

Blunt Trauma Abdomen and its Management: An Observational Clinical Study

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Abstract

Background and Objectives: The abdomen is among the three most often damaged bodily components, behind the extremities and the head. Blunt Abdominal Trauma (BAT) can be especially misleading since clinical symptoms might take hours or even days to appear, even if the internal organ damage may be severe and fatal. RTAs are the most frequent type of injury that results in BAT. Blunt abdominal injuries can be caused by external compression, crushing, or deceleration.

Aims and Objectives: Current research aimed to study and evaluate the different available modalities of investigations and their application in management of blunt trauma abdomen.

Material and Methods: The study was conducted as a hospital based prospective observational study at the Department of General Surgery, Government Medical College and Hospital of Central India. The clinical presentation, investigations, management, and outcomes of 100 patients experiencing blunt abdominal injury were assessed after acquiring institutional ethics committee approval and the informed written consent. All the data collected were analyzed using SPSS statistical software version 26.

Results: The mechanism of trauma, clinical presentation, investigation techniques, management used, and their correlation with the outcome were all examined and compared in the current study. Demographic information including age and gender were also compared. It was discovered that BAT frequently includes young men between the ages of 21 and 30. The most frequent type of injury is determined to be RTA. Splenectomy and intestinal perforation closure were the procedures that were carried out the most often. 61 among the 100 patients received conservative treatment. Mean duration of stay in hospital was found to be 8.19 days. Mortality was observed in 16% patients due to respiratory complications.

Conclusion: Due to its ambiguous presentation, subtle clinical presentation in initial phases, and the patient's quick deteriorating health, blunt trauma to the abdomen is a difficult entity to diagnose. Blunt abdominal trauma can be significantly decreased by preventing automobile accidents. When feasible, conservative care can be used on patients with mild injuries who are hemodynamically stable.

Keywords: Blunt Abdominal Injuries; CECT Abdomen; Hollow Viscous Injury; Laparomy; Solid Organ Injury; USG Abdomen.

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Introduction

Worldwide, there has been a significant increase in urbanization, motorization, industry, and changes to socioeconomic ideals. India isn't an exception to this evolving trend. Road traffic accidents are now the most significant public health risk in the world, posing one of the biggest hazards to human life and safety as a result of these developments. India is the nation with the most fatalities from road accidents.

The abdomen is among the three most often damaged bodily components, behind the extremities and the head. There are two main types of abdominal trauma that may be generally categorized:

1. Penetrating abdominal trauma
2. Abdominal blunt force injury. Blunt trauma affecting the abdomen is a more frequent type of damage amongst the two.

Blunt injury abdomen is most commonly caused by Road traffic accidents. [1] The rapid increase in number of motor vehicles and its aftermath has caused rapid increase in number of victims of blunt abdominal trauma. Motor vehicle accidents account for 75-80% of blunt abdominal trauma. [2] Other common modes are assaults, falls from great heights, sports-related accidents, martial arts injuries, athletic injuries, mountaineering, etc.

Blunt abdominal trauma is typically not noticeable, making it easy to miss unless someone look for it frequently. The majority of instances involving abdominal injuries results in death due to insufficient care and delayed diagnosis. The understanding of how to treat blunt abdominal injuries has steadily grown. Even with the most cutting-edge methods and developments in diagnostic as well as supportive treatment, death and morbidity are still widespread. The delay between the trauma and hospitalization, the inadequacy and lack of proper surgical care, the delayed diagnosis, the post-operative difficulties, and any further

trauma, particularly to the head and thorax, might all be contributing factors.

After acute abdominal trauma, concealed hemorrhage is the second most prevalent cause of death, and undetected abdominal injuries are frequently responsible for morbidity and late mortality in individuals who survive the initial stage of damage. Vigilant monitoring and prompt implementation of the right therapy reduce morbidity and death.

Hemorrhage and infection are the two primary side effects of abdominal injuries. Hemorrhage is typically the cause of early death after abdominal injuries. Large amounts of blood can be trapped inside the abdominal cavity until any clinical symptoms show up, and it can be remarkably non-irritating. Blunt trauma typically results in damage to solid organs like the liver and spleen. [3]

The most frequent cause of mortality taking place more than 48 hours following an accident is sepsis. The most common cause of intraabdominal sepsis after trauma is hollow viscous damage, which usually happens with penetrating trauma and results in the leaking of gut contents. Since stab wounds often just affect the tract, it is simpler to determine which organs would be affected. Intraabdominal, retroperitoneal, and pelvic hollow viscera can also rupture as a result of blunt abdominal trauma. In military training, blast is a major contributor to physical trauma, especially when it comes to gas filled viscera. [4,5]

Because of more thorough patient monitoring made possible by noninvasive technologies, the care of blunt trauma to the abdomen went through a paradigm change from early explorations, which were the standard, to a conservative approach that is increasingly selected management today. Through repeated physical and radiological tests, the patient is closely monitored. Patients with hemodynamic instability require prompt surgical procedures.

Aim and Objectives

The pattern of blunt abdominal trauma, the mode of injury, and the involvement of various abdominal organs; the various investigational modalities and their implementation in the management of blunt abdominal trauma; and the post-traumatic management and outcome with regard to conservative and operating modalities in patients of blunt abdominal trauma were the objectives of current research.

Material and Methods

The Department of General Surgery, Government Medical College and Hospital of central India, performed the study as a hospital-based prospective observational study. From January 2020 through June 2022, patients were enrolled.

- 1. Inclusion criteria:** The research included all patients hospitalized with traumatic abdominal injuries who were older than 12 years old.
- 2. Exclusion criteria:** Patients and guardians who refused to consent to research participation.
- 3. Methods of collection of data:** Patients' clinical histories, clinical examinations, and pertinent investigations were used to gather data from individuals who were hospitalized. On a specifically created proforma, patients' information was documented, including proof of identity, history, medical findings, diagnostic tests, surgical procedures, operative results, complications during the hospital stay, and complications during the subsequent follow-up period.
- 4. Methodology:** After preliminary resuscitation and hemodynamic

stabilization, every patient had a thorough evaluation. On the basis of the clinical findings, additional procedures such plain x-ray abdomen (erect and supine), abdominal ultrasounds, and CECT abdomen were chosen. The outcome of the medical evaluation and the results of diagnostic procedures led to the decision of whether or not to do the operation. Patients who were given non-operative or conservative therapy were required to follow stringent bed rest restrictions and undergo regular abdominal & systemic examinations along with hourly vitals monitoring. The right diagnostic techniques, such as abdominal ultrasonography and CECT abdomen, were repeated as needed.

Statistical Analysis

Data was collected, compiled and tabulated in excel sheet. Qualitative data were represented as number with percentage. Quantitative data were represented as mean with standard deviation. Statistical analysis was done by using SPSS 26.0 version software (IBM, SPSS, Inc.). $p < 0.05$ value considered as a statistical significant.

Results

In present study, we observed 100 patients who were admitted between January 2021 and June 2022 in the Department of General Surgery, Government Medical College and Hospital of Central India.

Majority of patients (30%) belongs to 21-30 years of age group. Male predominance (80%) was seen in present study. Road traffic accidents were the most common mode of Injury (63%) among all in blunt abdominal trauma patients. (Table 1)

Table 1: Demographic variables of blunt abdominal trauma patients

Variables		No. of patients (n)	Percentage (%)
Age groups (years)	11-20	09	09%
	21-30	30	30%
	31-40	22	22%
	41-50	19	19%
	51-60	14	14%
	61-70	04	04%
	71-80	02	02%
Gender	Male	80	80%
	Female	20	20%
Mode of Injury	Road traffic accidents	63	63%
	Blow with blunt object	24	24%
	Fall from height	13	13%
Clinical features	Abdominal pain	91	91%
	Tenderness	80	80%
	Guarding	58	58%
	Rigidity	53	53%
	Abdominal distension	33	33%
	Vomiting	32	32%
	HB <10	30	30%
	Absent bowel sounds	20	20%
	Shock	12	12%

A total of 92% Patients went under both X-Ray Abdomen and USG Abdomen where as 46% patients underwent CECT whole abdomen. (Table 2 & 3)

Table 2: Investigations modalities for blunt abdominal trauma patients

Investigations		Operative (n)	Conservative (n)	Total
Plain X-ray Abdomen	No abnormality detected	19	42	61
	Gas under diaphragm	19	3	22
	Fracture	1	8	9
	Not Done	0	8	8
	Total	39	61	100
USG Whole Abdomen	free fluid	22	31	53
	Hollow Viscous Injury	10	1	11
	Normal	0	11	11
	Not Done	0	8	8
	Liver	0	7	7
	Spleen	3	1	4
	Kidney	1	1	2
	HVP + liver	1	0	1
	spleen + liver	0	1	1
	kidney + liver	1	0	1
	Pancreas	0	1	1
	Total	38	62	100
CECT Abdomen	Organ injury	21	24	45
	Not Done	16	23	39
	Peritoneal collection	2	11	13

	Normal	0	3	3
	Total	39	61	100

Table 3: Association of outcome with USG and CECT Abdomen

Investigation performed			Outcome	Improved (n)	Mortality (n)
Total USG performed(n=92)	Injuries detected (n=28)	CECT Performed (n=15)	Conservative(n=10)	10	0
			Operative (n=5)	5	0
		CECT NOT Performed (n=13)	Conservative(n=2)	1	1
			Operative (n=11)	10	1
	Injuries NOT detected (n=64)	CECT Performed (n=46)	Conservative(n=28)	26	2
			Operative (n=18)	17	1
		CECT NOT Performed (n=18)	Conservative(n=13)	12	1
			Operative (n=5)	3	2

After the detailed clinical examination 39 patients with hemodynamic instability with either hemoperitoneum or peritoneal collection underwent exploratory laparotomy. 61 patients were selected for conservative management and 39% patients had undergone some operative procedure. Respiratory complications were the most common complication in this series accounting for 10% of patients followed by wound infections (7%). 84 % Patients improved and mortality was observed in 16% patients mainly due to respiratory complications. (Table 4)

Table 4: Management modalities for blunt abdominal trauma patients

Management		No. of patients (n)	Percentage (%)
Conservative		61	61%
Operative		39	39%
Operative (n=39)	Splenectomy	15	15%
	Closure of perforation	15	15%
	Mesenteric Repair	5	5%
	Drainage of Hemoperitoneum	4	4%
	Nephrectomy	3	3%
	Ileostomy	2	2%
	Bladder Repair	1	1%
	Suprapubic catheterization	1	1%
Complications	Respiratory	10	10%
	Wound infection	7	7%
	Wound dehiscence	2	2%
	Intra-abdominal infection	2	2%
Final Outcome	Improved	84	84%
	Mortality	16	16%

Discussion

The third most often damaged body part, requiring surgical intervention in 25% of instances, is the abdomen. There are two types of abdominal trauma: blunt and penetrating. While complications from blunt trauma might go undiagnosed if the clinical indications are

not obvious, penetrating abdominal injuries are simple to identify. In as many as 40% of individuals with hemoperitoneum, abdominal signs may be missing. The clinical assessment of blunt abdominal wounds may occasionally be obscured by other, more glaring exterior

injuries. The requirement for an accurate and quick imaging technique to evaluate related abdominal visceral injuries is explained by hemodynamic instability, altered state of awareness, and the occurrence of concomitant injuries to the pelvic bones, cranium, chest, or limbs.

Multiple investigations in the literature have demonstrated the impact of many different factors on the outcome, including age, gender, etiology, clinical characteristics, investigational methods, treatment techniques, etc.

Demographic variables: In total, 100 patients with blunt abdominal trauma were enrolled in the study. The majority of these patients were between the ages of 21 and 30, which is consistent with the findings of Kumar *et al.* [6,] Jitendra *et al.* [7], and Loknatham *et al.* [8]. Overall, it can be said that the youth working class and productive age group are more impacted by blunt abdominal injuries. Similar to prior research that have revealed a male preponderance, the current investigation impacted 80% of males & 20% of females.[6, 9,10]

The most frequent type of injury seen by individuals with blunt abdominal trauma is a car accident. This situation is brought on by modernization, the quick advancement of technology, and rising automobile usage.[6-10]

Clinical parameters: In the current series, pain accounted for 91% of patients and tenderness for 80% of patients, making it the most prevalent symptom and sign, respectively. 43% of those surveyed by Davis *et al.* expressed general concerns. Therefore, this emphasizes the significance of cautious and ongoing surveillance. It will also be beneficial to perform recurrent clinical examinations of individuals with USG abdomen.[11]

Investigation modalities: 92% of patients had both an X-ray and a USG of the abdomen,

compared to 46% who had a CECT of the whole abdomen. In our study, the spleen is the most often wounded organ, followed by the liver, much as in the series by Loknatham *et al.* and Jitendra *et al.* [7,8] The liver was found to be the most often damaged organ, subsequent to small bowel perforation, according to Kumar *et al.*, Goyal *et al.*, and Sisodiya *et al.*[6,9,10]

Management strategies: Out of 100 patients in the research, 61% were treated conservatively, and 39% had exploratory laparotomies. Similar outcomes of patients that were handled conservatively rather than surgically were also reported by Sisodiya *et al.* [9]. In our study, there has been a move towards conservative care, which was beneficial in preventing unfavorable laparotomy with negative findings and morbidity. USG and CECT abdomen were the core investigations, when treating patients with traumatic abdominal injuries. It becomes increasingly crucial when choosing between surgical and nonsurgical treatment.[12] The key to managing patients with blunt abdominal injuries is early identification, frequent clinical evaluation, and utilization of the appropriate investigation.[13]

In the current research, complications affected 21% of the individuals. In those who suffered chest injuries, respiratory issues accounted for 10% of complications, followed by wound infections (7%), while wound infections made up the majority of complications in other trials. [14,15] The average length of hospital stay among those who had conservative care was 8.19 days, compared to 11 days for patients who received surgical care. Mortality in the current research was 16%, compared to 5.6% in the earlier research by Sisodiya *et al.*[9]

Conclusion

Abdominal blunt injury combined with solid organ damage accounts for a substantial patient burden in contemporary culture. Most injuries occur as a result of automobile accidents. Therefore, efforts should be taken to

govern traffic norms and enforce strict adherence to road traffic laws. Every hospital should have well-established trauma care centre. It is important to take steps to get patients from the accident scene to trauma centers as soon as possible. A helpful inquiry to find linked hollow viscous damage is an erect abdomen X-ray. Bleeding is still occurring while titers in the serial hematocrit value are declining. USG and CECT abdomen were the core investigations, then treating patients with traumatic abdominal injuries, and it becomes increasingly significant when selecting between surgical and nonsurgical treatment. The key to managing patients with blunt abdominal injuries is early identification, frequent clinical evaluation, and utilization of appropriate investigation. The morbidity and death in these individuals are increased by delayed presentation, inclusion of many intra-abdominal organs, the existence of extra-abdominal injuries, and related co-morbid conditions. The prognosis for trauma patients may be improved by early diagnosis, intensive resuscitation, and prompt surgical procedure.

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