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Study of Ultrasound in Acute Abdomen at Ccmmc and Hospital, Durg

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Abstract

Acute abdomen is a term frequently used to describe the patients who are having abdominal tenderness and rigidity. Before the use of imaging technique, these patients were candidates for surgery. Ultrasound plays an important role in the initial evaluation of the acute abdomen. Ultrasound may be used as a first line of investigation in order to make a definitive diagnosis or can be used as a triage tool to direct subsequent patient management appropriately. Ultrasonography remains the primary imaging technique in the majority of cases, especially in young and female patients, when there is a limitation of the radiation exposure. ***Material and methods:*** 50 cases of acute abdomen were selected for the study. Patients with trauma and with compromised vital signs were excluded from the study. History taking and thorough clinical examination was carried out. All necessary biochemical and haematological investigations were carried out. Provisional diagnosis was made on the basis of sonographic findings. ***Results:*** 27 patients were male and 23 were females. Mean age of the patients was 36.34± 21.03 years. Final diagnosis was made on the basis of operative procedure, histopathology and therapeutics. Finally, 15 (30%) cases were diagnosed as acute appendicitis. 9 (18%) were diagnosed as acute cholecystitis, 4 (8%) each as pancreatitis, ulcer perforation and instentinal obstruction, 2(4%) each were diagnosed as ectopic pregnancy, Amoebic liver abscess, psoas abscess and Renal cause, 4 (8%) were diagnosed as pelvic inflammatory disease and 2 (4%) were chronic liver disease. Among the surgically treated patients, 38 patients (72%) were correctly diagnosed by preoperative ultrasonography. These included acute appendicitis (n = 14), acute cholecystitis (n = 10), ulcer perforation (n = 4), and liver abscess (n = 2), ectopic pregnancy (n=2), intestinal obstruction (n=4) and psoas abscess (n= 2). ***Conclusion:*** Ultrasonography plays an important role in the evaluation of the acute abdomen and initial evaluation by supporting the differential diagnosis.

Keywords: ***Ultrasound, Acute Abdomen, EM***

Introduction

Evaluation of the emergency department patient presenting with acute abdomen is sometimes difficult. Doctors in the emergency medicine (EM) must be skilled in the assessment of abdominal pain and common presentation must be approached in a serious manner, as it is often a symptom of serious disease and there is a chance of misdiagnosis due to which there may be medico legal actions taken against both general and EM physicians.[1] Of all patients who present to the emergency medicine, 4%–5% have acute abdominal pain.[2] Obtaining a careful medical history and performing a physical examination are the initial steps and the clinician may consider imaging examinations to help in the correct diagnosis of acute abdomen patients.

Acute abdomen is a term frequently used to describe the patients who are having abdominal tenderness and rigidity. Before the use of imaging technique, these patients were candidates for surgery. However, with the advent of imaging, some patients with acute abdomen will not undergo surgery.[3]

Ultrasound plays an important role in the initial evaluation of the acute abdomen. Ultrasound may be used as a first line of investigation in order to make a definitive diagnosis or can be used as a triage tool to direct subsequent patient management appropriately. As with all ultrasound techniques, the value of the test is in the high sensitivity and specificity provided by a trained, experienced operator.

The location of pain is a useful starting point and will guide a further evaluation of acute abdomen.[4] However even though CT is emerging as a modality of choice for evaluation of the acute abdomen, ultrasonography (US) remains the primary imaging technique in the majority of cases, especially in young and female patients, when there is a limitation of the radiation exposure.[5]

Emergency ultrasonography plays an important role in acute abdominal conditions by supporting the differential

diagnosis of medical and surgical disease. Causes are different in different age group and population. Also it is important to consider special populations such as the elderly or oncologic patients, who generally present with atypical symptoms of a disease.

American College of Radiology has recommended using different imaging studies to assess abdominal pain based on the location of pain, computed tomography is recommended for the right and left lower quadrant pain and ultrasonography is recommended to assess the right upper quadrant pain.[4] Accurate diagnosis can be made on the basis of physical examination, medical history, and laboratory test findings while imaging plays a vital role in only small number of patients.[5]

Aim of Study

To evaluate the role of ultrasonography in the diagnosis of acute abdomen and to correlate the ultrasonography findings with clinical features to make the provisional diagnosis

Material and Methods

A prospective study of 50 cases of acute abdomen was carried out in a department of Radiology at CCM Medical College Kachandur, Durg from Nov 2015 to January 2017. Written informed consent was taken. Patients with trauma and with compromised vital signs were excluded from the study. History taking and thorough clinical examination was carried out. All necessary biochemical and haematological investigations were carried out. Provisional diagnosis was made on the basis of sonographic findings. The final diagnosis was made on the basis of operative findings, histopathological findings and laboratory findings.

Results

Of the total 50 patients included in the study 27 were male and 23 were females. Mean age of the patients was 36.34± 21.03 years. There were 14 cases diagnosed of Acute appendicitis with sensitivity of 100% and Positive Predictive Value82.35%.10 cases were diagnosed as Cholecystitis with sensitivity and positive predictive values as 90.91% and 80.57% to 85.77% respectively. In perforation, ectopic pregnancy, amoebic liver abscess and psoas abscess sensitivity was found to be 100% and positive predictive values 100%. In pancreatitis and renal disease sensitivity was 75% and 50% respectively while positive predictive values were 63.01% to 84.08% and 11.11% to 66.66% respectively.

Table no I: Showing clinical, final and Ultrasonographic diagnosis and sensitivity and Positive Predictive Value

	Clinical diagnosis	Final diagnosis	Ultrasonographic diagnosis	Sensitivity (%)	Positive Predictive Value
Acute Appendicitis	17	15	14	100	82.35%
Acute Cholecystitis	13	9	10	90.91	80.57% to 85.77%
Ulcer perforation	4	4	4	100	100%
Pancreatitis	5	4	3	75.00	63.01% to 84.08%
Ectopic pregnancy	2	2	2	100	100%
Amoebic liver abscess	2	2	2	100	100%
Intestinal obstruction	3	4	4	100	100%
Psoas abscess	0	2	2	100	100%
Renal cause	4	2	1	50	11.11% to 66.66%
Pelvic inflammatory disease	0	4	0		
chronic liver disease	0	2	0		

Final diagnosis was made on the basis of operative procedure, histopathology and therapeutics. 15 (30%) cases were diagnosed as acute appendicitis. 9 (18%) were diagnosed as acute cholecystitis, 4 (8%) each as pancreatitis, ulcer perforation and instentinal obstruction , 2(4%) each were diagnosed as ectopic pregnancy, Amoebic liver abscess, psoas abscess and Renal cause, 4 (8%) were diagnosed as pelvic inflammatory disease and 2 (4%) were chronic liver disease.

Treating physicians and surgeons analysed the distribution of diseases and compared ultrasonographic conclusions with confirmed diagnoses of acute abdomen. The role of emergency abdominal ultrasonography was evaluated especially in the decision of emergency operation. Thirty-eight patients underwent surgery and 12 patients were treated conservatively. Among the surgically treated patients, 38 patients (72%) - were correctly diagnosed by preoperative ultrasonography. These included acute appendicitis (n = 14), acute cholecystitis (n = 10), ulcer perforation (n = 4), and liver abscess (n = 2), ectopic pregnancy (n=2), intestinal obstruction (n=4) and psoas abscess (n= 2).

Discussion

Ultrasound examination is non-invasive, cheaper, and highly accurate diagnostic tool in acute abdomen. The most common US technique used to examine patients with acute

abdominal pain is the graded-compression procedure by which interposing fat and bowel can be displaced or compressed by means of gradual compression.[6]

In a study of 496 patients who presented with acute abdominal pain to an emergency, the proportion of patients with a correct diagnosis after clinical evaluation increased from 70% to 83% after evaluation with ultrasonography.[7] Walsh et al.[8] excluded patients who were clinically suspected of having perforated peritonium, bowel obstruction, or appendicitis, whereas Dhillon et al.[9] included all patients with acute abdominal pain for whom ultrasonography was requested by the physician in the emergency medicine.

Although most of abdominal pain is benign in nature, as many as 10% of patients in the emergency department and a lesser percentage in the out-patient setting have a severe or life-threatening cause or require surgery. Perforated viscus or vascular diseases such as aortic dissection and mesenteric ischemiamay cause acute abdominal pain even if less frequent conditions.[3]

Abdominal pain in women may be related to pathology in the pelvic organs. Ectopic pregnancy, pelvic inflammatory disease, and hemorrhagic ovarian cysts are the most commonly diagnosed gynaecologic conditions of women with acute abdomen. Nongynaecologic conditions may overlap the presentation of acute pelvic pain and should also be considered like acute appendicitis.[10] Ultrasonography may be the primary or the only necessary imaging tool in the assessment of acute pelvic pain in women, thereby reducing cost, length of hospitalization, and adverse complications of contrast material reactions, and radiation exposure.[11]

In our study sensitivity positive predictive value of ultrasonography were variable but were quite similar with the final diagnosis. In a study by Ralls PW the role of ulrasonography in evaluation of suspected acute cholecystitis reported accuracy of 95 to 99%.[12] While in our sensitivity was 90.915 and positive predictive value was 80.57%.

Ultrasonography was able to diagnose 14 cases of acute appendicitis out of 15 cases with 100% sensitivity. Visualization of a non-compressible appendix with maximum outer diameter >6 mm or visualization of an appendicolith within an appendix of any size was the diagnostic criteria for acute appendicitis. Appendicolith was visualized in 2 patients only. In 1 patient ultrasonography was normal. In a study by Gaensler EHL et al[13] sensitivity in acute appendicitis was 80 -89% while in our study it was 100%.

Free fluid with echoes was seen on ultrasound in patients of peritonitis. On ultrasonography pneumoperitoneum appeared as an echogenic line beneath the anterior wall of abdominal cavity, associated with characteristic posterior shadowing or reverberation artefact and as little as 1 to 2 ml of free air can be detected by the ultrasonography.[14] In our study 4 cases each were diagnosed as ulcer perforation and intestinal obstruction.

There were4 cases of acute abdomen in clinical diagnosis with pathologies of renal origin while in ultasonographic findings only one case with renal calculi can be diagnosed. In our study 2 cases of psoas abscess was observed by ultrasonography presenting as acute abdomen which shows hypoechoic collection in renal area. Ultrasound was accurate in diagnosing all the 2 cases of amoebic liver abscesses and sensitivity of ultrasound was 100% this rate was comparable with the accuracy rate by Abdul K et al.[15]

On the basis of our study, we concluded that Ultrasonography plays an important role in the evaluation of the acute abdomen because of its low cost, absence of radiation and need for contrast materials. Normal and pathologic sonographic appearances of bowel will enable radiologists to use of this imaging modality. Also it is important in the initial evaluation by supporting the differential diagnosis.

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