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An Evaluation of the Impact of Blunt Abdominal Trauma On Solid Organs Like Liver, Spleen, Kidney And Hollow Viscera Like Stomach, Small Intestine And Large Intestine

Dr. Shesh Kumar[1*], Dr. Dinesh Kumar[2], Dr. Ram Lakhan Singh Verma[3]

[1]Assistant Professor, Department of General Surgery, Uttar Pradesh University of Medical Sciences (UPUMS), Saifai, Etawah, Off, Kurawali - Mainpuri - Etawah Rd, highway, Saifai, Uttar Pradesh 206130, India
[2]Assistant Professor, Department of General Surgery, Rama Medical College, Rama Medical College Campus, Rama City, Mandhana, Kanpur, Uttar Pradesh 209217, India
[3]Lecture, Department of General Surgery, Uttar Pradesh University of Medical Sciences (UPUMS), Saifai, Etawah, Off, Kurawali - Mainpuri - Etawah Rd, highway, Saifai, Uttar Pradesh 206130, India

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***Corresponding author:** Dr. Shesh Kumar

Abstract **Original Research Article**

Objective: To evaluate the impact of blunt abdominal trauma on solid organs like liver, spleen, kidney and hollow viscera like stomach, small intestine and large intestine. ***Methods:*** This was a cross-sectional study conducted among patients admitted in surgical emergency with blunt abdominal injury in a tertiary care hospital in eastern Uttar Pradesh. All patients were examined locally and systemically. Local abdominal examination consists of inspection, Palpation, Percussion and Auscultation. Systemic examination consists of CVS, CNS and respiratory. All patients were subjected to detailed laboratory and radiological investigation at the time of admission and at regular interval during the time of treatment. The post-operative complications and outcome in terms of discharged, expired were noted. ***Results:*** Aspirate examination was normal in 58.3% patients. X-ray abdomen showed that GUD and GGA was in 25% and 10.4% patients respectively. USG abdomen revealed that Intra-peritoneal collection was in 50% patients and Splenic injury was in 16.7% patients. Simple closure of ileal perforation was done in 18.8% patients. Wound infection post-operative complication was in 6.3% patients. Biliary fistula and Respiratory complication was in 4.2% patients. Majority of patients did not have post-operative complications (81.3%). More than one fourth of patients stayed in hospital 11-15 days (29.2%). Majority of patients were improved and discharged (81.3%). Mortality was in 2.1% patients. ***Conclusion:*** The study shows the minimal post-operative complications like wound infection, respiratory complications are common in blunt abdominal trauma. The in-hospital mortality was also low.

Keywords: Blunt abdominal trauma, Solid organs, Mortality.

INTRODUCTION

Trauma is an enormous nationwide concern, representing one of the leading causes of death in all age groups [1]. The majority of traumatic injuries presenting to the emergency department are due to blunt trauma, with the most common mechanism of injury being motor vehicle collisions [2]. Up to 70% of motor vehicle collision– related injuries undergo diagnostic imaging [3]. Abdominopelvic trauma can present as a wide spectrum of injuries, ranging from fractures, solid organ injury, and hollow viscus injury to vascular injury. Vascular injury in particular is an important imaging diagnosis given its association with potential rapid deterioration of the patient's hemodynamic status, leading to hypotensive shock and, in turn, higher morbidity and mortality [4].

Over 90% of patients with an absent distal pulse have a major arterial injury. Evidence of abdominal tenderness and abdominal wall hematoma at physical examination can also be highly suspicious for intra-abdominal vascular injury [5].

Trauma from the seat belt, specifically the lap band, can cause abdominal wall bruising or laceration. This physical examination finding should raise suspicion for injuries affecting abdominal structures such as soft tissues, visceral organs, and major vessels. Approximately 30% of patients presenting with classic seat belt–related abdominal wall bruises at physical examination have associated significant intra-abdominal injury [6-8].

The present study was designed to evaluate the impact of blunt abdominal trauma on solid organs like liver, spleen, kidney and hollow viscera like stomach, small intestine and large intestine.

MATERIAL AND METHODS

This was a cross-sectional study conducted among patients admitted in surgical emergency with blunt abdominal injury in a tertiary care hospital in eastern Uttar Pradesh. The study was approved by the Ethical Committee of the Institute and consent was taken from patient's attendant. All patients came to emergency with blunt abdominal injury are kept under monitoring of vitals like Pulse rate, Blood pressure, Respiratory rate and Oxygen saturation.

All patients were examined locally and systemically. Local abdominal examination consists of inspection, Palpation, Percussion and Auscultation. Systemic examination consists of CVS, CNS and respiratory. All patients were subjected to detailed laboratory and radiological investigation at the time of admission and at regular interval during the time of treatment. The post-operative complications and outcome in terms of discharged, expired were noted. The descriptive statistics are presented.

RESULTS

About one third of patients were between 11-20 years of age (354%). Majority of patients were males (87.5%). RTA was the most of mode of injury (50%). FFH was the second most common mode of injury (27.1%). Tenderness was among all the patients. Pain in abdomen was in 95.8% patients (Table-1).

Aspirate examination was normal in 58.3% patients. X-ray abdomen showed that GUD and GGA was in 25% and 10.4% patients respectively. USG abdomen revealed that Intra-peritoneal collection was in 50% patients and Splenic injury was in 16.7% patients (Table-2).

Simple closure of ileal perforation was done in 18.8% patients. Simple closure of jejunal perforation and R. A. of jejunum was done in 16.7% patients. Perforation taken as loop ileostomy was done in 12.5% patients (Table-3).

Jejunal perforation and Ileal perforation was in 18.8% and 16.7% patients respectively. Liver injury and Splenic injury was in 14.6% patients (Table-4).

Wound infection post-operative complication was in 6.3% patients. Biliary fistula and Respiratory complication was in 4.2% patients. Majority of patients did not have post-operative complications (81.3%) (Table-5).

More than one fourth of patients stayed in hospital 11-15 days (29.2%). Majority of patients were improved and discharged (81.3%). Mortality was in 2.1% patients (Table-6).

Table-1: Basic characteristics of patients

Basic characteristics	No. (n=48)	%
Age in years		
0-10	6	12.5
11-20	17	35.4
21-30	6	12.5
31-40	10	20.8
41-50	7	14.6
>50	2	4.2
Gender		
Male	42	87.5
Female	6	12.5
Mode of injury		
Road traffic accident (RTA)	24	50.0
Fall from height (FFH)	13	27.1
Assault	7	14.6
Animal attack	2	4.2
Others	2	4.2
Symptoms and signs#		
Pain abdomen	46	95.8
Distention of abdomen	34	70.8
Hematuria	6	12.5
Tenderness	48	100.0
Guarding/rigidity	33	68.8
Absent bowel sound	31	64.6
Tachycardia (pulse >100/min.)	22	45.8
Hypotension (B.P. <90mmhg)	15	31.3

#Multiple response

Table-2: Distribution of investigations

Investigations	No. (n=48)	%
Aspirate		
Blood	8	16.7
Intraluminal contents	12	25.0
WNL	28	58.3
X-Ray abdomen		
Within normal limit (WNL)	31	64.6
Gas under diaphragm (GUD)	12	25.0
Ground glass appearance (GGA)	5	10.4
USG abdomen	n=24	
Intra-peritoneal collection	12	50.0
Liver injury	2	8.3
Splenic injury	4	16.7
Renal injury	2	8.3
Bladder injury	1	4.2
Within normal limit	3	12.5

Table-3: Distribution of Operative procedure

Operative procedure	No. (n=48)	%
Simple closure of ileal perforation	9	18.8
Simple closure of jejunal perforation	8	16.7
R. A. of ileum	2	4.2
R. A. of jejunum	8	16.7
Perforation taken as loop ileostomy	6	12.5
Repair of liver laceration	4	8.3
Repair of bladder rent	7	14.6
Spleenectomy	4	8.3

Table-4: Distribution of organs involved

Organs involved	No. (n=48)	%
Jejunal perforation	9	18.8
Ileal perforation	8	16.7
Duodenal perforation	0	0.0
Transverse colon perforation	0	0.0
Liver injury	7	14.6
Splenic injury	7	14.6
Renal injury	3	6.3
U. Bladder injury	1	2.1
Mesenteric tear	2	4.2
None	11	22.9

Table-5: Distribution of post-operative complications

Post-operative complications	No. (n=48)	%
Wound dehiscence (WD)	0	0.0
Wound infection (WI)	3	6.3
Biliary fistula (BF)	2	4.2
Pancreatic fistula (PF)	1	2.1
Intra-peritoneal abscess (IPA)	1	2.1
Respiratory complication (RC)	2	4.2
Anuria	0	0.0
None	39	81.3

Table-6: Distribution of hospital stay and outcome

Hospital stay and outcome	No. (n=48)	%
Hospital stay in days		
0--5	13	27.1
6--10	13	27.1
11--15	14	29.2
16--20	4	8.3
21--25	0	0.0
26--30	3	6.3
>30	1	2.1
Outcome		
Improved and discharged	39	81.3
Abscond	2	4.2
Expired	1	2.1
D.O.P.R.	6	12.5

DISCUSSION

In this study, RTA was the most of mode of injury (50%). FFH was the second most common mode of injury (27.1%). This finding was in consistent with the study by Devis *et al*., [9] in which the most common mode of injury was road traffic accident. However, fall from height was least common mode of injury in Devis *et al*., study [9].

In the present study, abdominal pain was the most common presenting complaint accounting for 96% and abdominal tenderness was the most common sign accounting for 100% of cases. But the signs and symptoms in blunt abdominal injuries are notoriously unreliable and are often masked by concomitant head injuries, chest injuries and pelvic fractures. Significant injuries to the retroperitoneal structures may not manifest signs and symptoms immediately and be totally missed even on abdominal X-rays and DPL predisposing the patients to grave consequences of missed injuries. In Davis *et al*., [9] study, 43% of patients had no specific complaints and no signs or symptoms of intra-abdominal injury when they first presented to the emergency room. But 44% of those patients eventually required exploratory laparotomy and 34% of patients had an intra-abdominal injury. This emphasizes the importance of careful and continuing observation and repeated examination of individuals with blunt abdominal trauma. Out of 48 patients, 12 patients showed intraluminal contents were aspirated in the present study. This finding is similar to by Gupta *et al.*, [10].

In this study, X-ray abdomen showed that GUD and GGA was in 25% and 10.4% patients respectively. USG abdomen revealed that Intra-peritoneal collection was in 50% patients and Splenic injury was in 16.7% patients. Davis *et al*., [9] reported that in their series, abdominal X- ray was abnormal in 21% of cases; pneumoperitoneum was detected in 6% of cases and dilated bowel loops in 6% of cases. In Yoshi H *et al*., study, the sensitivity of ultrasound in detecting injuries in blunt abdominal injury patients was about 94.6%. In study of Gupta *et al*., [10], ultrasonography was done only in 7 patients and it revealed pathology like renal laceration and retero-periotoneal haemetoma in 6 cases.

In the present study, Jejunal perforation and Ileal perforation was in 18.8% and 16.7% patients respectively. Liver injury and Splenic injury was in 14.6% patients. According to Davis et al[9], most common organ involved in BTA was Spleen comprising 25%. Second most common organ injured was Liver comprising 16% and third most common organ involved was Small intestine comprising 8%. According to Cox [11], most common organ involved in BTA was Spleen comprising 46%. Second most common organ injured was Liver comprising 33% and third most common organ involved was Small intestine comprising 8%.

In this study, simple closure of ileal perforation was done in 18.8% patients. Simple closure of jejunal perforation and R. A. of jejunum was done in 16.7% patients. Perforation taken as loop ileostomy was done in 12.5% patients. In Khanna *et al*., [12] study, closure of bowel perforation was done in 13 patients, colostomy in 2 patients, repair of mesentery in 9 patients, splenectomy in 4 patients, splenorrhaphy in 1 patient and hepatorraphy in 6 patients.

In this study, wound infection post-operative complication was in 6.3% patients. Biliary fistula and Respiratory complication was in 4.2% patients. Majority of patients did not have post-operative complications (81.3%). Nance *et al.*, [13] reported complication rate of 27% in a series of 480 patients. The commonest complications were found wound infection.

In the present study, majority of patients were improved and discharged (81.3%). Mortality was in 2.1% patients. The mortality rate in this study is much lower than Khanna *et al.*, [12]. The mortality rate in

Davis *et al*., [9] study was 13.3%. In the study by DiVincenti *et al*., [14], the mortality rate was 23% and Cox [11] study reported a mortality rate of 10%.

CONCLUSION

The study shows the minimal post-operative complications like wound infection, respiratory complications are common in blunt abdominal trauma. The in-hospital mortality was also low.

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