pISSN 2349-3305 | eISSN 2349-2902

Original Research Article

DOI: http://dx.doi.org/10.18203/2349-2902.isj20164455

Non-operative treatment of splenic injury in patients with blunt abdominal trauma

Munir Ahmad Wani, Mudassar Shah*, Ajaz Ahmad Malik

Department of General Surgery, Sher-I-Kashmir Institute of Medical Sciences, Soura, Srinagar, Jammu & Kashmir, India

Received: 20 September 2016 **Accepted:** 20 October 2016

*Correspondence:

Dr. Mudassar Shah,

E-mail: mudasir.shah@rediffmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Few decades back splenectomy was the sole treatment for splenic injury. But with the recognition of OPSI and mortality related to it, attempts have been made to preserve the spleen whenever possible. Patients with blunt abdominal trauma and splenic injury can be treated non-operatively in selected cases.

Methods: One hundred (100) patients of blunt abdominal trauma with splenic injuries were treated non-operatively between 2013 and 2015. Patients were between 18 and 60 years of age and 95 were males. Patients having signs of peritonism or free intraperitoneal fluid on FAST were subjected to contrast CT abdomen. Patients having life threatening extra-abdominal injuries were excluded from the study. Similarly, patients having Grade V splenic injury, pneumoperitoneum or contrast extravasation were operated and hence excluded from study. The patients were monitored, transfused blood when necessary and discharged when stable enough.

Results: We had 20 Grade I, 26 Grade II, 44 Grade III and 10 Grade IV splenic injuries. Associated thoracic injuries were seen in 20 patients, orthopaedic injuries in 13 patients, head/maxillofacial injuries in 4 patients and other abdominal injuries in 22 patients. The hospital stay was between 5 and 20 days. 23 patients needed blood transfusion. There was no operative intervention and no mortality in 100 patients.

Conclusions: Patients with splenic injury who are haemodynamically stable can be effectively managed non-operatively under meticulous monitoring and ever readiness for operative intervention if need arises. Saving spleen saves the patient from laparotomy and some life threatening infections.

Keywords: Abdomen, Laparotomy, Male, Spleen

INTRODUCTION

Few decades ago most of the patients with splenic injury were treated by splenectomy. However, the approach has changed with the recognition of a lifelong risk of infections following splenectomy. Overwhelming post splenectomy infections (OPSI) occurs after splenectomy for trauma in 0.5-2.5% of cases. ¹⁻³ The mortality for this condition may be over 50%. ^{4,5} Nonsurgical management is preferred for splenic injuries in patients who are hemodynamically stable. ^{6,7} Non-operative management

of splenic injury helps in preservation of splenic immune function to prevent OPSI and the avoidance of immediate and late complications associated with laparotomy. 8,9

There are certain concerns associated with non-operative management like delayed rupture of the spleen and the possibility of overlooking other intra-abdominal injuries. The true incidence of delayed rupture is probably 1-2%. ¹⁰ Up to 30 per cent of severely injured patients with splenic damage may have additional intra-abdominal injuries. ¹¹ To avoid the risk of missing these intra-abdominal

injuries some trauma centres advocate early laparotomy with splenic conservation, because splenorrhaphy can be successful in over 50 per cent of cases. ¹²

Study has a series of 100 patients who were admitted in our department with splenic injury due to blunt abdominal trauma and were managed conservatively.

METHODS

A prospective study on 100 patients who were admitted in our department with blunt abdominal trauma and splenic injury between 2013 and 2015. Only those patients were included in the study that were haemodynamically stable, had no other life threatening injuries and were intended to be managed non-operatively. Patients with penetrating abdominal trauma were also excluded from the study. Non-operative management was defined as intentional observation of a proved splenic injury.

Initial management of patients was done in emergency department which included particular attention to airway, breathing and circulation. Complete physical examination was done to assess the nature and extent of injury. After initial stabilisation and depending upon the nature and extent of injury, the patients were subjected to investigations like CT head, spine or thorax, FAST, chest and abdominal x-rays.

Those patients having severe head, spinal or thoracic injury which needed surgical intervention were excluded from study straightway. Those patients who required only intercostal drainage for haemothorax were included in the study. Patients having free intraperitoneal fluid on FAST or signs of peritonism were subjected to contrast CT of abdomen.

Once the splenic injury was confirmed on CT in the first instance, further plan of action was taken depending upon associated CT findings. The patients were taken for surgical exploration if any of the following was present.

- Shattered spleen or Grade V splenic injury
- Contrast extravasation
- Gut perforation
- Severe injury to any other viscera that needed surgical intervention

Those patients with splenic injury who did not have any of the above findings and those who remained haemodynamically stable were kept for non-operative management. The patients were monitored with regular check on vitals, abdominal examination and input-output monitoring. Daily haematocrit was done. Blood was transfused when required. Ultrasound scans of abdomen were done to check the status of organ injury and intraperitoneal fluid. Oral feeds were started once patient had passed flatus and there were good bowel sounds. The patients were discharged depending on Grade of injury

and patient status. The patients were advised complete bed rest for duration depending upon the grade of injury. They were followed up after 1 week, 1 month and at 6 months afterwards on outdoor basis.

RESULTS

Patient ages ranged between 18 to 60 years with mean age of 24.6 years. Ninety-five (95%) patients were male. Mode of trauma was motor vehicular accident in 35, motor-cycle accidents in 40, vehicle-pedestrian accidents in 3, sports related accidents in 2, fall from height in 17 and physical assault in 3 patients. Ninety (90%) patients reported to hospital within 24 hours of injury. Twelve (12%) patients arrived with a systolic blood pressure of less than 100 mm Hg. In each case normal blood pressure was restored with minimum crystalloid fluid administration.

In all the 100 patients, splenic injury was confirmed by contrast CT abdomen. There were twenty (20%) Grade I, twenty-six (26%) Grade II, forty-four (44%) Grade III and ten (10%) Grade IV injuries. The associated injuries are depicted in the Table 1.

Total hospital stay ranged from 5 and 20 days, more for higher grade of injury and associated injuries. Blood transfusion was required in 23 patients, one unit in 16 patients, two units in 5 patients and 2 patients' required three transfusions. There was no mortality in our series and no patient required operative surgery. There was one case of perisplenic abcess formation in the follow up period which was managed by percutaneous drainage. There was no evidence of delayed haemorrhage, splenic cyst formation, splenic infarction or complications related to missed abdominal injury in patients who followed up.

Associated injuries	No. of patients
Thoracic	20
Lung contusions	05
Haemothorax	17
Orthopaedic	13
Long bone fractures	10
Pelvic fractures	03
Vertebral fractures	01
Head/maxillofacial	04
Abdominal	22
Liver	08
Renal	11
Adrenal	02
Pancreatic	01

DISCUSSION

Since the recognition of OPSI and its associated mortality, there have been attempts for preserving spleen following splenic trauma. The non-operative approach of managing a splenic trauma patient was introduced in 1968 by Simpson et al in paediatric age group.¹³ The

chance finding at autopsy of a completely transacted yet healed spleen in a child who was thought to have injured his spleen sometime previously implied that major splenic injury could be well tolerated. Other reasons children were first chosen for non-operative treatment were because most of the time spleen is the sole organ injured in abdominal trauma in children and delayed splenic rupture is rare in paediatric age groups. It has also been suggested that non-operative treatment is more likely to be successful in children due to more functional smooth muscle and elastin in the splenic capsule and parenchymal vessels and a higher capsular to parenchyma ratio. ^{14,15}

The enthusiasm for non-operative management of splenic injury has further increased owing to improvements in radiological imaging. Diagnostic peritoneal lavage had been the traditional first line investigation, but has been replaced by abdominal ultrasound and CT scan. Abdominal ultrasound can be performed in the resuscitation room but CT scan usually require transfer to other departments and are therefore only suitable for stable patients. These investigations can detect injuries to the spleen that have not caused intra-peritoneal bleeding; such injuries would not have been detected by diagnostic peritoneal lavage. The majority of such injuries would not be expected to present clinically; a few might however have presented as 'delayed rupture'. As CT scan is more sensitive than ultrasound in assessing splenic injury, higher non-operative management rates for such splenic injuries would be expected. Indeed, non-operative rates of 70 per cent were reported in one series using CT. 16 Another useful use of CT is that it can be used for grading of the injury that might be useful for further decision making. The conservative approach may be extended to pathological spleen.¹⁷ The patients with haemophilia and splenic injury may be treated conservatively. 18

Some people have criticised the method of non-operative management in that splenic salvage is possible in a very small percentage of patients who fail conservative therapy, however it has been contested by other studies. ^{14,19} Others have raised concerns about missing a significant intra-abdominal injury by non-operative approach, however proper investigations and monitoring of the patients may prevent that.

The mode of trauma in most of the patients in our series was road traffic accidents. The patients of splenic injury selected for study were haemodynamically stable and had other intra-abdominal or extra-abdominal injuries that mandated urgent operative intervention, were ruled out. Due to this careful patient selection, planning and management all of our 100 patients were managed conservatively with no one requiring surgical intervention and there was no mortality. Those patients requiring more than one blood transfusion had other associated injuries like long bone fractures.

CONCLUSION

Those patients of splenic injury who are haemodynamically stable can be managed non-operatively provided other life threatening intra-abdominal injuries have been ruled out, there is good institutional support like ICU facilities and round the clock availability of professional who can operate the patient if needed. It is rewarding if spleen is preserved given the morbidity and mortality of exploratory laparotomy and splenectomy.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the

institutional ethics committee

REFERENCES

- 1. Neal BJ, Mcdonald JC. The risk of sepsis in the asplenic adult. Am Surg. 1981;194:775.
- 2. Singer D. Post-splenectomy sepsis. In: Rosenberg HS, Bolander RI? Perspectives in pediatric pathology. First edition. Chicago Year Book, Medical Publishers. 1973:285-311.
- 3. Shaw J H, Print CG. Postsplenectomy sepsis. Br J Surg. 1989;76:1074-81.
- Green JB, Shackford SR, Sise M J. Late septic complications in adults following splenectomy for trauma: a prospective analysis in 144 patients. J Trnunza. 1986;26:999-1004.
- 5. Ellison EC, Fabri IJ. Complications of splenectomy. Surg Clirz North Am. 1983;63:1313.
- Coburn MC, Pfeifer J, DeLuca FG. Nonoperative management of splenic and hepatic trauma in the multiply injured pediatric and adolescent patient. Arch Surg. 1995;130:332-7.
- 7. Lucas CE. Splenic trauma: choice of management. Ann Surg. 1991;213:98-112.
- 8. Willis BK, Deitch EA, Mcdonald JC. The influence of trauma to the spleen on postoperative complications and mortality. J Trauma. 1986;21:1073-7.
- Green JB, Shackford SR, Sise MJ, Fridlund PH. Late septic complications in adults following splenectomy for trauma. J Trauma. 1986;26:999-1004.
- 10. Benjamin CI, Engrav LH, Perry JF. Delayed rupture or delayed diagnosis of rupture of the spleen. Surg Gynaecol Obst. 1976;142:171.
- 11. Fischer RI, Crotchet M, Reed RL. Gastrointestinal disruption: the hazard of nonoperative management in adults with blunt abdominal injury. J Trauma. 1988:28:1445-9.
- 12. Jalovec LM, Boe BS, Wyffels IL. The advantages of early operation with splenorrhaphy versus nonoperative management for the blunt splenic trauma patient. American Surgton. 1993;59(10):698-704.

- 13. Upadhyaya P, Simpson JS. Splenic trauma in children. Surg Gynecol Obstet. 1968;126(4):781-90.
- Malangoni MA, Levine AW, Droege EA. Management of injury to the spleen in adults results of early operation and observation. Ants Surg. 1984;200:702-5.
- 15. Morganstern L, Udeya RY. Nonoperative management of injuries of the spleen in adults. Surg Gyrlawl Obstct. 1983;157:513-8.
- 16. Nelson JB, Bresticker MA, Nahrwold DL. Computed tomography in the initial evaluation of patients with blunt trauma. Trauma. 1992;33:722-7.
- 17. Guth AA, Pachter HL, Jacobowitz GR. Rupture of the pathologic spleen: is there a role for nonoperative therapy? J Trauma. 1996;41:214-8.
- 18. Fort DW, Bernini JC, Johnson A, Cochran CJ, Buchanan GR. Splenic rupture in hemophilia. Am J Pediatr Hematol Oncol. 1994;16(3):255-9.
- 19. Mahon PA, Sutton JE. Nonoperative management of adult splenic injury due to blunt trauma: a warning. Am J Surg. 1985;149(6):716-21.

Cite this article as: Wani MA, Shah M, Malik AA. Non-operative treatment of splenic injury in patients with blunt abdominal trauma. Int Surg J 2017;4:278-81.