

# Role Of Ultrasonography In Non Traumatic Acute Abdomen

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## Abstract

**Background:** In acute abdomen the patient experiences sudden severe abdominal pain which may suggest a threat to his/her life and may or may not demand immediate operative interference. It is important to make early diagnosis and a delay will worsen the condition and may lead to fatal outcome.

**Objective:** To determine the ability of ultrasound to diagnose non traumatic acute abdominal conditions, analysis of ultrasound findings and its correlation with clinical findings, laboratory and other radiological investigations along with operative findings, wherever possible. In addition to compare sensitivity and specificity in diagnosing various conditions.

**Materials and methods:** The study comprised of patients presented with non-traumatic acute pain abdomen during the period June 2003 to October 2004 to our hospital and underwent ultrasonography.

**Results:** A total of 148 patients were included in this study and underwent abdominal ultrasonography. Definite diagnosis was made in 116 cases (78.4%). The sensitivity and specificity for ultrasound in diagnosing acute appendicitis, ureteric colic, acute pancreatitis and acute cholecystitis was around 66.6% and 100%, 84.6 % and 98.4%, 73.6% and 97.7%, 92.3% and 100% respectively.

**Discussion:** In diagnosing hepatobiliary and gynecological conditions ultrasonography is highly sensitive and highly specific. In diagnosing acute appendicitis, ureteric colic and acute pancreatitis ultrasonography has high specificity but low sensitivity. However ultrasonography was misleading in five cases.

**Conclusions:** The accuracy of ultrasound in diagnosing hepatobiliary and gynecological disorders helps to reduce negative laparotomy rate and is cost effective. Hence ultrasonography should be a part of routine surgical investigation and should be mastered and used by surgeons.

## INTRODUCTION

'Acute abdomen' is a term used to encompass a spectrum of surgical, medical and gynecological conditions ranging from the trivial to life threatening conditions which require hospital admission, investigations and treatment. Acute abdominal conditions occupy one of the few areas of medical practice where the surgeon often reaches a diagnosis without resorting to numerous investigations. Today, ultrasonography (USG) of abdomen is one of the commonly asked investigations by the surgeon in case of acute abdomen. Advantage of USG over other radiological investigation is that it is easily available, cost effective, portable, no known side effects, non invasive and requires minimal patient preparation.

## MATERIALS AND METHODS

This being a prospective study comprised of patients presented with non traumatic acute abdominal pain during the period of June 2003 to October 2004 at Kasturba Medical College Hospital, Manipal, and a tertiary referral centre in South India and were subjected to USG examination after clinical examination. Patients under 15 years of age, patients referred to hospital with definite diagnosis and with traumatic acute abdomen were excluded. The instrument used was ultrasound GE Logic 200 of frequency 200MHz. Patients were examined by the emergency duty radiology postgraduates and in doubtful cases patients were re-examined by radiology staff.

### RESULTS

The study comprised of 148 patients who attended our hospital casualty with history of acute pain abdomen during the above mentioned period. There were 91 males and 57 females and the male to female ratio was 2:1. The common age of presentation was between 21 and 30. Out of 148 patients USG gave an accurate diagnosis in 116 cases (78.4%). The most common cause of pain abdomen in our study was acute appendicitis (36 patients, 24.3%) followed by non-specific pain abdomen (28 patients, 18.9%). Other common causes for pain abdomen were ureteric colic (24 patients, 16%), acute pancreatitis (19 patients 12%), acute cholecystitis (12 patients 8%) and acid peptic disease (10 patients 6.7%). Few other causes for acute abdomen in our study was hollow viscus perforation (9 patients, 4.7%), ovarian cyst (4 patients, 2.7%), liver abscess (3 patients, 2%), hydatid cyst of liver (2 patients 1.4%), ruptured ectopic pregnancy (1 patient, 0.7%), TB abdomen (1 patient, 0.7%) and secondaries in abdomen (1 patient, 0.7%). The sensitivity and specificity of USG in diagnosing acute appendicitis, ureteric colic, acute pancreatitis and acute cholecystitis was around 66.6% and 100%, 84.6% and 98.4%, 73.6% and 97.7%, 92.3% and 100% respectively in our study. For hollow viscus perforation it was around 92.3% and 100%, where as for other conditions such as liver abscess, hydatid cyst and rupture ectopic pregnancy the sensitivity and specificity was 100% but patients with these conditions were very few.

### DISCUSSION

Clinical diagnosis and USG diagnosis were compared with the final diagnosis based on laboratory values, radiological findings, and operative findings. Out of 148 patients definite clinical diagnosis was made in 105 patients (70.9%) and USG made a correct diagnosis 116 cases (78.4%). Hence with the help of USG, accuracy of diagnosing acute pain abdomen increased by around 8%.

However USG was misleading in five cases, where two cases were diagnosed as ureteric colic and in three other cases a probable diagnosis of pancreatitis was made but finally all the five cases turned out to be non specific pain abdomen. Presence of intra abdominal gas, echogenic walls of vessels and renal sinus fat may mimic renal stones, whereas dilated second part of the duodenum, lateral segment of left lobe of liver and horse shoe kidney may mimic enlarged pancreas and may be mistaken for pancreatitis. USG helped in diagnosing four cases of ureteric colic, three cases of acute cholecystitis, two cases of acute

pancreatitis and one case of acute appendicitis which were misdiagnosed clinically. In nine cases, it helped in diagnosing the disease which was clinically never thought off (three cases of liver abscess, two cases of hydatid disease, two cases of ovarian disease, one case of TB abdomen and one case of secondaries in liver).

In diagnosing hepatobiliary and gynecological disease, USG is highly sensitive and specific, and is seen to be more accurate than clinical diagnosis. Whereas in diagnosing acute appendicitis, it is less accurate than clinical diagnosis. In diagnosing retroperitoneal conditions, the sensitivity and specificity is almost same for clinical and USG diagnosis. In diagnosing acute appendicitis, ureteric colic and acute pancreatitis USG has high specificity but low sensitivity. In non specific pain abdomen (28 patients) and acid peptic disease (10 patients), USG helped in ruling out other acute abdominal conditions for the cause of pain. In seven cases of hollow viscus perforation, pneumoperitoneum was not detected even in a single case; however indirect evidence of peritonitis such as free fluid and decreased peristalsis was detected in five out of seven cases. X-ray abdomen was found to be superior to ultrasonography in detecting pneumoperitoneum in our study. For few conditions such as liver abscess, hydatid and ovarian cysts and ruptured ectopic pregnancy the number of cases are very less to comment.

### COMPARISON WITH AVAILABLE LITERATURE

There are a few studies which have looked at the various parameters we analyzed. Allemann et al [1] reported that in USG done by surgeons for patients with acute abdominal pain it the correct diagnostic rate from 348 patients (70%) to 414 patients (83%). In the same study, USG was found to have sensitivity and specificity of 94% and 99% in diagnosing biliary tract disease. Mishra et al [2] in their study of imaging for acute abdomen had 13 cases of appendicitis. USG was diagnostic in 11 with sensitivity and specificity of 91.6% and 97%. Zoller et al [3] in their meta analysis demonstrated that USG has sensitivity of 85% and a specificity of 96% in diagnosing acute appendicitis. McGrath et al in their study on the role of early USG in the management of the acute abdomen concluded that it is most useful in the diagnosis of gynecological disorders. Manfredi et al [4] concluded that USG in acute pancreatitis is a good screening test in patients with suspected biliary pancreatitis and a mild clinical course but contrast enhanced CT is preferred for patients with acute pancreatitis.

### **CONCLUSION**

In diagnosing hepatobiliary and gynecological disorders USG is more accurate, whereas in diagnosing acute appendicitis, ureteric colic and acute pancreatitis it has high specificity but low sensitivity. USG is also helpful in diagnosing alternative disease and to reduce negative laparotomy rate. Other advantages of USG over other radiological investigations are that it is portable, hazardless and cost effective. Hence USG should be an important part of routine surgical investigation and should be mastered and used by surgeons.

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