

# Management of Spleen Injury: A One Year Experience from a Tertiary Care Hospital in Nepal

Joshi A\*

\*Assistant Professor, Department of Surgery, National Academy of Medical Sciences, Bir Hospital, Kathmandu, Nepal

## ABSTRACT

**INTRODUCTION:** The management of spleen injury has progressed from the era of splenectomy to the era of splenic preservation. This study aims to determine the management approach and outcome following spleen injury in a tertiary care hospital.

**METHOD:** A retrospective observational study was conducted from June 2015 to May 2016 from hospital records in Department of surgery at National Academy of Medical Sciences (NAMS). The American Association for the Surgery of Trauma Organ Injury Scale (OIS) was used for grading splenic injury. The analysis was done for operative rate, mortality, hospital length of stay and ICU length of stay. Different modalities of treatment and the treatment outcomes were evaluated.

**RESULT:** There were total of 15 cases of spleen injury. The most common mode of injury was fall from height (66.6%) followed by road traffic accidents (20%) and stab injury (2%). Sixty percent of the cases underwent operative management out of which 55.5% cases had splenectomy, 22.2% cases had splenic repair and 22.2% had repair of associated liver injury. There were 13.3% mortality and 86% recovery without residual morbidity.

**CONCLUSION:** Most of the cases with spleen injury were managed with favorable outcome. The careful patient selection for non-operative management will result in higher splenic salvage.

**KEY WORDS:** Injury, Management, Outcome, Spleen.

## INTRODUCTION

Abdominal trauma is one of the common causes of preventable trauma related death. The injury to spleen is very common during abdominal trauma. During the past two decades, the management of blunt abdominal solid organ injury has shifted from operative to selective non-operative management.<sup>1</sup> Historically the management of splenic injury can be divided into two phases, the period in which splenectomy was the treatment for virtually all spleen injuries and the era of splenic preservation. An autopsy

study from Eastern Nepal showed that splenic injury occurred in 21.7% of the total cases of abdominal trauma.<sup>2</sup> In Western Nepal, the need of splenectomy in splenic injury due to blunt abdominal trauma was 1.29%.<sup>3</sup> In India, 46% cases out of total blunt abdomen trauma with visceral injuries had spleen injury.<sup>4</sup> The management of spleen injury varies from splenectomy to spleen preserving procedure. The hemorrhage from traumatically disrupted spleen can be lethal when timely splenectomy may be life saving or injured patients can be treated with spleen salvage procedures and preserve the organ's immunological function.<sup>5-9</sup> The data from the American College of Surgeons National Trauma Data Bank shows that up to 15% of patients with blunt splenic injury will undergo an emergency splenectomy within six hours of admission, due to ongoing bleeding and hemorrhagic shock.<sup>10</sup> The remaining patients with blunt splenic injury were considered for non operative management and were managed successfully.

## Correspondence :

Dr. Anip Joshi  
Assistant Professor and Chief Consultant Surgeon  
Department of Surgery  
National Academy of Medical Sciences  
Bir Hospital, Kathmandu, Nepal  
Email: anipjoshi@yahoo.com  
Mobile No: 9841329195

The management of spleen injury has progressed from the era of splenectomy to the era of splenic preservation. The success rates for non-operative management of blunt splenic injury are 95% or higher for pediatric patients and approximately 80% or higher in adults.<sup>1</sup> A feasibility assessment study of non-operative management of blunt abdominal trauma from teaching hospital in Western Nepal showed that the total cases of spleen injury who underwent successful non operative management was 3%.<sup>11</sup>

This study aimed to determine the management approach and outcome following spleen injury in a tertiary care academic hospital.

### METHOD

A retrospective cross sectional observational study was conducted from June 2015 to May 2016 from hospital records in Department of Surgery at National Academy of Medical Sciences. The secondary data were collected from hospital record and data was entered in Performa designed for the study. The data collected were regarding patient demographics (age and sex), trauma characteristics (mechanisms and mode of trauma, type of management – surgical or conservative) and outcome of injury. The American Association for the Surgery of Trauma Organ Injury Scale (OIS) was used for grading splenic injury. The patients in each grading category were analyzed for operative rate, mortality, hospital length of stay and ICU length of stay. Different modalities of treatment and the treatment outcomes were evaluated. The data were further analyzed for the type of operative interventions adopted for splenic injury. The data was analyzed using Microsoft Office Excel 2007 and SPSS software.

### RESULT

There were total of 15 cases of spleen injury managed during a period of one year. The mean age of presentation was 39.2 years. The mechanism of injury was blunt in 86% and penetrating in 14%. The mode of injury was fall from height (60%), road traffic accidents (20%), stab (13.3%) and physical assault (6.6%). The clinical presentations were hypovolemic shock (46.6%), abdominal pain (33.3%), left chest pain (13.5%) and loss of consciousness (6.6%). The patients who were hemodynamically stable were continued with conservative approach whereas the hemodynamically unstable patients underwent operative management.

**Table 1: Outcome of spleen injury following conservative and operative management**

OIS grade	N	Conservative	Operative	Mortality	LOS (days)	ICU (days)
I	2	50%	50%	0	11	4
II	0	-	-	-	-	-
III	8	50%	50%	1	13.6	6
IV	3	66%	33%	0	14	5.3
V	2	0	100%	0	26.5	5.5
Total	15					

OIS=Organ Injury Scale, LOS=Length of Stay, ICU= Intensive Care Unit

The length of stay in the hospital was found to be increasing with the increase in OIS grade whereas the length of ICU stay was not found to be increasing substantially with increasing OIS grade. The operative rate for spleen injury was 53.33% out of which 55.5% cases had splenectomy, 22.2% cases had spleen repair and 22.2% had repair of associated liver injury. There were 13.3% mortality and 86% recovery without residual morbidity.

**Table 2: Operative interventions for spleen injury**

OIS grade	N	OR (%)	Splenectomy	Splenor-rhaphy	Explo-ration
I	2	50%	-	-	1
II	0				
III	8	50%	3	1	-
IV	3	33%	1	-	-
V	2	100%	2	-	-
Total	15				

OIS= Organ Injury Scale, OR=Operative Rate

### DISCUSSION

The study shows that 50% of the patients with spleen trauma can be managed with non-operative modality in Organ Injury Scale (OIS) grade I to IV whereas 100% of the patients in OIS grade V required operative treatment. The OIS grade V spleen injury requires operative treatment such as splenectomy because the patients present in the state of refractory hemodynamic instability.<sup>12</sup> The immediate operative intervention should be performed for patients with splenic injury who develops hemodynamic instability or substantial blood transfusion due to splenic injury. The OIS grade IV spleen injury can be managed with conservative approach with close monitoring in Intensive Care Unit for any hemodynamic instability. The close monitoring of hemodynamic status in conservative approach and

timely operative intervention in case of hemodynamic unstable patients will lead to favorable outcome in spleen injury.

In splenic injury, there was a significant incremental increase in mortality rate for Grade V injury as compared with lesser grade and LOS and ICU stay also showed incremental increase with increasing OIS grade splenic injury.<sup>13</sup> In this study, there was no correlation between mortality and higher OIS grade of splenic injury but the LOS was higher with increasing OIS grade. This can be due to small number of patients included in this study.

The non-operative management of blunt spleen injury has increased over time and has acceptable mortality and complications rates in selected patients.<sup>14</sup> Yanar showed that success rates for non-operative management of blunt spleen injury is approximately 80% or higher in adults.<sup>1</sup> In this study the non-operative management was 46.67% in adults. Although this is higher than the success rate of non operative management for spleen injury in a teaching hospital in Western Nepal<sup>11</sup>, this is still low as compared to international scenario.<sup>14</sup> The low rate of non-operative management in this study can be due to lack of specialist trauma surgeons with experience of non-operative modality of treatment in spleen injury. Although splenic injury is a common problem the management decisions vary and single management protocol does not universally apply.<sup>15</sup>

The efforts at splenic preservation could be divided into three different areas: operative attempts at maintaining splenic function; embolization of the splenic artery and its branches; and non-operative management of splenic injury.<sup>16</sup> In this study, the first and third methods were adopted for spleen salvage.

## CONCLUSION

Most of the cases with spleen injury were managed with favorable outcome in a central academic hospital with tertiary level care. The careful patient selection for non-operative management will result in high rates of overall splenic salvage.

## REFERENCES

1. Yanar H, Ertekin C, Taviloglu K. Nonoperative treatment of multiple intra-abdominal solid organ injury after blunt abdominal trauma. *J Trauma* 2008;64:943-948.
2. Subedi N, Yadav BN, Jha S, Gurung S, Pradhan A. An autopsy study of liver injuries in a tertiary referral center of Eastern Nepal. *J Clin Diagn Res* 2013;7(8):1686-1688.
3. Khan S, Khan IU, Aslam S, et al. Retrospective analysis of abdominal surgeries at Nepalgunj Medical College (NGMC), Nepalgunj, Nepal: 2 year's experience. *Kath Univ Med J* 2004;2:336-343.
4. Sah D, Sinha SP. Pattern of Abdominal injuries in a tertiary care centre in Western U.P. *Ann Int Med Dent Res* 2016;2:5-9.
5. King DR, Lobe TE, Hasse GM, et al. Selective management of the injured spleen. *Surgery* 1981;90:677-682.
6. Morse MA, Garcia VF. Selective non operative management of pediatric blunt splenic trauma: Risk for missed associated injuries. *J Pediatr Surg* 1994;29:23-27.
7. Cogbill TH, Moore EE, Jurkovich GJ, et al. Non-operative management of blunt splenic trauma: A multicenter experience. *J Trauma* 1989;29:1312-1317.
8. Villalba MR, Howells GA, Lucas RJ. Non operative management of the adult ruptured spleen. *Arch Surg* 1990;125:836-840.
9. Archer LP, Rogers FB, Shackford SR. Selective non operative management of liver and spleen injuries in neurologically impaired adult patients. *Arch Surg* 1996;131:309-315.
10. Zarzaur BL, Kozar R, Myers JG, et al. The splenic injury outcomes trial: An American Association for the Surgery of Trauma multi-institutional study. *J Trauma Acute Care Surg* 2015;79:335-342.
11. Ghimire P, Yogi N, Ghimire P. Non-operative Management of Blunt abdominal trauma in a Tertiary Care Hospital of a Developing Nation. *Nep J Med Sci* 2013;2:38-41.
12. Zarzaur BL, Rozycki GS. An update on non operative management of the spleen in adults. *Trauma Surg Acute Care* 2017;2:1-7.
13. Tinkoff G, Esposito TJ, Reed J, et al. Association for the Surgery of Trauma Organ Injury Scale I: Spleen, Liver, and Kidney, Validation Based on the National Trauma Data Bank *J Am Coll Surg* 2008;207:646-655.
14. Cadeddu M, Garnett A, Al-Anezi K, et al. Management of spleen injuries in the adult trauma population: A ten year experience. *J Can Chir* 2006;49:386-389.
15. Manus RS, Mann NC, Worrall W, et al. Statewide variation in the treatment of patients hospitalized with spleen injury. *Arch Surg* 1999;134:1378-1384.
16. Richardson JD. Changes in the management of the injury to the liver and spleen. *J Am Coll Surg* 2005;200:649-668.