



## Role of Ultrasound In Diagnosing Acute Abdomen A Prospective Study.

### KEYWORDS

Ultrasound, operative findings, acute abdomen, appendicitis, Peritonitis, Obstruction.

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### ABSTRACT

*Aim of this study is to evaluate the role of emergency ultrasound in diagnosing the acute abdominal conditions which require emergency surgical intervention. After thorough clinical examination and establishing provisional diagnosis, Emergency ultrasound abdomen examination has been done by the duty radiologist. Immediate surgery has been done. The ultrasound findings are then compared with operative findings are assessed statistically. The present study conducted in the department of General surgery, OSMANIA GENERAL HOSPITAL, HYDERABAD on patients presenting with history of acute abdomen attending the emergency surgical ward, which require emergency surgical intervention during the period from November 2013 to September 2014.*

**INTRODUCTION:** Acute abdomen designates symptoms and signs of intra-abdominal disease which usually requires surgical operation. Acute abdomen encompasses a wide range of surgical, medical and gynecological conditions acute abdomen is a common reason for the admission of patients into the emergency room. 5-10% of all emergency admissions are for acute abdomen. The causes of abdominal pain can range from benign self-limiting conditions to acute life threatening disorders some of which may not require surgical management. Acute abdomen must be evaluated methodically, rapid and accurate diagnosis.

While clinical examination is the mainstay for rapid and accurate diagnosis of acute abdomen it is sometimes uninformative, making imaging modalities necessary. An early and accurate diagnosis is needed for prompt and appropriate management in order to limit morbidity and mortality. Ultrasonography is the most common imaging modality resorted to in evaluating acute abdomen. As it is commonly available. It provides a rapid, safe, cost effective and repeatable evaluation of solid abdominal viscera and free fluid in abdomen fluid. Its main limitation is operator dependent and it is not reliable in presence of air/bone. In an era of evidence based medicine understanding the value of ultrasonography as an adjunct to the clinical diagnosis before surgery is of utmost importance. This study aim to study the role of emergency ultrasound abdomen in diagnosing those acute abdominal conditions which require surgical intervention.

### MATERIALS AND METHODS

The data pertaining to History, clinical examination and ultrasound abdomen of the patients attending emergency surgical ward, Osmania general hospital is collected. The collecting data includes preoperative emergency ultrasound abdomen findings along with the intra operative findings. The total number of cases included in the study was 25 and it is a prospective study.

### INCLUSION CRITERIA

Patients above 14 years of age  
All patients with acute abdomen underwent emergency surgery

### EXCLUSION CRITERIA

Patients below 14 years of age  
Statistical Methods

### Data analysis done by following table

Ultrasound results	Diagnosis		Total
	Disease	Non-Diseased	
Positive	A(true +ve)	B (False +ve)	A+B
Negative	C (false -ve)	D (true -ve)	C+D
Total	A+C	B+D	A+B+C+D

Evaluation of Ultrasound

Sensitivity	=	A/A +C X 100
Specificity	=	D/B + D X 100

Positive Predictive value = A/A +B X 100  
Negative predictive value = D/C +D X 100

### CRITERIA FOR INTRAOPERATIVE DIAGNOSIS:

Acute appendicitis – Inflamed appendix, catarrhal appendix, faecoliths, Hypertrophied mesoappendix.  
Peritonitis due to perforation – Free fluid in the peritoneal cavity and presence of perforation.  
Intestinal obstruction- Dilated bowel loops, strictures, adhesions, growth. Mesenteric ischemia-Homogenously hyper echoic mucosa and hypo echoic sub mucosa.

### OBSERVATIONS AND RESULTS

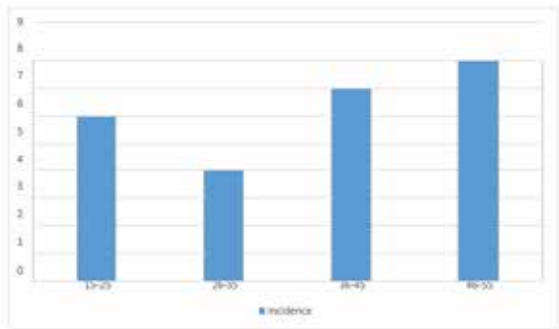
The total number of cases studied in the present study are 25. These are the admitted cases in the emergency ward of General Surgery department in Osmania General Hospital, Hyderabad, between Nov 2013 to Sep 2014.

### AGE INCIDENCE:

AGE	INCIDENCE
15-25	6
26-35	4
36-45	7
46-55	8

In this study, majority of the patients are in the age group of 36 to 55 Yrs.

X axis = age groups Y axis = No. of patients



**SEX INCIDENCE:**

TOTAL	MALE	FEMALE
25	19	6
100%	76%	24%

The total number of male patients in present study are 19, and that of female patients are 06.



**EMERGENCY ULTRASOUND ABDOMEN FINDINGS:**

No	USG Findings	No. of Patients	
		Male	Female
1	Acute appendicitis	5	3
2	Intestinal obstruction	5	0
3	Ruptured liver abscess	1	0
4	Inconclusive findings	14	3
TOTAL :		25	6

Out of 25 cases Emergency Ultrasound Abdomen established diagnosis in 11 cases and in remaining 14 cases reported as inconclusive or normal study.

**COMPARISON OF EMERGENCY ULTRASOUND ABDOMEN AND LAPAROTOMY FINDINGS:**

In present study out of 25 cases, in 9 cases of acute appendicitis ultrasound diagnosed in 5 cases and ultrasound accuracy is 71.4%. there are 5 cases of large bowel obstruction, 4 cases of carcinoma colon are there and ultrasound diagnosed 3 cases by presence of obstruction, 1 case by cause of obstruction. ultrasound accuracy is 75%. 1 case of sigmoid volvulus which is diagnosed and accuracy is 100%. 2 cases of small bowel obstruction are there in which 1 case of TB abdomen is identified by ultrasound and accuracy of 100%, 1 case of obstructed umbilical hernia is not identified by ultrasound. 3 cases of mesenteric ischemia which are not diagnosed by ultrasound. Remaining 2 cases, one is Gall bladder perforation and one is pancreatitis and ultrasound did not identify.

S. No	Diagnosis	Ultra-sound Findings	Laparotomy findings	Ultrasound accuracy
1	Acute Appendicitis	05	07	71.4%
2	Appendicular perforation	00	02	0%
3	Intestinal obstruction due to carcinoma	03	04	75%
4	Intestinal obstruction due to obstructed umbilical hernia	00	01	0%
5	Intestinal obstruction due to sigmoid volvulus	01	01	100%
6	Intestinal obstruction due to T B Abdomen	01	01	100%
7	Mesenteric ischemia	00	03	0%
4	Prepyloric perforation	00	03	0%
5	Ruptured liver abscess	01	01	0%
6	Gall bladder perforation	00	01	0%
7	Pancreatitis	00	01	0%
TOTAL :		11	25	44%

**DISCUSSION**

**OPERATIVE DIAGNOSIS VERSUS ULTRASOUND DIAGNOSIS**

**IN ACUTE APPENDICITIS:** In present study, there are 9 cases of acute appendicitis. Ultrasound diagnosed in 5 cases out of 9 cases. Remaining 4 cases evaluated clinically and emergency operation done. One case reported as normal study and one case reported as subcentimetric mesenteric lymphadenopathy. Two cases reported as free fluid in iliac fossa and diagnosed appendicular perforation after surgery.

**Ultrasound accuracy in diagnosing in acute appendicitis:**

Ultrasound results	Diagnosis		Total
	Disease	Non-Diseased	
Positive	5	0	5
Negative	4	0	4
Total	9	0	9

SENSITIVITY- 5/9\*100= 55.55% SPECIFICITY =100%

**IN PERITONITIS:** In present study, 4 cases of peritonitis are there. Out of 4 cases three cases of pre pyloric perforation are present. Ultrasound detected only minimal free fluid in abdomen in 2 cases and distended bowel loops

in 1 case .Doubtful pneumoperitoneum given in one case. Moderate free fluid given in gall bladder perforation and did not commented about the status of gall bladder.

**IN OBSTRUCTION:** Out of 7 cases of obstruction, ultrasound diagnosed in 5 cases by presence of obstruction i.e. DILATED BOWEL LOOPS. In 2 cases, one case ultrasound reported as normal study ,intraoperatively diagnosed as carcinoma sigmoid colon and one case ultrasound reported as defect in anterior abdominal wall with herniation of bowel loops, intraoperatively diagnosed as dilated bowel loops .In ultrasound diagnosed cases, three cases of carcinoma colon, 1 sigmoid volvulus,1 T B abdomen.

OPERATIVE FINDINGS	ULTRASOUND FINDINGS
Carcinoma caecum(Hypoechoic lesion of 3.6*3.3 cm noted in right iliac fossa, Dilated bowel loops all over the abdomen 3.6 cm ?obstruction)	Hypoechoic lesion in right iliac fossa ,Dilated bowel loops in abdomen
Sigmoid volvulus(dilated sigmoid colon and long sigmoid mesentery)	Distended bowel noted in right hypochondriac, epigastric regions
Carcinoma sigmoid colon(Gross distension of small and large bowel loops up to descending colon; Hardstrictures growth at junction of descending and sigmoid colon)	Dilated bowel loops present Minimal free fluid in abdomen
Carcinoma recto-sigmoid(Constricting,annulargrowth at recto sigmoid junction)	Normal study
T B Abdomen(Ascetic fluid of 2 lit, Diffuse tubercles all over the abdomen)	Dilated small bowel loops, Moderate free fluid in abdomen
Carcinoma transverse colon(Hard, constricting stricture at transverse colon; proximal bowels are dilated)	Multiple dilated bowel oops
Obstructed umbilical hernia (Loculated hernia sac, ascetic fluid of 1 lit, interloop adhesions omentum adherent to sac, dilated small bowel loops)	Defect in the anterior abdominal wall with herniation of bowel loops

Ultrasound results	Diagnosis		Total
	Disease	Non-Dis-eased	
Positive	5	0	5
Negative	2	0	2
Total	7	0	7

Ultrasound accuracy in identification of presence of obstruction:

**Sensitivity =71.42% Accuracy =71.42%**

**IN MESENTERIC ISCHAEMIA:** In 3 cases of mesenteric ischemia, ultrasound did not diagnosed in any case. One reported as doubtful pneumoperitoneum, operative diagnosis is gangrene of sigmoid colon. One case reported as moderate ascites, found to have gangrenous ileum of 20cm proximal to I C junction .One case reported as obstructed umbilical hernia, found to have gangrenous jejunum of 10 cm of length intraoperatively.

**IN RUPTURED LIVER ABSCESS:** In the study, reported a case of ruptured liver abscess which is pre operatively diagnosed by ultrasound. In ultrasound 5\*6, 5\*2Cavities in both lobes of liver and collection in right paracolic gutter is noted and the operative diagnosis is Ruptured liver abscess (150 ml of pus, multiple cavities in 4,7and 8 segments of liver).

**IN PANCREATITIS:** Ultrasound findings are dilated bowel loops in lower abdomen, Minimal free fluid in abdomen. Operative findings are necrotizing pancreatitis.

**CONCLUSIONS AND SUMMARY**

Acute abdomen is a common surgical problem encountered in emergency set up. Ultrasound abdomen most common and widely accepted investigation for the diagnosis of etiology and pathology of acute abdomen. In present study, US is found to be accurate in diagnosing acute appendicitis in 55% of patients .US identified the presence of intestinal obstruction but not cause of obstruction and also detected ruptured liver abscess. US is not useful in identifying the cause of peritonitis. Many other studies have also concluded that US is useful investigation in the management of acute abdomen. This study is limited for the fact that emergency ultrasonographic studies was performed by residents in radiology.

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