

Determine the pattern of blunt abdominal injuries by CT scan

Abstract

Objective: To examine the pattern of multiple blunt abdominal injuries by using computed tomography scan in patients presented to emergency department.

Study Design: Cross-sectional/observational.

Place and Duration:

Materials and Methods: Total 105 patients of both genders presented to emergency, suspected to have intra-abdominal injuries were enrolled. Patients detailed demographics including age, sex, mode of injuries and complete clinical features were recorded after taking informed written consent. CT scan was performed to examine the injured organs. Data was analyzed by SPSS 24.0.

Results: Out of 105 patients 82 (78.10%) were male while 21.90% were females with mean age 26.02 ± 16.43 years. RTA was the most common cause of injury found in 76 (72.38%) patients. Blunt abdominal injuries found in 98 (93.33%) patients. Bowel injury was the commonest injury found in 45 (45.92%) followed by spleen, kidney, hemoperitoneum, pelvis fracture, lung, pleural effusion, liver and mesentery. CT scan showed 100% accuracy to diagnose blunt abdominal injuries.

Conclusion: It is concluded that road traffic accident was the commonest cause of blunt abdominal injuries and bowel was the commonest injured organ. CT scan provides 97.96% accuracy for detection of visceral injuries.

Keywords: blunt abdominal injuries, computed tomography scan

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Introduction

Blunt abdominal trauma (BAT) accounts for the majority of abdominal injuries seen in the Emergency Department. ¹ It is responsible for substantial morbidity and mortality. Around 75% of BAT cases are related to motor vehicle collision (MVC) or vehicle versus pedestrian accidents. ² Blows to the abdomen (15%) and falls (6-9%) are also responsible. ³ Occult BAT may occur with child abuse and domestic violence. It has been reported that about 31% of patients with multiple trauma suffer from abdominal injuries. ⁴⁻⁵

The spleen and liver are the most commonly injured solid organs in BAT. ^{2,3} About 13% and 16% of these patients have hepatic and splenic injuries respectively. ⁶ Injuries to the pancreas, bowel and mesentery, bladder, and diaphragm, as well as retroperitoneal structures (kidneys, abdominal aorta), are less common but must also be considered. According to standard ATLS guideline, all the patients with blunt abdominal injuries who are hemodynamically unstable and have signs of exsanguination should undergo emergency laparotomy; however, selecting these patients, especially in the multiple trauma patients remains a challenge. ⁷

CT scan is currently a widely available imaging technique in clinical practice. ⁸ CT radially detects direct and indirect features of bowel and mesenteric injury an important advance because unrecognized bowel or mesenteric injuries may result in high morbidity and mortality. ⁹ The ability of CT to perform and produce fast processing images such as MPR (multiplanar reformatting images) is important for accurate interpretation of abnormalities. ¹⁰ Pre-hospital transportation, initial assessment, thorough resuscitative measures and correct diagnosis are of utmost importance in trauma management. This study was conducted aimed to examine the pattern

of different blunt abdominal injuries by using CT scan in patients presented to emergency department.

Material and methods

This cross sectional study was conducted at Saidu Teaching Hospital during January 2020 to July 2020. In this study total 105 patients of both genders suspected to have intra-abdominal injuries presented to emergency department were enrolled. Patients detailed demographics including age, sex, mode of injuries and complete clinical features were recorded after taking informed written consent. Patients with no consent and those who were died before complete examination were excluded.

Baseline investigations like blood investigations, chest x-ray, x-ray abdomen were carried out. Special investigations like Ultrasonography and Computed Tomography scan were done as per the hemodynamic stability of the patient and according to the suspicion of the organ/viscera/vessels involved. Accuracy of computed tomography scan was examined.

All the data was analyzed by SPSS 24.0. Mean \pm SD was done. Frequency and percentages were recorded in tabulation form.

Results

Out of 105 patients 82 (78.10%) were male while 21.90% were females with mean age 26.02 ± 16.43 years (ranges 10 to 60 years). (Table 1)

RTA was the most common cause of injury found in 76 (72.38%) patients followed by fall from height in 20 (19.05%) patients, homicide in 7 (6.67%) and 2 (1.90%) had unknown. (Figure 1)

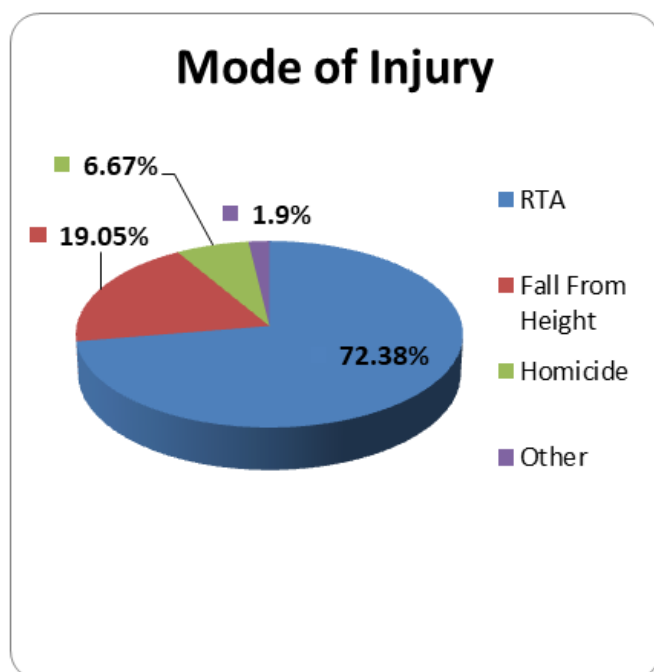


Figure 1 Mode of blunt abdominal injuries.

Table 1 Demographics of all the patients

Characteristics	Frequency No.	%age
Mean Age (Yrs)	26.02±16.43	-
Gender		
Male	82	78.1
Female	23	21.9

According to the CT scan examination, multiple blunt abdominal injuries were found in 98 (93.33%) patients. Bowel was the commonest injured organ found in 45 (45.92%) patients followed by spleen in 28 (26.67%) patients, hemoperitoneum in 24 (22.86%) patients, pelvis fracture found in 22 (20.95%) patients, liver found in 13 (12.38%) patients, pleural effusion found in 10 (9.52%) patients, lung found in 6 (5.71%) patients, kidney found in 2 (1.90%) and mesentery injury found in 2 (1.90%) patients respectively. (Figure 2).

Table 2 Correlation of CT scan and operative findings for diagnosing visceral injuries

CT Scan	Operative		Total
	Positive	Negative	
Positive	TP 44	FP 1	45
Negative	FN 1	TN 52	53
Total	45	53	98

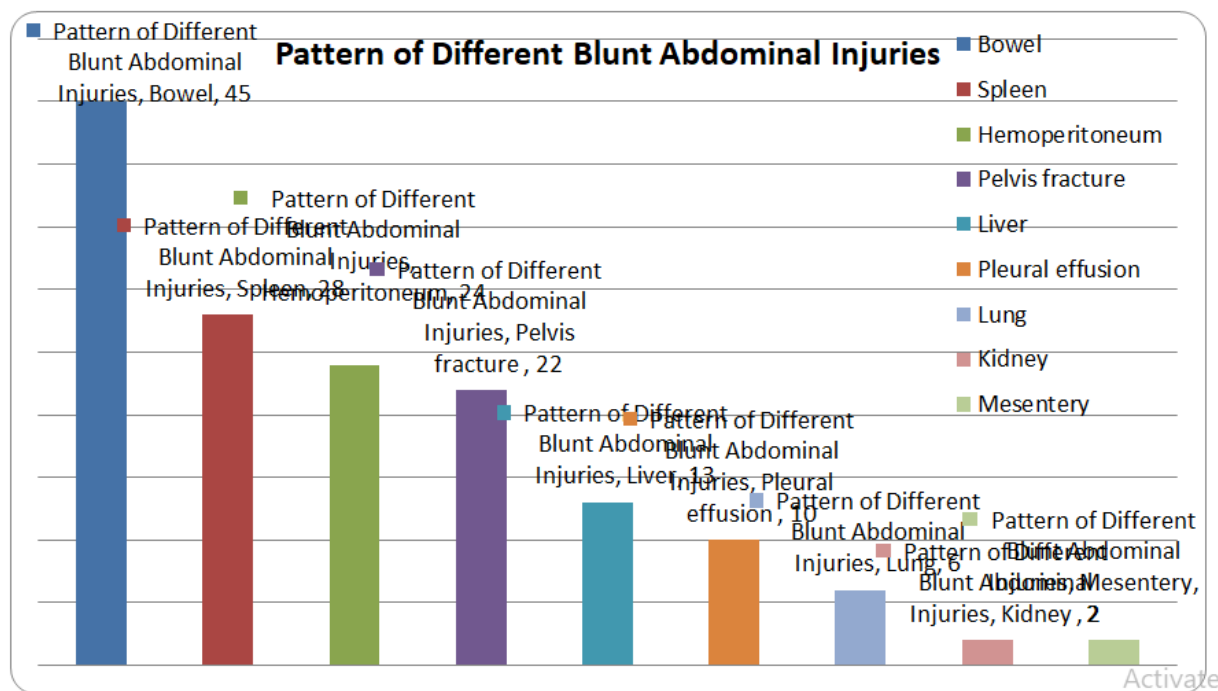


Figure 2 Pattern of different blunt abdominal injuries.

According to the CT scan examination, visceral injuries found in 45 patients and by operative findings 46 patients had visceral injuries. The sensitivity, specificity, PPV, NPV and diagnostic accuracy of CT imaging were 97.78%, 98.11%, 97.78%, 98.11% and 97.96% respectively.

Discussion

Blunt abdominal injuries are the most frequent manifestation in emergency department and associated with high rate of morbidity and mortality. Early and accurate diagnosis is very essential for the management of blunt abdominal injuries and to reduce the

complications and mortality rate.¹¹ Ultrasonography, X-ray images are the commonly performing diagnostic modalities in emergency departments and are very helpful for diagnosing multiple blunt abdominal injuries but CT scan considered safe and effective with higher rate of diagnostic accuracy as compared to ultrasonography and x-ray for diagnosing solid organs in blunt abdominal injuries.¹²

We conducted present study to examine the pattern of multiple blunt abdominal injuries by using CT scan in patients presented to emergency. In this regard 105 patient who were suspected to have intra-abdominal injuries were included. Majority of patients 78.10% were male while females were 21.90% and the mean age of patients was 26.02±16.43 years. These results showed similarity to other previous studies in which male patients were high in number 70% to 85% and the most common age group of blunt abdominal trauma patients was 20 to 30 years.¹³⁻¹⁴

In present study RTA was the most common cause of injury found in 76 (72.38%) patients followed by fall from height in 20 (19.05%) patients, homicide in 7 (6.67%) and 2 (1.90%) had unknown. A study by Qadri AI et al.¹⁵ reported that RTA was the commonest mode of injury found in 54.16% patients followed by fall from height in 41.66% pediatric patients of blunt abdominal trauma. Another study by Ajmal R et al.¹⁶ regarding pattern of blunt abdominal trauma demonstrated that RTA was the most frequent cause of injury found in 78% patients.

In our study, according to the CT findings, Bowel was the commonest injured organ found in 45 (45.92%) patients followed by spleen in 28 (26.67%) patients, hemoperitoneum in 24 (22.86%) patients, pelvis fracture found in 22 (20.95%) patients, liver found in 13 (12.38%) patients, pleural effusion found in 10 (9.52%) patients, lung found in 6 (5.71%) patients, kidney found in 2 (1.90%) and mesentery injury found in 2 (1.90%) patients. Sah and Sinha reported in their study that 61 cases had blunt abdominal injuries and among them bowel was the most commonly found injured organ in 70.5% patients followed by mesentery in 52.4% patients, spleen in 46% patients, liver in 34.4% and kidney in 11.4% patients.¹⁷

Jayant et al.¹⁸ reported that most common injured organ was liver in 37.5% patients followed by spleen and mesentery.

We found visceral injuries in 45 patients by CT scan and by operative findings 46 patients had visceral injuries. The sensitivity, specificity, PPV, NPV and diagnostic accuracy of CT imaging were 97.78%, 98.11%, 97.78%, 98.11% and 97.96% respectively. These results were comparable to many of previous studies in which CT scan showed higher accuracy ranges 93% to 100% for detection of visceral injuries.¹⁹⁻²⁰

Conclusion

We concluded that road traffic accident was the commonest cause of blunt abdominal injuries and bowel was the commonest injured organ. Moreover, CT scan is very helpful for diagnosing multiple blunt abdominal injuries and plays an important role in the management of blunt abdominal injuries.

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Conflict of interest

None.

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