cases have discharged by 10days without any mortality.

Limitations: Single centre, retrospective study, small sample size, absence of long-term follow up, Variations in clinical evaluation, imaging practices, and treatment decisions among different clinicians could also have influenced the results.

Prospective, multicentre studies with larger sample sizes are warranted to validate these findings and provide more robust evidence.

CONCLUSION

Acute appendicitis remains the most common surgical emergency in the paediatric population, and timely diagnosis is essential to prevent complications such as perforation and intra-abdominal abscess. A thorough clinical evaluation supported by appropriate laboratory investigations and imaging significantly improves diagnostic accuracy. Early surgical intervention, particularly laparoscopic appendectomy where available, is associated with favourable outcomes, shorter hospital stay, and reduced postoperative morbidity. Increased awareness of atypical presentations in children and the use of standardized diagnostic protocols can further reduce delays in treatment and improve overall patient outcomes.

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