**Original Research Article**

# A clinicopathological study of acute appendicitis in eastern India

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## ABSTRACT

***Background:*** *Appendicitis is the most commonly performed emergency abdominal surgery. An accurate and timely diagnosis of acute appendicitis remains a challenge.*

***Objective:*** *This study was performed to determine and correlate between the clinical patterns of acute appendicitis, laboratory and ultrasound findings and pathology found in appendicectomy specimens to help timely diagnosis and reduce negative appendicectomy rate.*

***Methods:*** *This is a cross sectional study, detailed history and clinical examination of the patient was carried out at the time of admission. Operative findings along with any complications as well as histopathological findings were recorded. Patients were followed up for one month for any complications.*

***Results:*** *A total of 125 patients were treated for appendicitis during this period with a male female ratio of 1:1.36. Most common age group was the 2nd decade with mean age being 20 years, while most common symptom was abdominal pain. Ultrasonography showed evidence of acute appendicitis in 85.6% and leucocytosis in 66.4% cases. Although only 5.6% of appendices grossly appeared normal during surgery, histopathology showed 14.4% to be normal. Wound sepsis (24.8%) was the most common post-operative complication.*

***Conclusion:*** *Diagnosis of acute appendicitis in our setting is still based on high index of suspicion following clinical evaluation. Combining this with laboratory findings and ultrasound scan has yielded an acceptable negative appendicectomy rate. We advocate routine use of ultrasound along with clinical evaluation and laboratory tests for the timely diagnosis of acute appendicitis and an early surgical intervention to prevent complications.*

***Keywords:*** *Appendicitis, vermiform appendix, appendicectomy, clinicopathological evaluation*

## Introduction

The diagnosis of acute appendicitis is predominantly based on clinical findings. When appendicitis manifests in its classic form, it is easily diagnosed and treated. Unfortunately, these classic symptoms occur in just over half of patients, therefore an accurate and timely diagnosis of acute appendicitis remains clinically challenging. Delay in diagnosis leads to complications significantly increasing morbidity. [1] Although the mortality rate has been vastly reduced, the diagnostic inaccuracy rate of 15% to 20% has remained unchanged in the past century. High rates of negative appendectomy have been reported in females of reproductive age. [2] The main factors contributing to this high negative laparotomy rate have been the nonspecific clinical features of acute appendicitis. Ultrasound has been proposed as an ideal noninvasive adjunct to diagnosis in suspected appendicitis. The pathophysiology of acute appendicitis explains why only half of the patients have a classical presentation. A number of non-appendiceal pathologies in the right iliac fossa can mimic appendicitis and a significant number of appendicectomies are being performed for non-appendiceal

pathologies. This study was performed to determine and correlate between the clinical patterns of acute appendicitis, laboratory and ultrasound findings and pathology found in appendicectomy specimens at our institution to help timely diagnosis and reduce negative appendicectomy rate.

## Material and methods

This is a cross sectional study, which was conducted from January, 2013 until December, 2015 at Rajendre Institute of Medical Sciences, Ranchi. The patients who visited our institution with features of acute appendicitis formed the pool for the present study. A detailed history was taken and clinical examination of the patient was carried out at the time of admission with special references to demographic characteristics, symptoms and signs and disease chronology, etc. After admission investigations were done and its findings recorded. Operative findings along with any complications as well as histopathological findings were recorded. Patients were followed up for one month for any complications.

## Result

Out of the total of 125 patients studied, 72 were female i.e. 57.6% while 53 were male i.e 42.4%, with a male female ratio of 1:1.36. (Fig.1)

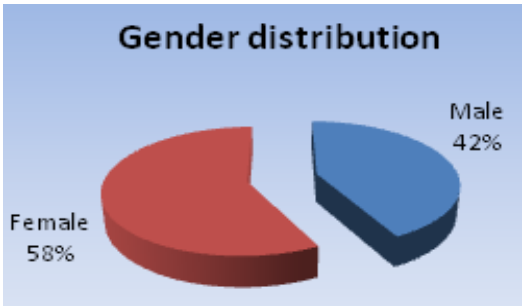


**Fig.1 Gender distribution**

The majority of our patients were in the second decade (n=48 i.e. 38%) followed by 3rd decade (n=41 i.e. 32.8%) and fouth decade (n=23 i.e. 18.4%) respectively with mean age being 20 years. (Fig.2)

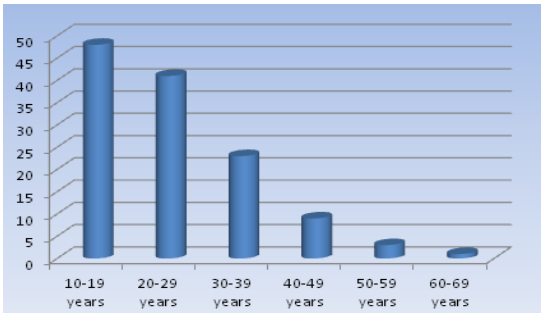


**Fig.2 Age distribution**

The most common presenting complains were abdominal pain (100%), Nausea or vomiting (84%) and anorexia (69.0%). Shifting of pain was present in 64.8% of the patients while 20% of the patients presented with diarrhea. As for clinical signs 89.6% of the patients in this study had some degree of right iliac fossa tenderness. Rebound tenderness could be elicited in 72.8% of the patients while 68% had elevated tempreture. Generalized abdominal tenderness was present in 57.6% of the patients whereas Rovsing and Psoas sign was positive in only 30% and 24% respectively. 66.4% of patients had leucocytosis (> 10 × $10^9$ per litre) with 79.2% showing shift to the left. All the 125 patients were subjected to ultrasound scan. (Table: 1) 107 (85.6%) patients showed ultrasonographic evidence of acute appendicitis while 18(14.4%) patient didn't show any ultrasonographic signs of acute appendicitis. At surgery, 54% (n=68) of appendices were apparently inflamed. 29.6% were perforated and 8.8% were gangrenous. 7 cases had normal appendix whereas in 2 cases faecolith was present. (Table: 2)

**Table: 1 Frequency and distribution of symptoms and signs of acute appendicitis**

| Symptom | Frequency | Percentage |
|---|---|---|
| **Abdominal pain** | 125 | 100% |
| **Nausea / Vomiting** | 105 | 84% |
| **Anorexia** | 87 | 69.6% |
| **Shifting of pain (migration)** | 81 | 64.8% |
| **Diarrhoea** | 25 | 20% |
| **Signs** | | |
| **Tenderness in RIF** | 112 | 89.6% |
| **Rebound Tenderness** | 91 | 72.8% |
| **Elevated Temperature** | 85 | 68% |
| **Generalized Abdominal tenderness** | 72 | 57.6% |
| **Rovsing sign** | 37 | 30% |
| **Psoas sign** | 30 | 24% |
| **Investigations** | | |
| **Ultrasonography** | 107 | 85.6% |
| **Leucocytosis** | 83 | 66.4% |
| **Shift to the left** | 99 | 79.2% |

**Table: 2 Operative findings**

| Operative Finding | Frequency | Percentage |
|---|---|---|
| **Inflamed** | 68 | 54.4 |
| **perforated** | 37 | 29.6 |
| **gangrenous** | 11 | 8.8 |
| **normal** | 7 | 5.6 |
| **faecolith** | 2 | 1.6 |

**Table: 3 Histopathological findings**

| Histological Findings | Frequency | Percentage |
|---|---|---|
| **Inflamed** | 47 | 37.6 |
| **Perforated** | 38 | 30.4 |
| **Normal** | 18 | 14.4 |
| **Gangrenous** | 14 | 11.2 |
| **Faecolith** | 8 | 6.4 |

Appendix was found to be inflamed in 47 specimens (37.6%) while a negative appendicectomy was seen in 18 (14.4%) cases when no pathology was found in the specimen. Appendix shows histological evidence of perforation in 38 (30.4%) cases, gangrene in 14 (11.2%) and faecolith in 8 (6.4%). (Table: 3) Wound sepsis (n=31, 24.8%) was the most common complications followed by wound dehiscence (n=11, 8.8%). one patient developed faecal fistula (0.8%) and 2 patients (1.6%) died. Most of the cases which developed complications were from complicated appendicitis group. (Table: 4)

**Table: 4 Post-operative complications**

| Complication | Frequency | Percentage |
|---|---|---|
| **Surgical site infection** | 31 | 24.8 |
| **Wound dehiscence** | 11 | 8.8 |
| **Faecal fistula** | 1 | 0.8 |
| **Death** | 2 | 1.6 |

## Discussion

Appendicitis is the most commonly performed emergency abdominal surgery and can also be the site of a variety of neoplasms and unusual inflammatory conditions. [3] lifetime risk of appendicitis

has been estimated to be 8.6% for males and 6.7% for females. [4] Though a fair number of studies have been conducted and literature exists relating to epidemiology, clinical presentation, surgical findings and histopathological picture, but very few data and literature is present from India. We evaluated the epidemiology, clinical presentation, diagnosis, operative findings, histopathological findings and complications of acute appendicitis in our hospital.

In our series male female ratio was found to be 1:1.36 with female predominance which is in contrast to many of the studies in the west and Africa which find male predominance, [4,5] one study from New Delhi also shows male predominance. [6] This may be due to regional variations or due to prevalence of malnutrition and anemia specially in females in our not so developed part of India and in our opinion larger studies are required to shed better light in this matter. In our study majority of the patients i.e 38% were in the 2nd decade. Marudanayagam R et al in their study of 2660 appendicectomy also found similar result of 2nd decade predominance with 35.09%. In their audit of 250000 patients Addiss DG et al observed that highest incidence of primary positive appendectomy (appendicitis) was found in persons aged 10-19 years. While Singhal R et al found 3rd decade to be most commonly affected. Our result is in concordance to most of the studies. In our study most common presenting complains were abdominal pain (100%), Nausea or vomiting (84%), anorexia (69.0%) migratory pain (64.8%) and diarrhoea (20%). The migratory pain along with leucocytosis has been considered to be a useful finding in the diagnosis of acute appendicitis. This is seen in 64.8 % and 66.4% cases respectively in our study which showed concordance with other studies. [5,7] Ultrasonographic scan showed evidence of acute appendicitis in 85.6% of patients. The ultrasonographic signs include periappendicular infiltration, a visible "cockade," and an appendix larger than 12 mm in diameter. John H et al concluded that in 12% of doubtful cases ultrasonographic results decisively favoured operation, and in 4.5% it prevented an unnecessary laparotomy in the presence of positive clinical symptoms. [8] In our opinion ultrasonography is an additional tool for the surgeon in the diagnosis of acute appendicitis and in association with clinical evaluation and laboratory findings can be very valuable.

Although only 5.6% of appendices grossly appeared normal during surgery, histopathology showed 14.4% to be normal. Thus a negative appendicectomy rate of 14.4% in our series is within 10–25% rate considered acceptable. [9] The perforation rate on histology was 30.4% which is slightly higher than the 5–26% reported in the literature. [10] Colson et al [10] proposed that a delay in presentation of more than 12 h after onset of symptoms increased the perforation rate and an in-hospital delay did not affect the perforation rate. In our setting patients mostly present late as the first medical personnel they visit is mostly not a doctor but a paramedical staff or a quack. As a result diagnosis is delayed and perforation rate is higher. Post operative follow up showed a wound infection rate of 24.8, which is within the 15-30% seen for this type of surgical wound. [11] Wound dehiscence, at 8.8% is much higher than acceptable limit of 1-3%, [12] which we feel is because our patients mostly come from a lower socio-economic background and are

usually malnourished and anemic, especially women who are a majority in our series. One patient developed faecal fistula while two patients died thus mortality rate being 1.6%. These post operative complications mostly occurred in the complicated appendicectomy group.

Diagnosis of acute appendicitis in our setting is still based on high index of suspicion following clinical evaluation. Combining this with laboratory findings and ultrasound scan has yielded an acceptable negative appendicectomy rate. More females than males had appendicitis in our study and mortality rate of 1.6% was seen. Although more studies are require from the Indian subcontinent, we advocate routine use of ultrasound along with clinical evaluation and laboratory tests for the timely diagnosis of acute appendicitis and an early surgical intervention to prevent complications.

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