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## Clinical presentation of appendicitis in the paediatric age group

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### Abstract

Misdiagnosis and complications result from the unusual clinical presentation of acute appendicitis in school children. The aim of this study was to see how age affected clinical presentation, intraoperative findings and post-operational complications in children suffering from acute appendicitis. From November 2016 until December 2018, 112 children under the age of 16 years who underwent both emergency and elective appendectomy in Basaveshwar teaching and general hospital, Kalburgi, were enlisted in this retrospective research study. Out of 112 cases, the majority of the cases, *i.e.*, 60 (54%) were males, followed by 52 females (46%), and the ratio of male to female was 1.5:1. An acute inflamed appendix was the commonest intra-operative observation in this study, *i.e.*, in 92 cases (82%), followed by a perforated appendix in 9 cases, gangrenous mass in 6 cases, appendicular mass in 3 cases and Meckel's diverticulitis in 2 cases respectively. Wound gaping was seen in 4 (4%) cases and postoperative ileus in 3 (3%) cases, respectively. There was no mortality. Appendicitis is a common surgical emergency in the paediatric age group. Early diagnosis & surgery are the key factors in the management of paediatric appendicitis. The younger ones having a more altered general state & a higher tachycardia degree, indicating that the disease has had more systemic repercussions. Hence, when treating a young child suffering from acute abdominal pain and systematically addressing the question of whether it may be acute appendicitis, extreme caution is needed.

**Keywords:** Appendicitis, children, under 16 years, post-operative complications

### Introduction

Acute appendicitis is an uncommon disease in children under the age of six, and in this age group it is often diagnosed with delay [1]. Indeed, in children aged 12 and under, an initial diagnostic error rate of 28 to 57 percent has been recorded, with rates as high as 100 percent in those aged two years or less [2]. Two-thirds of these young subjects have ambiguous anamnesis & atypical clinical presentations, which partly contribute to the diagnostic delay [3]. Acute gastroenteritis is the most common condition in young children who are usually examined in the form of pain in abdomen with vomiting and diarrhoea and who are eventually diagnosed with acute appendicitis [4].

This misdiagnosis is caused by the absence of the laboratory findings and classical clinical signs in younger children but are common in adolescents and older children [5]. The banality of acute gastroenteritis and caregiver reinsurance delay effective surgical intervention, indicating why younger children have a higher complication risk [6]. However apart from diagnosis & treatment delay, the occurrence of appendicitis in children is on a specific terrain marked by the fragility of the appendicular wall and the relative immaturity of the large momentum. Hence, making the condition more serious and vulnerable to complications in patients that are of young age [7].

Perforation of the appendix is the most common cause of complicated intra-abdominal infections in children, and it is one of the leading morbidity causes [8, 9]. Thus, two-thirds of appendicitis in children under the age of six is complicated [10], with the rate of perforation that ranges from 57 to 100 percent in children aged four to five years and one year, correspondingly [11]. This retrospective research study aimed to evaluate the presentation and complications of acute appendicitis in the paediatric age group. The study aim was to set on focus to the influence of clinical presentation and age on the outcome variables.

### 2. Materials and Methods

This retrospective study research was approved by the Institutional Ethics Committee (XXXXX). The study was undertaken in the hospital, where most of the cases are brought from

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rural areas. A sum of 112 children younger than age of 16 years who underwent both emergency and elective appendectomy in Basaveshwar teaching and general hospital, Kalburgi, between November 2016 to December 2018 were involved. Out of 112 cases, 60 were males, and 52 were females. Cases were presented with appendicitis, and complications like infected appendix, ruptured appendix, gangrenous appendix with abscess and appendicular mass were included in the study. All cases with intestinal obstruction, Meckel's diverticulum, mesenteric adenitis, salpingitis Children who didn't meet the study's inclusion needs or whose subject files were incomplete were removed.

The subjects were assessed & operated on by a paediatric surgeon. Appendix perforation, peritonitis (peritoneal inflammation with or without purulent peritoneal liquid), and formation of abscess complications were all detected by ultrasound during surgery and verified by histological examination. All patients were given pre-operative intravenous fluids and antibiotic covering aerobic and anaerobic bacteria. In all patients, McBurney's incision taken, and they underwent open appendectomy. A drain was kept in complicated cases. Children were discharged as soon as they were in good general state, afebrile, painless and with feeding autonomy. Primary outcome variables were the incidence of intraoperative findings, and secondary outcome variables were the post-operational complications.

### 3. Results

Demographic data results are summarized in Table 1. Out of 112 cases, most of the cases, *i.e.*, 60 (54%), were males, followed by 52 (46%) females. 1:5:1 was the male to female ratio.

**Table 1:** Gender wise distribution of cases

Gender	No. of cases	Percentage (%)
Male (n)	60	54
Female (n)	52	46
Total	112	100

An acute inflamed appendix was the commonest intraoperative discovery in this study, *i.e.*, in 92 cases (82%), followed by a perforated appendix in 9 cases, gangrenous mass in 6 cases, appendicular mass in 3 cases and Meckel's diverticulitis in 2 cases respectively. (Table 2) Drains were placed in all cases of gangrenous appendicitis, perforated appendix and appendicular mass (n-16) and were removed at 48 hours postoperative period.

**Table 2:** Intra-operative findings among the cases

Findings	No. of cases	Percentage (%)
Acute inflamed appendix	92	82
Perforated appendix	9	8
Appendicular mass	3	3
Gangrenous mass	6	5
Meckel's diverticulitis	2	2
Total	112	100

The postoperative complication is summarized in Table 3. Wound gaping was seen in 4 (4%) cases and Postoperative ileus in 3 (3%) cases, respectively. There was no mortality observed.

**Table 3:** Postoperative complications

Complications	No. of cases	Percentage (%)
Wound gaping	4	4
Postoperative ileus	3	3

### 4. Discussion

The paediatric age group differs in clinical presentation from that of adults as their description of symptoms is dependent more on family rather than patients themselves. The classic clinical picture with initial anorexia, peri-umbilical pain that migrates to the right fossa iliaca, fever and vomiting does not appear in adolescents and school children, particularly younger children [1]. Delayed diagnosis, mainly in children, could result in morbidity and even mortality. Diagnosing appendicitis in preschool children is difficult. Indeed, owing to a high misdiagnosis rate due to clinical symptoms that is atypical and trivialization of abdominal pain in this age category [12]. In different subjects, acute appendicitis which is the commonest abdominal emergency cause, have shown different clinical course, pathogenesis as well as outcome [13]. Complications in appendicitis occur when a delay in diagnosis and treatment, patient's inability in interpreting symptoms, misdiagnosis [14]. Chang *et al.* in 2010 reported that on the first visit to the emergency room 12 to 15 percent of paediatric appendicitis cases were missed which had a perforation rate of 73.1 percent versus 49 percent of those diagnosed on the first visit [15].

Male cases are more prevalent in our study than the female, which is in accordance with the study of Lee JA 1962 [16]. Our study results confirm that acute inflamed appendix was the most (86%) intra-operative findings. Appendicitis complications are more common and severe in children in comparison to adults, according to previous research. As seen in younger patients of age < five years, the non-specific clinical acute appendicitis appearance in young children is estimated to be associated for delayed diagnosis and, as a result, for a higher complication rate in this age category [12]. This actuality is demonstrated in our study in which a high rate of an acute inflamed appendix (82%), perforated appendix (9%), gangrenous mass (6%), appendicular mass (6%) and Meckel's diverticulitis (2%) was observed. In the study of Kuznetsov VI and Magerramov LG 1975, nine hundred sixty-six children suffering from acute appendicitis were operated on out of 976 children, with 169 (17.4%) having common appendicitis, four hundred one (41.2%) having phlegmonous appendicitis, and three hundred eighty six (40.4%) having gangrenous appendicitis. Ten children had appendicular infiltration, which necessitated surgery [17].

Apart from the lack of precision in clinical signs for diagnosing acute appendicitis in young children, imaging and laboratory tests are also insufficient diagnostic resources. Nonetheless, the literature acknowledges that an increase in biological markers like WBC (white blood cells) count, (PN) Neutrophil count & CRP (C-reactive protein) is frequently seen in acute appendicitis, but it lacks specificity, particularly when it is isolated [18,19]. Abdominal ultrasound should be remained number one option & the most often executed test for appendicitis diagnosis in the pediatric population due to the possibility of repeat examinations easily [20,21]. The MRI role for acute appendicitis diagnosis in young children has yet to be determined [22].

While open laparotomy was once the preferred method used for performing appendectomy procedures, laparoscopic appendectomy became more common in recent years. In our study, postoperatively, the risk of wound gaping and postoperative ileus was less. Whereas in the study of Kuznetsov Vi and Magerramov LG 1975, Different complications were found in 98 (10.1%) of the patients during the operation: inflammatory processes in the abdomen (infiltrations, abscesses

in 33), postoperative wound suppuration in 61 (6.3%), enteric fistula 1 (1%), intestinal obstruction 2(0.2%), intra-abdominal haemorrhage in 1 (0.1%), [Kuznetsov VI 1975]. Our research found no evidence of mortality.

## 5. Conclusions

Appendicitis is a common surgical emergency in the paediatric age group, and diagnosis is mainly clinical. This study research proves that the acute inflamed appendix in children below 16 years is common, which may be due to a high morbidity risk as a result of the delay in diagnosis. This, in turn, is a product of non-specific indications, followed by pathognomonic clinical & complementary test findings, and it rises with age. Early diagnosis and surgery are the key factors in the management of paediatric appendicitis. Crucially, children with acute appendicitis should continue to receive treatment by a paediatric surgeon, and the results can be improvised with management standardization.

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