

**Original Article**

## A Clinical Study of Blunt Injury Abdomen and Its Management at MNR Hospital Sangareddy, Telangana

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**Abstract**

*Trauma, or injury, is defined as cellular disruption caused by an exchange with environmental energy that is beyond the body's resilience. The abdomen is frequently injured after both blunt and penetrating trauma. Trauma is the leading cause of death between the ages of 1 and 44 years. In all age groups, it is surpassed only by cancer and atherosclerosis in mortality. The evaluation and treatment of abdominal injuries are critical components in the management of severely injured trauma patients. Because missed intra-abdominal injuries are a frequent cause of preventable trauma related deaths, a high index of suspicion is warranted.*

*Multiple factors, including the mechanism of injury, the body region injured, the patient's hemodynamic and neurologic status, associated injuries, and institutional resources influence the diagnostic approach and the outcome of abdominal injuries. Motor vehicle accidents account for 75 to 80% of blunt abdominal trauma. Approximately 25% of all trauma victims will require abdominal exploration. Blunt injury of abdomen is also a result of fall from height, assault with blunt objects, industrial mishaps, sport injuries. Blunt abdominal trauma is usually not obvious. Hence often missed, unless, repeatedly looked for. The knowledge in the management of blunt abdominal trauma has progressively increased.*

*Non operative management (NOM) for blunt abdominal trauma was found to be highly successful and safe. Management by NOM depends on clinical and hemodynamic stability of the patient, after definitive indications for laparotomy are excluded. A patient under NOM should be admitted to ICU for at least 48-72 hours for close monitoring of vital signs and repeated clinical examinations. NOM to be terminated if patient develops hemo-dynamic instability and appearance of newperitoneal signs due to delayed hollow viscous or missed injuries.<sup>44</sup>*

*In view of increasing number of vehicles and consequently road traffic accidents, this dissertation has been chosen to study the cases of blunt abdominal trauma with reference to the patients presenting at MNR medical college & hospital, Sangareddy.*

**Introduction**

Blunt abdominal trauma is one of the most common injuries caused mainly by road traffic

accidents. Injuries are usually not obvious, hence often missed, unless strong suspicion. In view of increasing number of motor vehicles and consequently road traffic accidents, apart from

industrial accidents, domestic violence, and criminal offence this dissertation has been chosen to study the cases of blunt abdominal trauma.

## Materials and Methods

### Source of Data

The material consists of blunt injury abdomen inpatients in all surgical units of MNR medical college & Hospital, Sangareddy during the period of September 2015 to September 2017.

### Method of Collecting Data

Total 50 cases clinically presenting as blunt injury abdomen during the period of September 2015 to September 2017 were taken for study. Each case will be examined clinically and properly in systematic manner as per the pro-forma drafted. Data were collected from the patients by their clinical history, examination and appropriate investigations. Post-operative follow up was done to note for complications. Documentation of patients, which included, identification, history, clinical findings, diagnostic test, operative findings, operative procedures, complications during the stay in the hospital and during subsequent follow-up period, were all recorded on a pro-forma specially prepared. The decision for operative or non-operative management depended on the outcome of the hemodynamic status and Computed Tomography and other investigations.

After admission data for my study was collected by:

1. Direct interrogation with the patient or patient relatives accompanying the patient and obtaining a detailed history.
2. Thorough clinical examination and relevant investigations done giving priority to life saving procedures
3. Clinical findings and relevant investigations reports are entered in the proforma prepared for the study.

After initial resuscitation of the patients, thorough assessments for injuries were carried out in all the patients. Documentation of patients data which included, identification, history, clinical findings,

diagnostic test, operative findings, operative procedures, complications during the stay in the hospital and during subsequent follow-up period, were all recorded on a proforma specially prepared. Demographic data collected included the age, sex, occupation and nature and time of accident leading to the injury.

After initial resuscitation and hemodynamic stability, all patients were subjected to careful examination, depending on the clinical findings; decision was taken for further investigations such as four-quadrant aspiration, diagnostic peritoneal lavage, x ray abdomen and FAST, CT abdomen.

The decision for operative or non-operative management depended on the outcome of the clinical examination, hemodynamic stability and findings of CECT abdomen and other relevant investigations.

Patients selected for non-operative or conservative management were placed on strict bed rest, intra venous fluids, analgesics and antibiotics as indicated, were subjected to serial clinical examination which included hourly pulse rate, blood pressure, respiratory rate and repeated examination of abdomen and other systems for further development of fresh findings or further deterioration of patient condition. Appropriate diagnostic tests especially ultrasound of abdomen was repeated as and when required. CT scan was done in 22 patients in our study. DPL was done by a semi-open technique through an infra-umbilical incision, inserting an infant feeding tube, irrigating the abdominal cavity with ringer lactate solution and aspirating. FAST was done in all patients and results and observations are as follows

### Inclusion Criteria

Patients presenting with blunt injury abdomen of any age in all units of Surgery MNR medical college & Hospital, Sangareddy.

### Exclusion Criteria

Patients presenting with penetrating injuries of abdomen.

## Discussion

### Sex incidence

Gender	Davis et al(%)	Our series (%)
Male	70	74
Female	30	26

From the above table it is clear that males are more common victims of blunt trauma abdomen which correlates with Davis et al study. In our study male to female ratio was 2.3:1. Male to female ratio was 4.4:1 in other studies like Thripathi et al. The incidence is slightly more in males as males are more involved in RTA and Assaults.

### Age Incidence

Age group	Our Study (%)	Davis et al (%)35
1-10	2	18
11-20	18	19
21-30	28	24
31-40	28	15
41-50	10	13
>50	14	11

Age group: In our study the age group varied from 8 to 80 years, maximum incidence was observed in the age group of 21-40yrs followed by 11-20yrs of age. The mean age was 34.8 yrs. In the study by E.Frich Jr et al, maximum incidence was observed in the age group of 20-29 yrs. In the study by Frederick .A .Moore et al in University of Texas the mean age was 27.2yrs. Our study results are comparable to other series.

### Mode of injury

Nature of injury	Our study (%)	Davis et al (%) 35	Khanna et al(%)36
RTA	46	70	57
Self fall	24	9	10
Assault	30	21	33

Nature of injury: from above table it clearly states that RTA is the most common mode of injury accounting for 46% cases followed by self fall (fall from height) accounting for 24% cases followed by assault accounting for 30% cases. This is comparable to Khanna et al series.

## Clinical presentation

- In our series tenderness was the most common examination finding accounting 98%. Abdominal guarding was next most common finding accounting in 52% of cases. The signs and symptoms are misleading in case of blunt trauma abdomen and are masked by concomitant head injury, chest injury and alcohol consumption. 16% of the patients were in hypovolemic shock on admission. Local (or) generalized guarding was present in 26 (52%) cases, out of which 15 cases were operated indicating guarding as an important sign. Rigidity was present in (38%) cases. In our study, 8(16%) patients presented with shock out of which 3 patients had splenic injuries, 2 had liver injuries and 3 had bowel perforation. Bowel sounds were sluggish (or) absent in 18(36%) of cases. Retroperitoneal organ injury was missed in 3 cases in DPL and USG abdomen and detected in CECT abdomen.
- Our study is comparable to study by Thripathi et al which reported Tenderness as most common sign in 80% of their patients and shock in 37.2% of their patients.
- In Davis et al study generalized abdominal tenderness and abdominal guarding were the most frequent physical findings, both signs being present in more than 75% of all patients. Rebound tenderness and abdominal rigidity were present in 28% of patients. 12% of the patients were in hypovolemic shock on admission. One hundred and ninety (43%) of the total patient population had no specific complaints and no signs or symptoms of intra-abdominal injury when they were first seen in the emergency room, but (44%) eventually required exploratory laparotomy, and 64 (34%) had an intra-abdominal injury. This emphasizes the importance of careful and continuing observation of individuals with blunt abdominal trauma.

**Latent period**

Latent period is the interval between the time of injury to presentation to our hospital. 52% of our patients presented between 2-4 hrs after injury. 82% presented within 6hrs after injury. This time lag is due to lack of facility for transport. Many belonged to rural area.

**Associated injuries**

Associated Injury	Our Study (%)	Khanna et al (%) 36	Davis et al (%) 35
Head	4	12	9
Thorax	10	24	27
Extremities#	8	23	11
Pelvis#	6		3
Soft tissue	4	6	10
No Associated injury	68	35	40

- In our study associated injury was present in 16 cases. The most common extra abdominal injury was thoracic accounting for 10 % followed by extremity fracture, pelvic fracture, head injury and soft tissue injury in descending order. The thoracic injury was mainly hemothorax and all 5(10%) cases underwent tube thoracostomy. 2 out 5 cases died due to associated head injury and retroperitoneal hematoma. Out of 2 cases of head injury one had SDH and other had Rt. Maxilla fracture. Pelvic fracture cases 3(6%) are managed conservatively. There was no associated injuries in 34 patients. The above table shows comparison to present study.
- In Davis et al study one hundred-twenty (27%) of the 437 patients had blunt chest trauma. Thirty-seven patients required either tube thoracostomy or operative thoracotomy. Fifty-one patients (11%) sustained an associated extremity fracture, 15 (3%) sustained pelvic fractures, and three patients sustained vertebral fractures. Another 28(6%) had combinations of associated injuries. Of the 41(8%) patients who sustained a serious head injury in addition to BAT, 3% died. The head injury

was directly responsible for death in of majority of these patients. Associated injuries tend to increase morbidity and mortality directly or indirectly

**Investigations**

**Plain X ray erect abdomen**

Plain erect X ray of abdomen was done in all 50 cases. Gas under diaphragm was found in 10 cases. All 10 cases underwent emergency laparotomy and all cases had either small bowel or colonic perforation during laparotomy. Primary closure of perforation was done. In Davis et al study abdominal X ray was abnormal in 21% cases and gas under diaphragm seen in 6% cases. In our study gas under diaphragm is seen in 20% of cases.

**Four-quadrant aspiration**

FQA was done in 60% of cases. 53.33% showed positivity. In Davis et al study it was done in 44% of cases and correct results were obtained in 37.84% cases.

**Diagnostic peritoneal lavage**

Diagnostic peritoneal lavage was done in 24% (12) cases, positive in 16% (8) cases. All cases showed significant injury during laparotomy. Hence DPL is a reliable investigation to detect significant intra-abdominal injury.

**Ultrasound examination (FAST)**

Organ injured	Our study (%)	Cusheri (%)	Davis et al (%)
Spleen	47.36	45	25
Liver	36.84	28	16
Kidney	10.53	16	-
Bladder	5.26	5	4

USG abdomen (Focused Assessment Sonography for Trauma) was done in all 50 cases out of which 18 cases had solid organ injury. CT also confirmed the solid organ injury along with its grade. Therefore USG abdomen is reliable in detecting solid organ injury and free fluid in the abdomen. Accuracy of USG was 100% in our

study. In a study by Richard K Simons in San Diego Medical center at California USG had an accuracy rate of 97.1%. Organ injured from above table, spleen is the most common organ injured in BIA as, accounting to 47.36%, followed by liver in 36.84% cases and kidney in 10.53% cases. comparable to other series. Imaging is essential in early decision making. Focused Assessment with Sonography for Trauma (FAST) examination of peri-hepatic, peri-splenic and pelvic areas help in early detection of clinically significant abdominal injury. FAST examination can be performed repeatedly and is an excellent adjuvant to physical examination.

**CT scan abdomen**

Grade of injury	Liver (No of cases)	Spleen (No of cases)
1	4	2
2	4	3
3	1	1
4	--	1
5	1	2
6	--	

CECT was done in 22 cases. CT was done in patients in whom ultrasound showed significant findings. Computed tomography (CT) can provide reliable information on hemo-peritoneum, extent of solid organ injuries. CT detected 4 cases of retroperitoneal organ injuries, most cases of hollow viscus perforation and ongoing bleeding by means of radiographic blush. 2 patients had combined liver and spleen injury.

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**Ratio of operative to conservative treatment**

Treatment	No of Cases	Percentage
Conservative	33	66
Operative	15	30

There is an increase in trend towards conservative management in case of blunt injury abdomen. The grade of injury was assessed by CECT and was most of them managed conservatively. Minor lacerations and capsular tears which are difficult to diagnose clinically were easily demonstrated in CECT scan and were selected for non-operative management. Guidelines for conservative management are

- 1) If the patient is hemo-dynamically stable
- 2) Minimal intra peritoneal collection
- 3) Lower grade solid organ injury eg. grade 1& 2

Two patients presented with stage of irreversible shock and had hemothorax with RPH & died during resuscitation. Resuscitative measures like intravenous fluid administration, blood transfusion, endotracheal intubation with mechanical ventilator support were started. These patients otherwise needed surgical intervention

after stabilization. In spite of all resuscitative measures patient could not be revived.

**Operative procedure**

In the present study, closure of bowel perforation was done in 10 cases. Splenectomy was done in 3 cases because of hemodynamic instability and higher grade of injury. Most of liver injuries were managed conservatively. Peri-hepatic packing was done in 2 cases. All renal injury cases were managed conservatively.

**Mortality**

Total 3 patients died in our series. Out of 50 patients 2 patients presented with stage of irreversible shock and died during resuscitation. Out of 15 patients managed surgically one patient died. Therefore mortality in the present study is 6%. The mortality rate in Di Vincenti et al study was 23%. Cox et al study reports mortality of 10% and in Davis et al study it was 13.3%.

**Conclusions**

The conclusions of our study were as follows:

- Blunt injury abdomen with solid organ injury forms considerable load of patients in our society.
- Most common age group involved is 21-40 years. Predominantly males are affected in large proportions.
- Road traffic accident forms the most common mode of injury. Adequate measures should be taken to prevent road traffic accidents by strict action and traffic norms and citizen education regarding safety measures.
- Well established trauma care centers should be established at every taluk hospital and near highways. Measures for early transport of the patients from the accident site to the trauma centers should be undertaken.
- Significant number of cases will have associated injuries with blunt injury abdomen like head injury, thoracic injury, extremity fractures.
- Clinical presentation is varied.
- Blunt injury abdomen is usually less obvious.

Hence, repeated examination by same personnel in a specialized trauma center is required.

- Erect abdomen X ray is a useful investigation to identify hollow viscus injury.
- With the advent of high resolution ultrasonography (FAST), DPL and FQA investigations are becoming less opted. Lower grade (1, 2) solid organ injury like liver, spleen, kidney can be managed conservatively.
- CECT forms the core investigation of choice in dealing with blunt injury abdomen patients, and is useful in deciding operative versus conservative management.
- Early diagnosis and repeated clinical examination and use of appropriate investigations forms the key in managing BIA injuries.
- Associated extra abdominal injuries like head, thoracic and orthopedic injuries influence the morbidity and mortality of the patients.

### Summary

- Summarizing the findings of the study, details furnished here are in accordance with the renounced statistics in MNR Medical College & Hospital, Sangareddy from September 2015 to September 2017 and studied 50 cases.
- This is a prospective study conducted over 20 months.
- Males (74%) outnumbered females (26%).
- The most common age group affected is of 21-40 years which forms the young and reproductive group.
- Road traffic accident forms the most common mode of injury (46%).
- The latent period in our study was <6hrs in 82% of cases.
- X ray erect abdomen and chest X ray forms important investigational tools.
- Ultrasonography (FAST) has detected solid organ injury or collection in 90% of cases. So it becomes an important tool in emergency set up, more so in hemodynamically unstable patients.

- Four quadrant aspiration is a simple and non-specific for diagnosis.
- DPL was done in small number of patients since facility of high resolution ultrasonography (FAST) was available in our institution.
- CECT abdomen was performed in 44% of study population and had pivotal role in deciding operative or conservative management in hemo-dynamically stable patients.
- The most common injured organ in the present study is spleen followed by liver, bowel and kidney in the descending order.
- Out of 9 cases of splenic injury, 6 were managed conservatively and 3 underwent splenectomy (one grade 4, two grade 5 injury).
- Out of 10 cases of liver injury 8 were managed conservatively and peri-hepatic packing was done in 2 cases.
- Retroperitoneal hematoma was seen in a 4 cases and treated conservatively.
- Two cases of renal injury and both were treated conservatively.
- Hence conservative treatment is safe and effective if followed judiciously.
- Associated extra abdominal injuries like head, thoracic and orthopedic injuries were found in 16 cases in the present study and influenced the morbidity and mortality of the patients. The present study showed a mortality of 6%.

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