Original Research Paper

Volume-9 | Issue-10 | October - 2019 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

General Surgery

A STUDY ON COMPARING OPERATIVE AND NONOPERATIVE MANAGEMENT OF SPLENIC INJURY IN A TERTIARY CENTER

Dr G Venkata Ramanaiah	Assistant Professor of Surgery, Department of General Surgery, SVRR Govt General Hospital, Tirupati- 517507
Dr K Manohar *	Professor Of Surgery, Department Of General Surgery, SVRR Govt General Hospital, Tirupati- 517507 *Corresponding Author
Dr Sindhuja Balaraj	Senior Resident Of Surgery Department Of General Surgery, Svrr Govt General, Hospital Tirupati- 517507

ABSTRACT **INTRODUCTION:** Spleen is the most commonly injured organ in blunt abdominal trauma. Once the diagnosis was established in the past, splenectomy was the only option available.

METHODS AND RESULTS: The study is a hospital based observational study. All the cases admitted in the emergency department and surgical wards which satisfy the inclusion criteria were included in the study. From December 2016 to 2017, 30 cases with only splenic injuries were studied who got admitted to surgical units in Sri Venkateswara Ramanarayan Ruia hospital, Tirupathi. 63.33% of patients were managed non-operatively successfully. Rest 36.66% cases were taken up for surgery due to instability in their hemodynamic status.

CONCLUSION: CECT abdomen is the investigation of choice in patients with splenic injuries. Grade of injury, age of the patient are no more the criteria for not preferring NOM. NOM is becoming the gold standard treatment for BSI.

KEYWORDS :

INTRODUCTION

Spleen is the most commonly injured organ in blunt abdominal trauma. Once the diagnosis was established in the past, splenectomy was the only option available until Singer described overwhelming post-splenectomy infection (OPSI) in 1973. A mortality rate in excess of 50% and a lifetime incidence of 2% in patients after splenectomy from OPSI and has resulted in splenic preservation or non-operative management (NOM) becoming the preferred treatment for haemodynamically stable patients.[1-4]

With the advancement in diagnostic facilities, availability of blood products, well established surgical intensive care units spleen can be salvaged in almost all hemodynamically stable patients as been chosen to study the splenic injuries in blunt trauma.

AIMS AND OBJECTIVES

The main aims and objectives of the present study are:

1. To evaluate the incidence of splenic injuries in blunt trauma to abdomen attending to emergency department.
2. To evaluate the various aetiological factors for the splenic injuries in blunt trauma to abdomen.
3. To evaluate the management of splenic injuries in blunt trauma to abdomen with aim of salvaging spleen in order to decrease morbidity and mortality.
4. To evaluate the complications associated with respective management modalities.

A total of 30 cases with only splenic injury are included in the study. Decision on patient management mainly depended on the stable haemodynamic [5] of the patient and partly on the investigations.

METHODOLOGY

The study is a hospital based observational study. All the cases admitted in the emergency department and surgical wards which satisfy the inclusion criteria were included in the study. The duration of study was one year from the approval from the ethical committee.

INCLUSION CRITERIA: All patients of age 14 years and above with isolated splenic injury due to blunt injury to abdomen will be included in the study.

EXCLUSION CRITERIA: Patients with associated other solid organ and hollow viscus injuries of abdomen are excluded from the study.

STUDY METHODS:

a) Direct interview with the patient or patient relatives accompanying the patient and detailed history will be noted.
b) Thorough clinical examination and findings will be noted.
c) X-ray abdomen, ultrasound abdomen, CT scan abdomen will be performed.

STATISTICAL ANALYSIS: The data will be analysed by using EPI INFO VERSION 7.2, and appropriate significance tests.

OBSERVATIONS AND RESULTS:

From December 2016 to 2017, 30 cases with only splenic injuries were studied who got admitted to surgical units in Sri Venkateswara ramanarayan ruia hospital, tirupathi.

Among 30 cases, 24 patients were male accounting for 80% of study population and 5 were females accounting for 20%. In this study majority of the patients belonged to 31 – 40 years accounting for 36.66% followed by 21 – 30 years age group. In 63.33% patients Road traffic accident was the commonest mode followed by fall from height in 26.66%. Least common was blow with blunt object in 10%.96.66% of the patients in this study presented with abdominal pain and , followed by abdominal distension in 46.66%,. Kehr's sign was positive in 43.33% in this study. Associated injury along with abdominal injury was present in 26 cases. The common extra abdominal injury was rib fractures followed by soft tissue injuries, orthopaedic injury and head injuries.

USG ABDOMEN

Table no 1: showing ultra sound scan of abdomen findings of subjects at presentation

FAST	NO OF CASES	PERCENTAGE
FREE FLUID PRESENT	27	90
FREE FLUID ABSENT	3	10

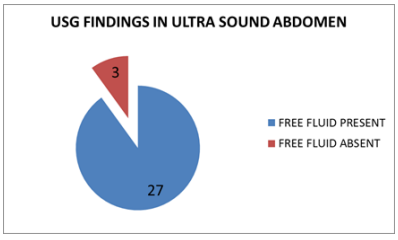


Fig No 1 USG Findings in Ultra Sound Abdomen

CT GRADING

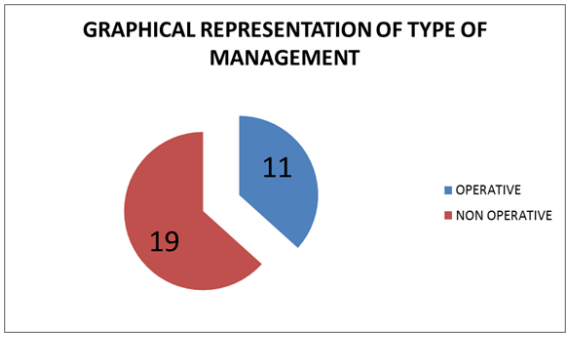
Table no 2

CT GRADE OF INJURY	NO OF CASES	PERCENTAGE

TYPE OF MANGEMENT	NO OF CASES	PERCENAGE
OPERATIVE	11	36.66
NON OPERATIVE	19	63.33
GRADE 1	3	10
GRADE 2	5	16.66
GRADE 3	9	30
GRADE 4	6	20
GRADE 5	4	13.33

CECT abdomen was done in almost all cases. 3 cases who were haemodynamically unstable even after resuscitation and patients who were in shock with high clinical suspicion of splenic injury were directly taken up for exploratory laparotomy. All those 3 patients had shattered spleen / avulsion of splenic pedicle (grade 5) on exploration.

RATIO OF OPERATIVE TO NON OPERATIVE MANAGEMENTTYPE OF MANGEMENT
Figure no 3



63.33% of patients were managed non- operatively successfully. Rest 36.66% cases were taken up for surgery due to instability in their haemodynamic status. All patients operated underwent exploratory laparotomy and splenectomy

SPLENIC GRADES AND THEIR ESPECTIVE MANAGEMENT
Table no 4

GRADE OF INJURY	NO OF CASES	NO OF NOM CASES	NO OF CASES CONVERTED FROM NOM TO OPERATE	TOTAL NO OF CASES OPERATED
GRADE 1	3	3	0	0
GRADE 2	5	5	0	0
GRADE 3	9	8	0	1
GRADE 4	6	5	2	3
GRADE 5	7	0	0	7

Almost all cases with splenic grades 1-3 were managed conservatively except for one case with grade three who was taken up for exploration directly as this case was haemodynamically unstable. Two cases with grade 4 were converted from NOM to OM. All patients with grade 5 injuries were directly taken up for exploratory laparotomy.

COMPLICATIONS IN OPERATED PATIENTS
Table no 5

COMPLICATION	NO OF CASES	PERCENTAGE (%)
WOUND INFECTION	4	13.33
WOUND DEHISCENCE	1	3.33
RESPIRATORY COMPLICATIONS	3	10
INTRA ABDOMINAL ABSCESS	1	3.33
OPSI	0	0

Infection at sutured site was the commonest complication in 13.33% of patients and the least common was intra-abdominal abscess seen in 3.33% of patients. No patients suffered from OPSI.

Complications in NOM patients:
Table no 6

COMPLICATIONS	NO OF CASES	PERCENTAGE
RESPIRATORY COMPLICATIONS	3	10
INTRA ABDOMINAL ABSCESS	1	3.33

4 patients developed complications in NOM, among which 3 patients had respiratory complications like pneumonia, haemothorax etc. Haemothorax was managed by inserting ICD and drain was removed after the noticing the full expansion of left lung on radiography. One patient developed Intra-abdominal abscess which was managed by draining the collection under ultrasound guidance

Total 2 patients died postoperatively and there was no mortality in the patients who underwent non operative management. Both the patients died within 72 hours of postoperative period due to ARDS. Their Endotracheal tubes secretion culture was positive for klebsiella in one patient and E.coli in the other patient. Their blood cultures were negative. So, the present study has a mortality of 6.66%.

DISCUSSION

Benjamin etal, Dennis etal describe mean ages of splenic injury between 30 and 36 years and a male preponderance of 60% to 84%. [1,6] Indermeet S.Bhulla et al [7] states that the most commonly affected people are <55 years of age. The present study correlates with the above study as 26 patients out of 30 patients belonged to age group less than 55 years.

RTA is the most common mode of injury in blunt trauma to abdomen due to increased number of vehicles. Another study done by Cocanour CS et al [8] states that road traffic accident and fall from height together are most injurious mechanisms in blunt trauma accounting for 92% and 91% respectively of splenic injuries with assault constituting 1% and 3.6% of injuries respectively. The present study closely correlates with the above two studies.

In the present series abdominal pain was the most common symptom and abdominal tenderness was the most common sign. This correlates with the Dennis king study.

KEHR'S sign was positive in 43.3% of patients which correlates with other study done by Rutkow IM [9] (1978).

In the present study associated injuries were present in 20 patients (66.6%) which almost correlate with the study done by Dannis King (1981) [10].

Most common associated injury was rib fractures present in 36.6% of patients. Isolated injuries to spleen were seen in 33.3% of patients. The table below shows the comparison of associated injuries between the present study and other studies

ASSOCIATED INJURY	DAVID ET AL	KHANNA ET AL	PRESENT SERIES
Head injury	9%	12%	3.33%
Rib fractures	27%	24%	36.66%
Orthopaedic injury	15%	27%	10%
Soft tissue injury	12%		16.66%

ULTRASONOGRAPHY OF ABDOMEN (FAST):

The sensitivity of FAST in detecting free fluid in the abdomen in the present study was 87.5%. When compared with other studies, according to Vander Vlies CH et al [11] sensitivity of FAST in detecting free fluid in the abdomen is >90% and 90-93% respectively

ADVANTAGES OF FAST:

1. FAST is rapid, repeatable, non-invasive and don't interfere with any subsequent investigations.
2. In patients who are haemodynamically unstable FAST is very useful. [12]

DRAWBACKS OF FAST:

1. FAST has got low sensitivity for detecting and grading splenic injuries.
2. FAST is observer dependent and it is uncommon to detect fluid

volumes <250ml on fast, sensitivity of FAST varies.
3. Presence of organ injury in the absence of haemoperitoneum on FAST can be as high as 29 %. [13,14]

4.CT SCAN OF ABDOMEN:
CT scan was done in almost all patients. 27 patients underwent CT scan and were graded as per AAST recent guidelines. Remaining three patients as they were haemodynamically unstable they were directly taken up for exploratory laparotomy. In the present study, CT scan has helped in identifying the splenic injuries efficiently increasing the number of patients to be managed under NOM.

Use of CT scan in patients with splenic injury has resulted in an increased incidence of diagnosis of splenic injury, with increasing recognition of low-grade injuries. [15]

Therefore, CT is the investigation of choice in haemodynamically stable patients with blunt trauma, with sensitivity and specificity of 96% for visualising direct splenic injury and is used as the primary investigation in a management algorithm in these patients, and also in patients in whom resuscitation restores haemodynamic stability [15, 16] and the present study results also explains the same.

RATIO OF NON OPERATIVE TO OPERATIVE MANAGEMENT:
Total of 19 patients were managed effectively with NOM i.e. 63.33%, and 11 patients underwent surgery i.e. 36.66%. Among the operated 11patients two patients were initially tried with NOM but as their clinical condition and haemodynamic stability detoriated they were taken up for immediate exploration.

NON OPERATIVE MANAGEMENT:
A total of 21 patients among the 30 patients were taken up for NOM in the present study. Only 9.52% i.e. 2 cases among them who had grade 4 injury underwent surgery as their haemodynamic stability couldn't be maintained. So this present study has got a success of 90.4% in managing the patients effectively with NOM. The main criterion taken up for NOM was a patient who was haemodynamically stable and who had splenic injuries of grade 1-4.

AUTHOR	PUBLISHED	NO OF CASES	NO OF NOM CASES	SUCCESS OF NOM
Bala et al 18	2007	64	51	100%
Sinha et al 19	2008	21	11	91%
Giannopoulos et al 20	2009	30	22	86%
Present series	NOT PUBLISHED	30	21	90.4%

Table: showing comparison of success of NOM

In the protocol for NOM, the main issues to be addressed are
1. Regarding the high failure rates in patients with high splenic grade.
2. Period of bed rest for patients in NOM.
3. Regarding high failure rates in patients with age > 55years.
4. Failure rates in high grade injuries

Pietzman et al [21] demonstrated a significant failure rate of NOM in relation to higher grades of injury. Failure rates were 19.6% of grade III, 33.3% of grade IV and 75% of grade V.

Nix et al [(33)] assessed age, injury grade, and haemodynamic status, reporting that the only significant predictor for failure in their series was injury grade. The present study also supports the same as 9.52% failure rate was from grade 4 only.

CONCLUSIONS
Spleen is the most common solid organ to get injured in blunt injury to the abdomen. Most common age group affected are between 31 – 40 years with male preponderance. CECT abdomen is the investigation of choice in patients with splenic injuries. All patients feasible should undergo cect abdomen as it guides in decision making by accurately giving the injury grade and associated abdominal visceral injuries. Grade of injury, age of the patient are no more the criteria for not preferring NOM. With availability of well-established intensive care units, facility for CECT abdomen, availability of blood and blood products, availability of 24 hour operation theatres, and well surgical experts. NOM is becoming the gold standard treatment for BSI.Associated injuries like head injuries, thoracic injuries, orthopaedic injuries influence the morbidity and mortality of the patients.

REFERENCES

1. Feliciano DV, Bitondo CG, Mattox KL, Rumisek JD, Burch JM, Jordan GL. A four-year experience with splenectomy versus splenorrhaphy. Ann Surg 1985; 201(5): 568-573.
2. Harbrecht BG. Is anything new in adult blunt splenic trauma? Am Journal Surg 2005; 190: 273-278.
3. Lucas CE. Splenic trauma. Choice of management. Ann Surg 1991; 213(2): 98-112.
4. Singer DB. Post-splenectomy sepsis. Perspect Pediatr Pathol 1973; 1: 285-311.
5 Renzulli P, Gross T, Schnüriger et al. Management of blunt injuries to the spleen Br J Surg 2010; 97: 1696-1703
6 john E. Skandalakis, Gene L. Colborn, Thomas A. Weidman, Roger S. Foster, Jr., Andrew N. Kingsnorth, Lee J. Skandalakis, et al. Skandalakis' Surgical Anatomy
7 Indermeet S Bhulla, Eric Frykberg, Daniel Siragusa, David Chaire, Julia Paul, Joseph J Tepas et al. Age does not affect outcomes of non operative management of blunt splenic injury: JAM col surg 2012 june21;214 (6): 958-64
8 Cocanour CS, Moor FA, Ware DN, Marvin RG, Clark JM, Duke JH. Delayed complications of nonoperative management of blunt adult splenic trauma. Arch Surg 1998; 133: 619-625.
9 Rutkow IM. Rupture of the spleen in infectious mononucleosis: a review. Arch Surg 1978; 113(6): 718-720.
10 Denis King. Selective management of injured spleen- surgery, 90:677, 1981
11 Van der Vlies CH, Van Delden OM, Punt BJ, Ponsen KJ, Reekers JA, Goslings JC. Literature review of the role of ultrasound, computed tomography, and transcatheter arterial embolization for the treatment of traumatic splenic injuries. Cardiovasc Intervent Radiol 2010; 33: 1079-1087.
12 Bode PJ, Edward MJ, Kruil MC, Vogt AB. Sonography in a clinical algorithm for early evaluation of 1671 patients with blunt trauma abdomen; AJR AM J Roentgenol, 1999; 172: 905-911.
13 Scnuriger B, Kilz J, Inderbit zin. The accuracy of FAST in relation to grade of solid organ injuries; a retrospective analysis of 226 patients with liver/splenic lesion. BMC med imaging, 2009; 9:3.
14 Miller MT, Pasquale MD, Bromberg WJ, Wasser TE, Cox J. Not so FAST. J Trauma. 2003; 54:52-59.
15 Harbrecht BG. Is anything new in adult blunt splenic trauma? Am Journal Surg 2005; 190: 273-278.
16 Pachter HL, Guth AA, Hofstetter SR, Spencer FC. Changing patterns in the management of splenic trauma: the impact of nonoperative management. Ann Surg 1998; 227(5): 708-719.
17 Nix JA, Constanza M, Daley BJ, Powell MA, Enderson BL. Outcome of the current management of splenic injuries. J Trauma 2001; 50(5): 835-842.
18 Bala M, Edden Y, Mintz Y et al. Blunt splenic trauma: predictors for successful non-operative management. Isr Med Assoc J 2007; 9: 857-861.
19 Sinha S, Raja SVV, Lewis MH. Recent changes in the management of blunt splenic injury: effect on splenic trauma patients and hospital implications. Ann R Coll Surg Engl 2008; 90: 109-112.
20 Giannopoulos GA, Katsoulis IE, Tzanakis NE, Patsaouras PA, Digalakis MK. Non-operative management of blunt abdominal trauma. Is it safe and feasible in a district general hospital? Scand J Trauma Resusc Emerg Med 2009; 17: 22.
21 Pietzman AB, Heil B, Rivera L. Blunt splenic injury in adults: multi-institutional study of the Eastern Association for the Surgery of Trauma. J Trauma 2000; 49(2): 177-189.