



A PROSPECTIVE STUDY OF BLUNT INJURY ABDOMEN

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ABSTRACT

Abdominal trauma is one of the most common causes among injuries caused mainly due to road traffic accidents. In view of increasing number of vehicles and consequently road traffic accidents, this study has been chosen to study the cases of blunt abdominal trauma with reference to the patients presenting at Govt General Hospital, Kadapa.

Aim

1. To evaluate the incidence, nature and various clinical presentations in blunt injury abdomen.
2. To evaluate various diagnostic modalities and frequency of various abdominal organs involved in blunt injury abdomen.
3. To assess the patient for surgical intervention and to avoid negative laparotomy
4. To evaluate modalities of treatment, complications and prognosis.

This study is a prospective study on 100 patients with blunt injuries to the abdomen admitted in Govt General Hospital, RIMS, Kadapa during the study period of 3 years.

Methods: There were a total of 206 cases of blunt injury to abdomen attended the emergency ward during the study period. And based on symptoms and investigations 100 patients were admitted in the Department of General Surgery and the analysis on the patients is as followed. Out of these 62% were male and 32% were female.

- Road Traffic Accidents were the most common cause of blunt abdominal trauma noted in 28%.
- Spleen was the most common solid organ involved. Small bowel was most commonly injured overall.
- Wound infection was most common post operative complication in 17% cases. Total number of deaths in this present study was 5. Mortality rate in the present study was 11. Most common cause of death was septicemia
- Diagnostic aspiration is an accurate investigation in intra abdominal pathology but poor in detecting retro peritoneal area lesions.
- X-ray erect abdomen was the most sensitive investigation for hollow viscous injury.
- Most useful investigation for solid organ injuries was CT Abdomen for non operative management.

KEYWORDS : Blunt injury abdomen, Road traffic Accidents, Solid organ injury, Non Operative management , CT abdomen

INTRODUCTION

Abdominal trauma is one of the most common causes among injuries caused mainly due to road traffic accidents. Motor vehicle accidents account for 75 to 80% of blunt abdominal trauma. According to WHO by the year 2020, trauma will become the first or second leading cause of loss of productive years of life for both developed and developing countries. Due to the 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, the morbidity and mortality remains at large. The reason for this could be due to the delay in diagnosis, inadequate and lack of appropriate surgical treatment, post-operative complication and associated trauma especially to head, thorax and extremities. Unnecessary deaths and complications can be minimized by improved resuscitation, evaluation and treatment. Rapid resuscitation is necessary to save the unstable but salvageable patient with blunt trauma abdomen. Accurate diagnosis and avoidance of needless surgery is an important goal of evaluation. In view of increasing number of vehicles and consequently road traffic accidents, this study has been chosen to study the cases of blunt abdominal trauma with reference to the patients presenting at General Hospital, Rajiv Gandhi Institute of Medical Sciences, Kadapa.

AIMS AND OBJECTIVES

1. To evaluate the incidence, nature and various clinical presentations in blunt injury abdomen.
2. To evaluate various diagnostic modalities and frequency of various abdominal organs involved in blunt injury abdomen.
3. To assess the patient for surgical intervention and to avoid negative laparotomy
4. To evaluate modalities of treatment, complications and prognosis.

METHODOLOGY

This study is a prospective study on 100 patients with blunt injuries to the abdomen admitted in Govt General Hospital, RIMS, Kadapa

during the period of 3 years.

Inclusion criteria: Patients >16 years, with Blunt injury to abdomen either by RTA, fall from height, object contact, assault.

Exclusion criteria: Patients <16 yrs, Blunt injuries due to blasts, patients with severe cardiothoracic and head injuries who are hemodynamically unstable. Patients fulfilling the inclusion and exclusion criteria are selected. Written and informed consent is taken. Demographic data like name, age, sex, occupation, economic status, literacy status noted. Nature of injury, time of event leading to injury, clinical examination, investigations, operative findings, operative procedures and complications during the stay in hospital and subsequent follow-up was all recorded on a proforma. After initial resuscitation, patients were subjected to clinical examination followed by investigations. The decision to operate on the patient is taken based on these results. With midline laparotomy incision, abdomen is explored from stomach duodenum, small intestine and large intestine and solid viscera to find the pathology and to grade injury according to the organ injury scale. The collected data is analyzed and statistics were made according to need.

RESULTS

There were a total of 206 cases of blunt injury to abdomen attended the emergency ward during the study period. And based on symptoms and investigations 100 patients were admitted in the Department of General Surgery and the analysis on the patients is as followed.

AGE INCIDENCE

In the present study maximum no of cases were in 21-30 years 32(32%) followed by 31-40 and 41-50 years 28(28%) and 26 (26%) respectively, and the mean age was 36.04.

SEX DISTRIBUTION

In the present study 62(62%) patients were males and 38(38%) were

females and the male to female ratio was 1.6:1 where as it was 2.3:1 in Davis et al³ study and 4...4:1 in other studies like Thripathi et al⁴ the incidence is more in males as males are more involved in RTA and Assaults.

NATURE OF INJURY

In this study, most common cause of blunt trauma to abdomen was Road traffic accidents 70 (70%), second common cause was fall from height in 18 (18%) cases Other cause was assault in remaining 12(12%) cases and this is comparable to other studies like Davis et al³ and Khanna et al⁵ series

LATENT PERIOD

Latent period is the time between occurrence of incident and admission to hospital. In the present study majority of the patients 73 (73%) attended the hospital within 6 hours after the insult.

ROLE OF INVESTIGATIONS

In the present study cases were subjected for DPA, X ray of chest AP, PA, erect abdomen and LS-spine depending on the presentation. 48 cases were subjected to DPA and in 28(28%)cases showed positive Result .3 cases of retroperitoneal pathology on laparotomy were negative for DPA. This shows that DPA is sensitive for intra abdominal pathology and poor in detecting retro peritoneal lesions. Air under the diaphragm was noted in 22(22%) cases, rib fractures were seen in 16(16%) cases remaining 57(57%) cases, it was normal. All were subjected to USG and it was noted that 70 (70%) cases had collection in the peritonealcavity either due to solid organ injury or bowel perforation, mesentery tears. In 37 cases there was associated injury to solid organs like liver, spleen, renal contusion and retro peritoneal collection. Patients with solid organ injury in USG were subjected to CT abdomen and in 12(12%) cases liver was found to be injured, in 16 (16%) spleen was injured, in 5 (5%) retroperitoneal hematoma was noted and in 4(4%) cases renal injury was present. The injuries were graded and managed conservatively and surgically based on the grade.

CASE MANAGEMENT

All the 100 cases in the present study were subjected to investigations and decision was made on management. So in 42(42%) cases surgery was performed within 6 hours after admission. In 55(55%) cases conservative management was planned and were kept for observation. 3 cases among them were taken for surgery within 12 hours due to development of signs of peritonitis in 2 cases and signs of re bleed from spleen in 1 case.

ORGANS INVOLVED In the present study spleen was involved in 16 cases G I, and G II is 10(10%) cases and G III, and G IV in 6(6%) cases, Liver was injured in 12 cases G I, G II in 7(7%) cases and G III, G IV in 5(5%) cases, mesentery tear In 5 (5%) cases, Mesocolon tear in 3 (3%) cases, gastric perforation 3(3%) duodenal perforation in 2 (2%), jejunal perforation in 4 (4%) cases ileal perforation in 11(11%), caecal perforation 1 (1%) and colon perforation 2(2%) renal contusion in 4(4%) cases, retro peritoneal haematoma in 5 (5%). In the remaining 32 cases no, significant injuries noted and were treated conservatively. .

PROCEDURES PERFORMED

In present study involvement of spleen was noted in 16 cases with GI, GII in 10 cases which were managed conservatively and with GIII, GIV in 6 cases splenectomy was done Liver was injured in 12 cases with GI, GII in 7 cases and managed Conservatively and with GIII, GIV injury in 6 cases laparotomy was done and gell foams were applied. And cases with mesentery tear in 5, meso colon tear in 3 were repaired. 2 cases of gastric perforation were managed with primary closure and In other case Gastro jejunostomy was done. Similarly for 1 case of duodenal Perforation primary closure was done and gastro jejunostomy was done in the other. A case of ascending colon perforation was closed primarily and in case of transverse colon perforation colostomy was done. In 3 cases of jejunal perforation primary closure was done and in 1 case resection and anastomosis was done. Similarly in 11 cases of ileal perforation primary closure was done and in 2 cases resection and anastomosis was done in 1 case ileostomy was performed. The caecal perforation was managed with right hemicolectomy. 3 cases of renal contusions and 4 cases of retro peritoneal hematoma were managed conservatively.

POST OPERATIVE COMPLICATIONS:

In the present study, wound infection was the most common complication after surgery seen in 10(23%) cases. Burst abdomen was noted in 3 (7%) cases. There were no other complications like pelvi c

abscess, anastomotic leak. There were 5 deaths noted (11%)

MORTALITY

Total 5 patients died in the present study. All 5 patients died post operatively out of 44 patients who were operated. Therefore mortality in the present study was 11% out of which 4 (9%) were male patients and 1(2%) was female patient. The mortality rate in Cox et al⁶ study reported mortality of 10% and in Davis et al³ study it was 13.3%. Among 5 cases in the present study 3 patients died because of septicemia and 1 patient due to ARDS and 1 due to sudden cardiac arrest. These results were comparable to another study by Jolly et al⁷. Which showed 10% mortality in their study with septicemic shock as the most common cause of death.

DISCUSSION

AGE INCIDENCE:

Maximum number of cases were in 21-30 years 32 (32%) followed by 31-40 years 28(28%) and 41-50 years 26 (26%). The mean age was 35.53 years. This shows that maximum number of patients were in reproductive age group. In present study majority of the patients of blunt abdominal trauma were of younger and middle age groups (64%). Of this 21-30 years group constituted 32% which was almost in par with Aleen and Perry et al⁸ which showed 28% cases between 20-29 years of age. In study by Nikhil mehta⁹ et al it was 40% , where as in Richard curie et al¹⁰ it was 35% which was in par with present study.

SEX DISTRIBUTION:

About 62(62%) patients were male and 38(38%) were female and male and female ratio was 1.6:1 in the present study. The male preponderance in our study reflects that the greater mobility of males for either work, such as drivers and mechanics for automobiles or recreational activities may be resulting in a higher exposure to the risk of traffic injuries. And females were involved in the assault injury in the house with minimal trauma. It was same compared to other studies like Tripathi¹¹ et al (1991) reported a ratio of 4.4:1 and Davis et al³ ratio of 2.3:1. The sex ratio as observed by Nikhil Mehtha et al⁹ was 3.7:1 which was comparable to the other studies.

NATURE OF INJURY

In this study, most common cause of blunt trauma to abdomen was road traffic accidents 70(70%). Automobile accidents accounted for 53% of cases in the study of Nikhil Mehta⁹, et al. Thus prevention of accidents can decrease fatality. Mohapatra¹² et al also. Reported 62% cases of blunt injury abdomen were due to RTA. Similarly Davis³ et al reported 70% and Khanna et al⁵ 57% due to RTA. Fall from height was found to be the second common cause in 18 (18%) cases. Other causes were due to assault in 12 (12%) cases. All studies uniformly showed that RTA was the predominant cause of blunt injury abdomen.

DIAGNOSTIC PERITONEAL ASPIRATION:

In the present study, diagnostic aspiration was done in 100 patients and 57 cases showed positive result. All these 57 cases showed significant intra abdominal injury on laparotomy. But 2 cases which were negative for DPL had significant retroperitoneal pathology. This shows that it is 100% accurate in intra abdominal pathology but poor in detecting retroperitoneal area lesions. In a study Mohapatra et al¹² showed diagnostic aspiration to be accurate in 95% cases. Another study by T.Narsing Rao et al¹³ showed diagnostic aspiration to be 100% accurate.

INVESTIGATIONS:

In the present study cases were subjected for X rays of chest AP view, PA view, erect abdomen and LS spine. Air under the diaphragm was noted in 27(27%) cases, rib fractures were seen in 16(16%) cases and in remaining 57(57%) cases it was normal. Another study Mohapatra et al¹² reported accuracy of x-ray erect abdomen to be 100% in detecting Hollow viscous injuries. All were subjected to USG and it was noted that 52(52%) cases had collection in the peritoneal cavity either due to solid organ injury or bowel perforation, mesentery tears. In 37 cases there was associated injury to solid organs like liver, spleen, renal contusion and retro peritoneal collection. In our study USG was sensitive in detecting solid organ. This is comparable to other studies like Ahmet et al¹⁴ which showed USG to have 89% accuracy, 77% sensitivity and 97% specificity. But it was not very helpful in detecting hollow viscous injuries Patients with solid organ injury in USG were subjected to CT abdomen and in 12(12%) cases liver was found to be injured, in 16 (16%) spleen was injured, in 5 (5%) retroperitoneal hematoma was noted and in 4(4%) cases renal injury was present. The injuries were graded and managed conservatively and surgically based

on the grade. Davis et al³ reported that in their series, abdominal X-ray was abnormal in 21% of cases; pneumo peritoneum was detected in 6% of cases and dilated bowel loops in 6% of cases. X-ray abdomen is an important diagnostic for as about 80-90% of gastric, duodenal, colonic perforation and show free intra peritoneal gas under right dome of diaphragm. Focused Assessment Sonography for Trauma (FAST) was done in all 100 cases of present study out of which 37 cases of Solid organ injury CT also confirmed the solid organ injury with its grade. Therefore USG abdomen is reliable in detecting solid organ injury and free fluid in the abdomen.

FREQUENCY OF ORGANS INVOLVED:

Spleen was the most common organ injured in the present study 16%. Followed by liver 12% and kidney 4% comparable to other studies like Devis et al³ and Cusher et al¹⁵. A positive Focused Assessment Sonography for Trauma (FAST) examination is highly sensitive for haemoperitoneum and clinically significant abdominal organ injury and is an excellent adjuvant to physical examination and has replaced diagnostic peritoneal lavage as diagnostic modality in the primary survey and also has several important disadvantages. First, Focused Assessment Sonography for Trauma (FAST) does not accurately detect the extent (grade) or the exact site of the organ injury. Hemo peritoneum detected by this in hemodynamically stable patients should be followed by a CT scan to evaluate the nature and extent of injury in more detail¹⁶. CECT abdomen is an excellent means to diagnose intra peritoneal haemorrhage however CT scan is poor for the diagnosis of intra peritoneal hollow viscus injuries and early pancreatic injuries.

Solid Organ Injured	Present Study	Davis ³ et al (%)	Nikhil Mehtha et al ⁹ (%)	Cusher et al ¹⁵ (%)	Cox et al ⁶ (%)
Spleen	16%	25%	53%	45%	46%
Liver	12%	16%	35%	28%	33%
Kidney	4%	-	17%	16%	
Bladder	5%	4%	3%	5%	
Small bowel	17%	8%	17%	9%	8%
Mesentery	5%	4%	11%	5%	10%

MANAGEMENT:

All the 100 cases in the present study were subjected to Investigations and decision was made regarding management. In 43(43%) cases surgery was performed within 6 hours after admission. In 57(57%) cases conservative management was planned and were kept for observation. 2 cases among them were taken for surgery with in 12 hours due to development of signs of peritonitis. Hence keeping the patients with significant injury to abdomen for observation will avoid morbidity and provide appropriate care within time. Present reports are comparable to Mohapatra et al who reported 39% laparotomy rates in their series. Non operative management consisted of nasogastric aspiration, urine out put measurement, I.V.fluids, analgesics and antibiotics. Non Operative Management of high-grade Blunt injuries to liver and spleen in selected patients is a feasible strategy

ORGANS INJURED:

In our study a total of 28 cases were found to be having solid organ injury, out of which 17(61%) were managed conservatively and 11 cases(39%) were managed surgically. All patients in nonoperative group recovered uneventfully except for one who was operated for delayed rebleed. Our study shows that 61% of solid organ injuries can be managed non operatively. A study by Rutledge et al¹⁷ also showed that incidence of non operative management in 48% of both hepatic and splenic injuries. 47.2% of the patients were treated by non operative management in a study by Marmorale C, et al¹⁸. Non Operative Management was successful in 963(89.91%) out of 1071 patients In Raza et al¹⁹. In the present study, 45 out of 100 cases were managed surgically. Spleen was involved in 16 cases GI, GII in 10(10%) cases and GIII, GIV in 6(6%) cases, Liver was injured in 12 cases GI, GII in 7(7%) cases and GIII, GIV in 5 (5%) cases, mesentery tear in 5 (5%) cases, mesocolon tear in 3 (3%) cases, gastric perforation 3(3%) cases, duodenal and colonic perforation 2 (2%) cases each, jejunal perforation 4(4%) cases, ileal perforation 11 (11%) cases, caecal perforation in 1 (1%) case, renal contusion in 4(4%) cases, retro peritoneal hematoma was noted in 5 (5%) cases. In the remaining 32 (32%) cases there were no significant injuries and were kept for observation.

PROCEDURE DONE:

Procedures done for splenic trauma in our study were splenectomy in 6 cases(33.3%) and splenorraphy in 10(66.6%) cases. Splenectomy was

done for most of grade 4 and 5 trauma and hemodynamically unstable patients of lesser grades. In 3 cases of grade 3 unstable patients of splenic trauma splenorraphy using prolene mesh was performed. Our study is nearly similar to study done by Davis et al³ which reported 24.7% of cases had splenic injuries, out of which 10.7% were operated and 14% were managed conservatively. Another study by R. Curie et al¹⁰ reported 27.5% of cases had splenic injuries, out of which 15% were operated and splenorraphy was done in all cases. Liver was injured in 12 cases with GI, GII in 7 cases which were conservatively managed and with GIII, GIV injury in 5 cases laparotomy was done and gell foams were applied. Our study is contrast to study by Davis et al³ which showed 16.47% of liver injuries, out of which 14% underwent laprotomy and suturing was done in all cases. Another study by R. Curie et al¹⁰ showed 20.6% of liver injuries. Our study is comparable to most other studies which showed Hepato splenal injuries as most commonly injured organs in blunt trauma. A study by Cox et al¹ found spleen to be most commonly injured organ than liver. Cases with mesentery tear in 5, meso colon tear in 3 were repaired. Mesenteric tear was observed in 5% cases, which were operated. Our study is comparable to a study done by Davis et al³ which showed 3.4% cases of mesenteric tear. 2 cases of gastric perforation were managed with primary closure and In other case gastro jejunostomy was done. Similarly for 1 case of duodenal perforation primary closure was done and gastrojejunostomy was done in the other. 2 cases of gastric perforation were managed with primary closure and In other case gastro jejunostomy was done. Similarly for 1 case of duodenal perforation primary closure was done and gastro jejunostomy was done in the other. In 4 cases of jejunal perforation primary closure was done and in 1 case resection and anastomosis was done. Similarly in 11 cases of ileal perforation primary closure was done in 8 cases and in 2 cases resection and anastomosis was done, in 1 case ileostomy was performed. In our study, injury to small intestine was in 17% A case of ascending colon perforation was closed primarily and in 1 case of transverse colon perforation colostomy was done. Large bowel injury was observed in 3% cases, which were operated. Our study is comparable to a study by R. Curie et al¹⁰ which showed 3.44% of their patients with injury to large bowel. The caecal perforation was managed with right hemi colectomy. 3 cases of renal contusions and 4 cases of retro peritoneal hematoma were managed conservatively. In Khanna et al¹³ study closure of bowel perforation was done in 13 patients, colostomy in 2 patients, repair of mesentery in 9 patients, splenectomy in 4 patients, splenorraphy in 1 patient and hepatroraphy in 6 patients. 20 From above it is clear that splenectomy was done less frequently in present study as compared to Khanna et al¹³ study in which splenectomy was done frequently.

COMPLICATIONS:

In the present study, wound infection was the most common complication after surgery seen in 10(23%) cases The cause of sepsis/infection in these patients were necrotic tissue, mutilating injuries and late presentatn in some patients. Burst abdomen was noted in 3 cases. Our study is comparable to a study by Jolly et al²⁰ which showed wound infection in 14% of the cases. Another study by Davis et al³ showed wound infection as a complication in 15% of the cases.

MORTALITY

Total 5 patients died in our study. All 5 patients died post operatively out of 44 patients who were operated. Therefore mortality in the present study was 11% out of which 4 (9%) were male patients and 1 (2%) was female patient. The mortality rate in Cox et al⁶ study reported mortality of 10% and in Davis et al³ study it was 13.3%. Among 5 cases 3 patients died because of septicemia and 1 patient due to ARDS and 1 due to sudden cardiac arrest. These results or comparable to another study by Jolly et al.⁷ Which showed 10% mortality in their study with septicemic shock the most common cause of death. Another study by Davis et al³ showed 13.3% mortality with septicemia was the most common cause of death. The major cause of mortality was delayed presentation of patients and poor general condition of patient.

CONCLUSION

. From the present study, we conclude that in haemodynamically stable patients with solid organ injury conservative management can be tried and non operative management is associated with less complications and morbidity. Damage control laparotomy is a potentially life-saving procedure with the potential to mitigate the devastating clinical outcomes.

To conclude initial resuscitation measures, correct diagnosis and finally rapid but appropriate management form the most vital part of blunt abdominal trauma management.

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