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Original Research Article

BLUNT INJURY ABDOMEN - A PROSPECTIVE OVERVIEW OF CLINICAL, RADIOLOGICAL, CONSERVATIVE AND SURGICAL APPROACH

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ABSTRACT

Background: The aim is to study the clinical presentation and management of blunt injuries of abdomen admitted in a tertiary hospital i.e. Government General Hospital, Jayashankar Bhupalpally.

Materials and Methods: This is a prospective study conducted in Government General Hospital &, Jayashankar Bhupalpally for a period of 1 yrs (From June 2023 to May 2024). The study comprises of patients in the age group of 13-69years, who sustained blunt abdominal trauma admitted at our hospital. All patients were received in the casualty department and registered as medico legal cases. Patients requiring neurosurgical intervention were not included in this study.

Results: In the present study, Blunt abdominal injuries are common. High index of suspicion is necessary to rule out abdominal injury especially in a polytrauma patient. Males are predominantly affected with male to female ratio of 3:1 and the most common age group is 20-29 years Road traffic accident forms the most common mode of injury. Plain erect x ray abdomen is a valuable investigation for diagnosing bowel perforations. Ultrasound examination – FAST helps in identifying solid organ injury and free fluid and is the most important first line investigation to be done. Diagnostic peritoneal lavage.was not done in the present study. The most common organ injury is Spleen and most of the cases were managed conservatively. Liver injuries are second most common all of which were managed conservatively. Mesenteric and bowel injuries are the next common, all were subjected to exploratory laparotomy. Retroperitoneal hematoma was seen in a small proportion of patients and were treated conservatively. Associated extra abdominal injuries like head, thoracic and orthopedic injuries were found which influenced the morbidity. Post operative complications like wound infection, dehiscence, respiratory infections and fecal fistula are common in blunt abdominal trauma. The present study showed a mortality of 8%.

Conclusion: This study emphasises on the interval between injury and surgery and the need for early diagnosis and prompt operative treatment to decrease morbidity.

Keywords: Blunt abdominal injuries, Diagnosis, Mortality, bowel perforations, USG.

INTRODUCTION

Trauma is the main public health problem in every regardless of the extent of socioeconomic development. The progress in technology has brought about a change in automobile industry giving speed the priority. It is impossible to meet a person who does not use automobiles. As trauma has become a ubiquitous feature in the modern society and abdomen is one of the most vulnerable parts of body for accidental and homicidal injuries. Abdomen is the third most commonly injured part of the body next to extremities and head injuries. The rapid increase in number of motor vehicles as well as increase in

population has caused rapid increase in blunt abdominal trauma. Motor vehicle accidents accounts for 75-80% of blunt abdominal injury.[1-3]

Unlike penetrating injuries, blunt abdominal injury is usually not obvious and hence it is often missed unless looked for. Most preventable deaths due to trauma are result of improperly treated abdominal injuries. In spite of vast experience and advancements in diagnostic and treatment modalities, the morbidity and mortality remains high. The reason for this may be the increased interval between injury and hospitalization, delay in diagnosis, inadequate surgical treatments, post operative complications and associated trauma.[4,5]

In this study an effort has been made to consolidate the available literature on recent advancements in diagnosis and management of intra abdominal organs injuries. Solid organs like liver, spleen, kidneys, mesenteric injuries and injuries to hollow viscus organs are included in this study

Aim

To study the clinical presentation and management of blunt injuries of abdomen admitted in a tertiary hospital i.e. Government General Hospital, Jayashankar Bhupalpally.

Objectives

1. To study the various clinical presentations in blunt trauma abdomen
2. To find the incidence of various organs injured in abdominal trauma
3. To study the time interval between trauma and admission and surgery and its effects on final outcome of patients.
4. To study the mortality and morbidity
5. To study conservative and operative modalities in the management of blunt injury abdomen

MATERIAL AND METHODS

This is a prospective study conducted in Government General Hospital, Jayashankar Bhupalapally for a period of 1 yrs. The study comprises of patients in the age group of 13-69years, who sustained blunt abdominal trauma admitted at our hospital. All patients were received in the casualty department and registered as medico legal cases. Patients requiring neurosurgical intervention were not included in this study.

After primary survey and prompt resuscitation, brief history and complete physical assessment, routine blood and urine examination including blood grouping and cross matching for blood transfusion were done. X rays and Ultra sonogram was done routinely. and CT scan were done for selected cases. Peritoneal tapping was not done as it is obsolete.

Based on the clinical finding and investigations cases were managed accordingly. Patients managed conservatively were subjected to serial clinical examinations and subsequent appropriate investigations. In cases of exploratory laparotomy, a systematic approach with examination of all intra-abdominal organs were made. After surgery patients were managed in the post operative ward with Nasogastric tube, IV fluids and antibiotics. Post operative complications were treated accordingly.

RESULTS

TABLE 1 : AGE AND GENDER WISE DISTRIBUTION(n=44)

AGE GROUP (YEARS)	MALES		FEMALES		TOTAL CASES	PERCENTAGE(%)
	NO OF CASES	%	NO OF CASES	%		
13-19	1	3%		0%	1	2%
20-29	13	39%	4	36%	17	39%
30-39	9	27%	3	27%	12	27%
40-49	5	15%	1	9%	6	14%
50-59	3	9%	2	18%	5	13%
60-69	2	6%	1	9%	3	7%
TOTAL	33	100%	11	100%	44	100%

[Table 1] shows the age and gender distribution involved in this study. In this study of the 44 patients 33 cases were male – 75% and 11cases were females 25%. This gives a male to female ratio of 3:1.

The majority of patients belonged to 20-29 years which constitutes 39% followed by 30-39 years age group which accounts for 27%

TABLE 2: DISTRIBUTION OF CASES BASED ON VARIOUS MODES OF INJURY(n=44)

MODE OF INJURY	NO.OF CASES	PERCENTAGE (%)
ROAD TRAFFIC ACCIDENTS	28	62
FALL FROM HEIGHT	7	16
ASSAULT	6	14
WALL COLLAPSE	1	2
BULL GORE INJURY	3	6
TOTAL	44	100

Of the 44 patients who sustained blunt injuries, 28 were due to Road traffic accidents which is 62% followed by fall from height accounting for 7% and assault accounting for 6%.

TABLE 3:OBSERVATION OF SIGNS AND SYMPTOMS(n=44)

SYMPTOMS AND SIGNS	NO OF CASES	PERCENTAGE %
ABDOMINALPAIN+ TENDERNESS	24	55
ABDOMINAL PAIN+ DISTENSION	20	45
FEATURES OF PERITONITIS	11	11
FEATURES OF SHOCK	6	6

Majority of the patients presented with abdominal pain and tenderness accounting for 55% followed by abdominal distension accounting for 45%.

TABLE 4: PLAIN XRAY FINDINGS(n=44)

AIR UNDER DIAPHRAGM	NO.OF CASES	PERCENTAGE (%)
PRESENT	3	7
ABSENT	41	93
TOTAL	44	100%

Out of 44 patients who underwent CXR with both domes of diaphragm, 3 cases showed pneumoperitoneum.

TABLE 5: ABDOMINAL USG FINDINGS(n=44)

ABDOMINAL USG	NO.OF CASES	PERCENTAGE(%)
EVIDENT (HEMOPERITONEUM/SOLID ORGAN INJURY)	37	84
INCONCLUSIVE	7	16
TOTAL	44	100

Ultra sound was done in 44 cases. 37 cases showed evidence of hemoperitoneum and solid organ injury (84%) and in 7 patients (14%) it was inconclusive.

TABLE 6: SURGICAL VS CONSERVATIVE MANAGEMENT(n=44)

TOTAL CASES	CONSERVATIVE MANAGEMENT	SURGERY
44	33	11
PERCENTAGE	75%	25%

After detailed clinical evaluation and investigations, 11 patients showed hemoperitoneum or pneumoperitoneum and underwent exploratory laparotomy. 33 patients were selected for conservative management as they had hemoperitoneum with low grade injuries and were hemodynamically stable.

TABLE 7: TIME INTERVAL BETWEEN INJURY AND SURGERY(n=11)

TIME INTERVAL (HOURS)	NO.OF CASES	PERCENTAGE(%)
0-4	2	18
5-9	6	55
10-14	3	27
TOTAL	11	100

Out of 11 patients taken up for exploratory laparotomy , 6 patients were operated between 5-9hrs. The average time interval between injury and surgery was 7 hours. The delay in rest of the patients was mostly due to delay in admission.

TABLE 8:SPECIFIC ORGAN INJURY IN BLUNT TRAUMA(n=44)

ORGAN INJURED	NO.OF CASES	PERCENTAGE(%)
SPLEEN	23	52
LIVER	12	27
MESENTERY+SMALL BOWEL	3	8
MESENTERIC TEAR	1	2
LARGE BOWEL	1	2
STOMACH AND DUODENUM	0	0
RENAL INJURY	4	9
BLADDER	0	0
RETROPERITONEAL HAEMATOMA	0	0

In the present study, spleen is the most commonly injured organ followed by liver.

TABLE 9 : OPERATIVE PROCEDURES DONE

OPERATIVE PROCEDURE	NO OF CASES	PERCENTAGE
SPLENECTOMY	6	55
MESENTERIC TEAR REPAIR	1	9
RESECTION ANASTOMOSIS OF SMALL BOWEL	3	27
RESECTION ANASTOMOSIS OF LARGE BOWEL	1	9

In the present study, 6 cases underwent splenectomy, 1 case of Mesenteric tear was treated by simple suturing and ligation of bleeding points .4 cases had mesenteric tear with associated bowel injury of which 3 cases involved small bowel and 1 case involved descending colon all of which were treated by 2 layered resection anastomosis.

TABLE 10: MORBIDITY (n=25)

POST OPERATIVE COMPLICATIONS	NO OF CASES	PERCENTAGE %
PARALYTIC ILEUS	3	12
PULMONARY COMPLICATIONS	7	28
WOUND INFECTION	5	20
WOUND DEHISCENCE	2	8
SEPSIS +RENAL FAILURE	4	16
ANASTOMOTIC LEAK OR EC FISTULA	2	8
PROLONGED HOSPITAL STAY	6	24

Patients had a combination of various complications.In the present study , pulmonary complications due to associated ribs fractures was common followed by prolonged hospital stay due to various reasons.Out of 11 cases operated, 5 cases had wound infections and 2 cases had wound dehiscence.4 patients had sepsis with renal failure.

TABLE 11: OUTCOME(n=44)

	RECOVERED WITH COMPLICATIONS	RECOVERED WITHOUT COMPLICATIONS	EXPIRED
NO OF CASES	22	19	3
PERCENTAGE	47%	45%	8%

In the present study, out of 44 cases, 19 cases recovered without complications, 22 cases recovered with complications. There was a mortality of 3 cases.

DISCUSSION

During the period of study, 44 cases of blunt abdominal trauma were admitted and operated at Government General Hospital, Jayashankar Bhupalapally. Road traffic accident forms the single most important cause for blunt injury abdomen in our study. This assumes all the more significance because

people involved in RTA are in their most active and productive phase of life.

The follwing indication for laparotomy were included in our study.

1. Hemodynamically unstable patients not improved with resuscitative measures
2. Pneumoperitoneum
3. Active bleed on CECT

Gender Distribution

The male: female ratio = 3:1 in the present study which is comparable to the above studies and in Amuthan et al 6 it is 4:1.

Therefore incidence is higher in males when compared to females as men are chief earners in India and are mostly involved in outdoor activities hence more prone for injury.

Age group Distribution

In the present majority of the cases were in the age group of 20-29years followed by 30-39years which is comparable to the above studies. This can be attributed to this age group who are more involved with automobiles and lack of safety measures. Hence mean age in various series was in third decade, which corresponds well with present study.

Comparison of modes of injury in various studies

In the present study the most common cause of injury is road traffic accidents which is comparable to the other studies. The rapid progress in technology has brought about a change in automobile industry giving speed the utmost priority. It is impossible to meet a person who does not use automobiles in his day to day life. This is due to new advances in the automobiles. Though they are being developed with increasing safety measures, RTA still continues to be the main mode of injury due to failure to follow traffic rules and their strict implementation. Priority is being given to speed rather than for safety. The rapid increase in number of motor vehicles as well as population explosion has caused rapid increase in blunt abdominal trauma. In Indian set up, fall from height accounts for the second most common cause due to various occupational adaptations eg: Taudi climbers. Bull gore injury accounts for 6 % as majority of the population in villages being farmers have work associated with animals (bulls).

Observations of Signs and symptoms

In the present study, abdominal pain and tenderness are most common presentation accounting for 55% which is in comparison to the studies by Davis et al,[5] and Ayode et al.[10] Significant injuries to the retro peritoneum and cases presented early may not show tenderness initially. Therefore careful monitoring is required for early detection and prompt management. This emphasizes the requirement of admitting the patient and careful monitoring and daily clinical examination of the patients to avoid missing the diagnosis.

XRAY Findings

In the present study CXR with domes of diaphragm was done to all the patients , out of which 3 cases showed air under the diaphragm which correlated positively to the intraoperative findings of bowel perforation .This is compared to study by Mahapatra et al who reported an accuracy of 100% in detecting hollow viscus perforations

USG Findings

Ultra sound was done in 44 cases. 37 cases showed evidence of hemoperitoneum and solid organ injury (84%) and in 7 patients (14%) it was inconclusive. Out of 37 cases diagnosed on USG, 6 cases underwent splenectomy with usg findings correlating to the intraoperative findings. 5 cases underwent splenectomy without CECT. 1 case had CECT done as the patient was stable and there was a dilemma regarding the need for surgery. Of the 33 cases managed conservatively with evident USG findings, 6cases underwent CECT as they were high grade injuries. 1 case was taken up for mesenteric tear repair and 2 cases underwent resection anastomosis after getting CECT done. Out of 7 cases which were inconclusive on USG, 2 cases showed pneumoperitoneum and underwent resection anastomosis and the remaining 5 cases underwent CECT. Therefore ultrasound is more reliable in detecting solid organ injuries and free fluid in the abdomen. Further evaluation with CECT regarding the size of mesenteric tear and bowel viabilty was done. This is comparable to study done by Soffer et al which showed 89% accuracy of USG in diagnosing solid organ injuries. However it was not very helpful in diagnosing hollow viscus perforations.

CECT Abdomen

In the present study CECT, was done where USG was inconclusive and in high grade injuries in hemodynamically stable patients. Out of 11 cases of exploratory laparotomy, 4 cases underwent CECT. 5 cases underwent splenectomy with evidence on USG but without CECT due to hemodynamic instability. 2 cases underwent resection anastomosis with pneumoperitoneum evident on XRAY. The similar observations were done in Mehta et al in which renal injuries were diagnosed and serially followed up with CT scan. Of all the modalities, CT scan in best in evaluating hemodynamically stable patients and helps in deciding the treatment options i.e conservative vs operative intervention. The major drawback is its cost and hemodynamically unstable patients.

Surgical and Conservative Management

In the present study, 75% cases were managed conservatively and 25% underwent surgery. This is in comparison to study by Amuthan et al6 in which 56% were managed conservatively and 44% underwent surgery. This shows a shift in the management strategies from operative as seen in the study by Davis et al,[5] to non-operative management in which the cases can be managed conservatively by daily clinical examination and serial investigations. This is possible due to improvement in the diagnostic modalities and the availability of CT scan which can accurately give the diagnosis and the status of active bleeding which defines a line between operative and conservative management. The disadvantages of non operative management are those of missed injuries

and delayed treatment resulting in morbidity and even mortality.

Time interval between in injury and surgery (Latent period)

In the present study majority of the cases underwent surgery between 5-9 hrs. In Mehta et al,[8] this was between 0-4 hrs. The golden hour i.e 6 hours from the time of injury is missed in the present study. The delay in surgical intervention in the present study can be attributed to the delay in admission due to lack of transport in rural regions and also lack of awareness as to the gravity of the underlying illness.

Specific organ injury in Blunt trauma

In the present series, Spleen is the most commonly injured organ accounting for 52% which is in accordance to the above studies. Spleen remains the most commonly injured organ in blunt abdominal trauma because of its mobility, its attachment to many structures in the left hypochondrium and its position and intimate contact with lower ribs. Spleen is relatively free to continue movement in patients who suffered deceleration injury and this leads to capsular tear at the attachment and possible fracture by contact with convex outer dome against the posterior lower ribs. Liver is the second most common organ injured accounting for27% which is similar to the studies by Mehta et al8 and Amuthan et al6. This can be accounted the ligament attatchments of the liver and spleen and also the close proximity to the rib cage.

Out of 23 splenic injuries, 14 cases were of grade 3, 3 cases of grade 2 managed conservatively.1 case of grade 4 and all grade 5 splenic injuries were treated by splenectomy. In the present study, low grade injuries were managed conservatively by prompt resuscitation, daily clinical examination and serial investigations for early identification of clinical deterioration. None of the cases managed conservatively were secondarily operated.

This is in accordance to study by Amuthan et al6 where 18% cases were managed conservatively and 14% were operated.

The present study is against study done by Gopalakrishnan et al9 in which all splenic injuries grade 2-5 were managed by splenectomy. In Mehta et al8 splenectomy was 30% and splenoraphy 4%, Davis et al5 62% splenectomy. All 12 cases of liver injury were managed conservatively most of which were of grade 3 and 4. 1 case of Mesenteric tear was treated by simple suturing and ligation of bleeding points. This is in accordance to the study by Gopalakrishnan et al and Mehta et al where 10% cases underwent repair.[8,9]

4 cases had mesenteric tear with associated bowel injury of which 3 cases involves small bowel and 1 case involved descending colon all of which were treated by 2 layered resection anastomosis. This is in accordance to the studies by Gopalakrishnan et al and Amuthan et al,[9] where 6 cases and 2 cases underwent resection anastomosis. In the present study solid organ injuries were treated conservatively to a major extent due to availability of advanced treatment modalities- CECT which helped in accurate diagnosis, the status of active bleed and helped in designing the treatment strategies.

Management strategies: Out of 23 splenic injuries, 14 cases were of grade 3, 3 cases of grade 2 managed conservatively. 1 case of grade 4 and all grade 5 splenic injuries were treated by splenectomy. In the present study, low grade injuries were managed conservatively by prompt resuscitation, daily clinical examination and serial investigations for early identification of clinical deterioration. None of the cases managed conservatively were secondarily operated. This is in accordance to study by Amuthan et al,[6] where 18% cases were managed conservatively and 14% were operated.

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Morbidity: In the present study as most of the patients were managed conservatively, wound infection was less common as compared to Amuthan et al.[6] Pulmonary complications were common which is in accordance to Amuthan et al,[6] in which it is the second most common complication . In the present study renal failure accounted for 16% which can be compared to Ayoade et al,[7] in which it was 7%.

Mortality: In the present study, the mortality rate was 8% , these are comparable to studies by Mehta et al,[8] -4 %, Amuthan et al,[6] -5%, Davis et al 5 - 13.3%, Ayoade et al,[7] 13%. Of the 3 cases, 2 cases presented late to the casuality and had post operative sepsis and renal failure 1 case had bull hit injury with pneumoperitoneum and post op anastomotic leak and septic shock. The major cause of death was due to a delay in the admission. This emphasises on the interval between injury and surgery and the need for early diagnosis and prompt operative treatment to decrease morbidity.

CONCLUSION

Our study proves that non operative management is a safe and effective method in the treatment of blunt injury abdomen. Non operative management depends on clinical and hemodynamic stability of the patient. The most common mode of injury in our study was due to road traffic accidents. The most common organ to be injured was the spleen followed by liver. Close monitoring of vital signs and repeated clinical examinations is important as management by conservative management depends on clinical and hemodynamic stability of the patient. Conservatively managed patient with Blunt trauma abdomen should have early and accurate diagnosis, prompt and thoughtful management to improve overall prognosis.

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