

Study of Clinical Profile and Management of Blunt Abdominal Trauma

Girish M Umare¹, Nitin Sherkar¹, A Motewar²

ABSTRACT

Introduction: In today's mechanized world Blunt Abdominal Trauma (BAT) is a common emergency which is associated with considerable morbidity and mortality. More than 75% of abdominal traumas are blunt in nature and liver and spleen are the commonest organs to be injured as a result of BAT. This study was conducted to evaluate cases of BAT with special emphasis on study of associated epidemiological factors, clinical profile and management strategies in patients presenting BAT.

Material and Methods: We conducted this prospective study of 50 patients admitted to our institute with history of Blunt Abdominal Trauma. After appropriate resuscitative measures detailed history was taken followed by thorough clinical examination in all the patients. Demographic data, history, clinical and intraoperative findings, investigations and complications during hospital stay and during follow up visits were all recorded. The management was decided depending upon history, clinical examination and investigations.

Results: Males were predominantly affected and most cases were between the age group of 11-40 years (76%). Majority of the patients (88%) presented with the complaint of abdominal pain followed by abdominal guarding (72%) and abdominal distension (52%). 29 (58%) patients were managed conservatively while operative interventions were required in 21 (42%) patients. Common surgeries performed in the studied cases included splenectomy (28.57%), primary closure of perforation (23.80%) and resection and anastomosis (19.04%). Majority of the patients (78%) were discharged within 10 days of admission.

Conclusion: Blunt Abdominal Trauma is one of the important causes of morbidity and mortality in young adults. Immediate resuscitative measures, management of associated injuries and appropriate operative intervention are important parts of management of such cases.

Keywords: Blunt Abdominal Trauma, Imaging studies, Visceral Injuries, Operative Interventions.

accidents account for 75 to 80% of blunt abdominal trauma². Blunt injury of abdomen can also occur as a result of fall from height, assault with blunt objects, industrial mishaps, sport injuries, bomb blast and fall from riding bicycle³. Blunt abdominal trauma is usually not obvious hence, often missed, unless, repeatedly looked for. Delay in diagnosis and inadequate treatment of the abdominal injuries may prove fatal. The status and co-existing injuries which may distract the attending surgeon from properly assessing difficulty in diagnosis arises from the factors like delay in reaching hospital, altered mental status of the patient and co-existing injuries making the diagnosis difficult⁴.

The factors like altered mental status of the patients makes it necessary that the management should not be based entirely on the basis of clinical examination and rather should be assisted by imaging like FAST (Focused assessment of sonography in trauma) and computed tomography (CT)⁵. The management needs multidisciplinary approach. In spite of the best techniques and advances in diagnostic and supportive care, the morbidity and mortality remains at large⁶. The usual complication arising out of BAT includes hemorrhagic shock due to blood loss. Fluid resuscitation and non operative management is all that is needed in haemodynamically stable patients with BAT. But in some cases refractory shock not responding to aggressive fluid resuscitation may be seen. In such patients one of the main concerns from the point of view of a treating surgeon is control of bleeding⁷. Continued intraabdominal bleeding secondary to vascular injuries may be the cause of patient not responding to fluid resuscitation and in such patients surgical interventions like therapeutic laparotomy and appropriate measures to stop bleeding (ligation of bleeders) may prove life saving⁸. The other indications for surgical interventions may include extensive renal injuries, expanding hematoma and extensive splenic injuries⁹. The major causes of mortality in cases of BAT include delay in seeking treatment, poor general condition and associated injuries (Head injury, lung laceration and

INTRODUCTION

With modernization, industrialization and motorization of the society there is a rapid increase in the incidence of Blunt Abdominal trauma (BAT). It is one of the most common injuries amongst those caused due to road traffic accidents¹. Injuries are reported to be amongst the top 10 killers around the world and abdominal injuries are amongst the top 3 of these overall cases. Majority of these abdominal injuries (> 80%) are of blunt character. Spleen and liver are found to be injured in majority of cases of BAT. Other injuries which may be seen include renal injuries, injuries to urinary bladder and urethra, pelvic fractures and vascular injuries. Motor vehicle

¹Assistant Professor, Department of Surgery, Government Medical College, Nagpur, ²Associate Professor, Department of Surgery, Dr Shankar Rao Chavan Government Medical College, Nanded, India

Corresponding author: Dr Girish M Umare, 104, Shri Siddhesh Sai Leela Apartment, Old Subhedar Layout, Sharda Chowk, Manewada Road, Nagpur (MS) 440024, India

How to cite this article: Girish M Umare, Nitin Sherkar, A Motewar. Study of clinical profile and management of blunt abdominal trauma. International Journal of Contemporary Medical Research 2018;5(1):5-9.

multiple rib fractures etc)¹⁰. Majority of the patients can be saved if Proper diagnosis of BAT and associated injuries is done and appropriate resuscitative measures along with surgical intervention (if needed) is done¹¹.

In view of increasing number of vehicles and consequently road traffic accidents, this study was undertaken to evaluate cases of BAT with special emphasis on study of associated epidemiological factors, clinical profile and management strategies in patients presenting with BAT.

MATERIAL AND METHODS

This was a prospective study of Patients admitted in department of surgery of a medical college situated in an urban area with the diagnosis of blunt abdominal trauma. The patients were included in this study depending upon a predefined inclusion and exclusion criteria. Any patient having any of the exclusion criteria was excluded from the study. The data was collected by direct interview with the patient or patient relatives accompanying the Patient and obtaining a detailed history. A thorough clinical examination was done in all the patients. Relevant diagnostic investigations (X-Ray Ultrasonography or CT scans) performed over the patient. After initial resuscitation of the patients, thorough assessments for injuries were carried out in all the patients. 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 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 x ray abdomen and Ultrasound abdomen and C T Scan abdomen. The decision for operative or non operative management depended on the outcome of the clinical examination, hemodynamic stability and ultrasound abdomen. Patients selected for non operative or conservative management were placed on strict bed rest and were subjected to serial clinical examination which included hourly pulse rate, blood pressure, respiratory rate and repeated examination of abdomen and other systems. Appropriate diagnostic tests especially ultrasound of abdomen was repeated as and when required. Nominal categorical data between the groups was compared using Chi-square test or Fisher's exact test as appropriate. $P < 0.05$ was taken to indicate a statistically significant difference. Minitab version 17 was used for computation of statistics.

Inclusion criteria

1. All patients presenting with history of blunt abdominal trauma.
2. Those who gave informed consent to be part of the study.

Exclusion Criteria

1. Those who refused informed consent.

2. Those who were found to have no evidence of abdominal injury on the basis of imaging.

RESULTS

In this prospective study of 50 patients with Blunt abdominal trauma there were 42 (84%) males and 8 (16%) females with a M: F ratio of 1:0.19 (figure-1).

Amongst the studied cases most common age group involved

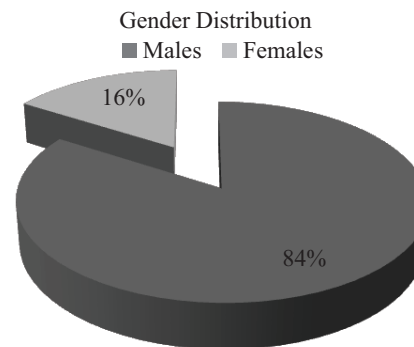


Figure-1: Gender Distribution of the studied cases.

Presentation	Number of Cases	Percentage
Abdominal Pain	44	88
Abdominal Distension	26	52
Hematuria	02	04
Abdominal Guarding and Rigidity	36	72
Shock	16	32

Table-1: Clinical Presentation of the studied cases.

Associated injuries	Number of Cases	Percentage
Head	05	10%
Chest	11	22%
Extremities	04	08%
Pelvis	04	08%
No Associated Injuries	27	54%

Table-2: Associated Injuries in the studied cases.

Ratio	No of Cases	Percentage
Conservative	29	58%
Operative	21	42%

Table-3: Ratio of operative to conservative management of the studied cases.

Organs	No of Cases	Percentage
Liver + Kidney	2	4%
Spleen + Kidney	1	2%
Spleen + Liver	1	2%
Liver + Gall Bladder	1	2%

Table-4: Multiorgan injuries in the studied cases

Hospital Stay	No of Cases	Percentage
01-10 Days	29	58%
11-20 Days	21	42%

Table-5: Hospital stay in the studied cases.

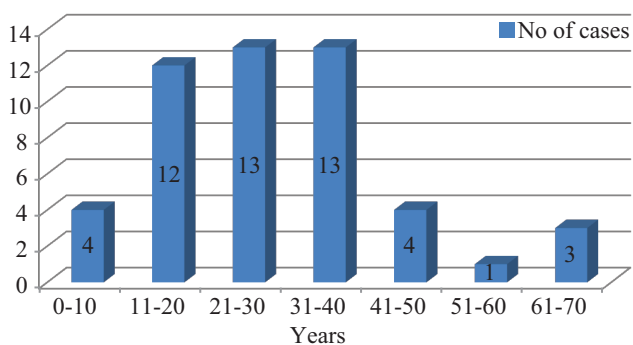


Figure-2: Age distribution of the studied cases.

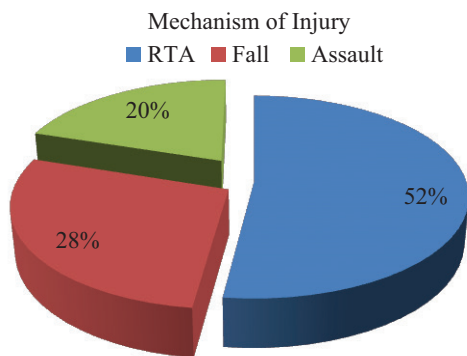


Figure-3: Mechanism of Injury in the studied cases.

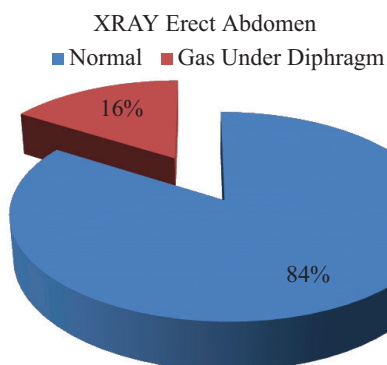


Figure-4: X-ray Erect abdomen in studied cases.

was 21-30 years (26%) and 31-40 years (26%) followed by 11-20 years (24%). Least number of cases were found between 50-60 years (2%) (figure-2).

In 26 (52%) cases road traffic accident was the mode of injury followed by fall from height in 14 patients (28%). 10 patients (20%) had the history of assault (figure-3).

88% of our patients presented with abdominal pain followed by abdominal guarding and Rigidity in 72%. Least patients presented with hematuria accounting for 4% patients. The study of the associated injuries showed that they were present along with abdominal injury in 33 cases. The common extra abdominal injury was thoracic in the form of fractured ribs and hemothorax followed by head injury, extremities fracture and pelvic injury (table1,2).

Plain X-ray of erect abdomen was done in all the cases out of which 8 (16%) patients showed gas under diaphragm s/o perforation. Rest of the 42 (84%) X-rays were normal. Ultrasound of the abdomen was done in all the cases. Spleen was found to be most commonly injured organ (38%)

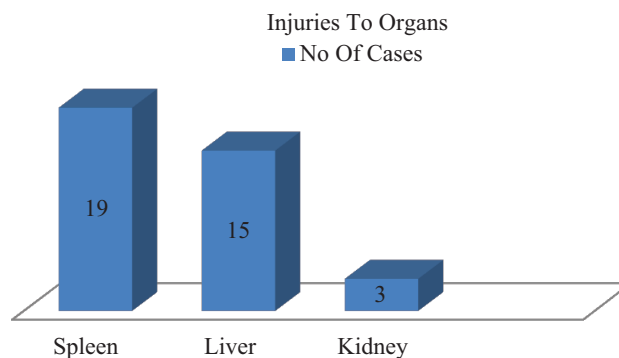


Figure-5: Injuries to Various Organs in the studied cases

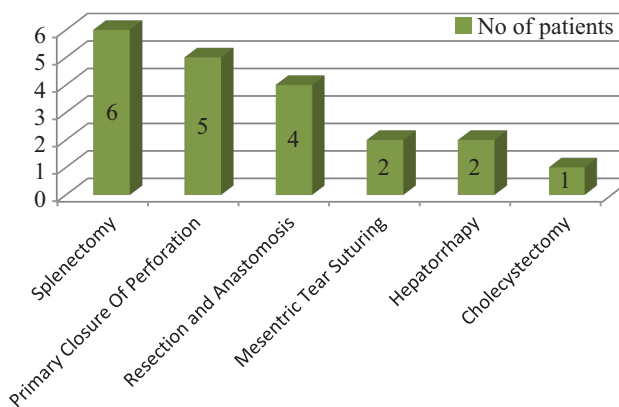


Figure-6: Type of surgeries done during laparotomy

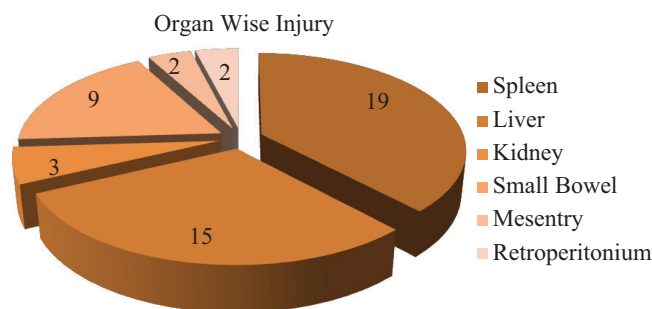


Figure-7: Organ Wise injuries in the studied cases.

followed by Liver (30%) and kidney (6%) (Figure 4,5).

21 (42%) of the patients underwent emergency laparotomy because of pneumoperitoneum or hemodynamic instability. 29 (58%) patients were managed non-operatively because they had no signs of peritonitis and they were haemodynamically stable. During laparotomy the most common operative procedure which was done was splenectomy (6/21) followed by primary closure of perforation (5/21), resection and anastomosis (4/21). Procedures like mesenteric tear suturing, hepatorrhapy and cholecystectomy was done in 2, 2 and 1 patients out of 21 operated patients (table-3, figure-6).

Spleen (38%) was found to be most commonly injured organ followed by liver (30%) and small bowel (18%). Kidneys (6%), mesentery (4%), retroperitonium (2%) and gall bladder (2%) were injured in relatively less number of patients (figure-7).

The analysis of the pattern of injuries showed that there were 5 (10%) patients with multiple organ injuries. 2 (4%) patients had hepatic and renal injuries, Splenic and renal injuries or

splenic and hepatic injuries were seen in 2 (4%) each. In 1 patient Liver and Gall bladder were injured (table-4). Majority of the patients (78%) were discharged within 10 days of admission. 11 (22%) needed to be in hospital beyond 10 days and were discharged before 20 days of admission. There was no patient who had to remain in hospital beyond the period of 20 days (table-5).

DISCUSSION

In this prospective study of 50 patients with blunt abdominal trauma majority of the affected patients were males (84%). The M: F ratio of the patients was found to be 1: 0.19. Males are reported to be uniformly more commonly affected than females in majority of the studies. Madhumita Mukhopadhyay et al in their study of 47 patients who underwent laparotomy following intestinal injuries from blunt abdominal trauma over a period of 4 years found that the M:F ratio in this study was 8.4:1¹². Similarly John L Kendall et al in a retrospective cohort study of 1169 cases of BAT reported that 66% of the affected individuals were Males¹³.

The most common age group involved in our study was 21-30 (26%) years and 31-40 years (26%). More than 50% in our study belonged to age group of 21-40 years. As the age advances there is less chances of individuals getting assaulted and use of motor vehicle also decreases and the incidence of BAT is found to be decreasing with the increasing age. Only 3 (6%) patients in our study were found to be above 60 years of age. Similar findings were reported by Davis et al who reported that 39% patients with BAT belonged to age group of 21-40 years¹⁴.

The analysis of mode of injury revealed that Road traffic accidents were the most common mode of injury (52%) followed by fall from height (28%) and assault (20%). Similar Findings were reported by Khanna et al who found that t most common mode of injury in cases of BAT was Road Traffic accidents (57%). In contrast to our study Khanna et al in their study found assault (33%) to be more common than fall from height (15%)¹⁵.

In our study abdominal pain was the most common presenting complaint accounting for 88% cases. Abdominal guarding and rigidity was most common sign seen in 72% 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. Retroperitoneal organ injury was missed in USG abdomen. Though ultrasound is very useful in emergency situations where bedside diagnosis of hemoperitoneum or injury to organs can be made on the basis of ultrasound there are various studies which have shown that a negative ultrasound doesn't necessarily rule out injuries and recommended that when ultrasound is used as sole modality of investigation then the patient should be admitted for observation and a repeat USG should be done as and when necessary¹⁶.

Associated injuries were present in 23 cases. The most extra abdominal injury was thoracic accounting for 22% followed by head injury, extremity fracture and pelvic fracture in descending order. There was no association in 27 patients.

Similar findings were reported by Nikhil Mehta et al in their retrospective study of 71 cases of BAT the authors found that the common associated injuries were head injuries (14%), hemothorax (14%) and rib fractures (20%). The authors managed most of the associated injuries conservatively except hemothorax and pneumothorax where intercostals drainage was needed¹⁷.

Plain erect X ray of abdomen was done in all 50 cases. Gas under diaphragm was found in 8 Cases out of 9 bowel perforations detected at laparotomy. So the sensitivity of plain x ray abdomen in detecting the pneumoperitoneum is in 89% the present study. Though many investigators still favors use of Plain radiography it is usually less sensitive and cannot be relied upon as a sole method of detecting pneumoperitonium¹⁸.

USG abdomen was done in all cases out of which 37 cases shows organ injury. Therefore USG abdomen is more reliable in detecting organ injury and free fluid in the abdomen. In our study USG could show Splenic, Hepatic and renal injuries in 38%, 30% and 06% patients respectively. Spleen was found to be injured most commonly. Similar study by Cox et al showed splenic and hepatic injuries in 46% and 33% patients respectively¹⁹.

There is an increase in trend towards conservative management if the patient is haemodynamically stable. The grade of injury was assessed by USG and CECT and was most of the time managed conservatively. Minor lacerations and capsular tears which are difficult to diagnose clinically can be easily demonstrated in USG and CECT scan and were selected for non-operative management. However the disadvantage of non-operative management is missed injuries resulting in increased morbidity and mortality. Operative intervention is needed in hemodynamically unstable patients who are not responding to aggressive fluid resuscitation and those with significant organ injuries. The common surgeries performed in our patients included splenectomy, primary closure of perforation and resection and anastomosis. Similar surgeries were required in patients of BAT as reported by Wu CL et al AB²⁰.

CONCLUSION

Blunt Abdominal Trauma is one of the important causes of morbidity and mortality in relatively young individuals. Most common mode of injury is road traffic accidents and men are affected predominantly. Early diagnosis of extent of injury by appropriate imaging (X-ray, Ultrasound or CT abdomen) and appropriate interventions (Aggressive fluid resuscitation, blood transfusion and operative interventions) are crucial in management. Associated Injuries like head injury, abdomino-thoracic injuries and fractures influence the outcome.

REFERENCES

1. Diagnosis of significant abdominal trauma after road traffic accidents. *Annals of The Royal College of Surgeons of England*. 1988;70:337-338.
2. Sabiston's Text book of surgery: 18 edition: vol 1: 2004: p483-53

3. Decker, G.A.G., Lee McGregor's Synopsis of Surgical Anatomy, Bristol John Wright and Sons LTD, 1986: p322-339
4. Morton JH, Hinshaw JR, Morton JJ. Blunt Trauma to the Abdomen. *Annals of Surgery*. 1957;145:699-710.
5. Gamanagatti S, Rangarajan K, Kumar A, Jineesh. Blunt abdominal trauma: imaging and intervention. *Curr Probl Diagn Radiol*. 2015;44:321-36.
6. Imentel SK, Sawczyn GV, Mazepa MM, da Rosa FG, Nars A, Collaço IA. Risk factors for mortality in blunt abdominal trauma with surgical approach. *Rev Col Bras Cir*. 2015;42:259-64.
7. Kar S, Mohapatra V, Rath PK. Isolated Mesenteric Vascular Injury Following Blunt Abdominal Trauma Leading to Massive Segmental Gangrene of Small Gut: A Case Report. *Journal of Clinical and Diagnostic Research: JCDR*. 2016;10:PD16-PD17.
8. Loffroy R, Chevallier O, Gehin S, et al. Endovascular management of arterial injuries after blunt or iatrogenic renal trauma. *Quantitative Imaging in Medicine and Surgery*. 2017;7:434-442.
9. Martin JG, Shah J, Robinson C, Dariushnia S. Evaluation and Management of Blunt Solid Organ Trauma. *Tech Vasc Interv Radiol*. 2017;20:230-236.
10. Wilson CB. The Management of Abdominal Injuries in the Presence of Head Injury. *California Medicine*. 1969;111:343-346
11. Vyhnánek F, Duchác V, Skála P. Damage control laparotomy in blunt abdominal injury. *Acta Chir Orthop Traumatol Cech*. 2009;76:310-3.
12. Mukhopadhyay M. Intestinal Injury from Blunt Abdominal Trauma: A Study of 47 Cases. *Oman Medical Journal*. 2009;24:256-259.
13. Kendall JL, Kestler AM, Whitaker KT, Adkisson M-M, Haukoos JS. Blunt Abdominal Trauma Patients Are at Very Low Risk for Intra-Abdominal Injury after Emergency Department Observation. *Western Journal of Emergency Medicine*. 2011;12:496-504.
14. Joe Jack Davis, Isidore Cohn, Francis C. Nance; Diagnosis and management of Blunt abdominal trauma. *Ann, Surg*, 1976 183: 672-678.
15. R. Khanna, S Khanna, P Singh, Puneet and A K Khanna; Spectrum of blunt abdominal trauma in Varanasi; *Quart J*; 1999;35;25-28.
16. Jansen JO, Yule SR, Loudon MA. Investigation of blunt abdominal trauma. *BMJ: British Medical Journal*. 2008;336:938-942.
17. Mehta N, Babu S, Venugopal K. An Experience with Blunt Abdominal Trauma: Evaluation, Management and Outcome. *Clinics and Practice*. 2014;4:599.
18. Remedios D, McCoubrie P; The Royal College Of Radiologists Guidelines Working Party. Making the best use of clinical radiology services: a new approach to referral guidelines. *Clin Radiol*. 2007;62:919-20.
19. Cox, Everard F. Blunt abdominal trauma: A 5 year Analysis of 870 patients requiring Celiotomy; *Ann, Surg* 1984;199:467-474.
20. Wu CL, Chou MC. Surgical management of blunt abdominal trauma. *Gaoxiong Yi Xue Ke Xue Za Zhi*. 1993;9:540-52.

Source of Support: Nil; **Conflict of Interest:** None

Submitted: 25-12-2017; **Accepted:** 27-01-2018; **Published:** 06-02-2018