



Severity of Splenic Trauma and Its Surgical Outcome among Patients Presented at Liaquat University Hospital, Pakistan

Suhail Ahmed Soomro ^{a*}, Riaz Ahmed Shah ^{b#}, Abdul Sattar Abro ^{c*},
Mushtaq Ahmad Abbasi ^{d‡}, Muhammad Fahim Ahsan ^{e*}
and Shahnawaz Khatti ^{f#}

^a Bilawal Medical College for Boys, LUMHS/ Jamshoro, Pakistan.

^b Civil Hospital Badin, Pakistan.

^c SMBBMU Larkana, Pakistan.

^d PUMHS for Women, Nawabshah, Pakistan.

^e PIMS Hospital Islamabad, Pakistan.

^f LUMHS, Jamshoro, Pakistan.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Objective: To determine the severity of splenic trauma and its surgical outcome among patients presented with abdominal blunt trauma at surgical emergency of Liaquat University Hospital Jamshoro (Hyderabad)

Material and Methods: This prospective case series study was conducted in the department of Surgery at Liaquat University Hospital Jamshoro, from December 2013 to November 2014. Patients having a diagnosis of abdominal trauma with a diagnosis of splenic injury, aged above 18 years and both genders were included. All the patients underwent surgical treatment as per indications. Patients were monitored during hospital stays to assess the outcome. A study proforma was employed to gather data and SPSS software version 20 was utilized for the analysis of it.

*Assistant Professor of Surgery;

#Consultant General Surgeon;

‡Associate Professor of surgery;

*Corresponding author: E-mail: Suhail.soomro77@hotmail.com;

Results: The study included 60 patients; their mean age was 28.3 ± 12.4 years. Most of the cases 51(84.9%) were between 18 and 40 years of age. Males were predominant with a male to female ratio of 3.1:1. The majority of the cases (48.3% and 33.3%, respectively) had Grade III and Grade IV injuries, and none of our patients were diagnosed as Grade V by the scan. Overall among 30 cases, developed complications, particularly as 10 cases had pulmonary infection, 08 cases had intra-abdominal bleeding, wound infection was in 9 and 1 had developed over-whelming post splenectomy (OPSS). The overall mortality rate was 5.0%.

Conclusion: Splenic trauma and its severity in patients having blunt abdominal trauma were observed to be the most frequent. A better outcome has been observed, and it is also depending on the immediate arrival, accurate diagnosis, surgeons' ability, and experience.

Keywords: Splenic trauma; severity; mortality.

1. INTRODUCTION

In blunt abdominal trauma, the spleen is one of the most commonly injured organs [1]. The treatment of individuals with blunt splenic damage has evolved from surgical and to non-surgical care in recent decades [1]. Trauma is the leading cause of death and morbidity among people under the age of 50 worldwide, and in Pakistan, it was recently reported that out of 130 blunt trauma cases, 65% had spleen injuries [2]. Hemodynamic instability with a rising pulse rate and lowering blood pressure is the most dependable indicator of splenic injuries. Splenic damage can cause pain in the left hypochondrium, as well as pain in the left shoulder tip and widespread abdominal pain. Left lower chest damage has been observed in 43 percent of individuals with splenic injuries [3,4]. Whether there are other organ injuries, a higher injury severity score, and increased age, the likelihood of dying from a spleen injury increases. Mortality rate following splenic damage is 6 percent to 10%, according to trauma facilities in North America [3,5]. The traumatic incident remains one of the leading causes of the mortality in people under the age of 40, and it reflects a long-standing clinical challenge with social and economic consequences, like the direct cost to society (treatment) and indirect cost to society (rehabilitation and loss of productivity) both influence the community and the person [6]. The surgical therapy at the turn of the 19th century was splenectomy, which was done to avoid traumatic amputation and had a postoperative death rate of 40% compared to non-intervention, which might reach 90% [1]. Splenectomy may be required in patients with splenomegaly (e.g., tropical, lymphoma, portal hypertension, autoimmunity) or in any situation in which the trauma surgeon believes non-operative management is not safe or appropriate [7,8]. Splenic trauma can be formerly classified based

on anatomical lesions. Patients' circumstances, on the other hand, may necessitate an emergency transfer to the operating room (OR) without the chance to determine the grade of splenic lesions prior to surgical investigation [9]. The most frequent method of splenectomy is still open surgery. In addition, several centers use laparoscopic and robotic procedures [10, 11]. Splenectomy can result in infectious, pulmonary, pancreatic, hemorrhagic, and the thromboembolic consequences. The most prevalent consequences are atelectasis and pneumonia in the lower lobes. Hemorrhages due to insufficient local hemostasis, wound infection, subphrenic abscess, infective morbidity caused by encapsulated bacterial involvement, pseudocyst and fistula caused by traumatic injuries to the pancreas at the time of splenic hilus dissection, and thromboembolic complications caused by the hematological alteration are all possible complications [10,12,13]. However, the mortality rate following splenectomy varies depending on the indications, however it is 0.97–6.04 times that of the general population [10]. This study has been conducted to evaluate the severity of splenic trauma and its surgical outcome among patients presented at surgical emergency with abdominal blunt trauma at Liaquat University Hospital Jamshoro (Hyderabad).

2. MATERIALS AND METHODS

This prospective case series study was conducted in the department of Surgery at Liaquat University Hospital Jamshoro, from December 2013 to November 2014. Patients having a diagnosis of abdominal trauma with a diagnosis of splenic injury, aged above 18 years and both genders were included. Patients with multi organ injuries and those who did not agree to participate in the study were excluded. A non-probability consecutive sampling technique was

used. A complete history, general physical examination, systemic examination, and baseline investigations such as blood CP, X-ray abdomen and chest ultrasound, urine DR, random blood sugar, virology test, urea and creatinine, as well as specific investigations such as CT scanning of the abdomen and chest, and peritoneal lavage were performed. All the patients underwent surgical treatment as per indications. Patients were monitored during hospital stays to assess the outcome. A study proforma was employed to gather data, and SPSS software version 20 was utilized for the analysis of it.

3. RESULTS

The study included 60 patients. Their mean age was 28.3 ± 12.4 years, ranging from 18 to 60 years. In the present study, males were predominant at 45 (75.0%), with a male to female ratio of 3.1:1. Table 1.

According to the severity of the splenic trauma, Grade I was seen in 1 (1.7%) patient and Grade II was observed in 10 (16.7%) patients by CT scan, whereas Grade III and Grade IV were seen in 48.3% and 33.3%, respectively, and none of

our patients was diagnosed as Grade V by the scan.

The morbidity in this study occurred in 30 patients (50.0%), 10 (16.7%) cases of pulmonary infection, intra-abdominal bleeding was seen in 8 (13.3%) cases, wound infection was present in 9 (15.0%) and 1 (1.6%) developed over-whelming post splenectomy (OPSS). There were three deaths (5.0%) in this study. Table.2

4. DISCUSSION

The spleen is the most usually injured solid organ in the blunt trauma of the abdomen, as well as the most commonly injured abdominal structure after blunt trauma. This study also has been done to assess the severity of splenic trauma and its surgical outcome among patients presented at surgical emergency with abdominal blunt trauma. In this study mean age of the participants was 28.3 ± 12.4 years, and males were predominant 45 (75.0%), with a male to female ratio of 3.1:1. Consistently Mehboob A et al. [14] reported that the most of the cases 56%, were found with age group of 21-40 years and in the line of this study, they found males in majority 93% and only 7% were females. On other hand Emre A et al. [10] demonstrated that the patient's

Table 1. Descriptive statistics of age and gender n=60

Variables	Statistics		
Age (years)	Average	28.3±12.4 years	
	Minimum	18 years	
	Maximum	60 years	
Gender	Male	45	75.0%
	Female	15	25.0%

Table 2. Distribution of patients according to severity of splenic injury and surgical outcomes n=60

Variables	Frequency	Percentage	
Severity of splenic trauma	Grade-I	01	1.7%
	Grade-II	10	16.7%
	Grade-III	29	48.3%
	Grade-IV	20	33.3%
Morbidity	Intra-abdominal bleeding	08	13.3%
	Pulmonary infection	10	16.7%
	Wound infection	09	15.0%
	Sub phrenic abscess	02	3.33%
	Thrombocytosis	01	1.66%
	Portal vein thrombosis	02	3.33%
	Pseudo cyst formation	01	1.66%
	Overwhelming post splenectomy infection	01	1.66%
Mortality	03	5.0%	

mean age was 50.51±22.63 years and inconsistently they found females in majority as 55.4% and remaining 4.5% were males. Above difference according to age and gender with international study may be because in our societies males are mostly involved in outdoor activities, therefore they are on high risk on these types' traumas [15].

In this study according to the severity of the splenic trauma, the Grade I was seen in 1(1.6%) patient and Grade II was observed in 10(16.6%) patients by CT scan whereas Grade III and Grade IV were seen in 48.3% and 33.3% respectively and none of our patients was diagnosed as Grade V by the scan. Similarly, Mehboob A et al. [14] reported that the splenic injuries were graded as 1(4%) case had grade I, among 3 (12%) cases grade II, in the 11 (44%) of the cases the injury grade was III, grade IV injury was seen in 10 (40%) of the cases and grade V injury was in only one case. In another study of twenty patients had Grade IV injuries, and eight cases had Grade V injuries, out of a total 28 cases having high-grade injuries. On other hand Chalya PL et al. [16] also found similar findings. In the line of this study Gangat SA et al. [17] reported that the grade III injuries were the most prevalent form of splenic injury 47%, and Grade IV injuries were 34%.

In this study the morbidity occurred in 30 patients (50.0%), 10 (16.7%) cases of pulmonary infection, Intra-abdominal bleeding was seen in 08(13.3%) cases, wound infection was present in 9(15.0%) and one (1.6%) developed overwhelming post splenectomy (OPSS). The most prevalent post-splenectomy consequences are lower lobe atelectasis and pneumonia, in addition, hemorrhages due to insufficient local hemostasis, infective complications from a wound infection, subphrenic abscess, and encapsulated bacteria, pseudocyst and fistula formation due to traumatic injuries of the pancreas during the dissection of the splenic hilus and coagulation abnormalities from hematological variations could occur in individuals [10,17,18]. Consistently Gangat SA et al. [17] demonstrated that the 15.9% pulmonary infection, 11.3% septicemia, 6.8% pancreatic fistula, 2.2% subphrenic abscess, 13.6% wound infection and 2.2% pneumococcal pneumonia were post operative complications. In this study mortality rate was (5.0%), while Gangat SA et al. [17] demonstrated that the overall mortality rate was seven (15.9%). Splenic injuries account for 25% of all solid abdominal organ injuries

worldwide, and the death rate linked with splenic trauma is estimated to be between 7 and 18% [16,19]. The duration of hospital stay amongst trauma individuals has been demonstrated to be a significant marker of morbidity. Prolonged hospitalization places an unacceptably high demand on health-care resources and reduces the population's productive potential due to time wasted in the hospital and impairment [16]. In order to provide appropriate trauma treatment for victims of splenic injuries, the challenges found in the management of the individuals having splenic injuries in our environment must be addressed [16].

5. CONCLUSION

Splenic trauma and its severity in patients having blunt abdominal trauma were observed to be the most frequent. A better outcome has been observed, and it is dependent on the immediate arrival, accurate diagnosis, the surgeons' ability, and experience.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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