

**Original article:**

## **A comparative study of pre-operative with operative diagnosis in acute abdomen**

**ANIL KUMAR J, REKHA PORWAL, ANIL KUMAR SHARMA, RAJESH KUMAR SINGH, VIJAY KUMAR**

Department of Surgery, JLN Medical College, Ajmer, Rajasthan, India

Corresponding author : Dr Anil Kumar

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### **Abstract**

Acute abdominal pain is a common symptom in emergency department that requires immediate intervention. A careful, methodical diagnostic approach is necessary for definite diagnosis that helps in reducing morbidity and mortality. Aim : To compare pre and post-operative diagnosis in acute abdomen and to see the negative laparotomy rate, the diagnostic accuracy and predictive values of different investigations in acute abdomen.

**Methods:** Prospective hospital based cohort study involving 60 patients was conducted to compare the pre operative diagnosis based on clinical examination and evaluations with post operative diagnosis of acute abdomen.

**Results:** All 60 patients with diagnosis of acute abdomen underwent emergency laparotomy. Acute abdomen was most common in the age group 21-30 years with male predominance. Acute appendicitis (63.3%) was the most common cause of surgical condition, and then the most common causes of acute abdomen were peritonitis (28.3%) and bowel obstruction (8.3%). The negative laparotomy rate was nil. Pre and post laparotomy diagnoses were the same in 84.2% in acute appendicitis, 82.7% in peritonitis and 60% in obstruction. The diagnostic accuracy rates were 95%, 83.3% and 93.3% respectively in the above diagnoses.

**Conclusion:** Clinical history taking and physical examination play the most important role in the management of acute abdomen. Radiological investigations meant mainly for excluding differential diagnosis. One of the important determinants of overall outcome is early diagnosis by clinical findings with radiological correlation followed by resuscitation, antibiotic therapy with early decision of operative measures.

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### **Introduction**

The term “acute abdomen” denotes an episode of severe abdominal disorder, which may require urgent surgical intervention. The acute abdomen refers to the clinical situation in which an acute change in the condition of the intra abdominal organs, usually related to inflammation or infection, demands immediate and accurate diagnosis<sup>1</sup>. Patient of “ Acute abdomen” presents with an acute onset of abdominal pain that may occur suddenly or gradually over a period of several hours and presents with plethora of symptoms which suggest disease that possibly is life threatening and demands an immediate or

urgent diagnosis for early treatment.

Acute abdominal pain is one of the most frequently encountered symptoms in patients seeking emergency department attention and is the most common presenting complaint in patients with surgical diseases of the abdomen. Many medical and gynecological diseases also manifest as acute abdomen and to differentiate them at times is quite difficult. From the surgical point of view, acute abdominal pain is the cardinal symptom of acute abdomen.

The syndrome of acute abdominal pain generates a large number of hospital visits. Conditions resulting in an acute abdomen can cause

serious complications or even death, especially if there is a delay in diagnosis and appropriate therapy, but as pointed out by Cope, “The term acute abdomen should not be equated with the invariable need for operation”.

Abdomen is considered to be the “Pandora’s box” and the complex symptoms of acute abdomen may comfort the surgeon with a problem of urgent diagnosis and immediate laparotomy if warranted or urgent decision for further management. This is the moment when the clinical judgment by the treating surgeon helps him tide over the enigma “To operate or not to operate”.

The range of disease extends from the relatively trivial to the immediately life-threatening and attempts to reach a diagnosis must sometimes be curtailed in the interests of immediate treatment. More commonly there is time to take a history, to examine the patient, and to organize the investigations, which will be helpful in establishing a diagnosis and planning treatment.

One of the most important phases in the training of the surgeon is the acquisition of ability to make a sound diagnosis. This is particularly true in case of acute abdominal emergencies, when the diagnosis should be made quickly as well as accurately. In emergency situation surgeon should eschew complacency and act quickly as if his own house is on fire (sushruta). No gift is greater than the gift of life.

Accurate recording of the relevant facts is vital and a clear understanding of the anatomy and pathophysiology of intra-abdominal disease is necessary for both diagnosis and treatment. These patients are therefore ideal for training junior members of a surgical team. The immediate feedback that an emergency operation provides on the accuracy and the adequacy of the pre-operative assessment and preparation is another reason why

the patient with an acute abdomen is an important part of surgical training.

The acute abdomen is test of clinical acumen of the clinician. Pre-operative diagnosis of acute abdomen with limited facilities is very crucial to minimize the morbidity and mortality in the developing countries like ours, where the facilities of diagnosis are limited and clinical acumen play a pivotal role in the diagnosis and management of acute abdomen. Thus, surgeons in developing countries need to improve diagnostic acumen and decision-making in the management of the acute abdomen.

The main objective of this study is to compare pre and post-operative diagnosis in acute abdomen and to see the negative laparotomy rate, the diagnostic accuracy and predictive values of different investigations in acute abdomen.

Sir Zachary Cope in “Cope’s early diagnosis of the acute abdomen”, has emphasized on the major role played by clinical history and physical examination in the management of acute abdomen. Previous studies have demonstrated that management errors can be significantly reduced by preoperative diagnosis in acute abdomen. Accurate and confirmative preoperative diagnosis of acute abdomen ensures definitive per-operative surgical treatment, which in turn minimizes the negative laparotomy.

The complexity of acute abdomen is such that a careful, methodical diagnostic approach is necessary in order to arrive at a diagnosis. Correct preoperative diagnosis of acute abdomen remains challenging despite proper history taking and clinical examination, as well as advancement in new imaging techniques<sup>2,3,4</sup>. In this study, attempts had been made to compare the preoperative findings so as to guide the practicing physicians to manage the cases of acute abdomen.

**Aims and objectives :**

1. To compare pre and post-operative diagnosis in acute abdomen.
2. Patients presented with symptoms of acute abdomen operated to see the negative laparotomy rate, the diagnostic accuracy and predictive values of different investigations in acute abdomen.

**Materials & methods**

The present study was a Prospective hospital based cohort study in the Department of General Surgery in J.L.N Hospital, Ajmer. The study involving 60 patients was conducted from May 2014 to august 2014 to compare the pre operative diagnosis based on clinical examination and evaluations with post operative diagnosis of acute abdomen.

• **Inclusion criteria:**

1. Patients of all age groups and both genders.
2. Previously diagnosed and referred cases of acute abdomen.
3. Those patients who were explored keeping a gynecological pathology as provisional diagnosis and were found to have surgical cause.

• **Exclusion criteria:**

1. Non consenting patients.
2. Traumatic acute abdomen.

- Patients was examined by the admitting surgical team after taking a thorough history, Relevant points in the history including the patient's gender, site of pain, character of pain, fever, loss of appetite, change in bowel habit, vomiting, abdominal distension and urinary or genital symptoms.
- Factors in the clinical examination that was considered of significant contribution to the final diagnosis include temperature, tachycardia, and abdominal tenderness and localized or generalized guarding.
- In all cases, white blood cell (WBC) count with a differential leukocyte count (DLC) and measurement of neutrophil percent was performed on admission.

Urinalysis (UA) will be performed for almost all patients. Abdomen X-ray and USG were performed in some cases considering the clinical suspicion. Pre-operative diagnosis made by surgical residents based on clinical examination and investigations compared to the post operative diagnosis.

**Results**

**Table 1: Correlation of pre operative and operative findings**

| Preop Diagnosis            | No. of cases | Correct Pre-op Diagnosis | % of correct diagnosis |
|----------------------------|--------------|--------------------------|------------------------|
| Acute Appendicitis         | 38           | 32                       | 84.2                   |
| Peritonitis                | 17           | 14                       | 82.7                   |
| Obstruction and its causes | 05           | 03                       | 60.0                   |

**Table 2: Diagnostic values for AA**

| Diagnosis     | Post op AA | Post op Others | Total |
|---------------|------------|----------------|-------|
| Pre op AA     | 32         | 06             | 38    |
| Pre op Others | 0          | 22             | 22    |
| <b>Total</b>  | 32         | 28             | 60    |

Sensitivity-100      Specificity-78.5      PPV-84.2      NPV-100      Accuracy-95

**Table 3 Diagnostic values for peritonitis**

| Diagnosis          | Post op DUP | Post op Others | Total |
|--------------------|-------------|----------------|-------|
| Pre op Peritonitis | 14          | 03             | 17    |
| Pre op Others      | 0           | 43             | 43    |
| <b>Total</b>       | 14          | 46             | 60    |

Sensitivity-100      Specificity-93.4      PPV-82.3      NPV-100      Accuracy-83.3

**Table 4 Diagnostic values for IO**

| Diagnosis          | Post op Obstruction | Post op Others | Total |
|--------------------|---------------------|----------------|-------|
| Pre op Obstruction | 03                  | 02             | 5     |
| Pre op Others      | 0                   | 55             | 55    |
| <b>Total</b>       | 03                  | 57             | 60    |

Sensitivity-100      Specificity-96.4      PPV-60      NPV-100      Accuracy-93.3

**Discussion**

**Demographic data:**

The present study shows that the most common age group presenting as acute abdomen is 3<sup>rd</sup> decade. Out of 60 cases, 24 cases presented by acute abdomen in 3<sup>rd</sup> decade. Similar results are seen in the study by **Marjaan Laal et al<sup>5</sup>** in which most common age group affected by acute abdomen was third decade. Another study by **B. Kotiso et al<sup>6</sup>** also stated most common age group for acute abdomen to be 3<sup>rd</sup> decade. Study by **Jd Wig et al<sup>7</sup>**

also supports the present study with most common age group for acute abdomen to be third decade. In study by **Chhetri RK et al<sup>8</sup>** acute abdomen was more common in third decade. Findings of these studies correlate the present study.

The present study shows male predominance over females. Out of 60 cases, 44 were male and 16 were females with a ratio of 2.74:1. This is supported by the study of **Marjaan Laal et al<sup>5</sup>** in which acute abdomen was more common in males than females. Study by **B. Kotiso et al<sup>6</sup>** also

supports our study with more no. of male cases than female with a ratio of 2:1. Study by **JD Wig et al**<sup>7</sup> also had male to female ratio of 3:1, 1.63:1 was ratio of male to female patients in study by **Chhetri RK et al**<sup>8</sup>.

**Symptoms**

Pain abdomen was the most common presenting complaint in patients of acute abdomen in the present study. Pain abdomen was present in all 60 cases of acute abdomen. This is supported by above studies.

In all these studies, pain abdomen was the most common symptom of acute abdomen, vomiting being the 2<sup>nd</sup> most common symptom and distension of abdomen being 3<sup>rd</sup> most common symptom and is comparable with my study.

**Investigations**

All the patients in the present study underwent resuscitation followed by blood investigations like Complete Haemogram, urinalysis, renal function test. Followed by specific radiological investigations like X-ray abdomen, USG abdomen and CT abdomen.

**A. XRAY ABDOMEN:** Xray abdomen was done in 22 cases of all acute abdomen i.e, 36.66% (all peritonitis cases) and had positive findings in all 22 cases. All cases of perforation peritonitis had findings of Gas under Diaphragm and all cases of intestinal obstruction had a positive finding in X ray abdomen.

**B. ULTRASOUND ABDOMEN:** USG Abdomen was done in 41 i.e. 68.34% cases of acute abdomen. Out of these 39 cases i.e 96.6% cases had positive findings on USG.

**Etiology of acute abdomen**

The present study shows that the most common cause of acute abdomen is Acute Appendicitis. Out of 60 cases, there were 38 cases (63.34% of total cases) of acute appendicitis with a correct pre operative diagnosis of 32 cases (84.2%). Peritonitis ranks second most common cause with 17 cases ( 28.33 % of total cases ) and intestinal obstruction is the third most common cause of acute abdomen with 05 cases ( 08.33% of total cases).

This is supported by various studies as follows;

|                              | <b>Present study</b> | <b>Marjan Laal et al</b> <sup>5</sup> | <b>B. kotiso et al</b> <sup>6</sup> | <b>J D Wig et al</b> <sup>7</sup> | <b>Chhetri RK et al</b> <sup>8</sup> |
|------------------------------|----------------------|---------------------------------------|-------------------------------------|-----------------------------------|--------------------------------------|
| Acute appendicitis           | 63.34%               | 56.8%                                 | 52%                                 | 21.4%                             | 55%                                  |
| Peritonitis                  | 28.33%               | 14.4%                                 | 09%                                 | 22.4%                             | 28%                                  |
| Acute Intestinal obstruction | 08.33%               | 07.2%                                 | 26%                                 | 37%                               | 17%                                  |

The difference in the frequency of causes of acute abdomen between the present study and study by **B. Kotiso et al**<sup>6</sup> may be due to the age group ( 14 – 84 ). As the cases included in study by **B. Kotiso et al**<sup>6</sup>, there might be many more patients of intestinal obstruction, as bowel malignancies are more common in old age group.

The difference in frequency of causes of acute abdomen between the present study and study by **J D Wig et al**<sup>7</sup> shows the changing trends in the etiology of acute abdomen.

#### **Diagnostic values**

1. **ACUTE APPENDICITIS:** In our present study Acute Appendicitis ranks first most common cause of Acute abdomen with a sensitivity of 100 % , specificity of 78.5 % , positive predictive value of 84.2 % and Negative predictive value of 100%. Diagnostic accuracy found to be 95%.
2. **PERITONITIS:** Perforation peritonitis was the second most common cause of acute abdomen in our present study with a sensitivity of 100%, specificity of 93.4%, positive predictive value 82.3% and Negative predictive value of 100%. Diagnostic accuracy was 83.3%.
3. **ACUTE INTESTINAL OBSTRUCTION:** Acute intestinal obstruction was the third most common cause of acute abdomen in our present study with a sensitivity of 100%, specificity of 96.4%, Positive predictive value of 60% and Negative predictive value of 100%. Diagnostic accuracy was found to be 93.3%

#### **Conclusion**

- The most common age group affected by acute abdomen in the present study was between 21-30 years. 40% were of this age group.

- Males were predominantly affected 73.3% as compared to females 23.7% with male: female ratio of 2.74:1.
- The most common symptom with which the patient of acute abdomen presents was Pain in abdomen which is seen in all cases in this study. Abdominal tenderness was the most common sign elicited in cases of acute abdomen in this study.
- X- Ray abdomen was done in all cases of acute abdomen. 36.67% cases of acute abdomen has positive findings on X- ray abdomen. USG Abdomen was done in 41 i.e. 68.34% cases of acute abdomen. Out of these 39 cases i.e 96.6% cases had positive findings on USG. Though careful history taking and physical examination are important in diagnosis of acute abdomen, Radiological investigations are important to rule out differential diagnosis.
- Acute appendicitis was the most common cause of acute abdomen in 63.34% cases. Peritonitis was the second cause of acute abdomen seen in 28.33%.
- Considering both clinical and radiological findings, acute appendicitis was diagnosed in 84.2% cases intra-operatively. Perforation Peritonitis was diagnosed i.e 82.7%.
- Diagnostic values for acute appendicitis – sensitivity, specificity, PPV & NPV are 100%, 78.5%, 84.2% & 100% respectively with diagnostic accuracy of 95%.
- Diagnostic values of perforation peritonitis – sensitivity, specificity, PPV & NPV are 100%, 93.4, 82.3% & 100% respectively with a diagnostic accuracy of 83.3%.

- Diagnostic values of Intestinal obstruction – sensitivity, specificity, PPV & NPV are 100%, 96.4%, 60.0% & 100% respectively with a diagnostic accuracy of 93.3%.
- Negative laparotomy rate was nil.

### References

1. Brewer BJ, Golden GT, Hitch DC. Abdominal pain: An analysis of 1,000 consecutive cases in a university hospital emergency room. *Am J Surg* 1976; 131:219-223.
2. Inderbir Singh. "Alimentary system in human embryology". Macmillan India limited publication 1995;5(12): 175-187.
3. Nathens AB, Rotstein OD, Marshall JC. Tertiary peritonitis: Clinical features of a complex nosocomial infection. *World J Surg* 1998; 22:158-163.
4. Das S. "Examination of Acute Abdomen", in *Clinical Das*, SB Publications 2011; 9: 459-480.
5. Marjan Laal, Amita Marlandoo. Acute Abdomen; Pre and Post – Laparotomy diagnosis. *International Journal of Collaborative research on Internal medicine & Public health* 2009;1(5):157-165.
6. Addis Ababa, Ethiopia. B. Kotiso, ZZ. Abdurahman. Pattern of Acute Abdomen in Adult Patients in Tikur Anbessa Teaching Hospital. *East and Central Africal Journal of Surgery* 2007;12(1):47-52.
7. JD Wig, RL Basur. Acute abdomen. *Journal of Post graduate medicine* 1978;24(2):121-124.
8. Chhetri RK, Shreshta ML. A comparative study of pre-operative with operative diagnosis in acute abdomen. *Kathmandu University Medical Journal* 2005; 3:107-110.