

Non-operative Management of Blunt Splenic Trauma

Ayesha Mehboob,^{1*} Mazhar Iqbal,¹ Kehkashan Anwar,¹ Gul Mohammed,¹
Malik Mussadiq,¹ Sughra Parveen¹

ABSTRACT

Objective To Find the outcome of non-operative management of blunt splenic trauma in a tertiary care center.

Study design Descriptive case series.

Place & Duration of study Surgical Ward 3 Jinnah Postgraduate Medical Centre Karachi, from July 2016 to July 2019.

Methodology All patients above 12 years of age, of both sexes, with isolated splenic injury due to blunt abdominal trauma, hemodynamically stable were included. On CT scan abdomen grading of splenic injury was done. Patients with polytrauma and those who needed resuscitation were excluded. Patients were monitored in ICU. If hemoglobin was less than 10 gm%, blood was transfused. If patients were hemodynamically unstable or delayed spleen rupture occurred, laparotomy was performed. Results were analyzed by SPSS version 24.

Results There were 25 patients above 12 years of age with 23 (93%) male and 2 (7%) female. Ten (40%) patients were between 12-20 years of age, 14 between 21-40 years (56%) and 1 (4%) was 50 years. Grade of splenic injury in 1 (4%) patient was 1, grade II in 3 (12%), grade III in 11 (44%), grade IV in 10 (40%) and grade V in 1 (4%) patient. Non-operative treatment of splenic trauma was successful in 24/25 (96%) patients. Splenic artery aneurysm was seen in 1 (4%) and delayed rupture of spleen occurred in 1 (4%) patient after 7 days.

Conclusion Non-operative treatment up to grade IV splenic trauma was successful in 96%.

Key words Splenic trauma, Spleen rupture, Splenic injury grade.

INTRODUCTION:

Non-operative management of blunt injury to spleen in adults is becoming standard of care in hemodynamically stable patients. Spleen is commonly injured organ in blunt abdominal trauma for which splenectomy is usually done to save lives specifically from hemorrhagic shock in most centres. Spleen has immune function so the risk of infection, like post

splenectomy sepsis, malaria and pneumonia is common after splenectomy. In recent decade some centres adopted non-operative management of splenic injury and other abdominal organs as well. Non-operative management in children demonstrated good results due to 80-90% and currently most centres consider it as the method of choice for the spleen injuries but there is no practical uniform protocol for this.¹

¹ Department of Surgery Ward 3 JPMC, Karachi.

Correspondence:

Dr. Ayesha Mehboob ^{1*}
Department of Surgery Ward - 3
Jinnah Postgraduate Medical Centre
Karachi
E mail: ayeshamehboob12@gmail.com

Arterial embolization and splenic abscess in non-operative management of splenic trauma had been found and reported even after 8 hours of the injury. It is specific to subcapsular hematoma and treatment is percutaneous drainage by ultrasound or CT scan guidance.² According to the literature, the success rates exceeds 90% with non-operative treatment and the failure rate is often as low as 8%.^{3,4} Complications like pseudoaneurysm of splenic artery and delayed

rupture of spleen are rare in non-operative management cases (around 5%), while pseudocyst is reported in 10%.⁵

Spleen has important role to play like immune function, filtering and capturing of macrophages, cellular and non cellular material from blood and plasma like pneumococcus and other bacteria, red cells etc. After splenectomy septicemia, opportunistic post-splenectomy infection (OPSI) and malaria can be life threatening thus salvage of spleen is important.⁶ In blunt abdominal trauma physical examination for splenic injury and laboratory data are non specific. CT scan in this situation is important.⁷ The objective of this study was to find the outcome of non-operative management of blunt splenic trauma.

METHODOLOGY:

This descriptive study was conducted in Surgical ward of Jinnah Postgraduate Medical Centre Karachi, from July 2016 to July 2019. Patients above 12 years of age, both sexes with blunt abdominal trauma causing isolated splenic injury were included. Patients with stab wounds, gunshot injury and those with polytrauma were excluded. All patients were thoroughly examined in emergency room. Hemoglobin estimation, FAST and other routine investigations were done. In hemodynamically stable patients with FAST positive or suspected splenic injury with history of trauma to upper abdomen grading of splenic injury was done on CT scan as recommended by AAST.

Hemodynamically stable patients were admitted for

monitoring of vital signs and hemoglobin level. Blood was transfused to those whose hemoglobin was less than 10gm/dl. Grading of injury was done on CT scan and if any patient dropped blood pressure and was tachycardiac even after transfusion then non-operative management was converted to open splenectomy. Patients were kept admitted for one week and then discharged. Follow up was advised after 1 and 3 months and CT scan done to note the late complications. Ethical approval was taken. Results were analyzed using SPSS version 24. Descriptive statistics were used to present data.

RESULTS:

A total of 25 patients above 12 years of age from both sexes were managed non-operatively. There were 10 (40%) patients between 12-20 years (40%) of age, 14 between 21-40 years (56%) and one above 50 year. There was male preponderance (n= 23 -92%). This study had only 2 (7%) female patients. Non-operative management was successful in 24 (96%) patients and one (4%) patient became hemodynamically unstable. This patient was operated. At laparotomy grade V spleen injury was found and splenectomy was done. Grades of splenic injury are given in table I. The most common grade was III followed by grade IV. Complications of non-operative management are shown in table II.

DISCUSSION:

Non-operative management is treatment of choice for splenic trauma with success rate of 90%.⁸ In the past splenectomy had been standard treatment for spleen rupture. The importance of spleen in immunity and risk of infection led in recent decade to

Grade of Splenic Injury	Number of Patients (n)	Percentage (%)
Grade I	02	8%
Grade II	02	8%
Grade III	11	44%
Grade IV	10	40%
Grade V	01	4%
Total	25	100%

Complications	Number of Patients (n)	Percentage (%)
Subcapsular abscess	00	0%
Aneurysm of splenic artery	01	4%
Delayed rupture	01	4%

conservative management of splenic trauma but still there is no uniform protocol. Success rate is high in properly selected patients for non-operative management as noted in this study as well.⁹

Non-operative management should be done if patient has stable hemoglobin level over 12-48 hours, minimal transfusion requirement - 2 units or less, CT scan injury scale Grade I or II without bleeding. Patients younger than 55 years if have other significant injury then surgery should be taken in consideration.¹⁰ Patients on antiplatelet drugs are clinically considered to have increased risk but still not confirmed in surgical literature.¹¹ Any attempt to salvage the spleen should be abandoned in face of ongoing hemorrhage or life threatening condition.¹² Current practice favor selective angiographic embolization over immediate splenectomy.

Non-operative management was done in this study and the outcome was satisfactory. Distribution of splenic injury grade in our study showed grade I/II in 16%, Grade III in 44% and Grade IV in 40%. Splenectomy was required in only one patient. He had grade V injury. Same were the observations in another study where grade I/II were 16%, grade III 44% and Grade IV 40%.¹² Of the total 96% patients were successfully managed non-operatively and the mortality rate was nil in our study.

The management of blunt splenic trauma involved strategies that avoid splenectomy. There is growing adoption of interventional radiology technique with evidence of reduction in splenectomy.¹³ Non-operative angioembolization is also proving a good approach. Several studies analyzed morbidity related to non-operative management.¹⁴ Mortality rate range from 3.7% -28.5%. Morbidity includes re-bleeding, splenic infarction, splenic abscess, acute renal insufficiency, and pseudocyst formation. The rate for minor complications is 23% - 61%. This include pleural effusion and partial splenic infarction.¹⁵ The rate of splenic complication in blunt splenic trauma is reported as 0% - 7.5%.¹⁶ Spleen rupture usually occurred between 4 to 10 days and patients who are readmitted the splenectomy rate in them is 1.4%.¹⁷ In this study delayed rupture occurred in one patient and minor aneurysm of splenic artery was noted in another. Non-operative management in more than 55 years of age is not recommended in literature.

Non-operative management of splenic trauma cannot be possible at every centre because all hospitals must be equipped with CT scan with provision of ICU care and availability of trauma surgeon 24 hours a day to deal with the delayed rupture of spleen.

CT scan with IV contrast is a good investigation for vitally stable patients. Doppler ultrasound and contrast enhanced ultrasound is beneficial to diagnose splenic vascularization, extended FAST is effective for delayed rupture of spleen and in follow up.¹⁹ Doppler ultrasound is helpful in diagnosing pseudoaneurysm blush as shown in CT scan.²⁰ Active contrast extravasation shows active hemorrhage. The contrast blush is an important predictor of failure of non-operative treatment. Hemoperitoneum is not a contraindication for non-operative treatment.

The limitation of study was small sample size. A study with large sample size and multicenter involvement may provide an evidence based data for non-operative treatment of splenic injury patients.

CONCLUSIONS:

Non-operative treatment of blunt splenic trauma was successful in 96% patients. This approach may be adopted in centers where ICU monitoring, CT scan and trauma surgeon facility is available.

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Received for publication: 21-08-2019

Accepted after revision: 30-09-2019

Author's Contributions:

Ayesha Mehboob: Data collection, data analysis.
 Mazhar Iqbal: Manuscript writing and data collection,
 Kehkashan Anwar: Data collection.
 Gul Mohammed: Data collection.
 Malik Mussadiq: Data collection.
 Sughra Parveen: Discussion section.

Conflict of Interest:

The authors declare that they have no conflict of interest.

Source of Funding: None

How to cite this article:

Mehboob A, Iqbal M, Anwar K, Mohammad G, Mussadiq M, Perveen S. Non-operative management of blunt splenic trauma. *J Surg Pakistan.* 2019;24(3):136-39. Doi:10.21699/jsp.24.3.7.