

**BLUNT ABDOMINAL TRAUMA- SCENARIO IN NORTH COASTAL ANDHRA PRADESH**Konkena Janardhana Rao<sup>1</sup>, Metta Raja Gopal<sup>2</sup>, Adusumalli Ramya Sai<sup>3</sup><sup>1</sup>Associate Professor, Department of Surgery, RIMS, Kadapa, Andhra Pradesh, India.<sup>2</sup>Professor, Department of Surgery, RIMS, Srikakulam, Andhra Pradesh, India.<sup>3</sup>Postgraduate Student, Department of Surgery, Andhra Medical College, Visakhapatnam, Andhra Pradesh, India.**ABSTRACT****BACKGROUND**

Blunt abdominal trauma is seen with increasing frequency in emergency rooms and continues to be associated with significant morbidity and mortality in spite of its improved recognition, diagnosis and management. Our experience in a tertiary care hospital has been reviewed to establish the patterns of injury and to assess the results of management. On the basis of this experience, it is possible to describe the most accurate and efficient means to establish a diagnosis, the diagnostic and operative procedures with the best results and the associated morbidity and mortality.

**MATERIALS AND METHODS**

This is a retrospective descriptive study, conducted from March 2016 to June 2017 on a total of 134 patients admitted with blunt abdominal trauma in the Department of General Surgery, King George Hospital, Visakhapatnam. This study aimed to investigate the signs and symptoms of the patients hospitalised due to blunt abdominal trauma and identify possible factors that affect morbidity and mortality.

**RESULTS**

Blunt abdominal trauma is very common in the age group of 30 - 40 years. More than 80% of the incidence showed male predominance. Solid organ injury, especially spleen followed by liver is the commonest intraoperative finding. Almost, 70% of the patients with blunt abdominal trauma were managed conservatively. Associated injuries like head injury were detrimental and contributed to significant mortality.

**CONCLUSION**

The incidence of blunt abdominal trauma is increasing. Correct diagnosis and proper management are dependent upon individual evaluation of each patient. The insidious nature of blunt abdominal injury is borne out by the fact that more than one-third of the "asymptomatic" patients had an abdominal organ injured. A high index of suspicion, adequate observation period and immediate intervention when necessary are therefore mandatory for proper care of patients with blunt abdominal trauma. Mortality and morbidity continue to be significant in blunt abdominal trauma.

**KEY WORDS**

Blunt Abdominal Trauma; Spleen; Liver; Laceration.

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**BACKGROUND**

Trauma-related mortality is one of the leading causes of global deaths. It is the leading cause of death and disability in developing countries and the most common cause of death under 45 years of age.<sup>(1)</sup> Most trauma-related injuries are blunt injuries.<sup>(2)</sup> Such injuries can be caused primarily by road traffic accidents, falls from height or assaults.<sup>(2)</sup> Blunt trauma injuries, which often present with multi-trauma are the main causes of emergency admissions.<sup>(3,4)</sup> Therefore, management and follow-up of these injuries require a multidisciplinary approach. The mortality rate can be reduced in a fully equipped emergency trauma centre where a multidisciplinary team is available.<sup>(5,6)</sup>

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Intra-abdominal injuries carry a high morbidity and mortality, because they are often not detected or their severity is underestimated. This is particularly common in cases of blunt trauma, in which there may be few or no external signs. We should always have a high index of suspicion of abdominal injury when the history suggests severe trauma. The mortality and morbidity rate of blunt trauma injuries are higher than penetrating trauma injuries.<sup>(7)</sup>

The current study aimed to study the signs and symptoms of patients hospitalised due to blunt abdominal trauma, evaluate the site of injury and identify possible factors that affect morbidity and mortality.

**MATERIALS AND METHODS**

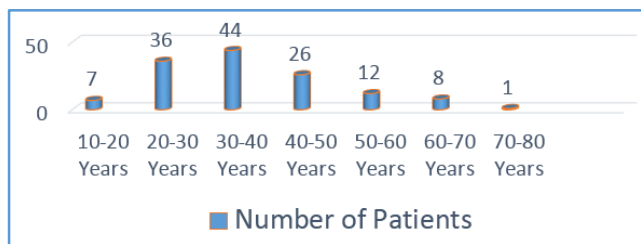
A retrospective descriptive study was conducted on 134 patients admitted with blunt abdominal trauma in the Department of General Surgery, King George Hospital, Visakhapatnam from a period between March 2016 and June 2017. All patients were resuscitated on admission in accordance with the Advanced Trauma Life Support (ATLS) protocol. Following resuscitation and clinical examination patients were subjected to Ultrasound screening of the abdomen, chest x-ray and x-ray erect abdomen. Ultrasound-

guided aspiration and CECT abdomen were done if necessary. Laboratory investigations like haematocrit were done. Specific investigations depending on the associated injuries like x-ray pelvis and CT brain were done. Vitals monitoring chart was maintained for all the patients. Patients with isolated renal or bladder injuries were excluded from the study.

For associated chest, head and bone injuries, corresponding specialities were consulted. Most of the tube thoracostomies were performed by General Surgeons, some by thoracic surgeons. In unstable pelvic fractures, external fixations were done by orthopaedic surgeons. All management and follow-up of the patients were conducted by General Surgeons in the Intensive Care Unit (ICU) and/ or General Surgery Inpatient Unit.

**RESULTS**

Of the 134 patients, 109 (81.3%) were males and 25 (18.6%) were females with age of the patients ranging from 15 to 80 years. 87 cases (64.9%) were under 40 years of age. Highest incidence was in the age group of 30 - 40 years (44 cases; 32.8%) followed by 20 - 30 years' age group (36 cases; 26.9%).



The main cause of blunt trauma was road traffic accidents in 111 cases (82.8%) followed by fall from height in 12 cases (9%) and blows to abdomen or assault in 11 cases (8.2%). About 91% of the blunt trauma injuries occurred under the influence of alcohol, either directly or indirectly.



Generalised abdominal tenderness and abdominal guarding were the most frequent physical findings, both signs being present in 77 cases (57%). In addition to these signs, abdominal rigidity was present in 24 cases (18%). 16 cases (12%) were in hypovolemic shock on admission. Rectal examination rarely gave abnormal findings such as pain or blood (1.4%).

Fifty seven patients (43%) had no specific complaints and no signs or symptoms of intra-abdominal injury when they were first seen in the emergency room. Nevertheless, 17 of these (29.8%) developed haemodynamic instability and eventually required exploratory laparotomy.

Diagnostic procedures included laboratory tests, x-ray examination, abdominal ultrasound and paracentesis. In case of doubt, CECT abdomen was performed. Only 15 cases (11%) had a haematocrit less than 30% on admission. 3 cases had haematuria (2.2%).

Ultrasound abdomen revealed free fluid in the abdomen in 60 (44.7%) cases, solid organ injury in 39 (29%) cases, normal study in 46.2% cases and inconclusive results in 9% cases. In cases with free fluid in the abdomen diagnostic aspiration was done, which revealed hemoperitoneum in 42 (31.3%) cases.

CECT abdomen was performed in 49 (37.4%) cases, which revealed positive findings like pneumoperitoneum, solid organ injury and its grade in 38 (28.3%) cases and normal study in 11 (8.2%) cases. Plain x-ray films of the abdomen were abnormal in 15 (11%) patients. Abnormal findings included free intraperitoneal air in 3 (2.2%) patients and dilatation of bowel in 12 (8.9%) patients.

Associated extra-abdominal injuries were encountered frequently (Table-1), most common being chest injuries.

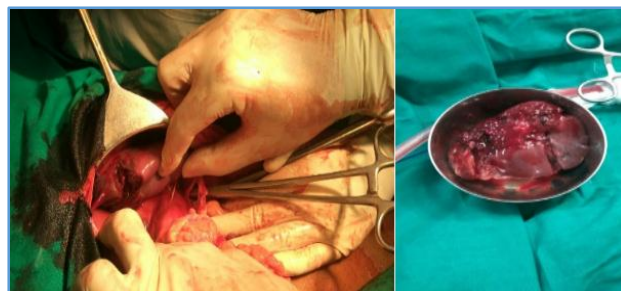
Sl. No.	Associated Injuries	No. of Patients	(%)
1	Chest injuries (Rib fractures, haemothorax or pneumothorax)	38	28.3
2	Extremity fracture	12	8.9
3	Pelvic fracture	5	3.7
4	Head injury	4	2.9
5	Combination of injuries	4	2.9

**Table 1**

38 (28.3%) of the 134 patients had blunt chest trauma. 28 (20.8%) patients required intercostal drain (ICD) insertion. 12 patients (8.9%) sustained an associated extremity fracture, 5 (3%) sustained pelvic fractures, 4 patients had associated head injury and 4 cases (3%) had combination of associated injuries. Of the 4 patients who sustained a serious head injury in addition to blunt abdominal trauma, 50% died.

Of the 134 patients, 42 were operated and 92 were managed conservatively. The spleen was the organ injured most frequently in 43 cases (32%) followed by liver in 28 cases (20.8%). Commonest hollow viscus injury was small bowel injury.

24 patients (56%) with splenic injury had splenectomy. All of them had drains placed in the left subphrenic space. Rest of the cases with splenic contusion and haemodynamic stability were managed conservatively.



**Splenic Laceration**

The liver sustained the second greatest number of injuries- 28 cases (20.8%). Of these, 36% were operated and the rest 64% were managed conservatively. Blunt liver

trauma has always been associated with a high morbidity. In spite of improved operative methods for managing the traumatised liver, postoperative complications occurred in 30% of our patients.

Only 6 (4.4%) cases had bowel injuries, of which 4 (2.9%) are small bowel injuries and 2 (1.4%) are large bowel injuries. Out of the 4 small bowel injuries, 3 were cases of jejunal perforation and 1 was a case of ileal perforation. 3 cases were treated with suture repair and 1 case required resection of injured bowel. There was a 50% postoperative complication rate and one death. The single death was the result of sepsis directly related to the abdominal injury. Two patients (1.4%) sustained colon injuries with a mortality rate of 50%. Proximal colostomy was the usual method of management of colon injuries.

One patient (0.7%) had gall bladder perforation, for which emergency cholecystectomy was done. One patient (0.7%) had combined injury to spleen and kidney for which splenectomy and nephrectomy were done. One patient had mesenteric tear (0.7%), in which bleeding vessel was ligated and haemostasis secured.

**Morbidity**

Of the 38 postoperative survivors, 23 (59%) recovered without a complication. Cardiovascular and pulmonary complications occurred in 9 cases (23.6%). Intra-abdominal complications including peritonitis, pancreatitis, subphrenic and subhepatic abscess, liver abscess, delayed postoperative haemorrhage occurred in 4 (10.5%) cases. Surgical site infection occurred in 7 (18.4%) cases, of which 2 cases developed wound dehiscence and one patient developed evisceration. Urinary tract complications occurred in 3 cases (7.8%).

**Mortality**

In addition to the 4 patients who died in the emergency room, 2 (1.4%) died following non-operative management and 4 patients died after operation. This represents a postoperative mortality of 9.5% and an overall mortality of 7.4%.

**DISCUSSION**

Blunt abdominal trauma is a leading cause of mortality and morbidity among all age groups. It produces injuries ranging from single organ to mutilating multiorgan injuries. Clinical assessment of abdomen might sometimes be inaccurate since there are often distracting injuries, altered levels of consciousness, non-specific signs and symptoms and large differences in individual patient reactions to intraabdominal injury. Clinical evaluation of abdominal injuries may be masked by more obvious external injuries.<sup>(8)</sup> Non-therapeutic laparotomies have significantly reduced with proper and timely application of imaging methods in blunt abdominal trauma patients along with physical examination. Unrecognised abdominal injury is a frequent cause of preventable death after trauma.<sup>(9)</sup>

Forty-three percent of the patients in this series gave no indication other than history that they had sustained blunt abdominal trauma. The subtlety with which organ injury can exist secondary to blunt abdominal trauma is exemplified by the figures showing that 17 (29.8%) of these “asymptomatic” patients were eventually explored and had an injury which

required repair. This emphasises the importance of careful and continuing observation of individuals with blunt abdominal trauma. Proper management of these patients requires careful initial evaluation and a period of observation.<sup>(10)</sup> Diagnostic procedures should be limited to those examinations that have proven effective in blunt abdominal trauma and should not delay laparotomy in an unstable patient.

The patient who has sustained blunt abdominal trauma may have sustained injury simultaneously to other systems, and it is particularly important to examine for injuries of the head, thorax and extremities. Care of the injuries in any of these systems may take precedence over the abdominal trauma. Failure to recognise an extra-abdominal injury may contribute to the patient’s death, when a relatively simple procedure might otherwise have saved the patient’s life.

In addition to a rapid and accurate history and physical examination including rectal examination, the initial evaluation should include basic steps listed in Table-2.

1. History and physical examination
2. Airway, nasogastric tube, Foley catheter, IV and central venous line
3. Lab Work: CBC, Serum electrolytes, RFT, Serum amylase, Cross-matching
4. X-rays: Chest, abdomen, skull, pelvis, extremities (as indicated)
5. USG abdomen and diagnostic tap
6. CECT abdomen, CT brain (when indicated)
<b>Table 2. Early Management should Include</b>

The chest x-ray will not only call attention to any associated injuries to the chest and mediastinal structures, but should also indicate if there has been a rupture of the diaphragm with intrathoracic displacement of some of the abdominal viscera. Incidence of rib fractures in this study was consistent with the studies conducted by Fazili et al.<sup>(11)</sup>

The abdominal films may reveal the presence of air under the diaphragm, evidence of massive retroperitoneal haemorrhage, enlargement of the kidney, enlargement of the splenic shadow or any one of which should hasten surgical intervention. Ultrasound abdomen reveals presence of free fluid and intraabdominal solid organ injury. CECT abdomen should be done when it is warranted. Ultrasound-guided diagnostic tap proved to be very accurate in assessing the presence of intraperitoneal blood. Diagnostic tap can be performed rapidly with minimal delay and requires no specialised equipment.<sup>(12)</sup> The trauma centre providing initial care ought to be capable of providing any of the listed procedures within a few minutes of patient’s admission to the unit.

The spleen was the organ injured most frequently followed by liver. Commonest hollow viscus injury was small bowel injury. These results were consistent with other studies of David<sup>(13)</sup> and Morton et al.<sup>(14)</sup> As noted in other reports,<sup>(15,16)</sup> jejunal or ileal trauma was usually located near the points of attachment at the ligament of Treitz and the ileocecal valve.

The cause of death was attributable to the abdominal injury in 40% of cases. Associated injuries, especially head trauma, were responsible for the remainder of the fatalities. In patients requiring multiple procedures, the abdominal injury was the cause of death in 18% of cases. If only a single

abdominal organ was injured, it was infrequently the cause of death. Early diagnosis can decrease the mortality by 50%.<sup>(17)</sup> Mortality is related to delayed presentation and diagnosis, associated injuries and delayed surgical intervention.

#### CONCLUSION

The incidence of blunt abdominal trauma is increasing with male predominance. Road traffic accidents under the influence of alcohol is the most common cause. Correct diagnosis and proper management depend on individual evaluation of each patient. The insidious nature of blunt abdominal injury is borne out by the fact that more than one-third of the "asymptomatic" patients had an abdominal organ injured. The majority of abdominal injuries are managed non-operatively. Bowel injuries are associated with high mortality and form the major chunk of failure of non-operative management. A high index of suspicion, adequate observation period, swift recognition and immediate intervention when necessary are therefore mandatory for proper care of patients with blunt abdominal trauma. Mortality and morbidity continue to be significant in blunt abdominal trauma.

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