Original Research Article

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Hospital based study of non-operative management of blunt splenic trauma

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ABSTRACT

Background: Operative management by Splenectomy was the standard of care for blunt splenic trauma till recent years. This was based on the assumption that spleen has limited physiological role in adulthood and conservative management has a very high likelihood of potentially fatal haemorrhagic crisis.

Methods: This observational descriptive study was conducted during November 2013 to November 2015 at Department of Surgery, Government Medical College and Hospital, Aurangabad, Maharashtra, India. All patients diagnosed to have splenic injury due to blunt trauma, attending casualty or OPD or referred from other centers to our tertiary centre were included in the study.

Results: In our study of 32 cases, 25 (78.12%) patients underwent non operative management while 7 (21.87%) patients had splenectomy. 66.66% of children were managed conservatively, while 80.76 % of adults were managed by conservative management. 87.5% patients having systolic blood pressure < 90 mmHg, underwent operative management, while 63.63% of patients with pulse rate >100 had splenectomy. In 18 patients, there was no abdominal distension noticed and all of them underwent conservative management. 2 patients out of 8 patients with abdominal distension up to 2 cm underwent operative management. In 6 patients abdominal distension was noticed to be > 2 cm, among which 5 patients underwent operative management. In case of non-operative management, 22 patients out of 25 patients were discharged within 10 days, while in operative management 5 patients out of 7 patients were discharged after 10 days. Mean hospital stay in non-operative management was 6.88±5.34 days, while in operative management it was 13±3.3 days. In our follow up for post non operative management complications, 19 patients of 25 patients underwent CT scan at regular intervals; none of them had any complication.

Conclusions: Systolic blood pressure and abdominal distension are important parameters for deciding the management, according to our findings. Non operative management was done in majority of blunt splenic trauma cases which reduced the hospital stay. There were no serious complications noted in cases managed conservatively in our study population.

Keywords: Blunt splenic injury, CT scan, Splenectomy

INTRODUCTION

Operative management by splenectomy was the standard of care for blunt splenic trauma till recent years. This was based on the assumption that spleen has limited physiological role in adulthood and conservative management has a very high likelihood of potentially

fatal haemorrhagic crisis. However, with the realization of immunological function of spleen in adults, recognition of overwhelming infections occurring post splenectomy and the advancement in imaging and monitoring modalities, conservative management of blunt splenic trauma has gained considerable acceptance.^{1,2} Non-operative approach has now become

recommended mode of treatment in hemodynamically stable patients as it avoids the surgical and post-surgical complications of splenectomy.³⁻⁵ Present study describes the management and outcome of blunt splenic trauma cases at a tertiary care hospital in Marathwada region of Maharashtra in India.

METHODS

This observational descriptive study was conducted during November 2013 to November 2015 at Department of Surgery, Government Medical College and Hospital, Aurangabad, Maharashtra, India. Institutional Ethics Committee approved the study protocol. All patients diagnosed to have splenic injury due to blunt trauma, attending casualty or OPD or referred from other centres to our tertiary centre were included in the study. Informed consent was taken from all the participants.

Table 1: Grade, type and description of injury on CECT abdomen.

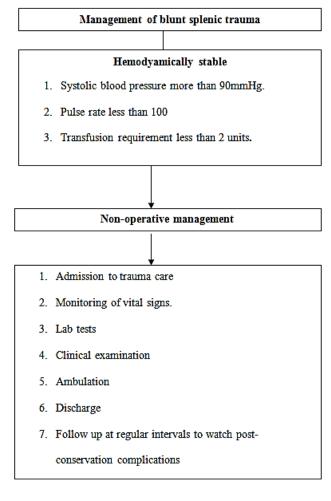
Grade	Type	Injury description		
ī	Hematoma	Subcapsular, < 10% surface area		
1	Laceration	Capsular tear, < 1 cm parenchymal depth		
Hematoma		Subcapsular, 10-50% surface area Intraparenchymal, < 5 cm in diameter		
II	Laceration	1-3 cm parenchymal depth; does not involve a trabecular vessel		
III	Hematoma	Subcapsular, > 50% surface area or expanding; ruptured subcapsular or parenchymal hematoma		
	Laceration	> 3 cm parenchymal depth or involved trabecular vessels		
IV	Laceration	Laceration involving segmental or hilar vessels and producing major devascularization (> 25% of spleen)		
	Laceration	Completely shattered spleen		
V	Vascular	Hilar injury that devascularizes spleen		

The study involved 32 cases of splenic injuries due to blunt trauma. Clinical evaluation and hemodynamic status was assessed for pulse rate, blood pressure, abdominal distension and biochemical and radiological investigations (haemoglobin, Sonography of abdomen and pelvis, CT scan of abdomen and pelvis). Patients were clinically and hemodynamically assessed on presentation and resuscitated by crystalloid solution and blood. Patients were then shifted to intensive care unit for monitoring of vitals like pulse rate, systolic blood pressure and abdominal distension. Thorough watch was

kept on vitals, abdominal distension and haemoglobin levels and if patient did not settle, he was operated. Patients who underwent non operative management were followed at 1, 2, 3, and 6 months interval and CT scan was done to check for late complications like, pseudoaneurysm, splenic abscess, and splenic cyst.

According to following CT scan grading, patients were graded.⁶

Flow chart for non-operative management



RESULTS

Observation from our study can be tabulated as follows.

Table 2: Non operative and operative management.

Procedure	Total	Percentage
Non operative	25	78.12%
Operative	7	21.87%

Total 32 cases of splenic trauma were studied.

66.66% of children were managed conservatively, while 80.76 % of adults were managed by Non operative management.

Table 3: Age distribution.

Management	Age in years	<15	16-29	30-49	Total
Operativa	Male	1	2	2	5
Operative	Female	1	1	0	2
Non ananativa	Male	3	10	11	24
Non-operative	Female	1	0	0	1
Total		6	13	13	32

Table 4: Age wise non-operative management cases.

Age	Non operative management	Operative management	Percentage of non- operatively managed patients
< 15 years	4	2	66.66%
> 16 years	21	5	80.76%

Table 5: Hemodynamic stability on presentation.

Parameters	Stable patients	Unstable patients	Total
Pulse rate	10 (31.25%)	22 (68.75%)	32
Systolic blood pressure	19 (59.37%)	13 (40.63%)	32

Table 6: Number of patients not stabilised after immediate resuscitation and underwent splenectomy later.

Parameters U	nstable	non operative management	Operative management
Pulse rate	11	4 (36.36%)	7 (63.63%)
Systolic blood pressure	8	1 (12.5%)	7 (87.5%)

87.5% patients having systolic blood pressure <90 mmHg, underwent operative management, while 63.63% of patients with pulse rate >100 had splenectomy. There was significantly higher number of patients with unstable systolic blood pressure in operative management group suggesting that systolic blood pressure is more important parameter for deciding the management, according to our findings.

Abdominal distension and operative management

In 18 patients, there was no abdominal distension noticed and all of them underwent conservative management. 2 patients out of 8 patients with abdominal distension up to 2 cm underwent operative management. In 6 patients abdominal distension was noticed to be > 2 cm, among which 5 patients underwent operative management. Thus as per our findings abdominal distension is an important

factor indicating whether patient will require operative management.

Table 7: Blood transfusions.

Blood transfusion (BT)	Total	Non operative management	Operative management
No BT	9	9	0
< 2 unit	16	15	1
3 or more unit	7	1	6
Mean units transfused		1.32±0.03	2.5±1.07

Around 9 (28.12%) of patents did not require blood transfusions, while 93.75% among conserved patients required less than 2 units and 85.71% among operated required 3 or more blood transfusion. A significantly large number of blood units were transfused in patients of the operative management group as compared to the non-operative management group.

Table 8: Radiological tests used.

Investigation	Patients	Non operative management	Operative management
CECT	26	19	7
Only USG	6	6	0

Table 9: American association of surgery for trauma: CECT grading of splenic injury.

Grade	Patients	Non operative management	Operative management
Grade I	2	2 (100%)	0
Grade II	5	4 (80%)	1 (20%)
Grade III	11	11 (100%)	0
Grade IV	5	1 (20%)	4 (80%)
Grade V	3	1 (33.33%)	2 (66.66%)
Total	26	19	7

Table 10: Hospital stay.

Procedure	Total	1-5 days	6-10 days	>10 days	Mean±SD
Non operative management	25	12	10	3	6.88±5.34
Operative management	7	0	2	5	13±3.3

In case of non operative management, 22 patients out of 25 patients were discharged within 10 days, while in operative management 5 patients out of 7 patients were discharge after 10 days. Mean hospital stay in non operative management was 6.88±5.34 days, while in operative management it was 13±3.3 days.

In 7 cases of operative management, 3 cases were operated within 24 hours of admission and rest 4 cases within 48 hours.

In study follow up for post non operative management complications, 19 patients of 25 patients underwent CT scan at regular intervals; none of them had any complication.

DISCUSSION

In this study of 32 cases, 25 (78.12%) patients underwent non operative management while 7 (21.87%) patients had splenectomy. Systolic blood pressure and abdominal distension are important parameters for deciding the management, according to our findings. Also, a significantly large number of blood units were transfused in patients of the operative management group as compared to the non-operative management group. Bala M et al have reported that 'systolic blood pressure upon admission as positive predictors for the success of non-operative treatment of splenic trauma, while the need for blood transfusion is a very strong predictor for splenectomy.⁵

Study found that patients with limited extra-abdominal injury (less than three regions) who do not require blood transfusion are significantly more likely to be treated successfully non-operatively'. CT scan was done in 26 patients of blunt splenic trauma, out of which 19 cases (73.07%) were managed conservatively. Soo KM et al studied Taiwan population-based data related to blunt splenic injury during a 12-year study period. They reported an increasing rate of use of CT scans from 40.3% in 1997 to 52.3% in 2008.

Study found the increasing use of CT scans was correlated with a decrease in the numbers of surgical interventions. The rate of surgical management decreased from 66.2% to 47.2% during same time period. They further mentioned that strategy of conservative management had been generally accepted after the popularity of CT scan. Similar to our observations, an Indian study by Hussain et al had concluded that blunt splenic injury can be managed non-operatively in a majority of patients.⁸

Limitations of this study include observational study design and small hospital based sample which reduces the external validity of the study. Further studies with better study designs and large diverse sample need to be done. However with the scarcity of data on the subject from this geographic location, it gives an insight regarding the factors related to conservative management option for blunt splenic trauma cases.

CONCLUSION

Systolic blood pressure and abdominal distension are important parameters for deciding the management, according to our findings. Non operative management was done in majority of blunt splenic trauma cases which reduced the hospital stay. There were no serious complications noted in cases managed conservatively in our study population.

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Ethical approval: The study was approved by the

institutional ethics committee

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