

**CLINICAL EVALUATION AND ROLE OF USG IN PATIENTS OF ACUTE APPENDICITIS IN A RURAL HOSPITAL**Sandesh Gawade<sup>1</sup>, Sachin Naik<sup>2</sup>**HOW TO CITE THIS ARTICLE:**

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**ABSTRACT: INTRODUCTION:** Acute appendicitis is the commonest emergency met in surgical practice. The clinical features sometimes being non-specific and list of differential diagnosis is too long. Diagnosis being particularly difficult in females due to associated gynaecological and obstetric conditions. The aim is to reduce unnecessary laparotomies and incidence of appendiceal perforation which is associated with significant post-operative morbidity. Reported approaches to achieve this objective include emergency laparotomy, Ultrasonography (USG), scoring system, CT scan etc. In peripheral areas USG remains most widely available and preliminary investigative for establishing definitive diagnosis in addition to clinical suspicion. **AIM:** Clinical evaluation and role of ultrasonography in patients of acute appendicitis in a rural hospital. **OBJECTIVES:** To study clinical profile of acute appendicitis. Role of USG in diagnosis of acute appendicitis. **METHODS:** 50 patients of acute abdomen suspected to have acute appendicitis, of all age groups and both sexes, admitted with cardinal features of acute appendicitis like pain in abdomen (Right iliac fossa), vomiting, and fever were included in this study. Patients were studied according to the Proforma. Surgeons made a final clinical diagnosis on the basis of clinical impression and USG information. All the patients diagnosed as acute appendicitis (without any lump formation in RIF) were treated surgically and diagnosis was confirmed histopathologically. Acute appendicitis was studied with special reference to clinical findings and ultrasonographic findings. Use of ultrasonography in the diagnosis of acute appendicitis was evaluated. **CONCLUSION:** USG remains most cost effective, efficient and valuable investigation for acute appendicitis in rural settings. The use of USG in suspected acute appendicitis should be complement to but not replacing clinical assessment.

**KEYWORDS:** Clinical, appendicitis, acute, ultrasonography.

**INTRODUCTION:** Acute appendicitis is the commonest emergency met in surgical practice. It is a well-known fact that nothing can be so easy, or as difficult as the diagnosis of acute appendicitis. It is because of the clinical features and special investigations, which are sometimes non-specific, and the list of differential diagnosis is too long. As also, diagnosis is particularly difficult in a woman of reproductive age group and in elderly adults, due to associated gynecological problems and uncharacteristic abdominal pains respectively. At times it becomes difficult to diagnose because of its position, such as inflamed retrocaecal appendix or when it is associated with pregnancy.

Problems in diagnosis and various systems developed to assist the clinical diagnosis of acute appendicitis are discussed abundantly in literature. The aim is to reduce the number of unnecessary laparotomies without increasing the incidence of perforation as appendicular perforation is associated with significant post-operative morbidity and mortality. The reported approaches to achieve this objective include intensive observation in hospital, emergency laparotomy, ultrasonography, computer aided prediction and scoring system. In the third world countries and

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peripheral areas ultrasonography remains the most widely available and used preliminary investigative procedure towards establishing a definitive diagnosis.

**MATERIALS AND METHODS:** 50 patients of acute abdomen suspected to have acute appendicitis, over a period of one year at a General Rural Hospital, of all age groups and both sexes, admitted with cardinal features of acute appendicitis like pain in abdomen (right iliac fossa), vomiting, and fever were included in this study. Patients were studied according to the proforma attached.

Ultrasonographies were done at the Radiology Dept. of the same hospital, by only one radiologist as it is user dependent procedure. Criterion used for diagnosis of acute appendicitis on ultrasonography was:

1. When the maximal tenderness was proved to be located on the appendix.
2. When the maximal tenderness was noted on the pathological manifestation (i.e. thickening of the intestinal wall or abscess formation) and the appendix was shown to be contiguous to the manifestation, appendicitis was diagnosed.
3. When the tenderness was noted on the pathological manifestation, apart from the depicted appendix or on lesions other than appendicitis, the diagnosis of appendicitis made before USG was refuted.
4. Finding of blind ended, tubular, non-compressible structure (diameter > 6mm & wall thickness > 2mm), diagnosis of appendicitis was made.
5. USG findings were considered negative when appendix could not be found and above criterion were not fulfilled.
6. Other findings like presence of appendicolith, dilated bowel loops in the vicinity of appendix were noted. Any free fluid in abdomen noted.

Surgeons made a final clinical diagnosis on the basis of clinical impression and USG information. All the patients diagnosed as acute appendicitis (without any lump formation in RIF) were treated surgically and diagnosis was confirmed histopathologically. Acute appendicitis was studied with special reference to clinical findings and ultrasonographic findings. Use of ultrasonography in the diagnosis of acute appendicitis was evaluated.

### OBSERAVATIONS AND RESULTS:

	SYMPTOMS	NO. OF PATIENTS	PERCENTAGE
1]	PAIN	50	100%
2]	FEVER	32	64%
3]	ANOREXIA	45	90%
4]	NAUSEA	40	80%
5]	VOMITING	33	66%
6]	DIARRHOEA	04	08%
7]	CONSTIPATION	08	16%
8]	H/O SIMILAR EPISODES	15	30%

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	<b>SIGNS</b>	<b>NO. OF PATIENTS</b>	<b>PERCENTAGE</b>
1]	Tenderness at McBurney's pt.	49	98%
2]	Hyperaesthesia	40	80%
3]	Rebound tenderness	44	88%
4]	Rovsing's sign	15	30%
5]	Guarding & Rigidity	28	56%
6]	Obturator test	07	14%
7]	Psoas test	08	16%
8]	Rectal tenderness	25	50%

Table 2: Signs

<b>Nature of pain</b>	<b>No. of patients</b>	<b>Percentage</b>
Starting in RIF & remaining there throughout the attack	35	70%
Periumbilical to start with-	10	20%
Starting in periumbilical region and then localizing in RIF	08	16%
Diffuse pain	05	10%

Table 3: Pain in acute appendicitis

Pain in abdomen is the commonest complaint. In this series 20% had pain in periumbilical region to start with. Pain got localized to right iliac fossa in about 16% of patients. In this series most common presentation was pain started in right iliac fossa and remained in right iliac fossa throughout.

Anorexia is next common symptom in a case of acute appendicitis and nausea, vomiting comes after that. Tenderness at McBurney's point & rebound tenderness are the most common signs in acute appendicitis. Hyperaesthesia is one of the commonest sign in associated with referred pain. This is characterized by exaggerated sensation of pain resulting from an ordinary innocent stimulus; this is found in 80% of patients in this series.

### INVESTIGATIONS:

#### WBC count:

<b>WBC count</b>	<b>No. Of patients</b>	<b>Percentage</b>
>10,000	35	70%
<10,000	15	30%

Table 4

Like other infections, blood picture shows rise in WBC count in acute appendicitis.

#### Neutrophil count:

<b>Neutrophil count</b>	<b>No. of patients</b>	<b>Percentage</b>
>75%	38	76%
<75%	12	24%

Table 5

Increase in neutrophil count is indicative of severity of infection.

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### Ultrasonographic findings in acute Appendicitis:

USG Findings	No. of patients	Percentage
Probe tenderness in RIF	49	98%
Free fluid in abdomen (right iliac fossa, pelvis)	05	10%
Non-compressible blind ended tubular structure in RIF (diam.> 6mm)	40	80%
Lump in RIF	04	08%
Dilated bowel loops in RIF	20	40%
Presence of appendicolith (faecolith)	03	06%

Table 6

In this series ultrasonography was suggestive of appendicitis in 43 patients. Out of which 42 patients were having acute appendicitis on histopathology. 4 patients were having acute appendicitis in histopathology in which USG was not suggestive of appendicitis. Decision of surgery in these patients was taken on clinical findings.

Ultrasonography diagnosed 6 cases of perforated appendix out of 11 cases in this series.

Ultrasonography report ↓	Appendicitis on histopathology	No appendicitis on histopathology	Total
Appendicitis (+)(no. of patients)	42	01	43
No appendicitis	04	03	07
<b>Total</b>	<b>46</b>	<b>04</b>	<b>50</b>

Table 7

Results of this series

Sensitivity: 91.30%

Specificity: 75%

Positive predictive value: 97.67%

### DISCUSSION:

**A] SYMPTOMS:** Common symptoms are abdominal pain; fever, vomiting with nausea & anorexia.

Nature of pain	Our series	Frank series <sup>(1)</sup>
Total percentage of patients getting pain	100%	99%
a) Periumbilical to start with	20%	10%
b) Starting in RIF & remaining there throughout the attack	70%	75%
c) Pain starting in umbilical region & then localizing in RIF	16%	05%
d) Diffuse pain	10%	07%

Table 8

In our series the most common type of presentation was pain beginning in right iliac fossa and remaining there throughout the attack.

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**a) Fever:** Temperature varies in different cases & on the whole is not reliable either as a diagnostic or a prognostic sign. In our series history of fever was present in 64% of cases.

Clinical feature	Our series	Adiga series <sup>(2)</sup>	Roy series <sup>(3)</sup>	Frank's series <sup>(1)</sup>
Fever	64%	40%	44%	83%

Table 9

**b) Anorexia, nausea, vomiting:** In our series around 45 patients presented with one of these symptoms out of 50.

Clinical Features	Our Series	Frank <sup>(1)</sup>	Adiga <sup>(2)</sup>
Anorexia	90%	92%	89%
Nausea	80%	78%	75%
Vomiting	66%	64%	61%

Table 9

Anorexia is the commonest of the three. Our findings co-relate with other series.

**c) Bowel complaints:** Diarrhea and constipation are symptoms with which patient may present. In our series constipation was present in 8 patients (16%) and diarrhea was present in 4 patients (08%).

Clinical Feature	Our series	Adiga's series <sup>(2)</sup>
Diarrhea	08%	15.9%
Constipation	16%	3.2%

Table 10

**B] SIGNS:** Hyperasthesia, tenderness at McBurney's point & rebound tenderness are common signs of acute appendicitis.

**a) Hyperasthesia:** Well marked hyperasthesia is one of the earlier signs of acute appendicitis. In our series, 40 patients (80%) had hyperasthesia. Hyperasthesia, which is characteristically supposed to disappear with perforation, persisted in two patients out of 11 cases with perforation.

SIGN	Our series	B-M Livingstone's series <sup>(4)</sup>
Hyperasthesia	80%	86%

Table 11

**b) Tenderness at McBurney's Point:** This is one of the most reliable sign of acute appendicitis. In this series, 49 patients had tenderness at McBurney's point.

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c) **Rebound Tenderness:** Present in 44 patients (88%).

SIGN	Our series	Adiga's series <sup>(2)</sup>
Tenderness at McBurney's point	98%	100%
Rebound tenderness	88%	74%

Table 12

d) **Rov-sing's Sign:** This test has been a subject of much controversy. In our series 15 patients out of 50 had this sign (30%).

SIGN	Our series	Adiga's series <sup>(2)</sup>
Rov-sing's sign	30%	19%

Table 13

e) **Obturator Sign:** In our series 7 patients presented with positive obturator test (14%).

SIGN	Our series	Adiga's series <sup>(2)</sup>
Obturator test	14%	12.7%

Table 14

Our findings co-relate with Adiga's series.

f) **Rectal Examination:** In our series 60% patients had tenderness on P/R examination.

SIGN	Our series	Adiga's series <sup>(2)</sup>
Rectal tenderness	48%	74%

Table 15

### C] Investigations:

#### a) TLC Count:

TLC count	Our series	Hoffmann's series <sup>(5)</sup>
>10,000	70%	85%
<10,000	30%	15%

Table 16

From this observation it is clear that increased total leucocytic count is one of the helping factors in diagnosis of acute appendicitis.

b) **Neutrophil Count:** Neutrophil count will be raised in acute appendicitis. Leucocytosis with shift to left in differential count increases with duration of the disease process.<sup>(5)</sup>

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Neutrophil count	Our series	Hoffman series <sup>(5)</sup>
>75%	76%	78%
<75%	24%	07%

Table 17

### c) Ultrasonography:

Ultrasonography ↓ report	Appendicitis on histopathology	No appendicitis on histopathology	Total
Appendicitis (+)(No.of patients)	42	01	43
No appendicitis	04	03	07
<b>Total</b>	<b>46</b>	<b>04</b>	<b>50</b>

Table 18

Ultrasonography was diagnostic in 43 patients out of 50 in this series [86%], which was 79-90% in other studies. <sup>(6, 7, 8)</sup>

The rate of diagnosis in perforated appendicitis is 54.5%, which was 56% in other studies. <sup>(6, 7, 8)</sup> The rate of diagnosis in perforated appendicitis was low compared with the rate of diagnosis in non-perforated appendicitis. This was probably due to the associated severe peritonitis which impedes adequate compression because of reflex rigidity and causes adynamic ileus with dilated bowel loops hiding the appendix from view. Fortunately in most of these patients the clinical indication for laparotomy was obvious. <sup>(7)</sup>

A retrocaecal position of appendix did not cause diagnostic problems because the caecum was often spastic & could be used as an acoustic window. In other cases appendix could be demonstrated by scanning laterally.

If ultrasonography demonstrates no abnormality or is not diagnostic, still there is chance of appendicitis according to our series (8%), which is comparable with other studies. <sup>(7)</sup>

Mesentric lymphadenitis was the sole finding in one patient (10 years male). This patient was conserved & did not experience any recurrent attacks on follow up for six months.

In this series the diagnosis of appendicitis on USG had a sensitivity of 91.3% & specificity of 75% with a positive predictive value of 97.67%. The surgeon's clinical impression had a sensitivity of 86.3%, a specificity of 42.8% and a positive predictive value of 90.4%. <sup>(9)</sup>

	USG diagnosis	Surgeon's clinical impression <sup>(9)</sup>
Sensitivity	91.3%	86.3%
Specificity	75%	42.8%
Positive predictive value	97.67%	90.4%

Table 19

**CONCLUSION:**

- USG remains most cost effective, efficient and valuable investigation for acute appendicitis in rural settings.
- The use of USG in suspected acute appendicitis should be complement to but not replacing clinical assessment.

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