



MDCT & USG FINDINGS IN BLUNT ABDOMINAL TRAUMA A COMPARATIVE STUDY

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ABSTRACT

Background: Blunt abdominal trauma usually has low sensitivity on physical examination and also subtle clinical manifestations. Improved resolution of the ultrasound machines and availability of multiple frequency probes has improved the specificity of ultrasound evaluation in blunt abdominal trauma. Despite this about 50% of the solid organ injuries are missed.

Computed tomography has been used to evaluate the patient with blunt abdominal trauma who FAST positive as well as indeterminate and clinically suspicious cases of solid organ, hollow viscera, spine & pelvic injury.

AIM & OBJECTIVES: The purpose of this study was to determine sensitivity, specificity and diagnostic accuracy of USG and MDCT and compare the efficacy of the two imaging modalities in blunt abdominal trauma.

METHOD: A prospective observational study of 50 patients was conducted in the Department of Radiodiagnosis, smt kashibai nawle medical hospital, Pune. All patients with blunt abdominal trauma were included FAST screening with ACUSION SIEMENS followed by MDCT study on 16 Slice Philips Brilliance was done. The findings were compared and sensitivity, specificity and diagnostic accuracy of USG and CT determined. These were compared with laparotomy findings.

Results: Although USG was sensitive, specific & accurate in detecting free fluid in abdomen, CT was better and also CT was superior than USG in detecting solid organ injury in patients with blunt abdominal trauma.

Conclusion: Ultrasound is an efficient modality in the initial evaluation of blunt abdominal trauma. But CT is the superior diagnostic modality and must be performed in symptomatic patient with ultrasound negative report and suboptimal ultrasound examination. CT scan thoroughly scrutinizes entire abdomen including retroperitoneum with additional assessment of thoracic trauma and bony pelvic trauma. Hence CT increases diagnostic confidence and influences management decision

KEYWORDS : Blunt Abdominal Trauma, MDCT, USG, FAST.

BACKGROUND:

Ultrasound is rapid, reliable, cost effective and easily available imaging modality with unique ability to detect free fluid and high negative predictive value. Comprehensive evaluation of actively injured patient is frequently impossible due to rib fracture, wounds and gaseous distension of bowel. CT is not only sensitive and specific but also provides global evaluation of abdomen and retroperitoneum. CT gives exact location of injury and its extent, so trend towards conservative management of liver, spleen and kidney injuries is increasing and also number of negative laparotomies is decreased.

“Focused assessment with sonography for trauma” (FAST) is a method to detect intra peritoneal fluid in an emergency setting. Second generation ultrasound with improved resolution and multiple frequency probes improve the specificity of ultrasound evaluation in blunt abdominal trauma. Even with improved ultrasound machines about 50% of the solid organ injuries are missed, hence cannot replace CT. Computed tomography has been introduced to evaluate the patient with blunt abdominal trauma among the FAST positive, indeterminate and clinically suspicious cases of solid organ, hollow viscera, spine & pelvis injury.

AIM & OBJECTIVES:

To evaluate the clinical usefulness of USG and CT scan in patients of blunt abdominal trauma and also to compare the sensitivity, specificity and accuracy of CT scan vs USG in detecting free fluid in abdomen and abdominal organ injury in patients of blunt abdominal trauma.

MATERIALS & METHOD:

A prospective observational study of 50 patients was conducted over a period of 2 years from July 2016 to August 2018 in the Department of Radiodiagnosis smt.kashibai nawle Hospital, Pune.

All patients presenting with blunt abdominal trauma were included. FAST screening with ACUSON SIEMENS followed by MDCT study on 16 SLICE PHILIPS BRILLIANCE was done in all patients. All patients with penetrating abdominal trauma were excluded.

USG technique

FAST was done as a quick screening test and patients were categorized

as positive, negative or indeterminate cases. Abdomen was screened for free fluid in peritoneal cavity and abdominal organ injuries.

CT scan technique

Scan protocol: 120-140 KVP, 200-250 mAs, Pitch 1.5, Field of view 240-300mm, Collimation 2.5 mm (3.2mm effective).

Initially unenhanced images of the abdomen and pelvis were obtained. Subsequently, non-ionic contrast of concentration 400 mg/ml was administered at 1.5ml/kg body weight in adults & children, and was injected @ 2-3ml/second through intravenous cannula using a pressure Injector. Multiphase contrast study was done in each patient. The findings of USG were compared with those of MDCT in detail. Confirmatory correlation was made with laparotomy findings in available cases. Statistical analysis was performed pertaining to sensitivity, specificity and accuracy of USG and MDCT separately and the two results were compared.

RESULTS

Of the total 50 patients, 52% patients were in the age group of 21-40 years, which is the most, The incidence of trauma was much more among males and the most common mode of trauma was road traffic accident (66%), followed by fall from height (28%). all the patients, 90% had abdominal organ injury and hemoperitoneum was found in 90% of

CASES

The most common organs injured were spleen and liver followed by kidney.

USG showed sensitivity of 100%, specificity of 62.5% and overall accuracy of 94% as compared to that of CT, which was 100 % sensitivity, 100% specificity and accuracy of 100% for detection of free intraperitoneal fluid. Also, USG showed sensitivity of 68.8%, specificity of 80% and overall accuracy of 70% as compared to CT, which was 97.7% sensitivity, 100% specificity and overall accuracy of 98% for detection of organ injuries.

DISCUSSION:

In this study, a male predominance was found with male: female ratio of 3.5:1 which was also noted by William Pevec, Andres Peitzman, Anthony Udekwa et al and Srisussadaporn S 26

Fifty two percent (52%) patients were in the age group of 21-40 years, the most active span of life, when people are prone for injuries, also demonstrated by Stuart E. Mirvis, Nancy O. Whitley, David R. Gens.

The commonest mode of trauma was road traffic accident accounting for 66% of total cases. This is similar to findings by Srisussadaporn S.

In this study, spleen and liver were the most common organs injured (seventeen cases each), followed by kidney, which was similar to study by Barry D. Toombs, Richard G. Lester, Yoram Ben Menachem et al.

In this study, USG showed sensitivity of 100%, specificity of 62.5% and overall accuracy of 94% as compared to that of CT, which was 100% sensitivity, 100% specificity and accuracy of 100% for detection of free intraperitoneal fluid which were very well comparable with other studies by Paolo Lucciarini, Schmuel Katz and Sattam S. Lingawi and Paul Vivian W. Wing, A. Kearney, William Pevec and S. Srisussadaporn.

In this study, USG showed sensitivity of 68.8%, specificity of 80% and overall accuracy of 70% as compared to CT, which was 97.7% sensitivity, 100% specificity and overall accuracy of 98% for detection of organ injuries which were very well comparable with other studies by Katz, Sattam S.

CONCLUSION

Ultrasound is an efficient modality in the initial evaluation of blunt abdominal trauma. But CT is the superior diagnostic modality and must be performed in symptomatic ultrasound negative patients, suboptimal ultrasound examination and in patients who are FAST positive and relatively hemodynamically stable to look for solid organ/mesenteric injury. CT scan thoroughly scrutinizes entire abdomen including retroperitoneum with additional assessment of thoracic trauma and bony pelvic trauma. Hence CT increases diagnostic confidence and influences

TABLES

Table 1: Age and Sex distribution (n=50)

S.NO	Age group(Years)	Male	Female	Total(%)
1	0-10	6	4	10 (20%)
2	11-20	6	1	7 (14%)
3	21-30	15	2	17 (34%)
4	31-40	6	3	9 (18%)
5	41-50	3	0	3 (6%)
6	51-60	3	0	3 (0%)
7	61-70	0	0	0 (0%)
8	71-80	0	1	1 (2%)
Total	39	11	50(100)%	

Table 2: Distribution of patients according to mechanism of injury (n=50)

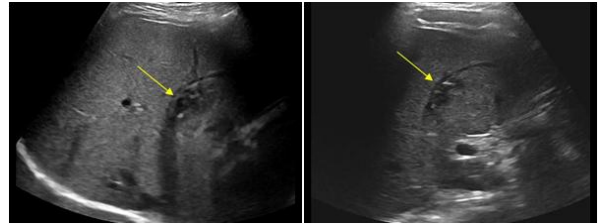
S.NO	MODE OF TRAUMA	NO.OF PATIENTS	PERCENTAGE OF TOTAL(%)
	ROAD TRAFFIC ACCIDENT	33	66%
	FALL FROM HEIGHT	14	28%
	FALL OF HEAVY OBJECT ON ABDOMEN	2	4%
	OTHERS	1	2%
	TOTAL	50	100%

Table 3: Distribution of patients according to organ injury (n=50)

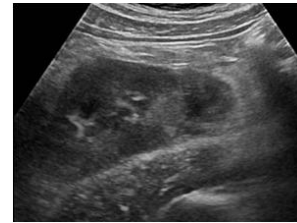
Sr. no	organ	Positive cases onUSG	Positive cases on CT	No of cases confirmed
1	Spleen	12	17	17
2	Liver	11	17	17
3	kidney	10	12	12
4	Pancreas	2	3	3
5	Retroperitoneal hematoma	1	3	3
6	Urinary bladder	0	1	1
7	Mesentry	0	3	3
8	Bowel	0	1	1

9	Pleural collection	7	8	8
10	Psoas hematoma	2	4	4
11	Ureter	0	1	1
12	Adrenal gland	1	2	2
13	Uterus	1	1	1

IMAGES



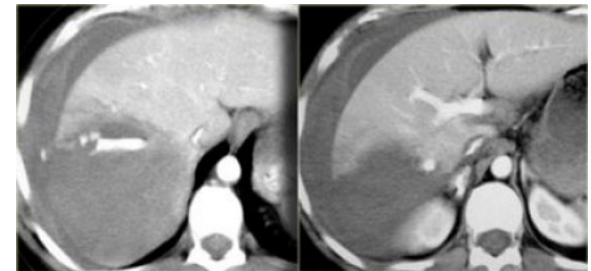
Intracapsular liver rupture



Small renal rupture / contusion of the lower pole of the right kidney



Splenic injury



Complete devascularization of the right lobe with Hemoperitoneum.

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