

## Study of Treatment Modalities for Blunt Abdominal Trauma and its Medicolegal Aspect

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### Abstract

**Background:** Blunt abdominal trauma management has changed drastically from surgical to conservative. In our study we analyzed 100 patients visited hospital with blunt abdominal trauma and diagnostic and management modalities and medicolegal aspect are discussed.

Study evaluate the incidence and clinical presentation, various available investigations, the organs affected in blunt abdominal trauma and management of complications, morbidity and mortality following blunt abdominal injury. To handle such cases to save the patient and our self from litigation.

**Material and methods:** This study consists an analysis of randomly selected 100 cases with blunt abdominal trauma admitted during the period of May 2018 to August 2020. It is a prospective observational study.

**Conclusion:** Blunt abdominal trauma is on rise due to excessive use of motor vehicles. From our study we concluded that single solid organ injury patients with hemodynamic stability (specially Grade 1 to grade 3) managed conservatively more compared to multiple solid organ injury patients and best investigated by USG FAST and CT scan. Careful record keeping can assist to protect against bogus and false allegations and complaints, as in court of law documentation is considered as part of witness.

**Keywords:** Trauma; Injuries; Blunt Abdomen; Treatment.

### Introduction

Trauma is a huge global health issue and is one of the leading causes of death worldwide among persons under the age of 45.<sup>1</sup> Abdomen is the third

most frequently injured region with injuries requiring surgery in civilian trauma victims.

Trauma is responsible for 8% of all deaths in India. In the city, 75 percent of abdominal trauma is caused by

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a blunt impact. The liver, spleen, and kidneys are the most often injured intra-abdominal organs. Majority of deaths occur shortly due to hemorrhage, while some occur later due to sepsis. Abdominal trauma is responsible for 15% to 20% of all trauma deaths.<sup>2</sup>

The treatment of abdominal trauma patients has shifted dramatically from operative to non-operative in recent years due to availability of improved imaging techniques. Conservative care is now considered first line of treatment for hemodynamically stable patients. ATLS (Advanced Trauma Life Support) uses standard methods to provide an organized approach to trauma patients.<sup>2</sup> It highlights the "Golden Hour" notion, which states that in order to avoid death, urgent, prioritized actions are required. They are not only bodily harm but also, they usually foretell sessions in courtroom or interrogation by lawyers. Thus, it is important about having the knowledge of the medicolegal work to protect the patient from harm and save ourselves from litigation or being caught.<sup>3</sup>

### Medicolegal cases (MLC)

Medicolegal case is "a case of injury/illness where the attending doctor, after eliciting history and examining the patient, thinks that some investigation by law enforcement agencies is essential to establish and fix responsibility for the case in accordance with the law of the land. In all MLC apart from examination and treatment following details must be taken care of

- Police report of MLC
- Identification marks (minimum 2)
- Record of investigations- X-ray, USG, CT scan and MRI
- Certificate should be issued to police or court on demand.
- The medical officer should fill a 'injury certificate'.
- The report must be written clearly and accurately because these reports involve litigation, insurance claims, medical negligence claims and worker compensation issues.

There are certain medicolegal aspects in blunt trauma abdomen like table death, legal notice, summons and warrant.

**Table death** is an event of death on table, in such case postmortem is advised to ascertain the actual cause of death.

**Legal Notice** is a claim made by person by his advocate. After proper study of case and each question should be answered separately.

**Summons** are ordered by the Court and served by post or other modes. Warrant can be issued if summons is refused to accept.

**Warrants** are issued by a court and are delivered by Police Station. It can be bailable or non-bailable.

### Police procedures:

Police procedure is that they come to hospital to take a statement. they can call health care worker to police station for statement. Such documents can be seized by police, if offence has been registered. Documents are preserved in form of panchnama and copy of panchnama is given to the doctor.

### When to issue MLC?

- Wounded cases, irrespective of manner and nature of injury (treating and saving the life being the priority). This can be also done after patient is stabilized.
- In cases and major injuries.
- On the basis of Suspect of abuse.

### Indemnity Insurance

To avoid toll on one's finance in case of actual negligence indemnity insurance comes into the picture. Insurance company can bear such finances with terms and conditions being applied which are mentioned in the contract.

### Blunt abdominal injuries:

Two sets of factors, endogenous and exogenous, determine the types and degree of visceral damage sustained when blunt force traumatizes the abdomen.

Endogenous determinant in blunt abdominal trauma:

Significant intrinsic factors, which help to determine the outcome of blunt abdominal injury, reside in the viscera and their vasculature.

### Organ Consistency:

- A firm and dense organ is more friable. Solid organs (e.g., liver and spleen) are more readily lacerated by blows than are such hollow organs as the (empty) stomach,

intestines, and (empty) urinary bladder.

#### Organ Mobility:

- Readily moveable or displaceable organs have considerable capacity to absorb the force of a blow, without serious injury, because of their ability to 'ride with the punch'.

Exogenous factors which influence severity and nature of visceral injuries resulting from trauma includes:

- Size and consistency of the traumatizing object, e.g., fist (punching), head (butting), foot (kicking), etc.
- Site of impact, e.g., epigastrium, inferior rib cage, suprapubic area, costovertebral angle, flank, etc.
- Speed and weight (force or energy) of the traumatizing mechanism.
- Nature of the traumatizing force, e.g., sharp impact or slow compression.
- Abdominal wall strength.
- Degree of abdominal "guarding" i.e., extent of protective contraction of abdominal musculature.
- Pre-existing visceral status.

#### Abdominal injuries:

Different varieties of blunt violence produce different kinds of abdominal injuries.

1. Contusion,
2. Tearing of parenchyma,
3. Rupture by a bursting force due to a rise of pressure inside the hollow organ
4. Tearing of attachments
5. Laceration of the organ by fractured bones.

The blunt force injuries of the abdominal organs are divided into

1. Injuries of the parenchymatous viscera and
2. Injuries of the hollow abdominal viscera and their attachments.

#### The Parenchymatous Viscera:

The most important organs in this group are the liver, spleen, kidneys, and pancreas. Since ordinarily their consistency is firm, they are not easily ruptured

by blunt force. The principal complication, which causes death in injuries of the parenchymatous organ is hemorrhage into the abdominal cavity.

#### The Hollow Abdominal Viscera:

The hollow abdominal viscera, including the gastrointestinal tract, the urinary bladder and the pregnant uterus, are injured by the same types of blunt forces as are the parenchymatous abdominal viscera. The structure of the hollow viscera is much more fragile and serious injury may be inflicted on them by a comparatively lower degree of violence.<sup>4-8</sup>

### Materials and Methods

This study consists an analysis of randomly selected 100 cases with blunt abdominal trauma admitted during the period of May 2018 to August 2020. It is a prospective observational study.

Each patient was evaluated clinically taking into consideration history, general examination, abdominal examination, and investigations and analyzed according to data collected on a planned proforma.

#### Inclusion Criteria

Cases of blunt abdominal trauma managed at tertiary care Hospital from May 2018 to August 2020.

Patients presenting within 48 hours of trauma.

Cases of blunt abdominal trauma with age more than 6 years.

With or without associated other injuries (chest, head, peripheral extremity injury).

#### Exclusion Criteria

All patients less than 6 years of age.

Patients with blunt trauma abdomen without solid organ involvement.

All patients were managed in trauma center as per ATLS guidelines and underwent appropriate primary resuscitation and investigations as per ATLS protocols for management of abdominal trauma and underwent exploration accordingly:

#### Examination:

General examination:

The patient should be examined from head to toe for

Pulse, Blood pressure, Respiration, Consciousness, Pallor, Generalized/Localized, edema, Cyanosis, Abdominal girth, Abnormal posture and Limb deformity.

Revised trauma score:

The Revised Trauma Score (RTS) uses 3 specific physiological parameters.

1. The Glasgow Coma Scale.
2. Systemic Blood Pressure.
3. The Respiratory Rate

GCS score	RR score	SBP score
13-15 4	10-29 4	>90 4
9-12 3	>30 3	76-89 3
6-8 2	6-9 2	50-75 2
4-5 1	1-5 1	1-49 1
3 0	0 0	0 0

When used for triage, the RTS is determined by adding each of the coded values together. Thus, the RTS ranges from 0-12 and is calculated very easily. An RTS of less than 11 is used to indicate the need for transport to a trauma care center.

The patients were followed up for a varying period of 15 days to 3 months.

### Discussion

In our study most common affected patients were male and between age group of 21-40 years as this age group people were more involved in working and due to socio cultural problem of our country.

Among them, 32% were less than 20 years of age, 48% were from 20-40 years of age and 20% above 40 years.

1. Age:

Age (years)	Total	Percentage
>6-20	32	32 %
21-40	48	48%
>40	20	20%
Total	100	100%

2. Sex:

Sex	No.	Percentage %
Male	74	74%
Female	26	26%
Total	100	100

Most common mode of blunt abdominal injury was Road Traffic Accident (68%) followed by falldown (22%), assault(08%), others (02%).

3. Mode of Injury:

Mode of Injury	No.	Percentage
RTA	68	68
Fall down	22	22
Assault	08	08
Others (trauma by animal)	02	02
Total	100	100

Blunt abdominal injury was commonly associated with other injuries due to force pattern. In our study chest injuries (20%) was more associated with blunt abdominal trauma. Most of the patient were presented to hospital within 5 hours after injury. This was similar to another study in America in which most of patient arrive in hospital in 1 hour. In western world patients reach tertiary trauma center early due to compatible transport services.

In this study USG FAST was commonly used to diagnose patients with abdominal injuries.<sup>9</sup> Compared to CT scan it is easily available can be done in emergency at bed side. But it has false positive result also and it required minimum of 150-200 ml of fluid for detection. CT scan was done whenever required and compatible to patient condition [10].

4. USG/CT FINDINGS:

USG/CT FINDINGS	No.	Percentage %
Free Fluid	100	100%
Liver Injury	42	42%
Splenic Injury	58	58%
Renal Injury	28	28%
Pancreas Injury	08	08%
Total Patients	100	100

In our study most common injured organ was spleen (58%). And liver (42%), renal (28%) and pancreas (8%) were rest of solid organ involved. In our study most common single solid organ was involved (64%) compared to multiple solid organ involvement (36%). In our study 68.75% patients with single solid organ injury were managed conservatively while 50% patients with multiple solid organ injuries were managed conservatively. One patient who had single solid organ injury and put on conservative management ultimately converted to

operative intervention while two patients who had multiple solid organ injuries and put on conservative management ultimately converted to operative intervention due to deterioration. While 20 patients with single solid organ injury (31.25%) and 18 patients with multiple solid organ injuries (50%) undergone operative intervention.

5. Conservative Vs Operative Intervention in Solid Organ Involved(Soi):

SOI	Conservative	Operative	Total
Single	44(69%)	20(31%)	64
Multiple	18(50%)	18(50%)	36
Total	62	38	100

Recently change has shift toward nonoperative management. In operative intervention splenectomy was most commonly procedure performed. In our study ICU and hospital stay seen more in multiple solid organ injuries compared to single solid organ injury.

6. Organ Specific management

Grading of Injury	Management		
	Conservative	Operative	Total
<b>Spleen</b>			
1	06	00	6
2	14	00	14
3	20	02	22
4	02	10	12
5	0	04	04
Total	42	16	58
<b>Liver</b>			
1	04	00	04
2	14	02	16
3	10	02	12
4	08	00	08
5	02	00	02
Total	38	04	42
<b>Renal</b>			
1	20	00	20
2	06	00	06
3	00	00	00
4	00	02	02
5	00	00	00
Total	26	02	28

Contd... 6. Organ Specific management			
Pancreas			
1	0	0	00
2	0	02	02
3	02	02	04
4	0	02	02
5	0	0	00
Total	02	06	08

The chi-square statistic of above table was 6.43396. The P value was 0.0112. The result was significant as P<0.05. Most patients with multiple solid organ injuries have more complication compared to single solid organ injury. Complications which were most commonly seen were SSI, Septicemia, Respiratory complication, Acute renal failure.

**For surgeon safety:**

Following precautions could be taken

- A female patient should always be examined in presence of a female attendant.
- Proper General condition should be explained with no aspects hidden.
- Proper Functioning of the Operation Theatre and its Equipment like oxygen supply, surgical instruments, anaesthesia machine along with supply of emergent drugs should be kept in regular check.
- Informed and written consent should be taken prior to any procedure.
- For transferring patient to higher center proper consent and records of the procedure followed should be kept like calling of ambulance, presence of proper equipment etc.
- Complete name of patient should be written on every medical record and register.
- In complications follow standard protocol and documentation, refer if required and inform the patient of every protocol being followed. Maintain courtesy, empathy and respect for patient.
- Records should be maintained on regular basis with proper filing as per criteria.

### Summary

Most common affected age group was 21-40yrs with male were mostly affected in it. RTA was commonest cause for blunt abdominal injury. 50% patients were able to get admitted within 5 hours of injury. Splenic injury found most common and affect 58% of patients. Most patient had single solid organ injury (64%). Most common surgery performed was splenectomy due to higher grade of injury and instability. Conservative management was more successful in single solid organ injury than multiple solid organ injury. Associated extraabdominal injuries were found in 46 cases in the present study. Patients with single solid organ injury had less ICU (5.34d) and Hospital (9.96d) stay compared to multiple solid organ injury 7.0d and 11.3d respectively. Patients with single solid organ injury had less chances of complication (9.37%) compared to multiple solid organ injuries (44.44%). AKI was most common complication seen in our study.

### Conclusion

Blunt trauma to abdomen is on rise due to excessive use of motor vehicles. It poses a therapeutic and diagnostic dilemma for attending surgeon due to wide range of clinical manifestation ranging from no early physical findings to progression of shock. Hence trauma surgeon should rely on his physical findings in association with use of modalities such as X ray, USG FAST and if necessary, CT scan. From our study we concluded that single solid organ injury patients with hemodynamic stability (specially Grade 1 to grade 3) managed conservatively more compared to multiple solid organ injury patients and patients with single solid organ injury suffered less complication compared to multiple solid organ injury patients. Having proper and complete information about legal procedures and liabilities is the only way of safeguarding ourselves in case of medicolegal cases. Standard procedure

and protocols should be followed blunt abdomen management to prevent malpractice.

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