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Original Research Article

A Clinico-Etiological Profile of Spleen Injuries in a Tertiary Care Hospital

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Abstract

Background: Most splenic injuries result from motor vehicle accidents. Despite being shielded by the bony ribcage, the spleen continues to be the organ most frequently injured in cases of blunt abdominal injuries. It occurs in almost all age groups. The current study aimed to assess the prevalence, etiology of blunt abdominal trauma, clinical manifestations, mortality, and morbidity in all the cases of trauma spleen reporting to our tertiary care teaching Hospital in south India.

Methods: Successive cases with suspected spleen injuries were initially admitted to the casualty Department. The abdomen is specifically examined, paying particular attention to discomfort, guarding, stiffness, and bowel sounds. Every time a blunt injury occurs, a plain X-ray of the chest, abdomen, and, if necessary, other body areas, is obtained. An ultrasound with 3.5 Mhz curvilinear transducers while the patient is supine to do an emergency ultrasound of the abdomen and pelvic cavities.

Results: The age range of the cases in the study was 19 – 59 years the mean age of the study group was 33.5 ± 8.5 years. The most commonly involved age group was 21 – 30 years with 40.9% of cases followed by 31 – 40 years with 31.81% of all cases. Grade I spleen injuries were found in 36.36% of cases, Grade II spleen injury was found in 45.45% of cases, grade III injuries occurred in 13.63% of cases and grade IV was in 4.5% of cases No case of grade V spleen injury was found in this study. In the present study n=13 cases were managed by surgical methods and n=9 cases were managed by conservative methods.

Conclusion: Road traffic accidents were shown to be the most frequent cause of splenic injuries. The majority of splenic injuries occurred in young cases between the ages of 20 and 30. Early diagnosis depends on a thorough physical examination. Physical examinations are complemented by investigation reports. Early hospitalization, improved diagnostic techniques, optimal surgical timing, the availability of blood transfusions, closed clinical surveillance, and nursing care all have a significant role in lowering death rates following acute splenic injuries.

Keywords: Spleen Injuries, Management, Blunt Abdominal Injuries, Road Traffic Accidents.

Introduction

Surgeons working in trauma care are familiar with the concept of an injured spleen. Most people with splenic injuries now undergo rehabilitation and non-operative management. This transition from surgical to non-surgical treatment over the past few decades is a great example of how clinical judgment and logic have trumped conventional surgical approaches. The opening of the airway, breathing, and circulation should be prioritized in the emergency department. The key factor is a thorough history. It is crucial to determine whether a motor vehicle collision had fast deceleration, whether the patient was wearing a restraint device, and what kind of restraint was used. The most prevalent physical examination findings are peritonitis and hypotension. Signs of peritonitis, guarding, stiffness, and rebound tenderness may be felt on palpation. [1] The most frequent Diagnostic Peritoneal Lavage (DPL) results in situations of substantial splenic damage is either the return of gross blood or the presence of more than 1,00,000/mm^3 red blood cells. According to reports, DPL's specificity varies from 87% to 99%, while its sensitivity ranges from 82% to 96% for diagnosing serious intra-abdominal damage. [2] Furthermore, issues associated with DPL have a frequency of around 2.5%. [3, 4] FAST carries absolutely no risk of problems, and its use does not restrict the use of CT scanning thereafter. According to various estimates, FAST's sensitivity ranges from 42% to 93%, while its specificity varies between 90% and 98%. [5] When splenic damage is suspected in any hemodynamically stable patient, CT scanning is the diagnostic imaging technique of choice. Both FAST and DPL fall short of CT scanning's sensitivity and specificity (which are close to 100% and 98%, respectively) in identifying substantial intra-abdominal injuries and establishing the necessity for surgery. The American Association for the Surgery of Trauma's Organ Injury Scaling Committee (OISC) provides a standardized and consistent nomenclature for reporting reasons in addition to stratifying the severity of splenic injuries and deciding appropriate therapy. [6] There are five stages of splenic damage according to this grading system, which considers both CT results and intraoperative evaluation of the injured spleen. [1] However, the degree of the splenic damage determines if nonoperative therapy is necessary and, if not, whether splenorrhaphy or splenectomy will be the better surgical option. Younger, healthier patients with lower-grade splenic injuries and fewer comorbidities and associated injuries are typically treated nonoperatively or with splenic repair, while unstable, actively bleeding patients with more severe splenic trauma and/or numerous associated injuries need splenectomy.

Material and Methods

This prospective study was conducted in the Department of General Surgery, Prathima Institute of Medical Sciences, Naganoor, Karimnagar, Telangana State. Institutional Ethical approval was obtained for the study. Written consent was obtained from all the cases in the study after explaining the nature of the study in the vernacular language. Successive cases with suspected spleen injuries were initially admitted to the casualty Department, where general surgery was performed on each patient to determine their need for urgent medical attention. once stabilizing the airway, breathing, blood is collected and sent for blood grouping and type, crossmatching, urea and sugar, and hemoglobin percentage testing once an intravenous line is set up. For resuscitation, Ringer's lactate is initially administered. If the patient is not improving after receiving the initial crystalloids, depending on the severity of the damage, compatible whole blood transfusions from our blood bank are administered. A brief history of the

incident is obtained, including the location, size, shape, and nature of the wounds as well as the date and time of the injury, the mechanism of the damage, and the symptoms, with particular emphasis on abdominal discomfort, vomiting, and distension. The abdomen is specifically examined, paying particular attention to discomfort, guarding, stiffness, and bowel sounds. Every time a blunt injury occurs, a plain X-ray of the chest, abdomen, and, if necessary, other body areas, is obtained. An ultrasound with 3.5 Mhz curvilinear transducers while the patient is supine to do an emergency ultrasound of the abdomen and pelvic cavities. Unstable patients are not subjected to ultrasonography. For stable patients, who do not have a free peritoneal tap, and are intended to be handled non-operatively, a computed tomography (CT) scan of the abdomen is performed. Intercostal drainage tubes are inserted in the 4th or 5th intercostal spaces in the midaxillary line using a 32F or 28F intercostal drainage tube underwater seal kit while the patient is under local anesthesia and the strict aseptic guidelines if the patient has a chest injury with or without fractured ribs. The concerned specialists at our facility take care of any other injuries that may be present. A CT scan of the abdomen and pelvis is performed on n=15 stable patients, who have no free diagnostic peritoneal taps, and have little to no free fluid on ultrasound. These patients are graded according to the American Association for the Surgery of Trauma's Splenic Injury Scale (1994 revision) and are managed nonoperatively by continuous monitoring. [6] Two of these patients undergo surgery as a result of a deterioration in their condition and contrast blush on the CT scan. After a sufficient period of resuscitation, the remaining patients are scheduled for surgery (splenectomy). Endotracheal intubation is used during general anesthesia for all patients.

Results

A total of n=22 cases were included during the study period. Out of the total cases, n=16 were males and n=6 were females. The age range of the cases in the study was 19 – 59 years the mean age of the study group was 33.5 ± 8.5 years. The most commonly involved age group was 21 – 30 years with 40.9% of cases followed by 31 – 40 years with 31.81% of all cases. The age-wise and sex-wise distribution of the cases in the study has been depicted in Table 1.

Table 1: Demographic profile of the cases included in the study.

Age group	Male	Female	Total	Percentage
18 – 20	1	0	1	4.54
21 – 30	7	2	9	40.90
31 – 40	5	2	7	31.81
41 – 50	2	1	3	13.63
51 – 60	1	1	2	9.09
Total	16	6	22	100

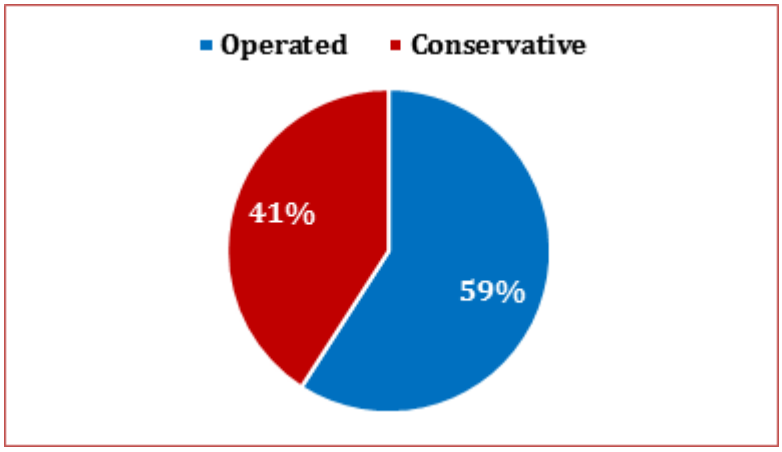

Figure 1: Showing the management of cases in the study.

In the present study n=13 cases were managed by surgical methods and n=9 cases were managed by conservative methods depicted in Figure 1. The interval between the injury and admission ranged from 30 minutes to 72 hours, and the patient who sustained the injury 72 hours after it occurred could not exactly recall the circumstance of the accident. It is evident that 12/22 individuals, or 54.54%, presented within 8 hours after the injury. The mode of injury is depicted in Figure 2. In the study we found n=13/22(59.09%) cases of injuries were due to road traffic accidents followed by falls from height in n=4/22(18.18%) the other cases included in the study were injuries due to falls of heavy objects and the animal attack occurred in rural residents.

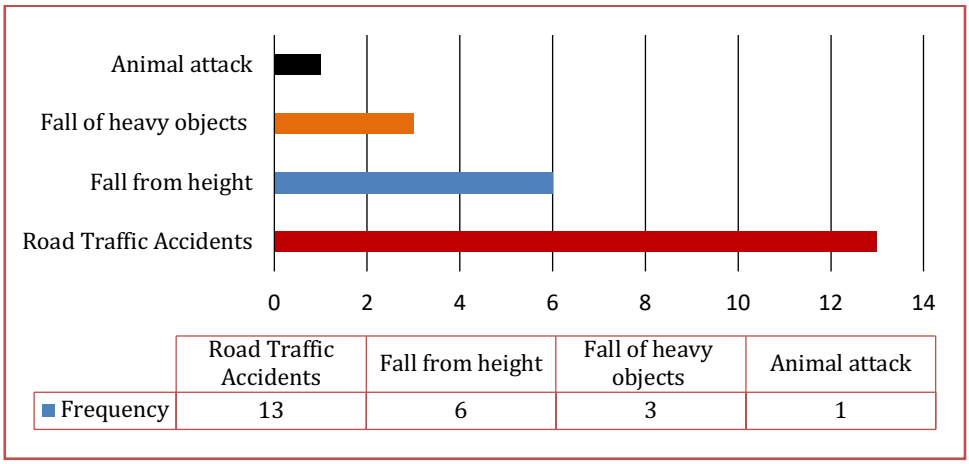

Figure 2: Mode of injury in the cases of the study.

Out of n=22 cases we had associated injuries in 10/22(45.45%) cases among these associated injuries fracture of ribs was most common followed by head injuries (table 2). The associated bony injuries and head injuries were managed by orthopedician and neurosurgeons respectively. N=4 cases had lacerations of the skin which were sutured under aseptic conditions at the time of admission. N=2 cases had hemothorax which was confirmed with an intercoastal drainage tube inserted at the time of admission.

Table 2: Associated injuries in the cases of the study

Associated injuries	Frequency	Percentage
Head Injuries	3	13.63
Fracture of ribs	4	18.18
Fracture of pelvis	1	4.54
Fracture of femur	1	4.545
Fracture of clavicle	1	4.545

The spleen injuries were graded from 1 to 5 in increasing order of severity. Smaller than 10% of the surface area of a hematoma or capsule laceration smaller than 1 cm is considered grade 1. Hematomas 10 to 50% of surface area or a capsule laceration 1 to 3 cm deep are considered to be in grade 2. Hematomas that cover more than 50% of the subcapsular surface area, hematomas that have ruptured or are known to be growing over time, intraparenchymal hematomas that are more than 5 cm or known to be growing, and capsule tears that are more than 3 cm deep and/or involve trabecular blood vessels are all classified as grade 3. If there is partial devascularization is more than 25% or if there is a laceration affecting a segmental blood artery, it is grade 4. A detached spleen or a completely devascularized spleen are both considered grade 5 the percentage and distribution are given in Table 3.

Table 3: Grading of spleen injuries in the cases of the study.

Grading	Frequency	Percentage
Grade I	8	36.36
Grade II	10	45.45
Grade III	3	13.63
Grade IV	1	4.545
Grade V	0	00.00

Among all the cases the most commonly reported symptom was abdominal pain followed by abdominal distension. Similarly, in the signs, the presence of tachycardia and hypotension was commonly found in the cases. The other signs and symptoms have been given in Table 4.

Table 4: Signs and symptoms reported in the cases of the study.

Signs and Symptoms	Frequency	Percentage
Abdominal Pain	18	81.81
Abdominal Distension	13	59.09
Guarding and rigidity	13	59.09
Abdominal tenderness	11	50.00
Pallor	12	54.54
tachycardia	14	63.63
Hypotension	14	63.63
Absent bowel sounds	09	40.90

In all n=22 patients, an abdominal plain x-ray was taken. In just n=3 cases, gas under the diaphragm was found. Laparotomy revealed n=2 bowel perforations. The other findings seen on the erect abdomen x-ray are displayed in the following table 5. Similarly, n=16/22(72.72%) cases underwent four quadrant aspirations out of

which 37.5% were positive and 62.5% were negative aspirations shown in Table 5.

Table 5: Investigations and findings in the cases of the study

Investigation	**Frequency**	**Percentage**
X-ray Abdomen (n=22)		
Gas under diaphragm	3	13.63
Ground glass appearance	2	9.09
Dilated loops	2	9.09
No Abnormality	15	68.18
Four Quadrant Aspiration (n=16)		
Positive	6	37.5
Negative	10	62.5

In this study, n=5/13 operated cases resulted in complications out of which wound dehiscence and infection were found in n=2 cases which were managed adequately. N=1 case was post-splenectomy infection (OPSI) and respiratory complications occurred in n=2 cases.

Discussion

In our study, the most significant cause of splenic damage to the abdomen is a motor vehicle accident. Because those participating in RTA are in their most active and productive stage of life, this has much greater relevance. In the Western world, accidents are the leading cause of mortality for persons ages 1 to 34. Prevention is preferable to treatment. A 10% increase in speed results in a 40% increase in the likelihood of motor vehicle passenger fatalities. For front passengers, wearing a seatbelt cuts their risk of death or serious injury by 45%. The current study's patients ranged in age from 19 to 59 years. The research group's average age was 33.5 ± 8.5 years. The age range with the highest percentage of cases (40.9%) was 21 to 30 years, followed by 31 to 40 years (31.81%). This information is consistent with the findings of Wilson and Loris, who discovered the biggest proportion of patients in the 20–40 year age range. Shackford et al., [7] discovered patients between 4 and 82 years, with a mean age of 27.5 years, while Akio et al., [8] found patients between 6 and 80 years, with a mean age of 33 years. In the study by Ahmed H et al., [9] the incidence was 40% and the mean age of presentation was 15–25 years. In the Cocanour et al., [10] study, 90% of patients are men and 10% are women. Spleen damage affects men more than women. Males significantly outnumbered females in Ahmed H et al., [9] study, with the ratios being 86.66% for men and 13.33% for women. Elmo JC et al., [11] found a male-to-female incidence ratio of 84.98% to 15.01%. According to Fuchs et al., [12] there are 80% men and 20% women in each group. Akio et al., [8] determined the incidence to be 81.91% and 18.8%, respectively for males and females. In our study, the lapse duration ranged from 30 minutes to 72 hours. It is evident that 12/22 individuals, or 54.54%, presented within 8 hours after the injury. Patients who arrived within 2 hours of their appointment had positive outcomes (P 0.01). Higher complication rates were seen in individuals who presented later (>24 h). In the present study n=13/22(59.09%) cases were managed by surgical methods and n=9(40.90%) cases were managed by conservative methods. Among the cases, n=2 cases were initially managed nonoperatively and then converted to operative management after 12 hours. 10/13(76.92%) cases were taken to laparotomy within 8 hours and one patient was taken for laparotomy within

one hour. The duration of the period from arrival to the operative procedure was utilized for resuscitation and investigations and to provide hemodynamic stability to cases. In the study, we observed that 13/22 (59.09%) of the injury cases were caused by traffic accidents, followed by falls from height in n=4/22 (18.18%) of the cases. The other cases included in the study were injuries caused by heavy item falls and animal attacks that happened to inhabitants of rural areas. These findings correlate with other similar studies where they found the common cause of injuries due to RTA and other related injuries. [13-15] In the current the other associated injuries have been given in Table 2. Allen et al., [16] studied patients who had had severe abdominal trauma and discovered other injuries to the abdomen including thoracic damage 6.1%, skeletal injury 58.9%, craniocerebral injury 47.2%, and spinal injury 2.2%. In their study of 919 patients who had suffered severe abdominal trauma between 1979 and 1983, McLellan et al., [17] discovered that 31% of cases also had head damage (81%), thoracic injury (59%), pelvic fracture (22%), and spinal cord injury (4%). It's Akio et al., [8] 20% of the patients in the polytrauma group had numerous abdominal injuries, whereas 80% of the patients had mixed injuries (craniocerebral and locomotor system trauma). The signs and symptoms of the patients in the study are given in Table 4. The pain was observed in 91.4% of patients by Tripathi et al., [18] In Ahmed et al., [9] research, (10%) of cases reported experiencing vomiting. Diagnostic peritoneal tap was performed in n=16 cases out of which it was found positive in n=6 cases and negative in n=10 cases. The quantity of fluid aspirated was considered to be positive tap. A negative tap was one in which no aspirate was obtained. In every case, blood in the peritoneal cavity was found during laparotomy. The splenic injuries ranged from a significant intraparenchymal laceration to a big subcapsular hematoma grading of the spleen injuries given in Table 3. In the study by Ahmed et al., 36.66% had surgery and all surgeries involve splenectomy. [9] Brasel et al., [13] in 69 of 164 patients, and Khanna et al., [18] in 5 of 19 splenic trauma patients. Following septicemia, one patient passed away from acute respiratory distress syndrome. Subdural bleeding caused the death of one patient. Non-operative treatment did not result in the death of any of our patients.

Conclusion

Road traffic accidents were shown to be the most frequent cause of splenic injuries. The majority of splenic injuries occurred in young cases between the ages of 20 and 30. Early diagnosis depends on a thorough physical examination. Physical examinations are complemented by investigation reports. Early hospitalization, improved diagnostic techniques, optimal surgical timing, the availability of blood transfusions, closed clinical surveillance, and nursing care all have a significant role in lowering death rates following acute splenic injuries. Most individuals with blunt splenic injuries can be handled with surgery. The effective therapy of patients with splenic injuries depends heavily on the careful observation of patients receiving conservative care and the availability of rapid surgical surgery, should it be necessary.

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