

# A Comparative analysis of Clinical of Radiological and Operative findings in Acute Abdomen in East Bihar

<sup>1</sup>Dr. Vishal Shekhar, <sup>2</sup>Dr. Chandra Mohan Sinha

<sup>1</sup>Senior Resident, <sup>2</sup>Associate Professor  
Department of General Surgery,  
Jawahar Lal Nehru Medical College, Bhagalpur

## ABSTRACT:

**INTRODUCTION:** The Term acute abdomen refers to sign and symptoms of abdominal pain and tenderness that often requires emergency surgical therapy, the objective of the present study was compare pre-operative diagnosis based on clinical examination, radiological with operative diagnosis in various acute abdomen conditions.

**MATERIAL AND METHOD:** The present study was a comparative observational study where all the patients were admitted through surgical emergency in Jawaharlal Nehru Medical College and hospital, Bhagalpur from august 2019 to September 2021 with acute abdominal pain. Total 100 were selected and they were examined clinically and evaluate with CBC, KFT, LFT, X-ray Of abdomen and who underwent exploratory laparotomy.

**Results:** The results showed that mean age of the patient is  $38 \pm 14.6$  years with M: F ratio of 1:3.5. Hollow Viscous Perforation was the most common cause of acute abdomen, accounting for 36% of total cases followed by intestinal Obstruction (24%). The accuracies was recorded for clinical features, ultrasonography and X-ray for acute abdomen cases.

**CONCLUSION:** We concluded that Plain X-ray san ultrasonography can be used for diagnosing acute abdominal emergencies; they are the cheaper, non-invasive, quick, reliable and highly accurate modality in diagnosing the exact cause of pain and its origin a patient presenting with an acute abdomen and thus helps the physician or surgeon to plan the timely management.

**Keywords:** Acute Appendicitis, perforation peritonitis, ultrasonography.

## INTRODUCTION

Acute abdomen means the patient complains of acute attack of abdominal pain that may occur suddenly or gradually over a period of several hours and present a symptom complex which suggests a disease that possibly threatens life and demands immediate or urgent diagnosis for early treatment.

Hippocrates observation of manifestation of acute abdominal conditions have been a masterpiece about life and its meaning. Among the condition that relate peculiarly to small intestine is Intestinal obstruction recognized as early as eight century BC. At that time, sushruta recommended that obstruction is treated by incision of the intestine, replacement of organ after moistening them with honey and butter and sewing up of the intestine. Acute abdomen refers to the clinical condition of the intra-abdominal organ, usually related to inflamed or infected, demands immediate and accurate diagnosis with abdominal pain present for less than 6-8 hours.

The Approach to a patient with an acute abdomen should include a through history and physical examination, The location of pain is critical as it may signal a localized process. However in patients with free air, it may present with diffused abdominal pain palpitation may reveal rebound tenderness and guarding and auscultation may revel absent bowel sound, suggestive of appendicitis, perforated peptic ulcer, acute pancreatitis, volvulus, rupture sigmoid diverticulum, ovarian torsion, lacerated spleen or liver and ischemic bowels.

History taking and physical examination from the corner stone of diagnosis equally important is investigational confirmation of suspected diagnosis by laboratory test and radiological investigation. Ultrasound is a well-established imaging modality for evaluating the abdomen as it is non-invasive, readily obtained relatively inexpensive and without the risk of ionizing radiation or iodinated intravenous contrast. In addition ultrasound has extremely high diagnostic accuracy in clinical scenarios, The present study was carried out as an attempt to correlate and emphasize the salient approaches to the diagnosis and treatment of the various acute abdominal conditions, because the clinical feature generally referred to acute abdomen often present an intriguing diagnostic challenge to the surgeon. In majority of the patients, a proper diagnosis may be reached by means of careful history and complete mastered examination, supplemented by a few simple laboratory findings and radiological imaging. It is hoped that this attempt will be of some aid in clarifying the vital decision any surgeon should take, when confronted with acute abdominal problem especially in places where the least diagnostic facilities are available.

## MATERIAL AND METHODS:

The present study was a prospective observational study where all the patients were admitted through surgical emergency in Jawaharlal Nehru Medical College and hospital, Bhagalpur in East Bihar from august 2019 to September 2021 to compare the pre-operative diagnosis based on clinical examination and investigation with operative diagnosis in acute abdomen.

**INCLUSION CRITERIA:**

All patients who presented to emergency Department with clinical diagnosis of acute abdomen were included in the study.

**EXCLUSION CRITERIA:**

- \*Pediatrics age group (14 yes and below)
- \*Acute abdomen in pregnancy
- \*Gynecological cause of acute abdomen
- \*Patients who refused surgery

Total 100 patients who underwent exploratory laparotomy were compared with intraoperative diagnosis, the post-operative period of all patients were followed.

**STATISTICAL ANALYSIS**

The data was entered in the excel spread sheet and statically analysis was performed using SOSS 20 software programe. The prescriptive statistics was calculated using percentage.

**RESULTS:**

In the present study, an increased incidence in female was observed, M: F ratio of 1:3.5. Mean age of the patient is  $38 \pm 14.6$  years with the range of 7-70 years (Fig 2). Most common age group was 21-30 (34%) years, followed by 31-40 (30%) years. Most common clinical complaint of patients was abdominal pain (localized or diffuse) present in 100% cases followed by vomiting, abdominal distention, fever and constipation seen in 88%, 60%, 34% and 30% respectively. (Table1)

Acute abdomen was perforation peritonitis the most common cause of acute abdomen, accounting for 36% of total cases which include gastric perforation and intestinal perforation. Second commonest cause for was intestinal obstruction that was seen in 24% cases. This was followed by acute Appendicitis, acute cholecystitis and acute pancreatitis with 10% cases each. Lesser common diagnosis were of Strangulated/ obstructed Hernia (6%) and Meckels Diverticulitis (2%).(Table2)

Total 83cases underwent radiographic analysis using X-ray. The specificity and sensitivity inacute intestinal obstruction were 80% and 92.86% respectively with PPV of 80% and NPV of92.86%. The accuracy recorded in our series was 89.47 %. However the X-ray could not accurately diagnose between the ilealandgastricperforations, it diagnosed pneumo-peritoneum (air under the diaphragm) with sensitivity of 80.33% and specificity of 100% with accuracy of 89.47%. Pneumoperitoneum indicates that patient had gastro intestinal perforation. One case each of strangulated hernia and meckels diverticulum had x-ray abdomen, it failed to arrive at an accurate diagnosis.(Table4).

Total 36 cases in present series underwent USG abdomen and the sensitivity and specificity of USG in renal colic were 100%. In cholecystitis it was 94.4% sensitive and 100% specific. In appendicitis it was 80% sensitive and 100% specific. The accuracy in appendicitis was 97.92%. It was 63.6% sensitive and 100% specific in GI perforation. However USG couldn't differentiate between gastricandileal perforation.(Table5).

Total 11 cases underwent CT scan and all the cases were correctly radiologically diagnosed by CT scan in the present series. In case of GI perforation, CT couldn't differentiate between gastric and ileal perforation, however it diagnosed pneumoperitoneum accurately.

**TABLE 1: PRESENTING COMPLAINTS**

Complaints	Number Of Patients	Percentage Of Patients
<b>Pain</b>	100	100%
<b>Vomiting</b>	84	84%
<b>Constipation</b>	55	55%
<b>Abdominal Distention</b>	80	80%
<b>Fever</b>	30	30%

**TABLE 2: INCIDENCE OF VARIOUS ACUTE ABDOMINAL EMERGENCY**

Diagnosis	Number of Patients Examined Clinically	Number of Patients Examined Radio-logically (X-ray abdomen)	USG	CT-scan	Final Diagnosis Of The Patients
<b>GI Perforation</b>	42	42	10		42
<b>Acute intestinal Obstruction</b>	32	32	4	1	32
<b>Acute Appendicitis</b>	12	5	8	1	11
<b>Cholecystitis</b>	8	-	4	5	8
<b>Pancreatitis</b>	3	-	3	3	3
<b>Strangulated Hernia</b>	3	-	-		3
<b>Meckel's Diverticulitis</b>	-	-	-		1
<b>No. Diagnosis Total</b>	- 100	4 83	7 36	- 10	- 100

**TABLE 3: COMPARING ACCURACY OF CLINICAL DIAGNOSIS WITH FINAL DIAGNOSIS**

ClinicalDiagnosis/ Final Diagnosis	Sensitivity(%)	Specificity(%)	PositivePredictiv eValue(%)	NegativePredicti veValue(%)	Accuracy(%)
Cholecystitis	100.00	96.88	94.74	100.00	98.00
Appendicitis	100%	100.00	100.00	100%	100%
Acute Intestinal Obstruction	100.00	97.78	83.33	100.00	98.00
Pancreatitis	80.00	100.00	100.00	97.83	98.00
Perforation	100.00	100.00	100.00	100.00	100.00
Strangulated Hernia	100.00	100.00	100.00	100.00	100.00

**TABLE4: COMPARING ACCURACY OF XRAY DIAGNOSIS WITH FINAL DIAGNOSIS**

X-Ray/Final Diagnosis	Sensitivity (%)	Specificity (%)	Positive Predictive Value (%)	Negative Predictive Value (%)	Accuracy (%)
Acute Intestinal Obstruction	80.00	92.86	80.00	92.86	89.47
Perforation (pneumoperitoneum)	83.33	100.00	100.00	77.78	89.47

**TABLE 5: COMPARING ACCURACY OF USG DIAGNOSIS WITH FINAL DIAGNOSIS**

USG / Final Diagnosis	Sensitivity (%)	Specificity (%)	Positive Predictive Value (%)	Negative Predictive Value (%)	Accuracy (%)
Cholecystitis	94.44	100.00	100.00	96.77	97.92
Appendicitis	80.00	100.00	100.00	97.73	97.92
Acute Intestinal obstruction	100.00	97.67	83.33	100.00	97.92
Pancreatitis	80.00	100.00	100.00	97.73	97.92
Strangulate Hernia	100.00	100.00	100.00	100.00	100.00
Gastro Intestinal perforation	63.64	100.00	100.00	90.24	91.67

## DISCUSSION

The present study comprises of a detailed clinical and radiological analysis of 100 cases of acute abdominal conditions admitted in the surgical Emergency of Jawaharlal Nehru medical college, Bhagalpur. The criteria for selection of patients for this study were clinically diagnosed acute abdominal cases.

Most of the patients were in age group of 21-40 years with mean age of  $38 \pm 14.6$  years. Manage of patients in a study done by Gupta K et al<sup>4</sup> were in 37.6 years where as in a study by Choi et al<sup>5</sup>, the mean age of the patients were in 59.7 years. Ali MJ et al<sup>6</sup> in their study also found that the most common age group to be 21-40 years. Sharma P et al<sup>7</sup> in their study showed that most of the patients were in 31-40 years age with  $37.9 \pm 16.7$  years as mean age. In the present study, an increased incidence in female was observed, with M: F ratio of 1:3.5. However in most of the studies there are more males affected than females. Most common clinical complaint of patients were abdominal pain (localized or diffuse); present in 100% cases followed by vomiting, fever, abdominal distention, and constipation. In a study by Choi et al<sup>5</sup> and gupta et al<sup>4</sup> the most common complaint was also acute abdominal pain. However Karmakar setal<sup>7</sup> in their prospective study observed abdominal pain as most common complaint seen in 70% patients.

In the present study the clinical and radiographic analysis were compared with final diagnosis for different cases.

In the present study the sensitivity and specificity for clinical diagnosis in acute intestinal obstruction was 100% and 97.78% respectively. It has a NPV and PPV of 100% and 83.3% respectively. The accuracy recorded in our series was 98%. The specificity and sensitivity in acute intestinal obstruction for X-ray abdomen was 80% and 92.8% respectively and with a PPV of 80% and NPV of 92.8%. The accuracy for x-ray was 89%. In case of USG, it was 97.6% specific and 100% sensitive in acute intestinal obstruction. CT scan was able to diagnose the etiology of acute intestinal obstruction accurately in all the cases (table 5).

Thompson et al in 2007 showed the sensitivity and specificity of acute intestinal obstruction to be 82% and 83% respectively.<sup>9</sup> According to Kim et al, the sensitivity and specificity of plain abdominal radiography for SBO were 82.0% and 92.4% respectively.<sup>10</sup> According to a study conducted by Suri et al, CT had high sensitivity (93%), specificity (100%) and accuracy (94%) in diagnosing the presence of obstruction. The comparable sensitivity, specificity and accuracy were, respectively, 83%, 100% and 84% for USG and 77%, 50% and 75% for plain radiography.<sup>11</sup>

Clinically the accuracy of diagnosis of GI perforation was 100%. X-ray could not differentiate between the ileal and gastric perforation but it diagnosed pneumo-peritoneum with a sensitivity of 83.33% and specificity of 100%. The accuracy of X-ray abdomen was 89.47%. CT diagnosed pneumo-peritoneum accurately in 2 doubtful cases. Ultrasonography was 63.6% sensitive and 100% specific for detecting GI perforation. Even though both USG and x-ray diagnosed pneumoperitoneum, it couldn't differentiate whether the GI perforation was gastric or ileal.

Bansal et al in their study in diagnosing intestinal perforations, found that overall positivity rate of plain radiography in detecting pneumoperitoneum to be 89.20%. The positivity rate was highest for stomach and duodenal perforation (94.19%) and the least was for appendicular perforation (7.69%).<sup>12</sup> Mohammad T in his study on gastrointestinal perforation concluded that plain X-ray of the chest and abdomen yielded high diagnostic accuracy rate.<sup>13</sup> It is suggested that the patients with no radiological findings GI perforation, may have small sized perforations sealed perforation or just a little peritoneal soiling and a conservative treatment should be adopted in these patients.<sup>13</sup>

The sensitivity and specificity of USG abdomen and clinical diagnosis in acute cholecystitis was 100%. In contrast to our study where all the cases were correctly diagnosed, Hwang et al in 2013 showed that it had only 54% sensitivity, 81% specificity, 85% PPV and 47% NPV. In addition to that, they also showed that a higher rate of accurate diagnosis can be achieved using a triad of positive Murphy sign, elevated neutrophil count and an ultrasound showing cholelithiasis or cholecystitis.<sup>14</sup>

Wertz et al in their study showed that the sensitivity of CT for detecting AC was significantly greater than that of US: 85% versus 68% ( $p = 0.043$ ), respectively; however, the negative predictive values of CT and US did not differ significantly: 90% versus 77%. Because there were no false-positives, the specificity and positive predictive values for both modalities were 100%.<sup>15</sup>

Pinto et al in their meta-analysis mentioned that ultrasound has the best sensitivity and specificity for evaluating patients with suspected gallstones.<sup>16</sup> Some ultra-sonographic findings are more strongly associated with acute cholecystitis than others: a positive Murphy's sign (pain is provoked by either the transducer or the sonographer's palpation under guidance, in the exact area of the gallbladder) is reported to have sensitivity as high as 88%. Ralls et al reported that one of the most important advantages of

ultrasound over other imaging techniques in the investigation of acute cholecystitis is the ability to assess for a sonographic Murphy sign, which is a reliable indicator of acute cholecystitis with a sensitivity of 92%.<sup>17</sup>

## CONCLUSION

In the present study we found that on combining clinical and radiological analysis, majority cases of acute abdomen could be diagnosed correctly. In the present study the sensitivity of clinical diagnosis was accurate for most of the cases (leaving pancreatitis) however specificity varied for Acute Intestinal Obstruction. However the specificity for acute intestinal obstruction was 92.86% for X-ray diagnosis. For gastro intestinal perforation pneumo-peritoneum could be accurately diagnosed in 89.47% patients. Similarly, USG wasn't of much use in GI perforation. In rest of acute abdominal cases USG had diagnosed most cases correctly. We concluded that Plain X rays and ultrasonography can be used for diagnosing acute abdominal emergencies; they are the cheaper, non-invasive, quick, reliable and highly accurate modality in diagnosing the exact cause of pain and its origin in a patient presenting with an acute abdomen and thus helps the physician or surgeon to plan the timely management. We also concluded that majority of cases can also be diagnosed clinically with high accuracy, provided we take a detailed history and have a thorough clinical examination.

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