BLUNT ABDOMINAL TRAUAMA AND PATTERN OF VISCERAL INJURIES

Masood Ahmed Qureshi[1],MuhammadSharif Awan[2], Imtiaz Ali Langah[3], Mushtaque Ahmed Abbasi[4], Masoom Ali Shah[5], Farkhana Yasmin[6]

ABSTRACT

OBJECTIVES: The visceral injuries, resulted from blunt abdominal trauma, their pattern, morbidity and mortality at Peoples University of Medical & Health Sciences for Women Nawabshah **STUDY DESIGN**: Prospective Observational study. **PLACE AND DURATION OF STUDY:**This study was conducted at Surgical Units of Peoples University of Medical and Health Sciences (PUMHS) for women and Jinnah Medical Center Nawabshah from January 2016 to December 2018. **PATIENTS AND METHODS:** About 66 patients were included in this study and admitted through ER (Emergecy Room) of all three surgical units of PUMHS Nawabshah. After resuccitation and necessary investigations like base line , ultrasound and CT Scan etc the pateints were explored and the injuries were noted, The data was recorded on a proforma, theb entered on MS Excel and analyzed by SPSS version 21. Demographic data, Frequencies and Percentages were calculated for presentation of qualitative variables like sex, presenting complaints, signs and symptoms and the quantitative variables like age presented by mean ± standard deviation. **RESULTS:** 26 of 66 patients did not need surgery treated on medicines and close observation. In 40 patients laparotomy was performed. Mean age was 32.5 years Road Traffic Accident (RTA) was the most common mode of injury in Blunt Abdominal Trauma (BAT) noted in about 35 patients (53.03%). Male to female ratio was 4.2:1. Most of the patients presented in BAT as pain in abdomen 56 (84.84%), tender abdomen 40 (60.60%) Distension 36 (54.54%), Shock 18 (27.27%), Vomiting 20 (30.30%) and absent or sluggish gut sounds 50 (75.75%). Hepatic trauma 20 (30.30%) little bit more than the splenic injury18 (27.27%) and intestinal injury the third number 14 (21.21%). Postoperatively surgical site infection, respiratory tract infection and sepsis occurred in about 24 patients and mortality was about 6 (11%) cases. **CONCLUSION:** Pattern of visceral injuries results from blunt trauma abdomen is more in solid visceras rather than intestine, Road traffic Accident is the common source of trauam hence preventive measures should be adopted like seat belt, careful driving and to follow the traffic rules.

KEYWORDS: Blunt Abdominal Trauma, Visceral Injury, Hepatic Injury.

1. Assistant professor, surgery, PUMHSW, SBA
2. Professor of surgery, PUMHSW, SBA
3. Senior Registrar, surgery, PUMHSW, SBA
4. Assistant professor, surgery, PUMHSW, SBA
5. Senior Registrar Peadiatric Surgery, PUMHSW, SBA
6. Medical officer gyane Unit 1, PUMHSW, SBA

Correspondence: Masood Ahmed Qureshi

Assistant professor, surgery, PUMHSW, SBA

Email: drmasood2001@hotmail.com

INTRODUCTION

In 1990, near about 5.5 million peoples were died throughout word due to injury. It is calculated that about 9 million people will die due to injuries, every year up to 2020. Road traffic accidents will be the third common cause of disability globally and second most common cause in developing countries.[1] In the modern era of excessive traffic the road traffic accidents are increasing which resulted thoracic and abdominal injuries which resulted significant rise in morbidity and mortality due to blunt and penetrating injuries.[2] An early assessment and symptoms and signs of blunt abdominal trauma may reveal the type of visceral injury in some patients, while other may require observation and investigations to diagnose the visceral injuries. The renal injuries in addition to other abdominal organs injuries like, liver, spleen, pancreas may need open surgical management.[3]

Regarding the solid organ injuries due to blunt abdominal trauma the splenic injuries follows the liver injury and if it is enlarged

due to any other reason leads the liver injury.[4] How to manage splenic trauma is controversial, to manage conservatively depends upon certain indications rather than operative management to conserve or to remove the spleen.[5] The second most common injury is liver trauma and needs close monitoring and observation and if the patient is stable then CT Scan abdomen is advisable.[6] If the liver injury is suspicious then laparoscopy in stable patients and laparotomy in hemodaynamicaly unstable patients should be done immediately. The mortality is attributed to uncontrolled hemorrhage per-operative or postoperatively.[7]

Regarding gastro-intestinal tract gastric rupture is the rare injury and is usually associated with thoracic injury. Multiple clinical features and management principles are described due to associated chest injury, formation of intra-abdominal abscesses which in turn may cause peritonitis. The major action to be taken for survival of these patients is early surgical intervention because of associated neurologic or vascular injuries is the factors which may cause mortality. Regarding abscess formation early aggressive surgical re-intervention must be carried out to drain the abscesses. Other rare injury is duodenal and difficult to diagnose needs frequent repeated examination, and investigations tools, preoperatively whole duodenum must be explored to rule out the duodenal injuries and its treatment.[9]

Mode of blunt abdominal trauma, its force, source and site of impact on abdominal wall may decide the type of small gut injureis. Because the diagnosis of small gut injury may be problematic especially in polytrauma, unconscious and head injury patients. Modern diagnostic tools like CT scan and MRI of abdomen, and conservative non operative approach for management of solid organ injuries has resulted unnoticed small gut injuries.[7-9]. Small gut injury is diagnosed on the basis of clinical features and an abnormal CT scan findings rather relying on laparotomy findings. Hence delay in diagnosis may cause significant morbidity and mortality in small gut injury.[10] ***** small gut rupture due to blunt abdominal trauma is not uncommon jejunal injury has masked clinical presentation and is very difficult to diagnose it has high morbidity and mortality if the diagnoses and treatment is delayed. If there is persistent abdominal pain following blunt abdominal, trauma small gut damage should be considered.[11] Major gut damage has high mortality because of associated other organ injuries and morbidity is associated with delay in diagnosis and treatment.[12] in blunt trauma of abdomen pancreatic injury is rare as compared to penetrating injury diagnosis is very difficult preoperatively and is usually made on exploratory laparotomy not on CT scan.[13]

Every surgeon dealing with blunt abdominal must be able to judge clinically and to evaluate by adjuncts like FAST (Focused Abdominal Sonography of Trauma), DPL (Diagnostic Peritoneal Lavage), CT scan when needed. He should have to take prompt action to treat them conservatively or surgically.

PATIENTS AND METHODS

About 66 patients were included in this study and admitted through ER (Emergecy Room) of all three surgical units of PUMHS Nawabshah. After resuscitation by maintaining Airway, Breathing, Circulation, any Disability and Exposure (ABCD&E) two intravenous line maintained by 18 gauge cannulas two liters of crystalloid solutions were infused to stabilize the patient and necessary investigations like base line, ultrasound and CT Scan where needed. Secondary survey was performed from head to toe and the patients were explored, where indicated, and the injuries were noted.

Statistical Analysis:
The data was recorded on a proforma, then entered on MS Excel and analyzed by SPSS version 21. Demographic data, Frequencies and Percentages were calculated for presentation of qualitative variables like sex, presenting complaints, signs and symptoms and the quantitative variables like age presented by mean ± standard deviation. Chi-square test was applied to test the significance of Clinical Presentation and Etiological Factors and p-value of <0.05 was considered as Statistically Significant.

RESULTS

In this prospective observational study 66 patients were included of blunt trauma abdomen from January 2016 to December 2018.

There were 52 (79%) males and 14 (21%) females with male to female ration of 4:1.

Mean age was about 32.5 and about fifty percent patients were young about 42 to 48 years.

Road traffic accident was the mode of trauma in about 36 (54.6%) from 66 patients. Fall from height was in 16 (24.3%) patients, assault in 10 (16.1%) and 4 (6.2%) due to industrial cause. (Table no 1)

From 66 most of the patients presented in BAT as pain in abdomen 56 (84.84%), tender abdomen 40 (60.60%) Distension 36 (54.54%), Shock 18 (27.27%), Vomiting 20 (30.30%) and absent or sluggish gut sounds 50 (75.75%). and abdominal tenderness in 40 (61%) was noted.

Hepatic trauma 20 (30%) little bit more than the splenic injury 18 (27%) and intestinal injury the third number 14 (21%). Grade I and II injuries were noted in 14(21%) and four in grade III, and two in grade IV liver injuries. Six patients went under laparotomy for liver repair and hemostasis, associated injuries of colon and Retroperitoneal Heamatoma were noted in four patients. (Table no 1)

The next solid organ injury was of spleen in 18 (27%) patients, grade I injuries in 8(12), grade II in 6 (9%), and grade III in 4(6%) and ribs fracture noted in six patients.

Regarding gastrointestinal injuries were in 14 (21%) patients, small gut got more injuries in 8(27%), along with mesenteric tear in 4 (6%) and stomach and duodenal injuries in 4(6%), and two patients has colonic injury associated with hepatic trauma. Pancreatic injuries found in 2 (3%) along with retroperitoneal hematoma.

Kidney trauma resulted in 6(9%) patients along with non expanding retroperitoneal hematoma, grade I and II injuries were noted in three patient of each and two patients had bladder rupture intraperitoneally

In 58 (88%) patients diagnosis was made preoperatively clinically and radiologically and exploration was done. All patients went for FAST, and diagnosis of heamoperitoneum in 45 patients, liver trauma in 16, splenic injury in 14, and renal injury in 4. Bowel perforation was diagnosed on X-Ray chest by free gas under right dome of diaphragm in 8 patients. (Table no 1)

Chest infection resulted in 10 patients may be due to anaesthesia complication and most commonly noted in splenic trauma patients in whom spleenectomy was done. Surgical site infection was the next morbid complication resulted in 8 patients, wound dehiscence followed by burst abdomen in 4 cases. (Table no 2)

Three patients died due to septicemia and multiple organ failure and two patients died in ER due to multiple organ injuries. (Table no 3)

Table No 2.Morbidity Associatet With Blunt Trauma Abdomen

MORBIDITY	FREQUENCY	PERCENT
Chest Infection	5	15.15
Wound Infection	4	12.12
Burst Abdomen	2	6.06
Enterocutaneous Fistula	1	3.03

TABLE NO 1 ***DEMOGRAPHIC DISTRIBUTION / OTHER FACTORS***

variable		frequency	%age	p value
Sex	Male	52	78.78	<0.002
	Female	14	21.22	
Age-	14 - 30 years	22	33.3	<0.001
	31 - 45 Years 46-60	28 12	42.4 18.3	
	More than 60 yrs	4	6.06	
Etiology	Road Traffic Accidents	39	60	<0.001
	Fall from Height Violence related Industrial accidents	16 08 03	25 12.2 4.5	
Clinical Features	Abdominal Pain	58	85	<0.001
	Absent Bowel Sounds	50	75.8	
	Tenderness Vomiting Shock Distension Hematuria	40 20 18 36 04	61 30.3 27.3 54.5 6.06	
Injuries	Liver Spleen Gut injury	20 18 14	33.4 27.27 21.3	<0.001
	Retroperitoneal hematoma Renal injury Pancreatic injury Urinary bladder	06 04 02 02	9.06 6.06 3.03 3.03	

Table no 3. Mortality associated with blunt trauma abdomen

Mortality	Frequency	Percent
Pre-Operative	2	6.06
Post Operative	1	3.03
Total	3	9.09

DISCUSSION

Our study includes 66 patients reached in Emergency Department of Peoples University of Medical & Health Sciences (PUMHS) for Women and Jinnah Medical Center Nawabshah, mode of injury was blunt abdominal trauma due to various causes. Age range was 14 to 50 years, and it is sole earner age for the family. 30(45%) patients were of young age group about 28 to 46 years is consistent with various stundies conducted in different countries.[1,14,16]

About 79% patients were male and 21% females nearly same as a study conducted at Lahore which shows 75% male and 25% female.[15] Another study conducted in Bulgeria shows little different figures about 64% male and 36% female[1] probably because working women are more in the field and face the road traffic accidents.Male to female ratioe 4:1 was in our study which is somewhat different from local study conducted in lahore[16] which shows 5:1.

Road traffic accident is the main source of blunt trauma abdomen and about 60% of patients admitted in PMC Hospital Nawabshah. This is because jam traffic, conditions of the roads, un-necessary speed breakers, not follows the traffic rules, passengers are travelling on the roofs, and hanging on the sides of the public transport. RTA is reported in the literature as leading cause of blunt abdominal trauma throughout world, 65% by Mahapatra in India[15] and 88% in Adeno [17]

Fall from heights was the second most common cause of blunt abdominal trauma about 25% and is more than the study by

Smith[18] and about 7% construction workers fall from buildings and very few from stairs at living places. Physical violence is the third cause of blunt abdominal trauma due to fights, robbery, and contributes about 12% is lower than the Smith's study which shows 24%.[18]

Accidents in industries result 4.5% due to struck by blunt objects in abdomen such as steel rods, concrete briks, and wood objects.

Commonest injury noted was the liver injury in our study and about 31% and other studies reported about 21% and 35% by Khan[16] and Ghazanfar[6] respectively. Grad I and Grade II were observed in 70% of liver trauma as compared to study by Khan[15] conducted in Lahore shows 62%. Next common organ involved in blund trauma abdomen is spleen and 18 (27%) patients got splenic inury and is near about a study by Smith[18] in USA, was about 26% while in other studies it was 56% and 58% by Adino[17] and Ghazanfar[6].

In our study the Bowel injury was the third common organ got injury about 14 patients (22%) and the results are different in another study which reports 5% is much less than our study[20].

Renal trauma 6.06% and retroperitoneal hematoma 9.09% were noted in this study and in few patients' associated pancreatic injury also. The results are same as shown in literature by Duraisamys.S and Yao[21] shows 11% which is about double to our study.

4 patients had mesenteric injuries along with small gut trauma. Ruptured bladder was resulted in two patients same as reported by Rodder[22]

Common complications noted in our study were, Chest infection 16%, Surgical Site Infection13%, burst abdomen 7%, and enterocutenous fistulae 3% and results are same as mentioned by Mohapatra in India[15]

The cause of mortality in bludnt abdominal trauma was poly organ injury with failure of organs and septicemia Moralitiy in our study was 9% and near about to mentioned by Ghazanfar as 11% in Rawalpindi[6] and somewhat less as reported by Mohapatra 17%, in India.

CONCLUSION

The following conclusion can be drawn from this study.

Road Traffic Accident is the common mode of blunt abdominal trauma,

Every organ is under jeopardy but solid organs are more prone to injury.

Early and prompt diagnostic, and therapeutic action may save the lives of bread earner.

Education to follow the traffic rules are preventive measures for safety

REFERENCES

1. Murray CJ, Lopez AD. Alternative projections of mortality and disability by cause 1990-2020: Global Burden of Disease Study. *Lancet* 1997; 349(9064): 1498-504.
2. Vyhnanek F, Fanta J, Vojtisek O, Kostka R, Jirava D, Cap F. Indications for emergency surgery in thoraco-abdominal injuries. Acta Chir Orthop Traumatol Cech. 2001;68(6):374-9.
3. Noor A, Ather H.Difference in the outcome of patients managed with isolated renal injury and co-existent abdominal organ injury**,** J Ayub Med Coll Abottabad Mar 2003;15(1):29-32
4. Kenneth D. Boffard and Douglas N.G. Bewley. Accident and Emergency Surgery. Russel RCG, Williaum NS and Bulstrode CJK. Bailey and love's Short practice of surgery; 24th. Edition. Karachi: National Book Foundation; 2004. 286-87
5. Aseervatham R, Muller M. Blunt trauma to the spleen. Aust N Z J Surg. 2000 May;70(5):333-7.
6. Ghazanfar A, Choudry ZA, Zubair M, Nasir SM, Khan SA, Ahmed W, Abdominal solid visceral injuries in blunt abdominal trauma - an experience in busy surgical unit of mayo hospital, Lahore.

Ann King Edward Med coll Jun 2001;7(2):85-7.
7. Letoublon C, Arvieux *C.* Treatment of blunt trauma to the liver, J Chir (Paris). 1999 Oct;136(3):124-9.
8. 38Brunsting LA, Morton JH. Gastric rupture from blunt abdominal trauma**.**J Trauma. 1987 Aug;27(8):887-91.
9. Nesbakken A, Buanes T, Gerner T, Naess F, Stadaas JO**.** Duodenal injuries due to blunt trauma.Tidsskr Nor Laegeforen. 1989 Sep 20;109(26):2659-61.
10. Fakhry SM, Brownstein M, Watts DD, Baker CC, Oller D. Relatively short diagnostic delays (<8 hours) produce morbidity and mortality in blunt small bowel injury: an analysis of time to operative intervention in 198 patients from a multicenter experience. J Trauma. 2000;48(3):408-15.
11. Harris CR.Blunt abdominal trauma causing jejunal rupture**.** Ann Emerg Med. 1985 Sep;14(9):916-8.
12. Hughes TM, Elton C, Hitos K, Perez JV, McDougall PA. Intra-abdominal gastrointestinal tract injuries following blunt trauma: the experience of an Australian trauma centre**.** Injury. 2002 Sep;33(7):617-26.
13. Akhrass R, Yaffe MB, Brandt CP, Reigle M, Fallon WF Jr, Malangoni MA.Pancreatic trauma: a ten-year multi-institutional experience**.** Am Surg. 1997 Jul;63(7):598-604.
14. Singh M, Amit Kumar, Verma AK, Kumar S, Singh AK. Original Research Paper Abdominal Organ Involvement in Blunt Injuries. J Indian Acad Forensic Med. Jan- March 2012; 34(1):24-26
15. Mohapatra S, Pattanayak SP, Rao KR, Bastia B. Options in the management of solid visceral injuries from blunt abdominal trauma. *Ind J Surg 2003; 65(3):263-8.*
16. Khan JS, Iqbal N, Gardezi JR Pattern Of Visceral Injuries Following Blunt Abdominal Trauma In Motor Vehicular Accidents Jcpsp 2006, Vol. 16 (10): 645-647
17. Edino ST. Pattern of abdominal injuries in Aminu Kano Teaching Hospital, KanoNiger Postgrad Med J. 2003 Mar;10(1):56-9
18. *Smith T, Caldwell A, D'amours M, Jalaludin M. Michael* Abdominal trauma: a disease in evolution ANZ J Surg 2005; 75(9): 790-4.
19. Mahmood T, Arshad AR, Aslam MN, Lateef A, Kamran A, Majeed. MH. Sensitivity, specificity and accuracy of ulrasonography performed by Trainee Surgeons for the Initial Assessment and Monitoring of Blunt Abdominal Trauma. Ann King Edward Med Coll 1999; 5(2): 139-41.
20. Uppot RA, Wills JS**.** Bowel, Trauma**,** eMedicine Last Updated: September 2, 2005
21. Yao DC, Jeffrey RB, Mirvis SE, Using contrast enchanced helical CT to visualize arterial blunt abdominal trauma: Incidence and organ distribution. Am J Roentgenol 2002; 178: 17-20.
22. K Rödder, R Olianas, M FischBladder injury Diagnostics and treatment Urologe A. 2005 Aug; 44:878-82