ORIGINAL ARTICLE

Management of Isolated Splenic Injuries after Blunt Trauma: An Institution's Experience Over 6 Years.

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SUMMARY

Forty-two patients with traumatic blunt splenic injuries were admitted over a six year period. Vehicular-related collisions and fall from height accounted for the injuries in 38 (90.5%) of them. Eleven (26.2%) underwent immediate surgery (7 splenectomy and 4 splenorrhaphy), while the remaining 31 patients were treated nonoperatively of which 3 underwent angio-embolisation. Twenty seven patients had either grade III or IV splenic injuries. Operative management was more likely in patients with lower haemoglobin or with more severe splenic injury. Nonoperative management can be adopted in patients with blunt isolated splenic injuries but operative management is still indispensable in certain instances.

KEY WORDS:
Isolated, Blunt, Splenic injuries, Trauma, Treatment Outcome

INTRODUCTION:

Management of traumatic splenic injury has evolved through the years. Splenectomy was the an appropriate preferred form of treatment decades ago, but with the heightened awareness of the dangers posed by overwhelming post-splenectomy infection (OPSI), preservation of spleen has become the standard of care in the attempt to preserve splenic function.[1-2] Success rate of over 80% have been reported in the literature for non operative management of traumatic splenic injuries.[3-5]

Our study was designed to review our institution's experience in the management of isolated blunt splenic injuries and to identify factors that could influence surgical intervention and outcome.

MATERIALS AND METHODS:

Study population

A retrospective review of all patients with traumatic splenic injuries presented to our institution over a six year period (January 2002 – December 2007) was performed. Tan Tock Seng Hospital is a 1300 bed hospital in Singapore that provides medical care to over 1.5 million people. It handles the highest number of trauma patients in Singapore and admits an average of 1000 serious trauma cases yearly, of which 96 percent were for blunt injuries, with 40 percent of trauma admissions having an injury severity score (ISS) of more than 16.

All patients with traumatic splenic injuries were included in our series. Patients were excluded from our series if they suffered penetrating injuries or had other abdominal viscera injuries. Splenic injuries were graded using the Organ Injury Scaling of the American Association for the Surgery of Trauma[6] with information obtained from either surgery, post-mortem examination or computed tomographic scans.

Data extracted included age, gender, mechanism of injury, admission haemodynamic parameters (systolic blood pressure and heart rate), Glasgow coma scale (GCS) score and the admission haemoglobin (Hb) levels and the Injury Severity Score (ISS), grading of splenic injury, type of operative intervention performed, the amount of red blood cell transfused, length of stay in specialised units, the total inpatient length of stay and eventual outcome.

All patients who were admitted for traumatic injuries would have a bedside ultrasound (FAST, Focused Assessment with Sonography for Trauma) performed in the emergency department. The findings of the FAST and the patients' haemodynamic stability would then be critical in determining immediate operative intervention or further imaging by computed tomographic (CT) scan. All trauma patients with splenic injuries are managed by the only dedicated surgical trauma team in the institution. The variables were analysed to the various outcomes using the Fisher's exact and the Mann Whitney tests. All analyses were performed using the Statistical Package for the Social Sciences (SPSS) 17.0 statistical package (Chicago, Illinois) and all p values reported are two-sided, and p values of < 0.05 were considered statistically significant.

RESULTS:

Study population

During the study period, 42 patients, median age 38 years (range, 14- 77 years), comprising of 81.0% (n = 34) males formed study group. Vehicular related collisions and fall from height accounted for the injuries in 27 (64.3%) and 11 (26.2%) patients respectively. The median time taken from the reception of the call for assistance till arrival at our emergency department was 18 (range, 10 – 34) minutes.

In the emergency department, the median systolic blood pressure of the study group was 115 (78 – 195) mmHg while the median heart rate was 92 (48 – 182) beats per minute. The median GCS and haemoglobin level were 15 (3 – 15) and 12.0 (6.7 – 16.1) g/dL respectively.

From the emergency department, eight (19.0%) patients were brought straight to the operating theatre while the remaining thirty-four (81.0%) underwent computed tomographic (CT) scans immediately from the emergency department which

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Table I: Comparison between the two groups of patients with blunt isolated splenic injuries (Operative vs. Non operative management)

Characteristics	Operative management (n = 11, 26.2%)	Non operative management (n = 31, 73.8%)	*p* value > 0.05
Age group (yrs)			
- Age ≤ 40	6 (54.5%)	14 (45.2%)	
- Age > 40	5 (45.5%)	17 (54.8%)	
Gender			
- Male	8 (72.7%)	26 (71.0%)	> 0.05
- Female	3 (27.3%)	5 (29.0%)	
Mechanism			
- RTA	6 (54.5%)	21 (67.7%)	> 0.05
- Falls	3 (27.3%)	8 (25.8%)	
- Others	2 (18.2%)	2 (6.5%)	
Grading of Splenic injuries: Number of patients			
- Grade 1	0 (0%)	5 (16.1%)	0.006
- Grade 2	1 (9.1%)	8 (25.8%)	
- Grade 3	3 (27.3%)	11 (35.5%)	
- Grade 4	6 (54.5%)	7 (22.6%)	
- Grade 5	1 (9.1%)	0 (0%)	
Mean ISS	28 (9 – 66)	22 (5 – 41)	> 0.05
HR (beats per minute)	92.4 (48 – 130)	96.7 (54 – 182)	> 0.05
1st Systolic BP (mmHg)	107 (78 – 146)	125 (78 – 195)	0.067
1st Hb (gm/dl)	10.7 (8.6 – 14.6) 1	3.1 (6.7 – 16.1)	0.005
Amount of red blood cells transfused (mls)	2755 (710 – 13212)	504 (0 – 5630)	0.003

confirmed the splenic injuries. Three of the patients who underwent CT scans initially were brought to the operating theatre immediately after assessment of their injuries.

In the operative management group (n = 11, 26.2%), seven patients underwent splenectomy while four had splenorrhaphy. In the non operative group (n = 31, 73.8%), none required eventual surgery though three underwent angio-embolisation for their splenic injuries, and all three procedures were successful without any complication.

Majority of the patients had either grade III (n = 14, 33.3%) or grade IV (n = 13, 31.0%) splenic injuries. There was one (2.4%) patient who had grade V injury who underwent immediate surgery, while another fourteen (33.3%) patients had grade I and II injuries. The median amount of red blood cells transfused was 720 (0 – 13212) mls. The median duration of stay in the specialized units and the total hospital were three (0 – 29) and seven (2 – 66) days respectively. There was one (2.4%) mortality in our series who perished from his massive injuries despite significant resuscitation.

Data analysis - Operative intervention vs. Non-operative management

As shown from table I, operative management was more likely in patients with lower Hb or with more severe splenic injury. They also required a higher amount of red blood cell transfusion. There were no significant differences seen between the two groups with regards to the ISS or length of stay.

DISCUSSION:

Non-operative management of traumatic splenic injuries has become the standard of care.[2-4] Some of the possible explanations for this evolution included: Improved quality and accessibility of computed tomography; better understanding of the physiology of critically ill patients; the availability of dedicated resources and skilled medical personnel allowing close monitoring of critically ill patients improved and accredited trauma scoring system; the accessibility to operating theatres and the increased expertise in embolisation, when immediately required and multiple studies illustrating the success and efficacy of nonoperative management.[4-5]

In our series, over 70% of the patients were successfully managed conservatively. The advantages of non operative management of blunt splenic injuries are the preservation of splenic function and to avert the complications associated with laparotomy. The major shortcoming is the sequelae of a delayed surgical intervention, if required.[7-8]

Even though none of our patients had failure of conservative treatment, there were numerous factors that have been shown to be associated with failure of non operative management. These include ISS > 15, AAST grade of splenic injury > III, older patients, low admission systolic blood pressure and higher transfusion requirement.[9-10]

Our initial operative intervention rate of 26% is comparable to other centres.[11] Previous reports has cited patients characteristics such as hypotension, tachycardia, abnormal haematocrit, coagulopathy and higher ISS, lower pH and multiple injuries as predictors for urgent surgical intervention,[12-13] which are similar to the findings in our series.

Should surgical intervention be required for the splenic injuries, options are usually confined to splenectomy and splenorrhaphy. Splenorrhaphy should only be carried out if the patient remains haemodynamically stable, could tolerate a longer surgery, and if the spleen was salvageable.[14] Splenectomy is indicated for more extensive splenic injuries or when patients are haemodynamically unstable.

CONCLUSION:

Non operative management can be adopted in majority of patients with blunt isolated splenic injuries but operative management is still indispensable in certain instances.

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