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AN OBSERVATIONAL STUDY OF MANAGEMENT OF SPLENIC INJURY IN A TERTIARY CARE HOSPITAL

General Surgery

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ABSTRACT

Background: Trauma is the leading cause of death below 50 years of age. Management of blunt abdominal trauma has changed from early surgical intervention to non-operative management due to advents of interventional radiology, endoscopy and minimal access intervention.
Methods: We performed a unicentric, retrospective and prospective study of 20 patients with blunt abdominal trauma with isolated splenic injury from September 2017 to August 2018 at a tertiary level hospital.
Results: Male population of age group 21-30 years was the common. Road traffic accident was the leading etiology. Abdominal pain (85%) and tenderness (100%) were common. 20% patients were operated, 80% managed conservatively. Hemoglobin fall and an increase in abdominal girth are significantly associated (p value = 0.038 S and 0.001 S) with surgical management.
Conclusions: A history, high index of suspicion and advance imaging are necessary to minimise delayed recognition. Patients with hemodynamic stability are candidates for non-operative management.

KEYWORDS

splenic injury, abdominal trauma, Non-operative management

INTRODUCTION

Trauma is a major global health problem. It is the leading cause of death and disability in the first four decades of life so rightly labelled "the neglected disease of modern society". Spleen is at the top of the solid organ list injured in blunt trauma abdomen. Road traffic accidents account for most of the cases of splenic injury. In comparison to blunt abdominal trauma, penetrating trauma can be easily diagnosed because of the presence of the entry wound and exit wound.[1]

A quarter of a century ago, removing an injured spleen was routine surgical practice due to misconceptions such as non-operative management carries a high mortality. The spleen has no function and it is a friable, vascular organ therefore, lacerations cannot be safely sutured.

Focused Assessment with Sonography for Trauma (FAST) has replaced diagnostic peritoneal lavage as diagnostic modality. The best individual predictor of successful observation in patients with blunt splenic injury was the CT-based grading system known as American Association for the Surgery of Trauma – Organ Injury Scale (AAST-OIS). Multi-detector CT (MDCT) grade and abbreviated injury scale score were the best combination of variables for selection of patients for observation versus splenic intervention. In hemodynamically stable patients with intra-abdominal fluid detected with FAST, MDCT scanning with intravenous contrast is now the gold standard diagnostic modality.[2]

Table 1: MDCT Severity grading of splenic injury as per AAST-OIS

Grade	Type	Injury Description
I	Hematoma	Subcapsular, <10% surface area
	Laceration	Capsular, <1cm parenchymal depth
II	Hematoma	Subcapsular, 10-50% surface area; intraparenchymal, <5cm in Diameter
	Laceration	Capsular, 1-3cm parenchymal depth that does not involve a trabecular vessel
III	Hematoma	Subcapsular; >50% surface area or expanding; ruptured subcapsular or parenchymal hematoma; intraparenchymal hematoma >5cm or expanding
	Laceration	>3cm parenchymal depth or involving trabecular vessels
IV	Laceration	Laceration involving segmental or hilar vessels producing major devascularisation (>25% of spleen)
V	Laceration	Completely shattered spleen
	Vascular	Hilar vascular injury that devascularizes spleen

NOM (Non Operative Management) of blunt injury to the spleen in adults has become the standard means of management in hemodynamically stable patients. NOM of splenic injury includes observation or angiography and embolization. It has been increased because of the progress made in the quality and availability of the MDCT scan and the development of minimally invasive intervention. Open splenectomy is still the proper choice of treatment especially if there are multiple sites of bleeding , those 55 years of age, risk of re-bleed. After the initial 24 hours, no additional interventions are warranted for patients with Grade I injuries. For Grade II to V, close observation as an inpatient or outpatient is indicated for 10 to 14 days. Delayed splenic haemorrhage after non operative management of blunt splenic injury is a feared complication, particularly in the outpatient setting.[3]

METHODS

The study was a prospective and retrospective observational study of 20 cases of abdominal trauma presenting with isolated splenic injury in a tertiary teaching institute from September 2017 to August 2018. Adults suffering a blunt abdominal trauma with radiological diagnosis of splenic trauma were included in the study. The exclusion criteria were pregnant females, patients with age less than 18 years, cases of iatrogenic splenic injury, penetrating abdominal trauma and ruptured splenic abscess.

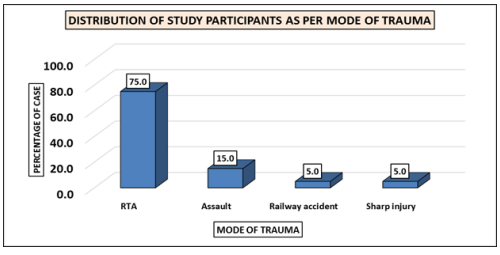
Cases were identified as evident by the clinical presentation and imaging. After thorough screening on the basis of inclusion and exclusion criteria proper informed consent was obtained. Each patient was subjected to a detailed history and thorough clinical examination. Simultaneously resuscitative measures were started. Patients were kept nil by mouth. At the same time for the patients in hypovolemic shock; oxygen was administered, a central venous catheter and urinary catheterization was done. Blood was sent for baseline investigations along with blood grouping and cross matching. Serial investigations for hemoglobin, platelets and increase in abdominal girth were monitored.

Once the patient was stabilized, ultrasound examination of abdomen (FAST) was carried out, followed by MDCT scan of abdomen if required. Further management was planned depending on the condition of the patient and grade of spleen injury. Some were conserved, some operated and while some had failure of conservation therapy. The findings at laparotomy were noted including amount of hemoperitoneum, extent of splenic injury and status of splenic hilar vessels along with the state of viscera. Post operatively, patients were given intravenous fluids, blood transfusions, antibiotics and analgesics. Drains were removed on 5th post-operative day and suture removal was done after 12 days. For post-operative patients with splenectomy, vaccination was done.

RESULTS

In this study, 20 cases of blunt abdominal trauma causing isolated splenic injury were studied.

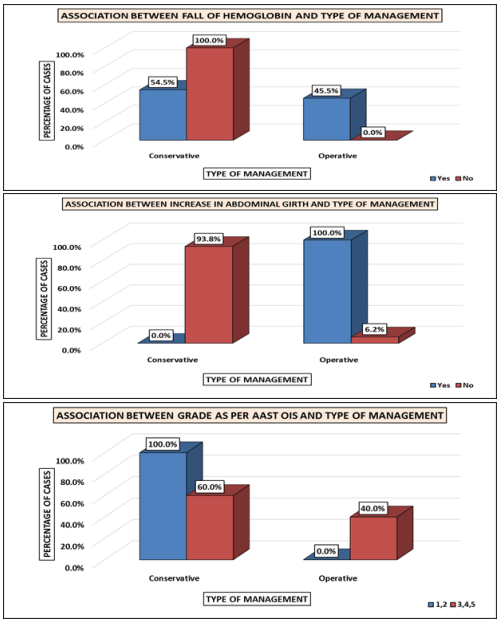
The age distribution was 21-30 years (60%), 31-40 years (15%) and >40 years (25%). Splenic trauma was seen at all ages, predominantly in the prime of life between 21-30 years (60%). There was male preponderance with a male: female ratio of 4:1. The modes of injury were also evaluated road traffic accidents (RTA) (75%), assault (15%), railway accidents (5%), and fall from height (5%). (Fig. 1)



The most common presenting complaint was pain in abdomen (85%). Vomiting (15%) and distension of abdomen (5%) were also seen. Abdominal tenderness was seen in all patients (100 %), guarding in most (70%) and rigidity in few (10%) cases. In accordance to the AAST-OIS grading, grade 3 (35%) was the most common followed by grade 2 (30%). A falling trend of hemoglobin was most commonly seen on serial investigations (55%) while a few demonstrated an increase in abdominal girth (20%).

Hemoglobin fall is significantly associated (p value = 0.038 S) with surgical management. An increase in abdominal girth is a positive predictor for surgical intervention (p value = 0.001 S).

20% patients were directly taken up for surgery, 80% patients were managed conservatively. out of which 1 (5%) patient showed signs of delayed hemorrhage and was operated upon. The most common indications for surgery were fall in hemoglobin accompanied by increase in abdominal girth and hemodynamic instability.



DISCUSSION

Our evaluation of 20 cases of isolated splenic injury helped us to understand and formulate an algorithm of management and also corroborate our findings with the few similar studies performed elsewhere.

The age of patients ranged from 20 to 62 years. Most of the patients (60%) were between 21-30 years. 75% of the patients were between 20-40 yrs. The average age of population in our study was 34 years. The age incidence was shown to be variable in different series, but the results are comparable to findings of *Haan et all* [4] and *Armstrong et all* [5] where the average age was 32, 25 and 37.8 years.

Male preponderance was observed with a male: female ratio of 4: 1. The findings were similar to the results of the study conducted by *Haan et all* [4] and *Armstrong et all* [5] where the ratio was 3: 1. In our study, among 20 patients, the most common mode of injury was RTA (75%). *Armstrong et all*[5] also corroborated the most common mechanism of injury for all patients as road traffic collisions (70.8%). Rapid industrialization and urbanization where priority has been given to speed rather than safety has resulted in increased susceptibility.

Abdominal pain (85%) and abdominal tenderness (100%) was the most common presentation of cases in our study. In *Davis et al* [6] 43% of patients had no specific signs and symptoms of intra-abdominal injury when they presented to the emergency room. 44% of those patients eventually required exploratory laparotomy .This emphasizes the importance of careful and continuing observation and repeated examination of individuals with abdominal trauma. On FAST findings, 35% revealed mild hemoperitoneum, 50% showed moderate and 15% had severe hemoperitoneum. *Peitzman et all* [7] suggested that as an independent variable, degree of hemoperitoneum inversely correlated with the success of NOM; 80.1% of patients with small hemoperitoneum, 50.6% with moderate hemoperitoneum, and 27.4% with large hemoperitoneum were successfully observed. Our study revealed Grade III and Grade II were most common (35 and 30%). This correlated with *Peitzman et all*[7] who had a 27.3% grade II, 22.6% grade III. Grade I and II were conserved in 100% cases. Grade III, IV and V were operated in 40%

In our study 75% patients were conserved. 20% were immediately operated upon. 5% were given a trial of conservation, upon failure were taken for surgery. The main indicators for immediate exploration were hemodynamic instability, fall in serial monitoring of hemoglobin and increase in abdominal girth(p value = 0.038 and p value = 0.001 S respectively). *Peitzman et all*[7] had a successful NOM in 75.0% of patients with grade I injuries, in 70.0% with grade II, in 49.3% with grade III, in 16.9% with grade IV, and in 1.3% with grade V. His study revealed 10.8% failed planned observation and required laparotomy.

The established literature on this topic has suggested that haemodynamic instability, regardless of injury severity, should prompt operative management. All haemodynamically stable patients with all grade injuries were managed conservatively by observation, with only one such patient requiring subsequent intervention by operative management. The average days of hospital stay for the conserved patients is 6 days while that for the operated is 8 days which matched *Cirocchi et all*[8] study.

Observational management can be used successfully for patients with blunt splenic injury who are hemodynamically stable. Poor patient selection has resulted in failure of observational management and risk significant adverse outcomes. The main risk of splenectomy is the onset of OPSI. We feel that a detailed history, timely and accurate imaging and repeated blood investigations can help salvage a traumatized spleen. The current trend to opt a NOM approach is showing a positive outcome but one should not disregard the older teaching where a quick splenectomy is warranted.

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