

Pattern Of Blunt Injury Abdomen With Special Reference To Non Operative Management In Central India Region

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Abstract:- Blunt injury abdomen is a leading cause of morbidity and mortality among all age groups and continues to be a frequent cause of preventable death. More than 50% of these fatalities are the result of motor vehicle accidents. Depending upon the injury to solid/ hallow viscus and hemodynamic stability of patient, Selective non operative or operative management of blunt injury abdomen is decided.

Methods: A descriptive, prospective study involving observation of 90 patients during 12 months. Demography, trauma characteristics, type of management and final outcome were measured. Patients were divided in 3 groups; those had managed non operatively (NOM), those managed by emergency laparotomy (OP) and those with a non operative management failure (NOM-F). **Results:** Blunt injury abdomen accounted for 1.08% of total admission. Majority of the patients belong to age group of 0-15 yrs and 16-30 year (31.1% each). with male: female ratio of 2.33:1. 66 cases (75.55%) underwent conservative management (NOM). 3 cases of NOM required operative intervention later (NOM-F). Total 22 cases (24.45%) underwent operative management. 2 patients expired during resuscitation. Liver (11.11%) was most commonly injured viscera followed by Spleen (10%), jejunum (8.89%), Ileum (7.78%). However in 31 cases no specific organ injury was identified, only intra peritoneal collection was present. 20 cases had no internal injury. Case fatality rate was 23.80% and 7.40% in males and females respectively. Higher mortality (35.71%) seen in operative group than conservative group (17.85%). **Conclusion:** patients whose have solid organ injury (upto grade III) with hemodynamically stable can be treated by non operative management in non ICU ward with close monitoring. Hollow viscus injuries managed by emergency laparotomy. solid organ injury especially spleen and liver with multiple sites intra abdominal collection in CT scan carries higher risk of non operative failure.

Keywords:- blunt injury abdomen, hemodynamic stability, laparotomy, non operative management, solid and hollow viscera.

I. Introduction

Joshua et al [1] 2004 reported that of 1102 patients evaluated for blunt abdominal trauma various etiology as follows : Motors Vehicles (62.22%), Fall from a height (16.2%), Collision of Motor vehicle with Pedestrian (9.2%), Assault (7.2%), and Others (5.18%). Clinical presentation of blunt trauma abdomen vary according to severity of injury from mild pain and tenderness in abdomen to nausea, vomiting, hematuria, sign and symptom of peritoneal irritation for example abdomen distension, hematemesis, guarding, rigidity, marked pallor and hypovolemia or shock etc. However, large amounts of blood can accumulate in the peritoneal and pelvic cavities without any significant or early changes in the physical examination findings. Bradycardia may indicate the presence of free intraperitoneal blood.

Diagnosis of blunt abdomen injury is based on clinical examination, x-ray abdomen, DPL [2], USG (FAST) [3] and CT scan [4] [5]. Assessment of hemodynamic stability is the most important initial concern in the evaluation of a patient with blunt abdominal trauma. In the hemodynamically unstable patient, a rapid evaluation for hemoperitoneum can be accomplished by means of diagnostic peritoneal lavage (DPL) or the focused assessment with sonography for trauma (FAST). Diagnostic peritoneal lavage has proven sensitive in ascertaining the presence of intra-peritoneal hemorrhage and bowel perforation. However, it is unable to evaluate the retroperitoneum and is an invasive procedure with possibility of serious complications like injury to major vessels, bowel or bladder.

Abdominal ultrasonography is an efficient method assessing patients of with blunt abdominal trauma. It can be performed quickly in the emergency department without interruption of resuscitation and can be repeated whenever diagnostic uncertainty exists. Radiographic studies of the abdomen are indicated in stable patients when the physical examination findings are inconclusive.

CT-scan is most reliable investigation to diagnose hollow/solid organ injury. Its advantage include superior definition of injury, leading to grading of the injury and sometimes the confidence to avoid or postpone surgery. Its disadvantages include the time taken to acquire image so can not be used to evaluating unstable

patients and financial considerations limits its use in all cases. **Estes** (1954)[6] said that lesions of hollow viscus will demand early operation but solid visceral injury, unless accompanied by persistent and uncontrolled hemorrhage, may more properly be considered candidates for temporary conservative measure and for delayed or late operation. However nowadays Management of blunt injury abdomen includes resuscitation ,nonoperative (conservative) and operative intervention depending upon the injury to organ and haemodynamically stability of patients.Based on CT-scan diagnosis and in haemodynamic stable patient treatment of solid viscus, primarily those to the liver , spleen and other solid organs,selective nonoperative management has become the standard of care[7][8]. Early and intensive care for haemodynamic stability of patient gives better results.

In this region blunt injury abdomen is common due to RTA and fall from height , prompted us to carried out present study to analyze various aspect of blunt injury abdomen

II. Meterials And Methods

A descriptive, prospective, hospital-based study involving observation of 90 patients in department of sanjay gandhi memorial hospital and Shyam shah medical colloge rewa between August 2014 to July 2015. All cases after admission particulaers , brief history , complaints were recorded immediately and assessed clinically by the integration of the data provided by the colour of skin, level of consciousness, quality of pulse, the blood pressure, depth and frequency of respiration, body temperature, and the state of pupil. Resuscitation and patients started with airway and establishment of intravenous route with collection of blood samples for grouping and cross matching ,complete hemogram, blood sugar and urea.Urine was examined for red cells. Those cases which failed to respond to fluid replacement were kept on steroid and vasopressor drugs example dopamine infusion,. Four quadrant abdominal paracentesis was attempted in patients with abdominal distention

Peritoneal lavage will be carried out only in those cases where four quadrant tap was negative or gave doubtful result. X-ray chest and erect abdomen will be taken.USG done in most of the patients. In hemodynamically stable patients where USG finding was inconclusive CT abdomen with or without contrast done to access depth and grading of injury.

The following criteria based on USG/CT scan diagnosis and hemodynamic stability of patient were taken as indications for conservative management of solid organ injuries:

- a. Hemodynamically stable patient.
- b. Absence of definite signs of peritonitis.
- c. Awake, alert and responding patient.
- d. Single organ injury (Hollow viscus excluded).
- e. No other indications for surgery.
- f. No coagulation defects.

The following findings were taken to be indications for operative management after blunt abdominal trauma:

- a. Signs of acute peritonitis - manifested by rigidity, muscle guard and rebound tenderness
- b. Persistent shock after proper resuscitation.
- c. Presence of gross hematuria, hematemesis and proctorrhagia.
- d. Positive abdominal paracentesis - blood, pus or fecal mater.
- e. Gas under right dome of diaphragm on straight x-ray.

Categorization of patients as stable or responders as well as resuscitation in emergency department was according to ATLS guidelines. Patients who were admitted with hypotension and tachycardia,deteriorated despite resuscitation, had positive FASTand moderate intra peritoneal collection ,underwent emergency laparotomy.patient died in EmergencyDepartment(ED) were excluded.Survivors were divided in 3 groups those had managed non operatively(NOM),those managed by emergency laparotomy(OP) and those with a non operative management failure(NOM-F).Laparotomy to a patient who left ED with decision for conservative management was considered as failure regardless of time interval.The dividing line between conservative and operative management was not rigid. Some patients initially selected for non-operative management ultimately needed operation on the basis of deteriorating symptoms and signs(NOM-Failure). In our study, there was no cut- off hematocrit value for blood transfusion was rather empirical. No patient was transferred to higher- level trauma centre in acute setting from this series.

III. Results

The majority of the patients belong to age group of 0-15 and 16-30 years(31.1% each).Next common group was 31-45 years (24.4%) with mean age was 27.5 years. Male predominance in all groups with male: female ratio of 2.33:1. RTA (53.3%) is most common cause of blunt injury abdomen followed by fall(25.5%), assault(10%) and other (fall of wall 3, bull horn injury 3 cases) 11.1%. student(36.7%) were most commonly involved , followed by housewives(16.6%), labourer (12.2%), farmer (11.1%) and driver (6.7%).On Clinical

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presentation, all patients had pain in abdomen(100%) followed by distension of abdomen(47.78%), vomiting(16.67%), retention of urine(3.33%) and haematuria(2.22%). Tenderness(80.00%) was the most common sign followed by abdominal distension(47.78%), muscle guarding(38.89.00%), sluggish/absent bowel sound (38.89%), superficial bruise/abrasion(22.22%) and shock (18.89%) .Other observations shown in following tables:-

Table: 1 Distribution of cases according to Four Quadrant Aspiration/DPL(n=40)

S.N.	Type of aspiration	No. of Cases	%	Intervention	
				conservative	Operative
1	Blood	19	47.50	15	04
2	Faecal	09	22.50	01	08
3	Bile	3	07.50	00	03
4	Haemorrhagic	3	07.50	01	02
5	Clear fluid	1	02.50	01	00
6	Negative	5	12.50	05	00
Total		40	100.0	23	17

Table: 2 Finding in USG of the Abdomen(n=55)

S.N.	Finding	Total Cases	Management			
			Conservative	%	Operative	%
1	Splenic injury	08	07	12.73	01	1.82
2	Hepatic injury	07	06	10.91	01	1.82
3	Renal injury	03	03	5.45	00	00
4	Haemoperitonium	06	06	10.91	00	00
5	Intraperitoneal free fluid	25	20	36.36	05	10.09
6	Normal study	06	06	10.91	00	00
Total		55	48	87.27	07	12.73

Table: 3 Findings in CT scan abdomen(n=12)

*AAST= the American Association for the Surgery of Trauma. CT scan done in 12 cases where diagnosis and

S.No.	Organ	AAST Grade					Conservative	%	Operative	%	Total	%
		I	II	III	IV	V						
1	Liver	1	1	2	-	-	3	20.0	1	6.7	4	26.7
2	Spleen	-	1	1	1	-	2	13.3	1	6.7	3	20.0
3	Kidney	1	2	-	-	-	3	20.0	0	00	3	20.0
4	Pancreas	1	1	-	-	-	2	13.3	0	00	2	13.3
5	Diaphragm	-	-	-	-	1	0	00	1	6.7	1	6.7
6	Lung	1	1				2	13.3	0	00	2	13.3
Total							12	79.9	3	20.1	15	100

grading of injury not ascertained by USG. In 4 cases more than one organ injury found .

Table No.4 Distribution of cases according to visceral injury in blunt injury abdomen(n=90)

S. No	Organ	Solitary	Combined	Total	%
1	Liver	07	03	10	11.11
2	Spleen	08	01	09	10.00
3	Jejunum	08	00	08	08.89
4	Ileum	05	02	07	07.78
5	Duodenum	04	00	04	04.45
6	Renal	02	02	04	04.45
7	Diaphragm	02	00	02	02.22
8	Colon	01	00	01	01.11
9	Pancreas	01	01	02	02.22
10	Intra peritoneal collection alone(no organ injury detected)	31	00	31	34.45
11	No internal injury	-	-	20	22.22

*Cases were calculated from intraoperative finding [21], ultrasonography[55] and CT scan [12] and autopsy records[12]

Table 5 Distribution of cases and mortality according to their management

S.N.	Treatment modality	Total	Survived	Death	CFR	$\chi^2 = 0.288$ P value= 0.59
1	Conservative (NOM)	66	56	10	17.85%	
2	Operative	19	14	05	35.71%	
3	NOM-Failure	03	03	00	00%	
Total		88	73	15	17.05%	

*2 patients expired during resuscitation

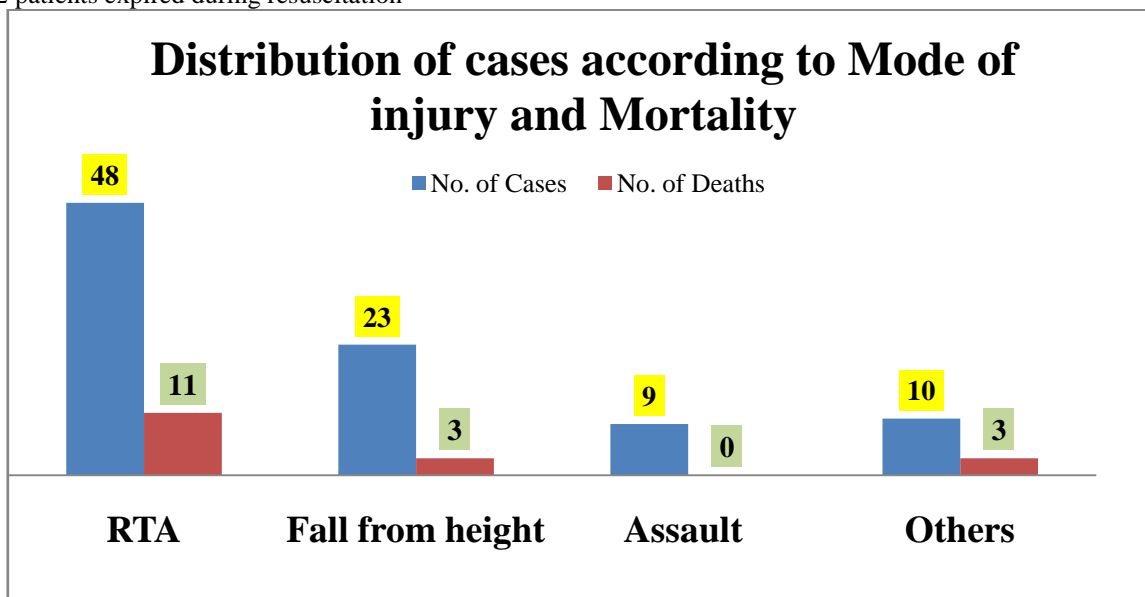


Table: 7 Distribution of cases according to Age and Mortality

S.N.	Age Group (in yrs)	No. of Cases	No. of Deaths	Mortality (%)
1	0 to 15	28	04	14.28
2	16 to 30	28	05	17.86
3	31 to 45	22	04	18.18
4	>45	12	04	33.33
Total		90	17	18.89

Table: 8 Distribution of showing mortality in patients with/without associated extra abdominal injury

S.N.	Injury	Total No. of Cases	No. of Death	Mortality %	$\chi^2 = 0.589$ pvalue=0.443
1	Abdominal injury	55	09	16.36	
2	Abdominal + extra abdominal	35	08	22.86	
Total		90	17	18.89	

In this study, mortality rate in male and female group was 23.8% and 7.4% respectively, however males comprise of 88.2% of total deaths. The hospital stay for survivor and deceased ranged from 1 to 30 days with mean stay of 7.56 days having standard deviation of 6.69.

IV. Discussion

In present study more than 60% the patients were between 0-30 years (62.20%) 31.1% each from 0-15 and 16-30 years age group, where as age of patients ranged from 3 years to 90 years, with mean age being 27.5 years. In study by Ghosh et al (2011)[9] they found the greatest number of patient in the age of 21 to 30 years. The high incidence in these age group mainly because they are mobile age group of society and more

frequently at outdoors for study, occupational needs and for recreation. The commonest cause of blunt abdominal trauma was road traffic accident (53.33%) in the present series. This finding is similar to the study by **Ghosh et al(2011)**[9] found it to be 59.1%. In the present series the incidence of R.T.A. is quite high as stated by **ministry of road transport and highway ,road accident in india2011**[10] and **WHO,road traffic injury case-sheet march 2013**[11] which denotes the fact that In india motor vehicle population is growing at faster rate than the economic and population growth. In present study, the most common occupation group of blunt injury abdomen victims was student (36.01%) followed by housewives(16.6%) labourer (12.2%) and farmer(11.1%). The students, labourers and farmers are the most mobile group of the society.

X-ray chest and abdomen were done 84 cases ,injury detected in 45 cases out of 66 cases giving rise 68.18% sensitivity and positive predictive value 71.4%.Four Quadrant Aspiration /DPL was done in 40 cases where abdominal distention or intra abdominal haemorrhage was suspected .35 cases had positive where as negative in 5 cases , efficacy of four quadrant aspiration in present study was 87.5%. USG abdomen done in 55 cases , 50 cases had blunt injury abdomen , USG detected evidence of intra abdominal injury present in 49 cases so it is 98% sensitive and 2% false negative in this study.However in splenic ,hepatic and renal injuries it was 88.89%,100%and 66.67% respectively.CT scan done 12 cases for superior definition of injury. In present study it had sensitivity 100% for diagnosis of blunt injury abdomen. . Financial consideration and detection of bowel injuries in X-rays and USG, limits use of CT scan as prime diagnostic tool in all cases

In blunt abdominal trauma, including severe solid organ injuries, selective nonoperative management has become the standard of care. Non-operative management strategies are based on FAST/ CT scan diagnosis and the hemodynamic stability of the patient . Non operative management initially applied in 66(75%) patients those had solid organ injury(upto grade III) with hemodynamically stable or no obvious organ injury but had intra peritoneal collection without sign of peritonitis.Laparotomy done in 18 cases included 7 jejunal injuries ,4 ileal injuries,4 duodenal injuries,2 diaphragmatic injury and 1 case bilateral intercostal drainage done for associated hemothorax.NOM failed in 3 cases,all male.First patient had sealed ileal perforation with liver contusion operated 5th post admission day. Second had jejunal perforation,operated 2 days later due to sign of peritonitis.Third had liver laceration, operated 6 post admission day due to hemodynamic instability. The decision for laparotomy in these cases was based on hemodynamic instability,the presence or the development of the signs of peritonitis like pain abdomen, guarding, rigidity etc. and radiological findings suggestive of hollow viscus injury.

Total mortality in present study was 18.89 % . In the conservative group, mortality was 13.33%(n=12) and in the operated group it was 5.56% (n=5) ,findings are Similar to study by **Brown et al (2005)**[12] who reported an overall mortality of 18.2% among 1153 cases.

Highest number of mortality were seen in age group 16-30 years(n=5) followed by 0-15 years(n=4).However highest mortality rate seen in age group >45 years of age. Mortality more common in males than females(7.5:1).Because males <30 years of age are most active and frequently involve in outdoors works, so they are more prone to injury than other one.

Out of 22 operated cases,19 post-operatively cases were developed complications, most common being wound related complication (n=12). These ranged from minor discharge to wound gaping in 1 case. All such cases were managed with regular dressing and antibiotics. 1 case developed postoperative pneumonia which later on expired.5 cases developed septicemia which managed in surgical icu,out of which 3 cases were expired later on. 1 case developed intraperitoneal abscess which was managed in conservative manner.

V. Conclusion

In the present study, it was found that blunt injury of the abdomen causes significant morbidity and mortality among the population specially in young age group(15-30 years) . RTA remain major cause of injury due to growing urbanization and high vehicular density in this region.. The magnitude of the problem is ever increasing in our society and is an important issue for trauma surgeons and a health-care facility. Early and intensive care for haemodynamic stability of patient gives better results. Non-operative management is treatment of choice in case of solid organ injury based on FAST/ CT scan diagnosis and the hemodynamic stability of the patient . Hollow viscus injuries are managed by emergency laparotomy. Solid organ injury especially spleen and liver with multiple sites intra abdominal collection carries higher risk of non operative failure.

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