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A Clinical Study on Laparotomy Findings in Blunt Injury Abdomen

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Abstract
Background: *Blunt injury abdomen is most commonly caused by Road traffic accidents.[1] The rapid increase in number of motor vehicles accidents has caused rapid increase in number of victims of blunt abdominal trauma. Motor vehicle accidents account for 75-80% of blunt abdominal trauma.[2] Blunt abdominal injury is also a result of fall from height,assault with objects, industrial mishaps, sports injuries ,bomb blast and fall from riding bicycle.[2]*
Objective: *To study and evaluate the etiological,clinical factors and different findings in laparotomy influencing the outcome following blunt injury abdomen.*
Materials and Methods: *A prospective observational study at a single centre with all patients with blunt injury abdomen who underwent surgery during a period of* December 2015to November 2017 *were included for analysis. Demographic factors like age, gender, aetiology of injury, pre op clinical status, imageological factors like USG,Xray abdomen and CECT abdomen, surgical findings and postop complications were studied.*
Findings: *A total of 50 patients with blunt injury abdomen managed surgically were included in this study. Most common age group involved is 21-30 years. Predominantly males(92%) are affected in large proportions.Road traffic accidents (86%) forms the most common mode of injury. Majority of our study population (84%) presented with pain abdomen followed by features of peritonitis(56%). X-ray erect abdomen and chest x-ray forms important investigation tools.Ultra sonography (FAST) has picked up solid organ injury in 68% of cases. So it become important tool in emergency set up more so in hemodyanamically unstable patients. CECT abdomen was performed in 70% of study population and had pivotal role in deciding operative versus conservative management in hemodynamically stable cases. The most common injured organ is spleen followed by liver and small intestine. Pancreatic injury was seen in 5 cases .3 patients(6%) were died with pancreatic injury . Follow up was available for all patients at 6months.*
Conclusions: *In surgical blunt injury abdomen cases timely intervention splenic and liver injury patients had good prognosis in comparison with pancreatic injuries where pancreatic injuries had bad prognosis. Ultrasound and CECT abdomen will give better clue regarding plan of management and prognosis .*
Keywords: *Blunt injury abdomen,laparomy, ultrasound.*

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I. Introduction

Blunt injury abdomen is most commonly caused by Road traffic accidents.[1] The rapid increase in number of motor vehicles and its aftermath has caused rapid increase in number of victims of blunt abdominal trauma. Motor vehicle accidents account for 75-80% of blunt abdominal trauma.[2]

Blunt abdominal trauma is usually not obvious. Hence 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. The knowledge in the management of blunt abdominal injuries has progressively increasing. Inspite of the best techniques and advances in diagnostic and supportive care, the mortality and morbidity remains at large. The reason for this could be due to the interval between the trauma and hospitalisation, inadequate and lack of appropriate surgical treatment, delay in diagnosis, post operative complications and associated trauma especially to head and thorax.

This study main aim is to analyse the factors in blunt injury abdomen like demography,incidence, aetiology of injury, importance of various investigations, to study nature and incidence of injury to different intra abdominal organs,different findings in laparotomy and mode of treatment offered and its complications, mortality and morbidity.

II. Materials & Methods

It is a single centre, prospective observational, non randomised study of all patients with blunt injury abdomen attending emergency department within a week of injury, who were surgically managed in Department of General surgery, Guntur medical college, Guntur were included in the study. Patient enrolment began in December 2015 and ended in November 2017. **Inclusion criteria:** All patients with blunt abdominal injury for whom laporotmy was done with intra abdominal injuries were included in the study. **Exclusion Criteria:** Those patients admitted with blunt injury abdomen but managed conservatively, the Patients who died before confirmation of definitive diagnosis were also excluded from this study.

Evaluation: All patients were assessed clinically by using traditional methods. Apart from clinical parameters, the demographic parameters like age, gender, mechanism of injury, and timing of injury were also included in the study. Radiological evaluation done by using x ray abdomen, Ultrasound, CECT abdomen in some cases.The management was individualized and each case was assessed on its own. In patients where laparotomy was performed after resuscitation, the details regarding the viscera injured and nature of surgery performed were recorded. Each case was carefully followed up to evaluate the progress of patient and to note the development of complications, if any and its management. The details of all cases are summarized in the master chart and results of the study have been analyzed in detail.

III. Results

Study population:

Total of 50 patients were enrolled during the study period (Dec 2015 to Nov 2017). The descriptive analysis is provided in Table 1. Maximum number of patients in present study corresponds to below 30yrs (60%). Age groups were divided in to 2 categories, ≤30yrs and >30 yrs for analysis. Among the patients 92% were males. Most common mode of injury was road traffic accidents (86%) followed by falls (8%).

Clinical parameters: 84% Patients presented with abdominal pain followed by guarding and rigidity. Only 8% patients presented with shock. 64% patients presented within 12 hrs of injury,8% patients late period of upto 4 days.Associted injury along with abdominal injury was present in 37 cases, the common extra abdominal injury was thorax(32%) in the form of fracture ribs and hemothorax followed by extremities fracture,head injury, pelvis and soft tissue injury.

Imageology: Plain Xray Erect Abdomen was done in 46 cases and was not done in 4 cases as they were hemodynamically unstable. 20 percent of X ray Erect Abdomen was normal in our series. Four Quadrant Aspiration done in all cases.It was positive in 30 cases. USG was done in all 50 cases and findings depicted in table 2. CECT abdomen was done in 35 cases. Those patients who did not under went CECT either they were taken for laparotomy or hemodynamically unstable. In our study, spleen was the most commonly injured organ.

Types of surgery : Table 3 data shows various operative procedures carried out during exploratory laparotomy.

The duration of hospital stay varied from 10 to 54 days. The mean range of stay is 16 days. Out of 50 patients 3 patients had post op wound infection and 5 patients had respiratory complications, 1 had wound dehiscence and 1 had intra abdominal abscess. Total 3 patients died in this study. Two cases have pancreatic injury.One case have duodenal transection injury along with grade 4 pancreatic injury. Therefore the mortality rate was 6 percent.

IV. Discussion

Numerous studies in the literature shown how various factors like age, gender, etiology, clinical factors, imageological factors, laparotomy findings etc. had influence on the outcomes.

Demography & outcome:. According to Davis et al[3] study males(70%) are more common victims of blunt trauma when compared with present study the percentage in males is in higher side(92%). In present study average age was 29 yrs compared with Davis ea al where it was 32 yrs.. Most common etiology, according to Davis et al, motor vehicular accidents corresponds to 70%. In the present study, RTA contributed to 86% of cases.

Clinical parameters: In our study abdominal pain was the most common presenting complaint accounting 84%.Peritonitis was the next most common presentation in 56% of patients. The signs and symptoms are misleading in case of blunt trauma abdomen and are masked by concomitant head injury ,chest injury and alcoholic consumption.retro peritoneal organ injury was missed in USG abdomen.In Davis et al study 43% had no specific complaints .so this emphasizes the importance of careful and continuing observation and repeated clinical examination of individual with USG abdomen will be helpful. Latent Period : Latent period is the interval between the time of injury to presentation to our hospital.In our study 64% of patients presented between 1-12 hr after injury.24% presented 12-24hrs after surgery. This time lag is due to lack of facility for transport. Patient tolerance of pain in rural areas,lack of proper awareness of attenders and lack of proper health

care at peripheral centers. Associated injury was present in 37 cases . the most exra abdominal injury was thoracic accounting for 32% followed by extremity fracture, head injury ,pelvic fracture and soft tissue injury in descending order. There was no association in13 patients. Hemoglobin percentage was done in all cases out of which 26% have <8gm %.Hematocrit value was done in 45 patients. It was <30 in 40% of our study population . in 5 cases there was decreasing hematocrit on serial measurement.Urine microscopy was done in all cases. There was hematuria either macro /micro hematuria in 2%percent of cases which had renal injury on CT scan.

Imageological parameters: Plain X ray Erect abdomen was done in 46 patients .Gas under diaphragm was found in12 patients . in Davis et al it was found in 10 percent cases. USG abdomen(Focussed assessment with sonography for trauma) a was done in all cases out of which 42 cases have solid organ injury.free fuid in abdomen was found in nearly 45 cases .therefore USG was more reliable in solid organ injury than hollow viscus injury. splenic injury is the most common finding in USG , Followed by liver injury . relatively less specific in hollow viscus injury.Imaging is essential in early decision making .focused assessment with sonography in trauma (FAST) examination of pericardial, perihepatic, perisplenic and pelvis area help in early detection of clinically significant abdominal injury.FAST examination can be performed repeatedly and is and excellent adjuvant to physical examination. CECT was done in 35 cases. Six patients were presented in shock immediately took for laparotomy after FAST. It can accurately diagnose the grade of solid organ injury.It can also pick up retroperitoneal organ injury like kidney and pancreas.In our study CECT was accurate for 12cases of spleen, 10 cases of liver, detected 3 out of 5 cases of pancreatic injury. It also help to detect hollow viscus injury non specifically up to 18%of the cases.

Laparotomy findings: Organ injury found in our study compared with other study was depicted in table 4. Our study was have similar percentage in case of splenic inury , followed by liver injury and bowel injury.Bowel injury has same percent when compared with Hack man et al study. Splenic injury has relatively similar incidence when compared with Davis et al , cox et al[4,5] studies Our study has similar rate spleencetomy when compared to other studies followed by primary closure with heaptorraphy. In our study most common GIT surgery performed is resection and anastomosis similar to other studies. Our study has similar rate spleencetomy when compared to other studies follwed by primary closure with heaptorraphy [6,7]. In our study most common GIT surgery performed is resection and anastomosis similar to other studies.[8] In the present study pancreatic injuries had bad prognosis

Limitations of study: - Present study has the following limitations. The major limitations of the present study were a small sample size, with non-uniformity in imaging and timing of surgery.

V. Conclusions

Blunt injury abdomen with solid organ injury forms considerable load of patients in our society. Road traffic accidents 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 established at every Taluk hospitals.Measures for early transport of the patients from the accident site to the trauma centers should be undertaken. Erect abdomen X ray is a useful investigation to identify associated hollow viscus injury. Falling titers in serial hematocrit value indicates ongoing bleeding. Ultrasound and CECT Abdomen forms the core investigation of choice in dealing with blunt injury abdomen patients, and becomes more important in deciding operative versus conservative management[9]. Early diagnosis and repeated clinical examination and use of appropriate investigation forms the key in managing blunt injury abdomen patients[10].

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Table 1: Descriptive analysis of study participants (N=50)

Parameter	Frequency	Percent
I. Age group		
30 and below	30	60
Above 30	20	40
II.Gender		
Female	4	8
Male	46	92
III. Mechanism of injury		
RTA	43	86
Fall	4	8
Others	3	6
IV. Clinical presentation		
Abdominal pain	42	84
Abdominal distension	12	24
Abdominal guarding and rigidity	28	56
Shock	4	8
V.Haemoglobin		
>10 gm	19	38
8-10 gm	18	36
<8 gm	13	26
VI.Ultrasound abdomen		
Spleen	19	38
Liver	12	24
Kidneys	1	2
Pancrease	2	4
Hollow viscus &mesentery	0	0

Table 2: organ injury in USG abdomen

Organ	No cases	Percentage
Spleen	19	38%
Liver	12	24%
Kidney	1	2%
Pancreas	2	4%
Hollow viscus	0	0
Mesentry	0	0

Table 3: shows various operative procedures carried out during exploratory laparotomy.

Preocedure	No of patients	Percentage
Splenectomy	11	22%
Hepatorraphy	8	16%
Closure of perforation	7	14%
Spleenorraphy	4	8%
Resection anastomosis	4	8%
drainage procedure	3	6%
Spleenorraphy and mesenteric closure	3	6%
Mesenteric rent closure	2	4%
colostomy	2	4%
Hepatorraphy and mesentri closure	1	2%
Resection anastomosis and mesenteric closure	1	2%
Heppatorraphy and spleenorraphy	1	2%
Resection anastomosis and pancreatic tube	1	2%
Hepatorraphy and closure of perforation and resection anastomosis	1	2%

Table 4: organ inury comparision with other studies.

Organ	Our study	Davis eta al[3]	Cox et al[4]	Allen et al	Hackamn et al[5]
Spleen	36%	25%	46 %		
Liver	24%	16%	33%	33%	
Kidney	2%				
Bowel injury	34%				34%
Pancreas	20%				

Fig1: showing specimen of spleen after splenectomy