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EXPERIENCE WITH SPLENIC TRAUMA IN JEEVAN JYOTI HOSPITAL, ALLAHABAD, U.P. INDIA

¹Arpit Bansal, ^{*}¹Ashwani Kumar Bansal, ²Vandana Bansal and ³Ajay Kumar

¹Department of Surgery, Jeevan Jyoti Hospital, Allahabad, U.P. India

²Guru Gobind Singh Memorial Vanadana Women's Hospital, Allahabad, U.P. India

³Jeevan Jyoti Institute of Medical Sciences, Allahabad, U.P. India

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ABSTRACT

This study was carried out to estimate the prevalence, severity and mode of splenic trauma and management technique from amongst the abdominal trauma cases admitted in Department of surgery, Jeevan Jyoti Hospital, Allahabad. Methods: The study was carried out at Surgery Department of Jeevan Jyoti Hospital, Allahabad, Uttar Pradesh, India from March 2014 to Aug 2015. One hundred thirty consecutive abdominal trauma patients admitted to surgery department were included in the study. Their injuries were classified; treatment strategies outlined and complications were documented. Results: Out of the 130 patients presenting in emergency, 28 (21.53%) presented with blunt, 101 (77.7%) with penetrating trauma and 1(0.07%) by blast. 126 patients underwent laparotomy and 4 treated conservatively. Mean age was 28.56 (range 18-55) years. Out of these cases 28 patients had splenic injury, 9 (32.14%) with Type-I & II while 19 (67.86%) with Type-III & IV. 16 (57.14%) of the splenic injuries were due to blunt abdominal trauma and 12 (42.86%) due to penetrating abdominal injuries. 21 (75.0%) of the patients with splenic injury underwent splenectomy and 7(25.0%) splenorraphy. Over all complication associated with splenectomy was 57.8% and in splenorraphy it was 20%. Conclusion: The commonest cause of splenic injury was blunt abdominal trauma; Assessment of the severity of splenic injuries at the time of laparotomy resulted in splenic salvage procedures in some cases. Splenectomy was more complicated than splenorraphy.

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INTRODUCTION

The spleen is a delicate, fist-sized organ under your left rib cage near your stomach. It contains special white blood cells that destroy bacteria and help your body fight infections. The spleen also makes red blood cells and helps remove, or filter, old ones from the body's circulation. A ruptured spleen is an emergency medical condition that occurs when the capsule-like covering of the spleen breaks open, pouring blood into your abdominal area. Depending on the size of the rupture, a large amount of internal bleeding can occur. The spleen is the most commonly injured organ in the abdomen as a result of motor vehicle crashes, falls from a height, athletic mishaps, and beatings. Sometimes other abdominal organs also are damaged. Enlargement of the spleen (for example, due to Epstein-Barr virus causing infectious mononucleosis) makes the spleen more susceptible to injury. Only splenic injuries can be found in about one third of abdominal trauma and in

25–30% of patients who suffered a traffic accident (Buccoliero and Ruscelli, 2010). When the spleen is injured, blood may be released into the abdomen. The amount of bleeding depends on the size of the injury. A hematoma of the spleen does not bleed into the abdomen at first but may rupture and bleed in the first few days after injury, although rupture sometimes does not occur for weeks or months. An injured or ruptured spleen can make the abdomen painful and tender. Blood in the abdomen acts as an irritant and causes pain. The pain is in the left side of the abdomen just below the rib cage. Sometimes the pain is felt in the left shoulder. The abdominal muscles contract reflexively and feel rigid. If enough blood leaks out, blood pressure falls and people feel light-headed, have blurred vision and confusion, and lose consciousness (faint). Doctors usually do ultrasonography or computed tomography (CT) of the abdomen if they suspect an injury to the spleen. Rarely, if doctors suspect a severe hemorrhage, surgery is done immediately to make a diagnosis and control the bleeding. People with severe bleeding also are given intravenous fluids and sometimes blood transfusions.

***Corresponding author: Ashwani Kumar Bansal,**
Department of Surgery, Jeevan Jyoti Hospital, Allahabad, U.P. India.

Doctors used to always remove a damaged spleen. However, removing the spleen can cause later problems, including an increased susceptibility to infections. Doctors now realize that most small and moderate-sized injuries to the spleen can heal without surgery, although blood transfusions (see Blood Transfusion) are sometimes required and people must be treated in the hospital. When surgery is necessary, usually the entire spleen is removed (splenectomy), but sometimes surgeons are able to repair a small tear. It is a friable and highly vascular organ holding 25% of the body's lymphoid tissue and has both haematological and immunological functions (Cooper and Williamson, 1984; Muhammad and Ahmad, 1988).

In civilian community practice frequency of splenic rupture due to blunt trauma far exceeds than that of penetrating trauma. Road traffic accidents, steering wheel injuries and seat belt are the common implicating causes (Javed *et al.*, 2001; Ayub, 1997). Penetrating injuries of the left thorax should arouse suspicion of splenic injury. In such cases the frequency of associated intra-abdominal injuries are high (Khan, 1999). The splenic salvage operations and non operative treatment for splenic injuries have increasingly been practiced recently. The objective of this study was to estimate the prevalence, severity and mode of splenic trauma and management technique used from amongst the abdominal trauma admitted in Jeevan Jyoti Hospital, Allahabad, and U.P. India.

MATERIALS AND METHODS

This study period was from March 2014 to August 2015 at Department of Surgery, Jeevan Jyoti Hospital, Allahabad, U.P. India. One hundred thirty (130) consecutive patients admitted with abdominal trauma were included in this study. A pre-designed proforma was filled for all the identified information on patient in the study. All patients were received through casualty department where they were assessed and received initial management if their condition was haemodynamically unstable. Routine Investigations included hematological (hemoglobin, Total Leucocyte count, blood grouping & platelet count), biochemical (urea, sugar, serum electrolytes) and radiological (X-ray chest & abdomen) while abdominal ultrasound and CT scan was done on request of the admitting surgical team and subject to their availability.

In some cases where specialized radiological investigation could not be carried out diagnostic peritoneal lavage was carried out. The patients were assessed for a decision to conduct laparotomy. All the patients were given antibiotic cover. At laparotomy the splenic injury encountered was assessed for the extent of injury according to the standard grading system for splenic injury. 4 Cases where splenic salvage was feasible the following strategy was adopted. For Grade I tear, Spongstone gelatin sponge was applied with or without suture on the surface of the wound as a haemostatic agent, for Grade II and III tears deep mattress sutures with chromic 0 or 1 were applied over omentum patch to provide buttress to the splenic tissue. For grade IV and V injury the organ was assessed for splenectomy. Other injuries were also searched and dealt with accordingly. The patients were discharged with postsplenectomy instructions.

The data was collected and analyzed by SPSS 10 version of the statistic software.

RESULTS

130 abdominal trauma patients were followed up in this study. One hundred two patients were male and 28 females (3.6:1). Mean age of abdominal injury cases was 28.56 years (range 18 –55 years). Out of these 126(97.0%) patients underwent exploratory laparotomy while 4(3.0%) were treated conservatively. 101(77.7%) cases were due to penetrating injury while 28(21.5%) sustained blunt injuries. 13 cases out of blunt trauma (46.4%) due to falls from heights and 11 (39.2%) due to road traffic accidents. Splenic injury was noted in 28 (21.5%) patients. Amongst splenic injuries 20 (71.4%) were males and 8 (28.6%) females. Frequency of type of injuries is given in Table 1.

Table 1. Frequency of Injuries amongst Abdominal Trauma

Type of Injury	Over all frequency	Splenic Injury
Penetrating Injury		
Firearm	78 (60.0%)	09(6.9%)
Stab wound	23 (17.7%)	03 (2.3%)
Blunt Trauma	28 (21.5%)	16(12.3%)
Blast	1(0.8%)	-

Table 2 presents the mode of injury in splenic trauma cases. Splenectomy was carried out in 21 patients, 19 for type III & IV and 1 for type II injury. In 7 (26.31%) patients splenorrhaphy was performed for type I, II & III injuries (Figure 1). Comparative post operative complications are given in Table 3.

Table 2. Comparison between modes of injury and operated for splenic injury

Mode of Injury	Splenectomy cases	Splenorrhaphy cases	Total
Blunt abdominal injury	13	03	16 (57.1%)
Penetrating Injury	08	04	12 (42.9%)

Table 3. Complication associated with Splenectomies and splenorrhaphies

Complications	Splenectomy	Splenorrhaphy
Intra abdominal bleed/ collection	02 (14.3%)	Nil
High grade fever	02 (14.3%)	01 (20%)
Wound sepsis (Gross)	03(21.4%)	Nil
Entero- cutaneous Fistula	01(7.1%)	Nil
Total	08 (57.8%)	01 (20%)

The complications were markedly high in splenectomy cases. Table 4 details the evaluation of treatment in splenorrhaphy cases.

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 (Russel *et al.*, 2004). Same observations are noted in the present study where the mean age of patients with abdominal trauma was 27.26 years and M: F ratio was 3.6:1. Ahmad noted 50% of patients in his study belonging to age group of 12 - 40 years (Ahmad, 1992).

Table 4. Evaluation of Splenic salvage techniques

Salvage procedure on spleen	Severity Type of injury	No.of cases	Outcome
Simple repair with suture	I	1 (14.3%)	Uneventful recovery
Repair with sutures over spongiston	II	1 (14.3%)	Uneventful recovery
Repair with sutures over omental patch	III	3 (42.8%)	One patient developed intra-abdominal infected collection
Partial splenectomy and omental patch	IV	2 (28.6%)	Uneventful recovery

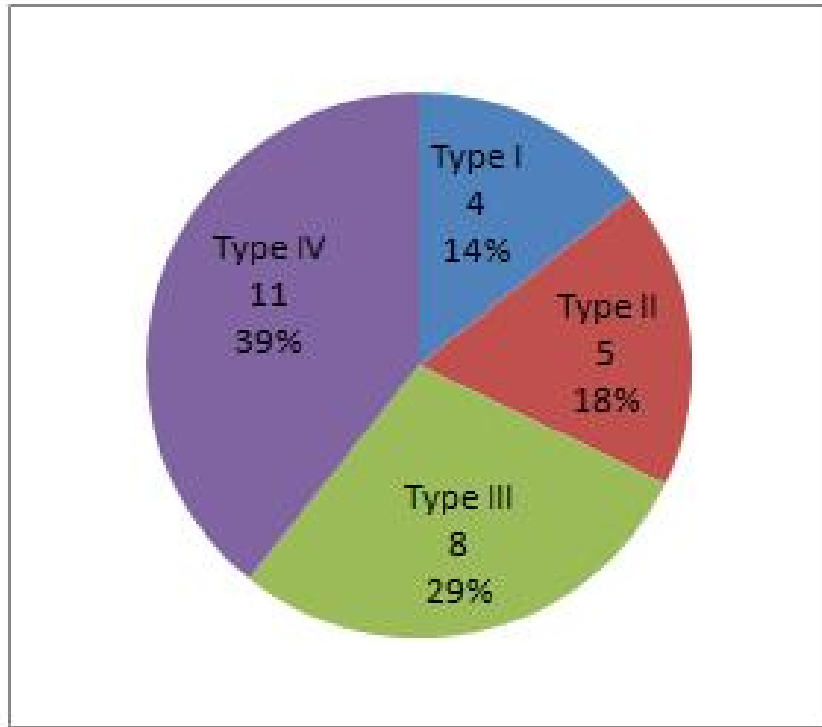


Figure 1. Type of Splenic Injury

In the present study out of one hundred thirty patients the male to female ratio was 3.6:1. While the ratio of splenic injury in male to female was 1.7:1. Almost similar observations were made by Memon *et al.* (Memon *et al.*, 2000). Anjum Fazili *et al.* reported in his study the median age was 34 year, 79% cases were males and 21% were female with a M:F ratio of 3.8:1 (Anjum Fazili and Shabana Nazir, 2001). Blunt trauma is the second commonest mode of abdominal trauma and spleen is the most common intra-abdominal organ injured in blunt abdominal trauma (Targarona and Trias, 1996). Ayub also concluded that blunt abdominal trauma is a common emergency (Ayub, 1997). Normal admission systolic blood pressure is clearly a sign of hemodynamic stability and intuitively a predictor of the success of non-operative management while the need for blood transfusion is a very strong predictor for splenectomy. Splenectomy is usually performed for patients with severe splenic trauma, portal hypertension, splenomegaly due to hematologic diseases, or splenic tumors (Kojouri *et al.*, 2004). In the present study 101(77.7%) cases were due to penetrating injury while 28(21.5%) sustained blunt injuries. 13 cases out of blunt trauma (46.4%) due to falls from heights and 11 (39.2%) due to road traffic accidents approximately same result was reported i.e. blunt abdominal trauma accounted for 25%. A total of 19 patients (19%) were noted with splenic injury and the most common cause of splenic injury was blunt abdominal trauma

i.e 57.89%. Most of the blunt abdominal traumas were secondary to falls from heights (40%) and road traffic accidents (36%). These results are also comparable with those of Arikan (Arikan *et al.*, 2001), Manohar (Manohar *et al.*, 1998) and Powell (Powell *et al.*, 1997). In our study 21(75%) patients underwent splenectomy while 7 (25%) patients underwent splenorrhaphy. While a study conducted by K.K. Tan reported that In the operative management group (n = 11, 26.2%), seven patients underwent splenectomy while four had splenorrhaphy. In the non operative group (n = 31, 73.8%), none required eventual surgery though three underwent angio-embolisation for their splenic injuries, and all three procedures were successful without any complication (Tan *et al.*, 2010).

In the present study type III splenic injury was most frequent i.e 7 patients (36.84%), type IV accounted for 6 patients (31.57%). Type I & II injuries were noticed for 3 patients (15.78%). Almost similar results were observed by Goan (Goan *et al.*, 1998). Where type III was documented as the most frequent one by Carlin (Carlin *et al.*, 2002). K. K. Tan reported that Majority of the patients had either grade III (n = 14, 33.3%) or grade IV (n = 13, 31.0%) splenic injuries. There was one (2.4%) patient who had grade V injury who underwent immediate surgery, while another fourteen (33.3%) patients had grade I and II injuries (Tan *et al.*, 2010). Complication such as Intra abdominal bleed/ collection found

in 14.3%, high grade fever in 14.3%, wound sepsis (Gross) in 21.4% and entero-cutaneous fistula in 7.1% found in splenectomy while in splenorraphy complication found in term of high grade fever in 20%, this showed that splenorraphy is less complicated than splenectomy (20% vs 57.8%). Approximately same result was reported by Tariq Saeed Mufti (Tariq Saeed Mufti *et al.*, 2007). While Robert *et al.* reported overall complication associated with splenectomy and splenorraphy was 17% vs 0% (Roberto Cirocchi *et al.*, 2014). This study attempts to follow their guidelines to some extent. In recent years the policy of spleen's conservation at operation has been established due to its important role in cellular and humoral immunity and the danger of overwhelming sepsis in asplenic patients (David *et al.*, 1997). Consequently operative techniques for splenic preservation have been developed and concept for non-operative management of selected splenic injuries is evolving (Gaunt *et al.*, 1999; Barone *et al.*, 1999).

Conclusion

In this study the commonest cause of splenic injury was blunt abdominal trauma and most of the splenic injuries were Grade III & IV. Splenectomy was performed in majority of the cases. Results of splenorraphy were encouraging. Splenorraphy should be considered in all the splenic injury cases at the time of laparotomy.

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