



A CLINICO EPIDEMIOLOGICAL STUDY OF BLUNT INJURIES ABDOMEN IN A TERTIARY CARE CENTER OF EASTERN UP

General Surgery

Dr. Ashok Kumar Associate Professor, Department Of General Surgery Brd Medical College Gorakhpur.

Dr. Mukul Singh Assistant Professor, Department Of General Surgery Brd Medical College Gorakhpur.

Dr. Yogesh Kumar Professor And Head, Department Of General Surgery Brd Medical College Gorakhpur.

Dr. Rahul Deo* Third Year Postgraduate Student, Department Of General Surgery Brd Medical College Gorakhpur. *Corresponding Author.

ABSTRACT

INTRODUCTION: Trauma is rapidly emerging as a modern epidemic. Blunt trauma continues to be the most common mechanism of injury to abdomen. Abdominal injuries are seen in 2-5% of all accidents and are leading injuries in 51.6% of fatal accidents. Hence, abdominal trauma makes trauma as one of the leading causes of acute abdomen in the day to day surgical practice. It accounts for the majority (80%) of abdominal injuries seen in emergency department, and is responsible for substantial morbidity and mortality.

AIM AND OBJECTIVES:

1. To study the impact of blunt trauma on abdominal viscera
2. To study the various modes of presentation of blunt abdominal trauma
3. To study the short term outcome of various types of blunt abdominal trauma in a tertiary care centre.

MATERIAL AND METHODS: A prospective study was conducted in the department of surgery B.R.D. medical college, Gorakhpur UP India during the period of 1 year from 1st October 2018 to 30th September 2019. A total of 73 patients who sustained BTA with or without associated injuries were included in this study.

CONCLUSION: With proper history, thorough clinical examination and use of common radiological investigations, diagnosis of intra abdominal visceral injuries in patients of Blunt Abdominal Trauma could be made with significant accuracy.

KEYWORDS

Blunt Injuries Abdomen, Clinico Epidemiological Study.

INTRODUCTION

Trauma is rapidly emerging as a modern epidemic. Blunt trauma continues to be the most common mechanism of injury to abdomen. Incidence of BTA is variable from time to time depending on circumstances, mode of injury. Abdomen injuries are seen in 2-5% of all RTA and are leading injuries in 51.6% of fatal accidents¹. Hence, abdominal trauma makes trauma as one of the leading causes of acute abdomen in the day to day surgical practice. It accounts for the majority (80%) of abdominal injuries seen in emergency department, and is responsible for substantial morbidity and mortality.

The spectrum of injuries may vary from simple to catastrophic events and proper assessment and diagnosis become important in such settings. Trauma is the leading cause of death in person under 45 years of age. The trauma can be either from road traffic accidents, accidental fall from height, sports injuries or violence. Motor vehicle accidents account for 75-80% of blunt trauma of abdomen. Blunt abdominal injuries are usually not obvious clinically in very early stage and are frequently unreliable. In view of increasing number of vehicles, consequent increase in road traffic accidents, rampant increase in construction works, accidental fall from height do occur. Apart from this the detection of intra-abdominal injuries poses a diagnostic dilemma if patient had suffered a poly-trauma.

Diagnosis requires intelligent interpretation of history, the physical finding and results of available radiological investigation. Various diagnostic modalities have been studied in great detail regarding how they help in the initial management of patients with blunt trauma abdomen (BTA). In the non-invasive tests category, the role of computed tomography (CT), Ultra-sonography (USG) and focused abdominal sonography for trauma (FAST) scans are already established, resuscitation along with USG and CT scan are very beneficial to detect these patients. Non Operative Management is beneficial as it includes avoidance of non-therapeutic laparotomies and the associated cost of morbidity, fewer intra-abdominal complications compared to operative management. Hemodynamic instability is associated with high morbidity and mortality in BTA patients. Suspected or confirmed hollow viscus injuries usually requires surgery. Hollow viscus injury (HVI) following blunt abdominal trauma is an infrequent diagnosis. Approximately 85% of all the patients with blunt hepatic trauma are

of minor grade injuries and patient are stable. In this group, non operative management significantly improves outcomes over operative management in terms of decreased abdominal infections, decreased transfusions, and decreased length of hospital stay.

For hemodynamically unstable patients, in patients with solid organ injuries operative treatment is still the rule, with the damage control approach now accepted as the standard of care. Bleeding is controlled often by perihaptic packing and patient's time in operation theatre is kept to a minimum. CT scan is the mainstay in the diagnosis for solid organ injuries after blunt trauma in the stable patient. The initial CT finding will help the trauma surgeon to determine the suitability of patient for non-operative treatment.

MATERIAL AND METHODS

A prospective study design was conducted in the department of surgery B.R.D. medical college, Gorakhpur UP India during the period of 1 year from 1st October 2018 to 30th September 2019.

Study Design: Prospective study.

Sample Size: A total of 73 patients who had sustained BTA with or without associated injuries were selected in our study.

Study Period: 1 year (1st October 2018 to 30th September 2019)

Source Of Data: Patients of Blunt Trauma Abdomen admitted in surgery department BRD Medical College Gorakhpur who were willing and had given their consent for study.

Inclusion Criteria

- Patients presenting with history of recent assault of blunt trauma and heavy object over abdomen.
- Road traffic accidents with suspected Blunt Abdominal Trauma.
- History of fall from height.

Exclusion Criteria

- Patients of paediatric age group (<12 years)
- Pregnant women
- Patients with penetrating and gun shot injuries were excluded from study.

OBSERVATIONS AND RESULT

Out of 73 patients of blunt abdominal trauma admitted in Surgery

Emergency during study period, 52 patients were managed operatively and 21 patients managed conservatively.

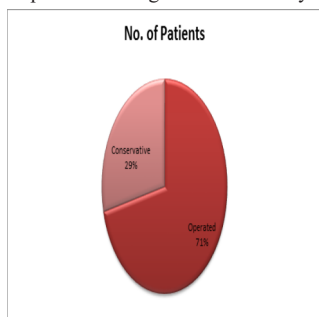


Figure 1: Case Distribution

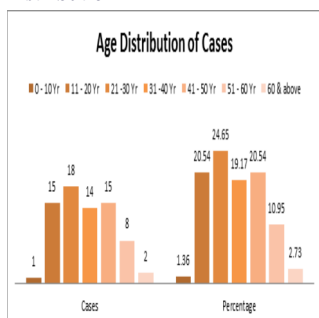


Figure 2:

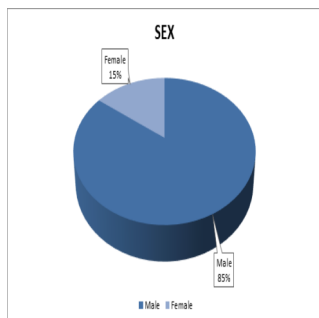


Figure:3

Male To Female Ratio 5.6:1

Table 1: Age/ Sex Ratio (N=73)

Agegroup	Male	Female	Total	%
0-10	1	-	1	1.36%
11-20	14	2	16	21.91%
21-30	15	4	19	26.02%
31-40	12	3	15	20.54%
41-50	10	2	12	16.43%
51-60	8	-	8	10.95%
>60	2	-	2	2.73%
Total	62	11	73	100%

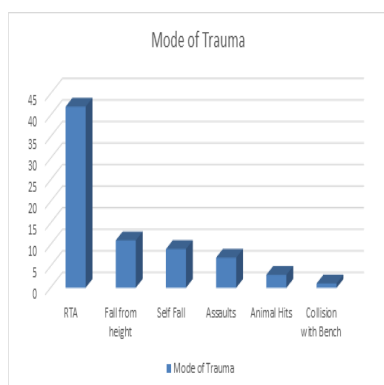


Figure 4:

Table 2: Clinical Signs (n=73)

ClinicalSigns	NoofPatients	%
Abdominaltenderness	70	95.89%
Tachycardia(PR>100)	55	75.34%
Hypotension(BP<90)	42	57.53%
Guarding/rigidity	40	54.79%
Reboundtenderness	20	27.39%
Pallor	34	46.57%
Absentbowelsounds	40	54.79%
Bruiseabdominalwall	20	27.39%
Shiftingdullness	8	10.95%
Maskingofliverdullness	9	12.32%

Table 3: associated Extra Abdominal Injuries

Extra abdominal injury	Frequency	Percentage
Skeletal injury	18	50%
Chest injury	5	13.88%
Head injury	8	22.22%
Soft tissue injury	5	13.88%

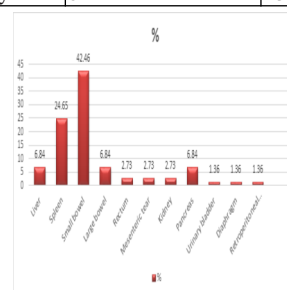


Figure 5:

Hollow viscus injury(Small and large bowel, rectum) was found to be most common in 38 patients i.e. 52% cases, out of which small bowel injuries were maximum in 31 i.e. 42.46% of total no of patients followed by spleen 18(24.65%) and liver 05(6.84%).

Spleen and liver were found to be most common solid organ injured ie 23 (31.50%).

Table 4: Relations Of Organ Injured To Mode Of Injury (N=73)

Modeofinjury	Singleorganinjury	Multipleorganinjury
RTA	29	16
FFH	9	2
Assaults	8	1
Animalhits	6	2

Table 5: Surgical Procedure (N=52) (78%)

OrganInjury	Operative Procedure	No of cases	Percentage
Splenic injury (n=18)	Splenectomy	9	50%
Liver injury (n=5)	Therapeutic packing and partialre pair	1	20%
Urinary bladder (n=1)	Primary repair in two layers	1	100%
Diaphragm (n=1)	Primary repair	1	100%
Jejunal perforation (n=16)	Primary repair	9	56.2%
	Resection and anastomosis	7	43.75%
Ileal perforations (n=15)	Primary repair	5	33.3%
	Resection and anastomosis	2	13.3%
	Resection anastomosis with diversion loop ileostomy	8	53.3%
Colon injury (n=5)	Primary repair with diversion loop ileostomy	5	100%
Rectum(n=2)	Primary repair with proximal diversion loop ileostomy	2	100%
Mesenteric tear(n=2)	Repair of mesenteric tear	2	100%

52 patients had undergone exploratory laparotomy in this study for

various HVI and solid organ injuries, Splenic injury was found in 18 patients of which splenectomy was done in 9 cases. Out of 5 patients of liver injury 1 patient operated and 4 patients managed conservatively. Renal injury was found in only 2 cases and was managed conservatively. Mesenteric tear was found in 2 cases and managed with exploratory laparotomy and primary repair. Pancreatic injury was found in 5 cases and were managed conservatively.

All the hollow viscus injuries were managed operatively.

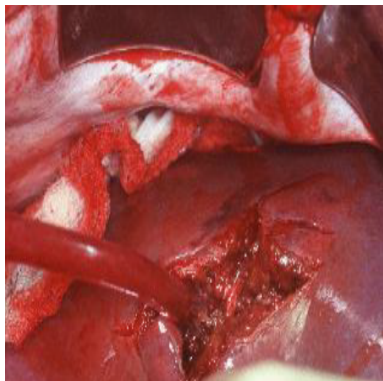


Figure 6: Liver Laceration

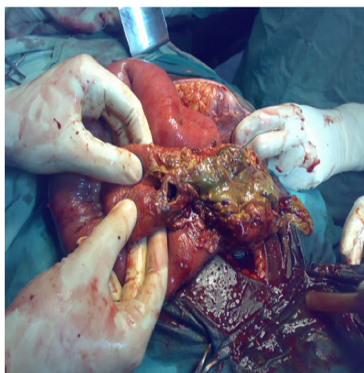


Figure 7: Small Bowel Perforation



Figure 8: Shattered Spleen

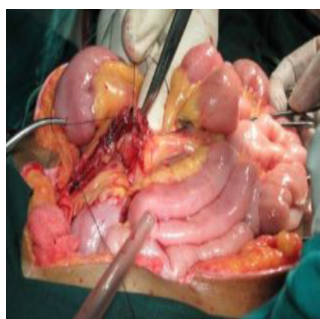


Figure 9: Mesenteric Tear

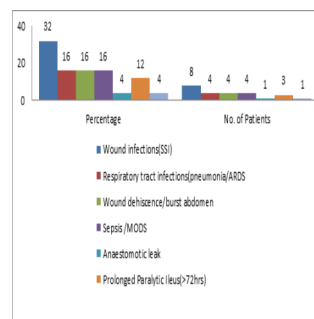


Figure 10: Post Operative Complications (N=25)

Out of 52 operated patients 25(48.07%) patients developed complication of which surgical site infection (SSI) was the most common complication 8(32%). Respiratory tract infection was 2nd most common complication in 4(16%)

Table 6: Mortality

Management	No of Patients	Mortality(%)
Operative patients	52	4(7.69%)
Non operative patients	21	1(4.76%)

Total mortality = 5(6.84%)

The mortality rate in this study was 6.84% i.e. 5 out of 73 patients. Among these 4 patients of operative group 3 patients have perforation peritonitis with sepsis and one of them was k/c/o diabetes mellitus with multiple intra abdominal injuries.

One patient who died in non operative group was having grade II splenic injury and associated head injury(CT scan finding-DAI with GCS(E1 V2 M2).

Table 7: Hospital Stay N=73

Duration	No. of cases	Percentage
1-7days	20	27.39%
8-14days	45	61.64%
>14days	8	10.95%

Average hospital stay in operative group was 8 to 14 days and in non operative group was 5 to 7 days.

Table 8: Outcome

Uneventful recovery	57	78.08%
Morbidity	11	15.06%
Mortality	5	6.84%

Uneventful recovery occurred in 57(78.08%) with 5(6.84%) mortalities.

DISCUSSION

A prospective study of 73 patients of Blunt Trauma Abdomen (BTA) was conducted in the Department of Surgery BRD Medical College Gorakhpur during a period of 1 year from 1st October 2018 to 30th September 2019.

Age Distribution

In this study of BTA 63 patients(80%) were under 50 years of age with mean age of 34 years. In our study common age group affected were 21-30 years, 18 (24.65%) patients belonged to this age group. This indicates that young adults are more prone to sustain abdominal trauma probably because of more exposure to day to day hazards of life. This result is consistent with study done by Kurane SB et al^[1] where the mean age of patients was 32 yrs. Similar results was seen in study done by Manoranjan UD et al^[2] where the mean age of patients was 32.51 yrs. Vadmalai K et al^[3] in their study showed maximum cases were in the age group 20-40 yrs (90%) which is similar to this study. Davis et al^[4] in their study also observed that 79 patients of BTA patients were under 40 of age. Our study is also comparable to Curie et al^[5] which showed maximum no of cases were under 50 yrs of age.

Sex Distribution

In our study 62(84.9%) patients were male and 11(15.1%) patients

were females. Male to female ratio 5.6:1 which is similar to study done by Yogish V et al^[6] which showed 75% of the patients were male, Basond AN et al^[7] in their study also reported 42(87.5%) of cases presenting were male which is consistent with this study. Other studies such as Tripathi et al^[8] reported male to female ratio 4.4:1 which was less compared to this study. Kumar et al^[9] showed 80% affected cases were male which is similar to this study.

Mode Of Injury

Most common mode of injury in our study was RTA with 42 (57.53%) cases followed by fall from height 11(15.06%). Similar cause of BTA was seen in study done by Trehan V et al^[10] who showed that RTA was the most common cause of BTA accounting for 67.97%, similar result was seen in study done by Kurane et al^[11] who showed 72% cases of BTA was due to RTA. Boulanger BG et al^[11] reported RTA as most common mode of abdominal injury (65.7%) while falls accounted for 7.8% CoxEF et al^[12] also observed that 89.5% patients of BTA was due to RTA.

Residence

Most patients in our study were from Kushinagar District 21(28.76%) followed by Deoria 17(23.28%) and Maharajganj 13(17.8%). These districts are very well connected to this tertiary care centre by national highways and most of the trauma patients are being referred here.

Socio Economic Status

Most patients in our study are from lower socio economic status 42(65.6%) followed by middle 20(31.25%) socio economic status.

Modes Of Presentation Of BTA

Common presenting symptoms and signs of BTA patients are abdominal pain, distention, vomiting, tenderness and guarding.

In our study abdominal pain and tenderness was found in 70(95.89%) patients followed by abdominal distention in 48(65.75%) cases. Examination findings in polytrauma cases were unreliable because of associated head injury and hemodynamic instability in majority of patients.

Mohapatra et al^[13] also reported pain abdomen in 77% cases. Davis et al^[4] reported in their study that tenderness and guarding present in 75% cases. Basond AN et al^[7] showed abdominal pain as the most common presenting symptom 66.67% which is comparable to this study.

Patients with BTA may have single or multiple intra abdominal injuries. In our study 30(33%) patients had single intra abdominal injury and 43(67%) patients had multiple intra abdominal injuries. Multiple intra abdominal injuries includes HVI and solid organ injuries. Jejunal, ileal, colonic and rectal injuries were noted in combination or two.

Associated Injury

Associated extra abdominal injuries were present 36 (49.31%) cases, out of which in 18(24.65%) cases of skeletal injuries were present. 8(10.95%) patients had head injury followed by soft tissue and chest injury in 5(6.84%) cases each.

Distribution Of Organ Injuries

In our study hollow viscus injury was found to be most common Intra abdominal injury. Out of 38(52%) cases of which hollow viscus injury small bowel injury was present in 31(42.46%) cases. Most common solid organ injury was spleen 18 (24.65%) followed by liver. Single intra abdominal organ injury was seen in 28.76% cases whereas multiple organ injuries were seen in 71.23% cases. This result is inconsistent with study done by Agarwal V K et al^[14] where the most common organ injured were solid visceral organ 70%. Liver was the most common organ injured. Similar results was seen in study done by Trehan V et al^[10] who showed liver 34.2% as the most common organ involved followed by spleen in 22.51% cases.

Investigations

In our study chest and abdominal X ray was done in 60 patients. Out of which, X ray Abdomen detected hollow viscus perforation in 32(53.3%) with an accuracy of 100%. In 12 patients enlarged soft tissue shadow was found. Mohapatra et al^[13] also reported accuracy

of X-ray erect abdomen to be 100% in detecting hollow Viscus perforations. USG (FAST) done in 34 cases of which 24(73.5%) patients have positive results while in 10 patients equivocal result found.

USG(FAST) is more sensitive in detecting solid organ injury however it is not very helpful in detecting hollow viscus injury. "McKenney et al^[15] reported FAST to be highly accurate (97%) in detecting Haemoperitoneum CT abdomen was done in 10 patients in which USG(FAST) was suspicious or equivocal and were haemodynamically stable.

CT abdomen is used for grading of organ injury following BTA. In our study CT was not the routine investigation but was used in defining treatment in some cases of BTA. Kailidou et al^[16] (2005) also used CT scan to assist in defining treatment.

Diagnostic Peritoneal Lavage (DPL)

Four quadrant needle aspiration was done in 66 patients, out of which 42 patients were found positive (i.e. aspiration contains blood, bilious content, mixed fecal and bilious content, fecal content etc.) Out of these 42 cases, 37 patients have undergone laparotomy and found to be positive (i.e. on exploration hollow viscus perforation/splenic contusion/liver laceration/renal injury present) Sensitivity was 88.09% and specificity 79.16%. This study is comparable to Mohapatra et al^[13] which showed DPL to be 95% accuracy.

Management

Exploratory laparotomy was done for patients with generalized peritonitis, hollow Viscus injury and haemodynamically unstable patients of BTA. So the choice between operative and non operative treatment is primarily decided by haemodynamic consideration rather than grades and severity of organ injury. In our study 52(71.2%) patients undergone laparotomy and 21(28.76%) cases were managed non operatively.

In our study hollow Viscus injuries were the most common abdominal injury accounting for 38(52%) cases out of 73 in which small Bowel injuries were 31(42.46%) out of 73 cases.

Jejunal perforation was present in 16 cases of which in 9 patients primary repair was done and in 7 cases resection anastomosis was done.

Ileal perforation was occurred in 15 cases of which 5 undergone primary repair 2 RA and 8 cases undergone resection anastomosis with diversion loop ileostomy. Our study is comparable to study of Allen et al^[17] which showed small bowel injury 35.3% cases. Colonic (2) and rectal perforations were managed by primary repair with diversion loop ileostomy. Mesenteric injury 2 cases were operated. In our study 33(45.2%) patients having solid organ injury of which 13(39.4%) were managed surgically and 20(60.6%) cases managed conservatively. A study by Rutledge et al^[18] also showed incidence of non operative management in 48% of solid organ injury. Out of 33 solid organ injury spleen 18(24.65%) was most common solid organ injury, out of which 9(50%) were operated (splenectomy done) and 9(50%) were managed conservatively. Splenic injury was similar (24.65%) in our study as compared to study by Davis et al^[4] 24.7% cases. Liver is the next most common solid organ injury 5(6.84%) cases, 1 case of which was operated packing with gelatin sponge to prevent further bleeding and 4 cases were managed conservatively. This is less compared to study by Davis et al^[4] which showed 16.47% of Liver injury of which 14% underdone laparotomy. Another study by Curie et al^[5] showed 20.6% liver injury.

In our study there was no negative laparotomy this was due to excellent pre operative workup, Mohapatra et al^[13] (2003) reported 1.4% in evidence of negative laparotomies.

Complications

Post operative complications were reported in 25(34.2%) patient out of 52 operated patients most common post operative complications was (SSI) accounting for 8 cases out of 25, means 15.4% patient of 52 operated cases.

2nd common complications were respiratory tract infections

(pneumonitis) occurred in 4 cases. followed by septicemia and MODS in all 4 patients. This study is comparable to study by Jolly et al^[19] which showed wound related complications in 14% cases.

3 patients developed prolonged Ileus (>72hrs) and 4 cases developed burst abdomen, abdominal compartment syndrome in 1 patient and anastomotic leak in 1 patient. which was minor leak and patient recovered on conservative management.

Mortality

In our study total mortality was 5(12.37%). In operated group mortality was 4 out of 52 patients i.e. (7.69%).

In non operated patient there was 1 mortality out of 21 i.e. 4.76% This patient was having associated head injury NCCT head showed DAI and GCS was E1V2M3 Postoperative mortality was due to septicemia and MODS in 4 cases (16%). Study by Davis et al^[4] showed 15% mortality with septicemia, which is similar as in our study. 5 patients died in 1st week and one died in 2nd week.

Hospital Stay

Non operative group of patients had hospital stay average 5-7 days and operated patients average is 7-12 days.

Outcome

In our study uneventfully recovery occurred in 57(78.08%) cases. 11 patients have morbidity in form of Surgical site infection, stoma related morbidity.

CONCLUSION

With proper history, thorough clinical examination and use of common radiological investigations, diagnosis of intra abdominal visceral injuries in patients of Blunt Abdominal Trauma could be made with significant accuracy.

Blunt Trauma Abdomen is a major cause of morbidity and mortality in young people. Most common cause being road traffic accident. It poses therapeutic and diagnostic dilemma for attending surgeon due to wide range of clinical manifestations ranging from no early physical finding to progression to hypovolumic shock and death. Hence the diagnosis should be made on the basis of physical findings in association with the use of diagnostic modalities such as X ray abdomen, USG (FAST) and diagnostic peritoneal lavage (DPL).

Hollow Viscus Perforations are relatively easy to pick on X ray. However solid organ injuries are difficult to diagnose due to limited availability of CT scan and hemodynamic instability of patients.

Proper early diagnosis and initial aggressive resuscitation are beneficial in having good outcome surgically as well as conservatively.

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