ORIGINAL ARTICLE

Splenic injury in blunt abdominal trauma

Muddasar Shahzad, Sheikh Muhammad Ibqar Azeem, Munir Ahmad

Received:
6th January, 2018

Accepted:
8th October, 2018

Abstract

Objective: To determine the frequency of splenic injury after blunt trauma abdomen and common types of trauma leading to it.

Study Settings: Surgical Department, Lady Reading Hospital, Peshawar.

Study Design: Descriptive (cross sectional) study.

Duration: From July, 2015 to December, 2016.

Material and Methods: A total of 240 patients above 14 years of age and of both genders presenting with blunt trauma abdomen in Out Patient Department or Emergency department were included in the study. After history and clinical examination, Ultrasound or CT scan abdomen was used as diagnostic tool for splenic injury. Splenic injury detected on exploratory laparotomy for blunt abdominal trauma were noted and once detected the patients was carefully checked for detection of types of trauma leading to spleen injury like road traffic accident, fall from height, assault and industrial accident. Data was recorded in predesigned proforma and analyzed by using SPSS version 20.

Results: A total of 240 patients were studied. Mean age was 30 years with SD±2.13. Seventy-five percent patients were male while 25% patients were female. 14(6%) patients had splenic injury in which 6(42%) patients had road traffic accident, 5(36%) had industrial accident, 2(14%) patients had fall from height and 1(8%) patient had assault.

Conclusion: The commonest causes of splenic injury in blunt abdominal trauma were road traffic accident and industrial accidents. Early diagnosis is the key for proper management and survival of the patients. Road traffic accident and industrial accident are preventable causes and can be minimized by following rules of traffic and industry.

Keywords: Splenic injury, Blunt trauma abdomen, road traffic accident, inductrial trauma.

Postgraduate Medical Institute (PGMI) Lady Reading Hospital, Peshawar
M Shahzad
SMI Azeem

Khyber Teaching Hospital, Peshawar
M Ahmad

Correspondence:
Dr. Muddasar Shahzad, Senior Registrar Surgical Unit 'A', Qazi Hussain Ahmad Medical Complex, Nowshera
Cell: 0321-9153199
Email: drmuddasarshahzad@gmail.com

Introduction:

Blunt abdominal trauma (BAT) presents special surgical problems and is a continuous challenge to the surgeon's ability to make an early diagnosis and provide adequate treatment.[1] Under the conditions of an increasing number of road traffic accidents and criminal injuries thoracic and abdominal trauma is a source of a significant morbidity and mortality in blunt and penetrating mechanism of injury.[2]

Abdominal trauma accounts for nearly 20% of all severe traffic injuries and can often result from intentional physical violence.[3] The incidence of blunt abdominal trauma requiring laparotomy is 6% with most frequent organ involved is spleen (40-55%), liver (35-45%), and retroperitoneum (5%).[4]

Abdomen is considered as a magic box both by the surgeons as well as the physicians. Sometimes exact injury is diagnosed only when abdomen is opened and the treating doctor should also remain alert to the development of clinical features regarding after blunt trauma to the abdomen after vehicular accident to avoid charged of negligence upon them. Visceral injuries following blunt trauma present a great medico-legal problem to the forensic experts.[5]

Involvements of associated intra abdominal organs like spleen; pancreas, bowel and liver with renal injuries have a higher rate of open operative management.[6] The spectrum of injuries in blunt abdominal trauma show splenic injuries to be the most common injury,[7] management of blunt splenic injury remains controversial.[7] Liver is the second most common organ which is involved due to blunt abdominal trauma. In all situations close observation of the patient is prenrequisite.[5,7]

Although protected under the bony ribcage, the spleen remains the most commonly affected organ in blunt injury to the abdomen in all age groups. Blunt injuries to the spleen are documented more frequently as the primary solid organ injury in the abdomen. These injuries are common in both rural and urban environments and result from motor vehicle crashes, domestic violence, sporting events, and accidents involving bicycle handle bars.[8]

The present study is designed to determine the frequency of splenic injury after blunt abdominal trauma and common types of trauma leading to it. As discussed above, splenic injury carries immense medico legal importance and a challenge for surgeons for its early diagnosis and intensive treatment. This study will provide us with local magnitude of the problem and common types of trauma leading to it. This study is designed while carefully reviewing the literature and found some difference in frequency of splenic injury in different settings. The results of this study will be immediately shared with local surgeons to make them aware of the situation and formulating recommendations for future research as well.

Material and Methods:

This prospective descriptive cross sectional study was conducted at Surgical Department of Lady Reading Hospital, Peshawar over a period of one and half years from July, 2015 to December, 2016 after approval from hospital ethical and research board. All patients above 14 years of age and of both genders presenting with blunt trauma abdomen were included and patients and patients presenting with chest injuries were excluded from the study. Consecutive (non probability) sampling technique was used and sample size was 240, using 6.06% splenic injury caused by industrial accidents, 95% confidence level and 3.03% margin of error under WHO software for sample size determination.

The purpose and benefits of the study was explained to all patients meeting the inclusion criteria presented in OPD or emergency department and a written informed consent was obtained. All patients were subjected to detailed history and clinical examination. Ultrasound or CT scan abdomen was used as adjuvant diagnostic tool for splenic injury. All the patients were subjected to exploratory laparotomy on next immediate OT list to detect spleen injury. All the laparotomies were done under supervision of an expert general surgeon. Once detected the patients was carefully checked for detection of types of trauma leading to spleen injury like road traffic accident, fall from height, assault and industrial accidents.

All the above mentioned information including name, age, gender, address and type of trauma were recorded on a predesigned proforma. The collected data was stored and analyzed in SPSS version 20. Mean and standard deviation was calculated for numerical variables like age. Frequencies and percentages were calculated for categorical variables like gender, splenic injury and common types of trauma (Road traffic accident, fall from height, assault and industrial accident). Splenic injury was stratified among age, gender and types of trauma to see the effect modifications. All results were presented in the form of tables and graphs.

Results:

A total of 240 patients were analyzed in which 180(75%) patients were male and 60(25%) patients were female. 65% patients were in the range of 20-40 years and 35% were in the range of 41-60 years of age. Mean age was 30 years with SD ± 2.13.

14(6%) patients had splenic injury while

Table-1: Stratification of splenic injury with age distribution (n=14)

Type of splenic injury	Age Range in years				Total	P-value
Age of patientsm	10-20	20-30	30-40	40-50		
Road traffic accident	2(14%)	2(14%)	1(8%)	1(8%)	6(40%)	0.865
Assault	0(0.0%)	1(8%)	0(0.0%)	0(0.0%)	1(8%)	
Fall from height	1(8%)	1(8%)	0(0.0%)	0(0.0%)	2(14%)	
Industrial accident	3(22%)	2(14%)	0(0.0%)	0(0.0%)	5(34%)	
Total	6(40%)	6(40%)	1(8%)	1(8%)	14(100%)	

Table-2: Stratification of splenic injury with gender distribution (n=14)

Type of splenic injury	Gender		Total	P-value
	Male	Female		
Road traffic accident	4(28%)	2(14%)	6(42%)	0.865
Assault	1(8%)	0(0.0%)	1(8%)	
Fall from height	2(14%)	0(0.0%)	2(14%)	
Industrial accident	4(28%)	1(8%)	5(36%)	
Total	11(78%)	3(22%)	14(100%)	

226(94%) patients didn't had splenic injury in blunt trauma. Type of trauma of splenic injury in 14 patients was analyzed as 6(42%) patients had road traffic accident, 5(36%) had industrial accident, 2(14%) patients had fall from height and 1(8%) patient had assault.

Stratification of splenic injury with age distribution was analyzed and shown in table no. 1

Stratification of splenic injury with gender distribution was analyzed and shown in table no. 2

Discussion:

Abdominal trauma is the leading cause of mortality and morbidity during first four decades of life and is the third commonest reported cause of death overall. Same observations are noted in the present study where the mean age of patients with abdominal trauma was 27.26 years. Ahmad noted 50% of patients in his study belonging to age group of 12 -40 years[9] and in our study most of the (65%) patients were in age range 20-34 years.

In our study seventy-five percent patients were male and 25% patients were female and similar results were found in another study in which out of hundred patients the male to female ratio was 5.5:1. While the ratio of splenic injury in male to female was 1.7:1. Ayub H et al noted a male to female ratio of 9:110. Almost similar observations were made by Memon et al, Zafar et al, Ahmad and Khan.[9,11-13]

The incidence of splenic injury in our study was found in 14(6%) patients in which 6(42%) patients had road traffic accident, 5(36%) had industrial accident, 2(14%) patients had fall from height and 1(8%) patient had assault. Similar observation was found in other as the actual frequency of splenic injuries with precision worldwide is not possible. A general consensus of trauma admissions at Level 1 trauma centers across the US suggested splenic injury occurs in as many as 25% of the average 800-1,200 admissions for blunt trauma per year.[10] In a study, the frequency of spleen injury after blunt abdominal trauma was 15.6% with type of trauma leading to injury was motor vehicle collision 46.8%, fall from height 15.6%, assault 9.37% and pedestrian motor vehicle accident 28.12%.[14] In another study, the proportion of patients with splenic injury after blunt abdominal trauma was 41.18% with road traffic accident being the most common cause 70.91% followed by assault 18.18% and fall from height 9.09%.[15] In another study, the frequency of splenic injury was found to be 27.27% with Road traffic accident was the major cause of Blunt abdominal trauma 54.55% followed by 24.24% had history of fall, 15.15% were injured due to violence, 6.06% had injuries caused by industrial accidents.[16]

Blunt trauma is the second commonest mode of abdominal trauma and spleen is the most common intra-abdominal organ injured in blunt abdominal trauma. Ayub also concluded that blunt abdominal trauma is a common emergency.[10]

The limitation of our study was single centre study and we were unable to study various patient's characteristics and co-morbidities considered a potential risk factors for splenic injury. We recommend a large multicenter prospective studies to generate local statistical data.

Conclusion:

The incidence of splenic injury is common in blunt abdominal trauma and the commonest cause of splenic injury were RTA and industrial accidents. Early diagnosis is the key for proper management and survival of the patients. Road traffic accident and industrial accident are preventable causes and can be minimized by following rules of traffic and industry.

Conflict of interest: None

Funding source: None

Role and contribution of authors:

Dr. Muddasar Shahzad, conception and acquisition of data and literature search.

Dr. Sheikh Muhammad Ibqar Azeem, did drafting the menuscript and data analysis.

Dr. Munir Ahmad, did supervision, critical revision and final approval.

References:

1. Brady RR, Bandari M, Kerssens JJ. Splenic trauma in Scotland: demographics and outcomes. World J Surg 2007;31:2111.
2. Tan K, Lewis GR, Chahal R. Iatrogenic splenectomy during left nephrectomy: a single-institution experience of eight years. Urol Int 2011; 87:59.
3. Kamath AS, Iqbal CW, Sarr MG. Colonoscopic splenic injuries: incidence and management. J Gastrointest Surg 2009; 13:2136.
4. Cassar K, Munro A. Iatrogenic splenic injury. J R Coll Surg Edinb 2002; 47:731. Merchea A, Dozois EJ, Wang JK, Larson DW. Anatomic mechanisms for splenic injury during colorectal surgery. Clin Anat 2012; 25:212.
5. Masoomi H, Carmichael JC, Mills S. Predictive factors of splenic injury in colorectal surgery: data from the Nationwide Inpatient Sample, 2006-2008. Arch Surg 2012; 147:324.
6. Davis JJ, Cohn I Jr, Nance FC. Diagnosis and management of blunt abdominal trauma. Ann Surg 1976; 183:672.
7. Salim A, Sangthong B, Martin M. Whole body imaging in blunt multisystem trauma patients without obvious signs of injury: results of a prospective study. Arch Surg 2006; 141:468.
8. Jacoby, R, Wisner, D. Injury to the Spleen. In: Trauma, 6th ed, Feliciano, D, Mattox, K, Moore, E (Eds), McGraw-Hill Professional, New York, 2008. p.661.
9. Ahmad I. Abdominal trauma. A prospective study. Pak J Surg 1992;8:37-42.
10. Ayub H. Assessment of blunt abdominal trauma. J Ayub Med Coll Abbottabad 1997; 9:27-8.
11. Memon AA, Ansari AG, Memon AQ. Indications for splenectomy and changing concepts. J Surg Pakistan 2000;5:7-9.
12. Javed NQ, Zahid AQ, Parkash A, Abdul SM. Gunshot perforation of gut and associated injuries. J Surg Pakistan 2001;6:21-3.
13. Khan A. Stab wounds abdomen: An experience with 105 laparotomies. J Ayub Med Coll Abbottabad 1999;11:6-8.
14. Memon MR, Sanghi AG, Abbasi SA, Memon AA. Role of laparoscopy in blunt abdominal trauma. RMJ. 2013;38(1):40-3.
15. Singh M, Kumar A, Verma AK, Kumar S, Singh AK. Abdominal organ involvement in blunt injuries. Indian Acad Forensic Med. 2012;34(1):24-6.
16. Shigeta K, Kitagawa Y, Yasuki T. Development of next generation human FE model capable of organ injury prediction. U. S. Department of Transportation, 1200 New Jersey Avenue SE Washington DC 20590 USA.