

# A Study on Diagnosis of Abdominal Emergencies by Ultrasonography in Rural Medical College

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## ABSTRACT

**Background:** The diagnosis of abdominal emergencies has become easy and with high sensitivity and specificity after invention of Ultrasonography. Previously the diagnosis of acute abdomen was dependent clinically and radiologically. The common abdominal emergencies encounter in surgical practice are acute appendicitis, perforation of hollow viscus, acute pancreatitis, intestinal obstruction and renal colic. Ultrasonography should be a part of routine surgical investigation because of its availability and noninvasive method. Ultrasonography is highly specific and sensitive in diagnosing hepatobiliary conditions whereas in conditions like appendicitis, perforation, pancreatitis, intestinal obstruction and renal colic are like 84.3%, 81.7%, 85.2%, 81.3% and 92.5% respectively.

**Aim of the study:** To analyze the ultrasound finding and its correlation with clinical findings, laboratory and other investigations, in diagnosing abdominal emergencies.

**Materials and Methods:** This study is conducted in Vishwa Bharathi Medical College and in Radiology department in collaboration with General Surgery department. This study has been conducted for 1 year from February 2020 to January 2021.

**Results:** We have included the 100 patients in this study; out of these 100 patients, 65 are males and 35 are females' patients the age group is between 20 yrs to 70 yrs.

The common age group is between 40 and 50 years. The common surgical emergencies in our study are acute appendicitis, peritonitis, renal colic and intestinal obstruction.

**Conclusion:** Acute abdomen cases are very common in India. Ultrasonography is important in early diagnosis and early management because of its availability and noninvasive method. Ultrasonography should be a part of routine investigation in acute abdomen cases.

**Keywords:** Abdominal Emergencies, Ultrasonography, Hemoperitoneum, Peritonitis.

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## INTRODUCTION

Ultrasound is composed of Sound wave with frequencies which are significantly higher than the range of human hearing (20,000Hz). Ultra-sonic images also known as sonograms are created by sending pulses of ultrasound into tissue using a probe. The ultrasound pulses echo off tissues with different reflection properties and are returned to the probe which records and displays them as an image. Acute abdomen or abdominal pain is severe pain arising in the abdominal area and it needs immediate diagnosis and intervention. In developed countries, acute appendicitis and acute intestinal obstruction accounts for 24.8% and 33.95% respectively. In developing countries, the incidence is not known.<sup>1</sup>

The Abdomen is divided into 9 regions but for clinical purpose into 4 quadrants 1) Right Upper 2) Right Lower 3) Left Upper 4) Left

Lower quadrants. Common causes of acute abdomen in right upper quadrant are, liver abscess, cholecystitis, intestinal obstruction and cholangitis.<sup>2</sup> The Causes of Acute abdomen in right lower quadrant are Acute appendicitis, ectopic pregnancy, diverticulitis, renal colic. Causes in left upper quadrants are pancreatitis, Gastritis, rupture of spleen, intestinal obstruction. The cause of acute abdomen in left lower quadrant are Ischemic colitis, renal colic, ovarian torsion, intestinal obstruction.<sup>3</sup> In all these conditions after clinical examination, plain X-ray abdomen and ultrasonography plays major role in the diagnosis. Ultrasonography has more than 90% of accuracy. The Current study was undertaken to evaluate the use of Ultrasonography in acute abdomen and to know the sensitivity and specificity in the prognosis and diagnosis.

The clinical features include pain abdomen which is severe, vomiting, fever, diarrhea, rigidity, tachycardia dehydration, altered sensorium and electrolyte abnormalities. Mortality may be high when signs and symptoms are associated with electrolyte abnormalities.

**MATERIALS AND METHODS**

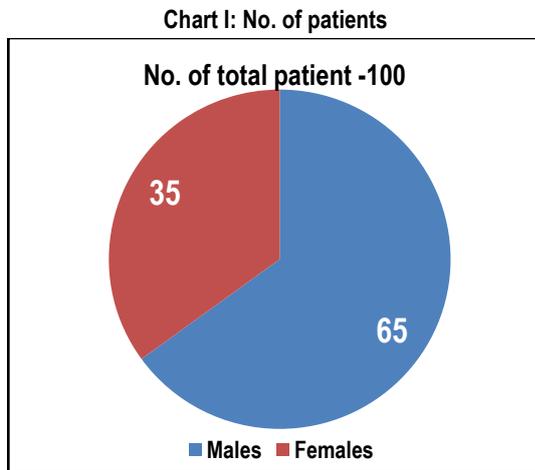
This study has been conducted in Vishwa Bharathi Medical College, Kurnool in the department of Radiology in collaboration with General Surgery department for 1year from Feb. 2020 to January 2021. We have included 100 patients in this study; out of these 100, 65 are Males and 35 are Female patients. The common age group is between 20 years and 70 years after careful history taking and clinical examination. The blood sample has been sent for laboratory for complete blood picture, RBS, Blood urea, serum creatinine, serum electrolytes and X-ray abdomen (erect posture) and ultrasonography. The data has been collected and computerized systematically by M.S. Office. The instrument used was US can with curvilinear probe of 3.5 MHz. Based on findings diagnosis made.



**Fig I: Ultrasound Scan in Acute cholecystitis**



**Fig II: Ultrasound Scan in Acute pancreatitis**



**Table I: The age group in Males (65)**

Age in Yrs	n (65)	%
20-29yr	10	15.38%
30-39yr	24	36.92%
40-49yr	18	27.69%
50-59yr	8	12.30%
60-70yr	5	7.69%

**Table II: The age group in Females (35)**

Age in Yr	n (35)	%
20-29yr	4	11.42%
30-39yr	11	31.35%
40-49yr	9	25.71%
50-59yr	7	20.00%
60-70yr	4	11.42%

**Table III: Cause of Acute abdomen**

Causes	n (100)	%
Acute Appendicitis	29	32.22%
Intestinal Obstruction	23	25.55%
Perforation	17	18.83%
Pancreatitis	14	15.26%
Others	7	7.13%



**Fig III Ultrasound Scan in Appendicular abscess**



**Fig IV Ultrasound Scan in Perforated appendix**



Fig V: Normal renal ultrasound

## RESULTS AND DISCUSSION

We have included 100 patients in this study; out of these 100, 65(72.2%) are Males and 35(29.8%) are females. The common age group involved is between 30yrs and 40years (56.7%). Majority of patients are having the symptoms of acute abdominal pain lasting from few hours to few days and associated with other symptoms like vomiting, fever, diarrhea hematuria, rigidity, tachycardia.<sup>4</sup>

The most common causes of pain abdomen in our study were gastrointestinal like intestinal obstruction 25.55% and acute appendicitis (32.22%) follower by renal colic. Out of these 90 cases 29 cases were diagnosed by ultrasounds and 17 cases diagnosed as perforated hollow viscus. The accuracy of diagnosis made by ultrasound scan is about 89.5%. The studies conducted by Chaetric R K and Shresthe M shows similar results to our study (92.7%).<sup>5</sup>

14 cases are diagnosed as acute pancreatitis (15.26%), real calculi are 6 cases (7.2%), 1 case diagnosed as choledocholithiasis and 1 case as torsion ovarian cyst. In our study the sensitivity and specificity for appendicitis, perforations of hollow viscus, pancreatitis and intestinal obstruction and renal colic are like 84.3%; 81.7%; 85.2%; 81.3%; and 92.5% respectively.<sup>6</sup>

Ultrasound is composed of Sound wave with frequencies which are significantly higher than the range of human hearing (20,000Hz). Ultra-sonic images also known as sonograms are created by sending pulses of ultrasound into tissue using a probe. The ultrasound pulses echo off tissues with different reflection properties and are returned to the probe which records and displays them as an image.

Compared to other medical imaging modalities, ultrasound has several advantages. It provides images in real time is portable and can consequently be brought to the bed side. It does not have ionizing radiation. Ultrasonography diagnosis was compared with the final diagnosis based on laboratory results X-rays and operative findings. In cases of acute abdomen, the examination by ultrasonogram is highly accurate. The study conducted by Allamann et al. Shows that Ultrasound Scan improved the correct diagnosis rate from 70% to 83%.

The diagnosis by ultrasound scan was compared with laboratory diagnosis and radiological findings and operative findings. In

Acute abdomen patients the Ultrasound Scan made highly accurate diagnosis in our study it is 83.5% to 89.5% The studies conducted by Panchar P. et al shows 76% accuracy.<sup>7</sup>

In our study, The accuracy for diagnosis of biliary tract disease and appendicitis improved after ultrasound from 437 (89.3%) to 468 (95.6%) to 472 (98.6%) respectively the corresponding sensitivities and specification were 89.3%; 95.6% and 91.3%; 98.6% In our study 6 cases were missed by ultrasound diagnosis and which were diagnosed by CT Scan abdomen The ultrasound scan able to detect 26 cases of acute appendix with blind ending tubular structure, remaining 3 cases were identified by laboratory. The sensitivity and specificity as 84.3% and 85.3%. The studies conducted by Benko et al show sensitivity and specificity as 81.5% and 84.9% respectively.<sup>8</sup>

The major symptoms in perforation of hollow viscus are fever, sharp burning pain in the epigastrium out of 17 cases 14 cases had rigidity of abdomen the ultrasound scan able to diagnose 13 cases out of 17, 4 cases were diagnosed later by laparotomy. The sensitivity and specificity of diagnosis with ultrasound scan were 84.5% and 81.2% respectively. Braccini G et al observed 86% and 83.5% respectively.<sup>9</sup>

In the cases of intestinal obstructive ultrasound scan diagnosed 21 out of 23 cases it detects dilated fluid filled a peristaltic bowel loops with coarse level intra luminal echoes. The cause of Hernia could not be detected by ultrasonography. The sensitivity and specificity with ultrasonography was 92.4% and 82.3% respectively. The study conducted by Schmutry et al shows that almost similar results 93.9% and 84.25% respectively. In our study in the cases of acute cholecystitis (4no.) The walls of gall bladder were thickened and edematous. The sensitivity of diagnosis by ultrasound scan was 99.89%. The sensitivity and specificity by Ralls PW et al were almost same.<sup>10</sup>

## CONCLUSION

Ultrasonography is very useful investigation in acute abdomen cases. It is noninvasive and portable, and investigation are easily carried out in rural areas also early diagnosis helps in the reducing the mortality. And sensitivity and specificity in most of the non-traumatic acute abdomen cases are nearly 85% to 93%. In India the common causes of acute abdomen are appendicitis, peritonitis, renal colic, cholecystitis.

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