

Original Research Article

Blunt abdominal trauma: the experience in rural India and review of literature

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ABSTRACT

Background: Blunt Abdominal trauma is one of the most common injuries caused due to road traffic accidents. The rapid increase in number of motor vehicles and its aftermath has caused rapid increase in number of victims due to blunt abdominal trauma. As the care of patients with blunt abdominal injuries is largely a surgical responsibility and abdominal injuries involving major hemorrhage from solid viscera constitute surgical emergencies. Abdominal blunt traumas represent a real diagnostic and therapeutic challenge to even a most experienced surgeon, thereby representing importance of its study. Early diagnosis and effective management help in decreasing mortality in blunt abdominal trauma.

Methods: Prospective study of 50 patients admitted to the institute with history of Blunt Abdominal Trauma. 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 and complications during the stay in the hospital were all recorded on a Performa specially prepared. 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 21-40 years (76%). Majority of the patients (90%) presented with the complaint of abdominal pain followed by abdominal distension (56%). 36(60%) patients were managed conservatively while operative interventions were required in 24(40%) patients. The common surgeries performed in the patients included splenectomy, primary closure of perforation and resection and anastomosis of bowel. Majority of the patients (80%) were discharged within 20 days of admission. The mortality in present study was 13.3%.

Conclusions: 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, Hemoperitoneum, Road traffic accident

INTRODUCTION

The rapid increase in number of motor vehicles and its aftermath has caused rapid increase in number of victims to blunt abdominal trauma. Motor vehicle accidents

account for 75 to 80% of blunt abdominal trauma. Blunt injury of abdomen is also a result of fall from height, assault with blunt objects, industrial mishaps, sport injuries, bomb blast and fall from riding bicycle.^{1,2} Blunt abdominal trauma is usually not obvious; hence it is often

missed, unless, repeatedly looked for. Due to the delay in diagnosis and inadequate treatment of the abdominal injuries, most of the cases are fatal. In spite of the best techniques and advances in diagnostic and supportive care, morbidity and mortality remain large. The reason for this could be due to the interval between trauma and hospitalization, inadequate and lack of appropriate surgical treatment, delay in diagnosis, post-operative complications and associated trauma especially to head, thorax. Early diagnosis and effective management help in decreasing mortality in blunt abdominal trauma.

METHODS

This prospective study was carried out at Government Medical College, Miraj, Maharashtra, India, between September 2011 to August 2013. The patients who presented in Emergency Department with Blunt abdominal injury were identified and following inclusion and exclusion criteria were applied.

Inclusion criteria

- Patients of all age groups.
- Patients of both sex group.

Exclusion criteria

- Patients presenting with major thoracic or head injury with minor abdominal trauma were excluded from the study due to difference in protocols of management.

This study is approved by institutional ethics committee.

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 and complications during the stay in the hospital 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.

The decision for operative or non-operative management depended on the outcome of the clinical examination, hemodynamic stability and X ray abdomen, FAST (Focused Abdominal Sonography for Trauma), CECT (Contrast enhanced computed tomography) abdomen. Diagnostic peritoneal lavage was not done in present study due to its invasiveness and easy availability of high resolution FAST and CECT scan.

Patients selected for non-operative or conservative management were placed on strict bed rest, 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. CECT scan was done in 47 patients in our study. FAST was done in all patients.

RESULTS

In this prospective study of 60 patients with Blunt abdominal trauma there were 50(83.3%) males and 10(16.7%) females with M: F ratio of 5:1. Amongst the studied cases most common age group (Table 1) involved was 21-30 years (46.6%) and 31-40 years (30%) followed by 11-20 years (8.3%). In 15(56.7%) cases road traffic accident was the mode of injury followed by fall from height in 14 patients (25%). 11 patients (20%) had the history of assault. 90% of our patients presented with (Table 2) abdominal pain followed by abdominal distention in 56.6%. Associated injury along with abdominal injury was present in 42 cases.

Table 1: Age Incidence.

Age group (Year)	No. of patients	Percentage %
11-20	2	3.3
21-30	28	46.6
31-40	18	30.0
41-50	5	8.3
51-60	5	8.3
61-70	1	1.6
71-80	1	1.6

Table 2: Clinical presentation.

Presentation	No. of cases	Percentage
Abdominal pain	54	90%
Abdominal distension	34	56.6%
Haematuria	10	16.6%
Abdominal guarding	19	31.6%
Shock	15	25%

Table 3: Associated injury.

Associated injury	No. of cases	Percentage
Head	7	11.6%
Thorax	20	33.3%
Extremities injuries	12	20.0%
Pelvis injuries	4	6.6%
Soft tissue injury	2	3.3%
No association	18	30%

The commonest extra abdominal injury (Table 3) was thoracic in the form of fractured rib or hemothorax followed by extremities fracture, head injury, pelvic and soft tissue injury. Hemoglobin was above 10 gm% in 28.3% of patients and was less than 8gm% in 16.7% cases. Gross hematuria is present in 6 patients and micro hematuria in 4 patients. Plain X Ray erect abdomen done in all patient (Table 4). 33.3% of X ray erect abdomen was normal in this series.

Table 4: X ray erect abdomen.

X ray erect abdomen	No. of cases	Percentage
Ground glass appearance	20	33.3%
Gas under diaphragm	6	10%
Enlarged soft tissue shadow (ESTS)	14	23.3%
No Abnormality detected	20	33.33%

Four Quadrant Aspirations (FQA) were done in 31 cases. It was positive in 23 cases. FAST done in all 60 cases (Table 5), free fluid without solid organ injury was present in 6 cases. CECT was performed in 49 cases (Table 6), 11 cases were taken for emergency laparotomy without CECT in view of their X erect abdomen finding (pneumoperitoneum) or hemodynamic instability, 24 patients with pneumoperitoneum or hemoperitoneum with hemodynamic instability underwent exploratory laparotomy, 36 patients were selected for non-operative management because they had no signs of peritonitis or they had hemoperitoneum but were hemodynamically stable.

Table 5: Organ injury in USG abdomen.

Organ	No. of patients	Percentage
Spleen	27	45.0%
Liver	22	36.6%
Kidney	7	11.6%
Pancreas	2	3.3%
Free fluid without solid organ injury	6	10%

Table 6: CECT scan.

Organ injured	No. of cases
Spleen	23
Liver	23
Pancreas	3
Renal	9
Retroperitoneal hematoma	2
Not done	11

The following table shows various operative procedures (Table 7) carried out during Exploratory laparotomy. Spleen 29(48.3%) was found to be most commonly injured organ followed by liver 25(41.6%) and kidney 10(15%). Small bowel 6(10%), pancreas 3(5%), retroperitoneum (3.3%) and urinary bladder (1.6%) were injured in relatively less number of patients. Many times, multiple organs were involved in 13 patients. Majority of the patients (80%) were discharged within 20 days of admission, 12(20%) needed to be in hospital beyond 20 days. Patients with associated extra abdominal injuries had prolonged hospital stay. Also, patients with multiple organ injury had longer duration of hospital stay. A total of 8 patients died in present study, 6 belong to operative group and 2 patients belong to non-operative group. Out of 6 patients who belong to operative group 4 had multiple organ injuries, of these 3 patients had hollow

viscus injury. Associated injury present in 3 patients of operative group. Respiratory infection presents in 2 patients of operative group. In non-operative group both the patients had multiple organ injuries; respiratory complication was present in 1 patient. The mortality in present study was 13.3%.

Table 7: Type of surgery.

Procedure	No. of patients	%
Closure of hollow viscus perforation	6	22.22%
Duodenum end to end anastomosis (for complete third part transection)	1	3.7%
Splenectomy	9	33.3%
Splenorrhaphy	3	11.11%
Hepatorrhaphy	6	22.22%
Mesenteric repair	1	3.7%
Bladder repair	1	3.7%

DISCUSSION

In this prospective study of 50 patients with blunt abdominal trauma, majority of the affected patients were males and were in the age group of 21-30 years, followed by 31-40 years; and this was comparable to the study by Davis et al.³ As the age advances there is less chances of individuals getting assaulted and use of motor vehicle also decreases and the incidence of blunt abdominal trauma is found to be decreasing with the increasing age. Young people who give more priority to speed rather than safety is the most frequently affected age group. The analysis of mode of injury revealed that Road traffic accidents were the most common mode of injury (56.7%) followed by fall from height (25%) and assault (18.3%). Similar Findings were reported Davis et al, and Anjum Fazili MS.⁴ In this series abdominal pain was the most common presenting complaint. Almost 90% of the cases give history of abdominal pain following blunt trauma. Abdominal distension was next most common presentation in 56.6% of cases. The signs and symptoms are often misleading in case of blunt trauma abdomen and are masked by other concomitant injury like head injury, chest trauma or extremity trauma. In Davis et al, study 43% had no specific complaints.³ So this emphasizes the importance of careful and continuing observation and repeated periodic clinical examination of individuals with blunt trauma abdomen. Associated injury was present in 42 cases. The most common associated extra abdominal injury was thoracic accounting for 33.3% followed by extremity fracture, head injury, pelvic fracture and soft tissue injury in descending order. There was no associated injury in 18 patients. Associated extra abdominal injuries increases the morbidity in the form longer duration of hospital stay. Plain X ray erect abdomen was done in all the patient in present study. Hollow viscus perforation as suggested by gas under domes of diaphragm was seen in 6 patients (10%). Davis

et al, reported that in their series, abdominal x ray presentation was abnormal in 21% of cases; pneumoperitoneum was detected in 6% of cases and dilated bowel loops in 6% of cases.³ FQA was done in suspected hemoperitoneum cases. Overall 51.6% of cases underwent FQA, 74.19% showed positive result for presence of hemoperitoneum. In Davis et al, study FQA was done in 44% of study cases. USG abdomen (Focused assessment with Sonography for Trauma) was done in all cases out of which 54 patients had solid organ injury.³ Therefore USG abdomen is more helpful in detecting solid organ injury and free fluid in abdomen with the sensitivity 90%. In Study conducted by Fleming S et al, shows FAST had specificity of 94.7% and sensitivity of 46.32%.⁵ Imaging is essential in early decision making. FAST examination of pericardial, perihepatic, perisplenic 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. Sensitivity of CECT was more than 95%. As per study by Hamidi MI et al, CECT scan Abdomen in blunt abdominal trauma had sensitivity of 97% and specificity of 95%.⁶ CECT scan provided reliable information on hemoperitoneum extent of solid organ injuries and ongoing bleeding by means of radiographic blush. In the present series is 21.6% of cases there was multiple organ injury in the abdomen. In Micheal L Nance et al, study, 1.9% of kidney injuries, 9% of liver injuries, 26.2% of pancreatic injuries and 7.9% of splenic injuries had associated hollow viscus injuries.⁷ Of the total 8 patients died in present study, 6 patients had dual organ injuries. Hence dual organ injury is a factor predictive of increased morbidity as well as increased mortality.

There is an increase in trend towards conservative management of blunt abdominal injury if the patient is hemodynamically stable. The grade of injury was assessed by CECT. Hemodynamically stable patients were selected for conservative management and was most of the time managed conservatively. Minor lacerations and capsular tears which are difficult to diagnose clinically can be easily demonstrated in CECT scan and were selected for non-operative management. However, the shortcoming of non-operative management is missed associated 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 the patients included splenectomy, primary closure of perforation and resection and anastomosis. Similar surgeries were required in patients of blunt abdominal trauma as reported by Wu CL et al.⁸

Out of the total 60 cases, 8 patients succumbed to their injuries in this study (13.3%), 3 patients died within 24 hours of presentation (early mortality) and rest 5 patients succumbed four days or later (late mortality). Early mortality can be attributed to hypovolemic shock

secondary to solid organ injury. Late mortality can be correlated to septicaemia, 6 patients belonged to operative group, 2 patients belong to non-operative group. Because of the presence of associated extra abdominal injury, dual organ injury and post-operative complications, the prognosis and outcome of individual organ injury is difficult to comment. However larger studies require coming to the conclusion. Mortality in the present study is 13.3% which is on par with the other published studies in this country Anjum Fazili MS et al.⁴ The mortality rate in Di Vincenti et al, study was 23%.⁹ Cox et al, study reports mortality of 10% and in Davis et al, study it was 13.3%.^{3,10}

CONCLUSION

Blunt injury abdomen contributes a considerable burden on the health care infrastructure. The most common injured organ in the present study is spleen followed by liver, kidney, bowel and pancreas in the decreasing order. Most common age group involved is 21-30 years. Predominantly males are affected in large proportions. Road traffic accident forms the most common mode of injury. So, efforts should be made to bring road traffic regulations into strict action and traffic norms regulated. Well established trauma care centers should be set up at every Taluka hospital. Improvement in emergency medical services and dedicated helplines should be undertaken. Significant number of cases will have associated injuries with blunt injury to abdomen like head injury, thoracic injury, extremity fractures influencing morbidity and mortality. Clinical presentation is varied, sometimes confusing. Blunt injury abdomen is usually less obvious. Hence, repeated examination by multispecialty personnel in a specialized trauma centre is required. Erect abdomen x ray is a useful investigation to identify associated hollow viscus injury. With the advent of high-resolution ultrasonography (FAST), invasive procedures like DPL and FQA investigations are becoming less opted.

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REFERENCES

1. Cusheri A, Giles R, Moosa A. R: Essential Surgical Practice; Butterworth Inter Ed. 1998:263-304.
2. Martin RS, Meredith JW. Management of acute trauma. In: Townsed CM, Beachamp RD, Evers BM, Mattox KL, editors. Seibston Textbook of Surgery: The biological basis of modern surgical practice. 19th ed. Canada; Elsevier Saunders: 2012:430-469.
3. Davis JJ, Cohn Jr IS, Nance FC. Diagnosis and management of blunt abdominal trauma. Ann Surg. 1976 Jun;183(6):672-8.

4. Anjum Fazili MS, Shabana Nazir MB. Clinical profile and operative management of Blunt Abdominal Trauma (Bat): a retrospective one-year experience at SMHS hospital, Kashmir, India. *JK Practitioner.* 2001;8:219-21.
5. Fleming S, Bird R, Ratnasingham K, Sarker SJ, Walsh M, Patel B. Accuracy of FAST scan in blunt abdominal trauma in a major London trauma centre. *Int J Surg.* 2012;10(9):470-4.
6. Hamidi MI, Aldaoud KM, Qtaish I. The role of computed tomography in blunt abdominal trauma. *Sultan Qaboos Univer Med J.* 2007 Apr;7(1):41-6.
7. Nance ML, Peden GW, Shapiro MB, Kauder DR, Rotondo MF, Schwab CW. Solid viscus injury predicts major hollow viscus injury in blunt abdominal trauma. *J Trauma Acute Care Surg.* 1997 Oct 1;43(4):618-23.
8. Wu CL, Chou MC. Surgical management of blunt abdominal trauma. *Gaoxiong Yi Xue Ke Xue Za Zhi.* 1993;9:540-52.
9. Di Vincenti FC, Rives JD, Laborde EJ, Fleming ID, Cohn I Jr. Blunt abdominal trauma. *J Trauma.* 1968 Nov;8(6):1004-13.
10. Cox EF. Blunt abdominal trauma. A 5-year analysis of 870 patients requiring celiotomy. *Annals Surg.* 1984 Apr;199(4):467-74.

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