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Splenectomy Versus Splenic Preservation in Cases of Blunt Splenic Trauma: A Retrospective Study

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Abstract:

Introduction: *The spleen is among one of the most frequently injured abdominal organs in patients of blunt abdominal trauma. Due to fear of hemorrhage from injured spleen, surgeons have commonly removed then even in minor injuries, specially because of widely prevalent misconception, from time of Aristotle, that spleen is not essential to life; rare examples of congenital asplenia already having been identified.*

Aim of the Study: *The aim of the study was to study the per-operative indications of splenic preservation with the criteria and various modes of splenic preservation.*

Material & Methods: *A Retrospective Study was conducted on 50 patients of blunt splenic trauma during the period of January 2016 to December 2019 in Dept. Of Surgery, Rajshahi Medical College Hospital, Rajshahi, Bangladesh. On the basis of clinical examination & various modalities of investigations diagnosis of blunt splenic trauma was made & with above aims & objectives in mind further management was done. The records of all the patients of major trauma were carefully evaluated on the basis of age, sex, mode and pattern of injury.*

Results: *This study comprises a retrospective study of 50 cases of blunt splenic injury admitted in Surgical Dept. Rajshahi Medical College Hospital, Rajshahi, Bangladesh during the period of three years from January 2016 to December 2019.The mean age of the series was 38.48 years, with most of the cases falling in 21-30 years with male to female ratio of 4:1. Majority of the patients presented with pain abdomen, shock and abdominal tenderness. USG was able to identify the splenic injury in most of the patients. Laparotomy was done in 25 cases (50%), splenectomy was done in 16 cases (32%), while in 9 cases (18% 0 splenorrhaphy was done. 23 cases were managed conservatively. Spleen preservation was done in 32 cases while 16 cases had splenectomy. Spleen preservation was possible in 64% of cases by operative or non-operative methods.*

Conclusion: *This retrospective clinical study of blunt abdominal trauma indicates that the road traffic accident is the major cause of splenic injury. Most of the splenic injury can be safely managed with conservation of spleen by operative as well as non-operative methods. Splenic injury still remains a challenge. Improved operative techniques, better understanding of spleen anatomy, advancement of anesthesia and operation theater facilities with excellent intensive care helped in improving the survivability of patients.*

Keywords: *Splenectomy, Selenography, Blunt Abdominal Trauma.*

1. INTRODUCTION

The spleen is among one of the most frequently injured abdominal organs in patients of blunt abdominal trauma. Due to fear of hemorrhage from injured spleen, surgeons have commonly removed then even in minor injuries, specially because of widely prevalent misconception, from time of Aristotle, that spleen is not essential to life; rare examples of congenital asplenia already having been identified. It is now believed that splenectomy is associated with an increased susceptibility to infection that may be 540 times greater than susceptibility in general population. It is because of this overwhelming complication rate that attempts are now being made to repair rather than remove an injured spleen.Injuries constitute a variable epidemic. Road traffic injuries are predicted to become the third largest contributor to global burden of diseases by 2025. They rank as the 11th leading cause of death by WHO/World bank report on road traffic [1]. Blunt abdominal trauma is a leading cause of morbidity and mortality in all age groups patients, mortality rate for hospitalized patients with BTA are approximately 5-10% [7].The Liver and spleen seems to be the most frequently injured solid organs although reports vary.Recent studies show an increased number of hepatic injuries [3].Our present study is stimulated by the progressive increase in traffic accidents over the past five decades and various surgical techniques which have been described for repairing injured spleen. Despite these various techniques, very few studies have compared splenorrhaphy with splenectomy. Though there is paucity of data regarding primary suture repair of the spleen in adults and children, we are trying to assess the feasibility of conserving an injured but otherwise healthy spleen by studying 50 cases of splenic trauma which were treated by operating and non-operating methods in the past three years at Rajshahi Medical College Hospital, Rajshahi, Bangladesh. The purpose of this study is to compare the possibility of spleen preservation versus splenectomy in blunt abdominal trauma so as to maintain the splenic function and protection against susceptibility to post splenectomy sepsis.

2. AIM AND OBJECTIVES

1. To study the per operative indication of splenic preservation.
2. To study the criteria of splenic preservation by conservative treatment.
3. To study various modes of splenic preservation.

3. MATERIAL AND METHODS

A Retrospective Study was conducted on 50 patients of blunt splenic trauma during the period of January 2016 to December 2019 in Dept. Of Surgery, Rajshahi Medical College Hospital, Rajshahi, Bangladesh. On the basis of clinical examination & various modalities of investigations diagnosis of blunt splenic trauma was made & with above aims & objectives in mind further management was done. The records of all the patients of major trauma were carefully evaluated on the basis of age, sex, mode and pattern of injury. Detailed study in the form of thorough history, clinical examination, investigations routine and special like Usg abdomen, pelvis and x-ray plain film abdomen with their management and complication were conducted on all splenic injury patients and mortality if were noted in the proforma. All patients of blunt splenic injury were grouped into five on the basis of mode of injury.

- ❖Road traffic accidents
- ❖ Fall from height
- ❖Animal related injury
- ❖ Assault
- ❖Occupational

Each group was subdivided into two sub groups on the basis of management part (1) conservative and (2) operative.

3.1. Conservative Management of Blunt Splenic Trauma

Following criteria was considered for conservative management;

- ❖ The patient's condition must be hemodynamically stable and have no clinical indication for laparotomy e.g. gross hemoperitoneum, other viscera injury etc.
- ❖ Stable splenic injuries on grading scale l to lll may be managed conservatively Extreme caution should be kept in mind regarding non operative management of grading lV and V even with hemodynamically stable.
- ❖ Ultrasonography abdomen and CT scan should be performed to know the presence or absence of hemoperitoneum, splenic contour

and extent of splenic injuries and rule out other abdomen visceral injuries.

- ❖ The patients must be monitored closely for vital parameter's bleeding or other complications in intensive care unit.
- ❖ The decision about conservative management must be made by surgeon with experience of splenic trauma.
- ❖ Non operative management must be performed in an institution where surgery can be performed immediately if needed.
- ❖ Associated head injury, chest injury, liver injury and other abdominal viscera injuries must be evaluated properly

Patients who were hemodynamically stable in secondary survey (after maintaining airway, breathing and circulation and by recording pulse B.P temperature and respiratory status) were included in conservative sub group.

3.2. Operative Management of Blunt Splenic Trauma

The major indication for urgent operation is hemodynamically instability. The criteria for hemodynamic instability are persistent tachycardia, rising pulse rate, falling blood pressure increasing abdominal girth, persistent abdominal rigidity, increasing free fluid in peritoneal cavity. A general guideline is to operate for systolic BP<90mm of Hg, or a pulse of >120 beats/minute if their is not immediate response to 1to2L of crystalloid resuscitation and when on physical examinations, DPL indicates intra-abdominal blood loss.Following method may be used in operating management of blunt splenic trauma;

- Splenectomy by open and laparoscopic method
- Splenorraphy
- Partial splenectomy
- Arterial ligation
- Autotranseplantion of spleen.

Comparative study was conducted for complication and outcome of conservative and operative management.

4. RESULTS

This study comprises a retrospective study of 50 cases of blunt splenic injury admitted in Surgical Dept. Rajshahi Medical College Hospital, Rajshahi, Bangladesh during the period of three years from January 2016 to December 2019.The mean age of the series was 38.48 years, with most of the cases falling in 21-30 years. The male to female ratio was 4:1. RTA (70%) was a major player in the causes of splenic injury while fall from height (18%) was the second leading cause.Pain abdomen was present in 38 cases, 20 patients had generalized pain while in 18 patients' pain had localized to left hypochondrium and epigastrium. 13 cases (26%) presented with referred pain to tip of the left shoulder. Abrasions and bruises were present in 23 cases. 43 cases were having abdominal tenderness on palpation while guarding and rigidity was present in20cases. It was observed that patients treated conservatively presented with pain abdomen tenderness in left hypochondrium, with localized bruise over chest andabdomen. Hemodynamically unstable patients presented with shock, rigidity and guarding with tachypnoea and tachycardia. The other associated injuries were Chest 12 cases (24%), fracture of long bones 8 cases (16%) and head injury 6 cases (12%).It was noted that 16 cases (32%) were in shock at the time of admission and 6 cases could not be revived and expired. In 45 cases Hemoglobin estimation was done, which showed that 19 cases (42.22%) had Hb level below 10 gms percent and 1 case had Hb below 5 gms percent. USG abdomen findings are given in [Table-1].

Table1. *USG/CT Findings (N=50)*

No of Patients	USG/CT findings	Treatment			Outcome		
			No.	%		No.	%
11	Grade I & II with minimal hemoperitoneum	Conservative	8	72.22%	Cured	8	100
					Expired	0	0
		Operative	3	27.27%	Cured	2	67
					Expired	1	33
28	Grade II to IV with moderate hemoperitoneum	Conservative	14	50.00%	Cured	14	100
					Expired	0	0
		Operative	14	50.00%	Cured	11	79
					Expired	3	21
9+2	Grade III to V with gross hemoperit	Conservative	1	27.27%	Cured	1	100
					Expired	0	0

	oneum	Operative	8	72.22%	Cured	8	100
					Expired	0	0

23 cases were treated conservatively while 25 cases were operated. [Table-2] shows the duration between admission and operation.

Table2. *Duration Between admission and surgery(N=50)*

Duration b/w admission & operation	No. of cases	Percentage
<24 HRS	17	68
>24 to <48 HRS	5	20
>48 to <72 HRS	1	4
>72 HRS	2	8
Total	25	100

[Table-3] shows that in 4 cases (8%) hemostasis was achieved by gel foam only and one case (2%) was treated by simple suturing. 3 cases (6%) were treated bysuturing with interposition of gel foam. 47 cases required blood transfusion, mostly 1 or two units.

Table3. *Methods of treatment employed(N=50)*

S. No.	Type of Treatment	No. of cases	Percentage
1	Non operative treatment due to non-revival from shock	2	4
2	Treated conservatively	23	46
3	Simple suturing	1	2
4	Suturing with interposition of gel foam	3	6
5	Hemostasis with gel foam only	4	8
6	Exploration only	1	2
7	Splenectomy	16	32
	Total	50	100

Wound sepsis was most common complication (14%) followed by Ileus (8%), Fever (7%) Jaundice (4%) and pseudo pancreatic cyst (3%). Hospital stay was higher (mean – 14.6 days) in operative group than non-operative group (mean – 9.75 days).In 32 cases spleen preservation was done (both operatively and non-operatively). The mortality rate was 3.1% in spleen preservation group while it was 19 % in splenectomy group [Table 4].

Table4. *Spleen preservation versus splenectomy (N=50)*

Splenic Preservation			Splenectomy					
Conservative Treatment			Splenorrhaphy					
No of Patients	Mortality	Per cent	No of Patients	Mortality	Per cent	No of Patients	Mortality	Per cent
23	0	0%	09	01	11 %	16	03	19 %

[Table-5] shows that conservative line of treatment is a better modality then operative intervention. The international literature clearly suggests that conservative management should always be preferred.

Table5. *Comparative study of spleen injury(N=50)*

Author	No. of Patients	Conservative		Splenorraphy		Splenectomy	
		No. of Patients	%	No. of Patients	%	No. of Patients	%
C L Witte *et al.*, [13].	20	9	45	9	45	2	10
Aseervatham R [11]	85	39	45.9	14	16.5	32	37.6
O.O. lowal [12].	55	12	22	10	18	33	60
Present Study	48+2	23	47.9	9	18.8	16	33.3

5. DISCUSSION

The incidence of spleen preservation in blunt spleen trauma is variable. In this study it was found to 66.7%. Aseervathm R *et al*., [11], noted 62.4% and O.O. Lawal [12] noted 40% spleen preservation.The present study indicates that incidence of splenic trauma is increasing. It shows that the cases of splenic trauma were 11 in 2016 as compared to 18 and 21 in 2009 and 2010 respectively. W E. Longo et al found that automobile accidents (49%) are most common blunt splenic injury while falls injury were 22% [8].The study showed that abdominal pain was most common symptom (78%). Other important landmark for diagnosis of splenic trauma were evidence of injury mark on abdomen and left lower chest,guarding and rigidity and shock. Schwartz states that sign and symptoms are related to shock and peritoneal irritation. Shock is present in three quarters of cases. Love and Bailey that massive intra-abdominal hemorrhage indistinguishable from liver injury was suggested by localized sign of pain, tenderness and rigidity at the left upper quadrant.In the present study 64% had other associated injury

while 73% were recorded by L. Parson *et al.*, [15].The management of splenic injury resulting from blunt trauma is controversial. Siriratsivawong A, Kris *et al.*, [10] studied 008 patients with splenic injury. Patient were classified as operative management (OM; 39.9%) or NOM (60.1%) according to their initial plan of treatment. Of the patients in the NOM group. 75.3% were successfully managed non-operatively (SNOM) whereas 24.7% eventually required surgery. Mortality rate was highest in the OM group (35.6%) compared with the successful (16.7%) and failed NOM (17.9%0. Mortality was high regardless of management, and failure of NOM in older patients is associated with significant longer hospital stay.The Present study clearly indicates that splenic conservation can be tried safely both conservatively and operatively in majority of splenic injury patients and thus avoiding the short- and long-term complications of losing a spleen.

6. Conclusion

This retrospective clinical study of blunt abdominal trauma indicates that the road traffic accident is the major cause of splenic injury. Most of the splenic injury can be safely managed with conservation of spleen by operative as well as non-operative methods. Splenic injury still remains a challenge. Improved operative techniques, better understanding of spleen anatomy, advancement of anesthesia and operation theater facilities with excellent intensive care helped in improving the survivability of patients.

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