ORIGINAL ARTICLE

Radiologist and Surgeon in Managing Hepatic Trauma: An audit of Radiology Department of Allama Iqbal Memorial Hospital Sialkot

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ABSTRACT

Aim: To assess the sensitivity and utility of sonographic findings in patients with hepatic trauma and to compare it with the operative findings and CT scan findings in the department of Radiology.
Study Design: A prospective clinical study.
Place & duration of study: The Department of Radiology and the Department of Surgery, Allama Iqbal Memorial Teaching hospital, Sialkot affiliated to Khawaja Muhammad Safdar Medical College, Sialkot from June 2016 to May 2020.
Methods: From June 2016 to May 2020; all patients serially presenting department of Radiology after admission to the surgical department of Allama Iqbal Memorial hospital with suspicion of hepatic injuries. The patients were classed in two groups: Group I- Patients who underwent surgery and Group II- Patients who were admitted and managed conservatively. A prospective cohort study in which the findings of all patients who underwent emergency sonograms were incorporated into data by the sonographer and physicians who interpreted them. All patients who sustained hepatic injuries during this period were identified.
Results: This study included 582 patients (73.4%), out of which 166 patients (28.5%) required surgical intervention and 416 patients (71.5%) were managed conservatively. CT scan was done in all patients of Group-11. Out of 166 operated patients, l l (6.63%) were categorized as Grade-1, 24(14.5%) in Grade-11, 88 (53%) in Grade-Ill, 36 (2l.7%) in Grade-IV and 7(0.4%) were categorized in Grade-V. Out of 416 non-operated patients, 30 l (72.4%) fell in Grade-I and 115(27.6%) in Grade-11. The correlation and comparison between sonographic data and operative findings in operated patients.
Conclusion: The most sensitive technique for detecting grade of liver injuries as a result of blunt abdominal trauma is ultrasonography. It is a primary diagnostic approach in such patients as it can be performed and repeated at bedside and aids in performing paracentesis.
Keywords: Abdominal trauma, ASST liver trauma grades, Computed Tomography, hematoma, hepatic trauma,

INTRODUCTION

The most common cause of death all around the world in people with age less than forty years is blunt abdominal trauma. The liver injury in this group has an incidence extending from 3 to 10%. In about 75-90% cases, lesions of other organs are found. The largest chunk of the liver parenchyma is its right lobe. Therefore, it is commonly involved in such types of injury. Posterior superior hepatic segments have significant importance in determining the site of the lesion. They are proximal to fixed anatomical structures such as ribs and vertebral column. An acceleration-deceleration mechanism is produced by the insertion of coronal segments in the parenchyma. Left hepatic lobe lesions usually result due to the direct impact on the abdomen. Caudal lobe lesions do not occur exclusively and are very rare. The signs and symptoms usually seen in such cases are pain in right hypochondrium, which often radiates to the tip of the right shoulder being the commonest and hypotension or shock in some severe cases. The most common hepatic injury is laceration with hematoma, haemorrhage, injury to the portal vein and common bile duct are other injuries. Prompt surgical intervention is required in lacerations involving portal vein, as there is increased arterial risk injury. Due to aggressive fluid resuscitation in such patients, periportal oedema is also observed.

The first radiological technique used for screening of abdominal blunt trauma is ultrasonography. Presence of free fluid whether it is blood or intestinal content is easily identified on ultrasonography. Being non-invasive, portable with no ionizing radiation, easily performed in emergencies repeatedly are its advantages. The most prompt technique to identify intraperitoneal fluid is FAST (Focused Abdominal Sonography for Trauma) scan. The investigation of choice for evaluation of liver trauma is Computed Tomography with a sensitivity and specificity of 95% and 99% respectively in these cases. Kidney failure or an anaphylactic reaction halts the use of this radiological technique in some patients. And its sensitivity is decreased when done as a non-contrast in cases of injuries involving solid organs. Nevertheless, to perform a CT scan, the patient has to be transferred to the specified unit. The

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patient may also not assume the best position for the scan due to pain or any deformity. Hazards of ionizing radiation or contrast media also contribute to the disadvantages of CT scan. The most common investigation used in the diagnosis of bile leak due to injury to the common bile duct is Scintigraphy. Most of the liver injuries are treated non-surgically. The patient should be hemodynamically resuscitated in case of abdominal trauma whether the injury is of high or low grade. Around 25% of the trauma cases involving liver are complicated with a mortality rate of almost 10%. Liver trauma is one of the common and urgently managing challenge and effectiveness of sonography is one main helping tool. No study regarding analysis, monitoring depending upon surgical and CT scan findings have been conducted in this region; so we planned this study and collected the data.

PATIENTS AND METHODS

From June 2016 to May 2020; all patients serially presenting department of Radiology after admission to the surgical department of Allama Iqbal Memorial hospital with suspicion of hepatic injuries. The patients were classed in two groups: Group I- Patients who underwent surgery and Group II- Patients who were admitted and managed conservatively. A prospective cohort study in which the findings of all patients who underwent emergency sonograms were incorporated into data by the sonographer and physicians who interpreted them. All patients who sustained hepatic injuries during this period were identified. Their physical examination, laboratory, computed tomographic and intraoperative findings were compared with the prospective datasheets. Based on the detection of free fluid, parenchymal injury, or both, the overall sensitivity of sonography for the detection of BHI was assessed and Grades of injury labelled. The sonographic findings recorded preoperatively were compared with operative findings recorded by the operating surgeon and in some cases discussed with the surgical department. The group II included non-operated patients and the finding recorded by the radiologist on sonography were compared with findings of CT scan done in these patients. This self-audit of findings were carried of all the reporting done by the consultant radiologists of senior registrars and assistant professor. Those patients who were not operated or did not have follow-up CT scans (non-operated patients) were excluded from the study. Data was entered and analysed by using SPSS v22.

RESULTS

Free fluid and parenchymal injury with no free fluid was detected in 117 patients (63%) and eight patients (3%) respectively on emergency sonograms. 3l patients were false negatives (32%). A discrete area of increased echogenicity followed by a diffuse hyperechoic pattern was commonly identified on sonograms. Concomitant intra-abdominal injuries, which included that of spleen, small and large intestines and kidney were present in 87 patients (64%). 131 exploratory laparotomies were performed. 104 patients (77%) had abdominal tenderness or distension, and right rib fractures were present in 109 patients (54%). The overall sensitivity of sonography for the detection of blunt hepatic injury was 71% based on detection of free fluid, parenchymal injury or both. However, it was 96% for Grade-III or higher injuries.

Table I- Study in brief

Total Sonographies done for hepatic trauma	793	100%
Patients dropped from study	211	26.6%
Patients included in the study	582	73.4%
Operated Patients (Group- I)	166	28.5%
Non operated patients (Group- II)	416	71.5%
CT scan done in group II	416	71.5%

Table II – Sonographic Grades of hepatic trauma

	(Group- I) (n= 166)	(Group- II) (n= 416)
Grade I	11 (6.63%)	301 (72.4%)
Grade II	24 (14.5%)	115 (27.6%)
Grade III	88 (53%)	-
Grade IV	36 (21.7%)	-
Grade V	7 (0.4%)	-

Data compared from sonographic findings and operative findings.

Table III – Operated Patients (Group- I) (n=166)

	Sonographic data	**Operative findings**	**Difference in findings (n)**
Grade I	11 (6.63%)	6 (3.61%)	5 (45%)
Grade II	24 (14.5%)	22 (13.3%)	2 (8.33%)
Grade III	88 (53%)	91 (54.8%)	3 (3.41%)
Grade IV	36 (21.7%)	39(23.5%)	3 (8.33%)
Grade V	7 (0.4%)	8 (4.8%)	1 (14.3%)
Total difference in grading of injury (false lower grade)	166 (100%)	166 (100%)	14 (8.4%)

The data in the table IV shows correlation between sonographic data and findings of CT scan in non-operated patients.

Table IV – Non operated patients (Group- II) (n= 416)

	Sonographic data	**Findings of CT Scan**	**Difference in findings**
Grade I	301 (72.4%)	295 (70.9%)	6 (1.99%)
Grade II	115 (27.6%)	114 (27.4%)	1 (0.86%)
Grade III	-	7 (1.68%)	7
Grade IV	-	-	
Grade V	-	-	
Grade VI	-	-	
Total difference in grading of injury (false lower grade)	416 (100)%	416 (100%)	14 (3.36%)

DISCUSSION

The data of our study shows that 793 sonographies were conducted in case of hepatic trauma. Out of which 211 patients (26.6%) were dropped from the study. 582 patients (73.4%) were included in the study, out of which 166 patients (28.5%) required surgical intervention and 416 patients (71.5%) were managed conservatively. CT scan was done in all patients of Group-II. Such mode of sample categorization was also followed in the studies Wortman JR, et al[10], Tsai R et al[11] Tomic I et al[12]. We present data and out of 166 operated patients, II (6.63%) were categorized as Grade-I, 24(14.5%) in Grade-II, 88 (53%) in Grade-III, 36(21.7%) in Grade-IV and 7(0.4%) were categorized in Grade-V. This is similar to those findings shown by Inukai et al[13], Waheed KB et al[14] and Margari et al[15]. Out of 416 non-operated patients, 301(72.4%) fell in Grade-I and 115(27.6%) in Grade-II. The correlation and comparison between sonographic data and operative findings in operated patients. There is a total difference of 8.4% in the grading of injury. On operative findings, 6(3.61%) patients fall in Grade-I, 22(13.3%) in Grade-II, 91(54.8%) in Grade-III, 39(23.5%) in Grade-IV and 8(4.8%) in Grade-V. These findings are comparable to the results presented by the studies by Margari et al[15] and Guillen B et al[16]. The comparison between sonographic data and findings of CT scan in non-operated patients. The total difference in grading of injury is 3.36%. Findings of CT scan showed 295 (70.9%) fell in Grade-I, 114 (27.4%) in Grade-II and 7 (I .68%) in Grade-III consistent with those presented by Guillen B et al[16] , Benjamin ER et al[17], Carter JW et al[18] and Shyu J et al[19].

CONCLUSIONS

Sonography is sensitive for the detection of all grades liver injuries resulting from blunt abdominal trauma. The versatility, sensitivity and, repeatability of US, along with its feasibility at bedside and the possibility of performing a guided paracentesis represent the main characteristics that make US the first diagnostic approach to patients with blunt abdominal trauma especially liver injuries. The operative findings confirm its sensitivity up to 97% and in nonoperative patients the CT scan findings also support its sensitivity.

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Conflicts of interest: Nil

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