

Management of splenic injuries in a regional setting – a single centre retrospective review

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Purpose

The spleen is one of the most commonly injured solid organs in the intra-abdominal cavity following blunt trauma and the management of splenic injury continues to evolve [1]. Splenectomies were initially introduced in the 1930's in order to decrease the mortality rate that was associated with non-operative management (NOM) [2]. With the advances in medical knowledge, including a greater understanding of the anatomy of the spleen, better imaging, embolization techniques for haemorrhage control, and treatment of splenic artery pseudoaneurysms, NOM has increased success rates. Recent studies suggest that conservative management is now attempted in 60-80% of patients with a splenic injury with a success rate of 85-94% [3]. There is a lack of recent data on how a regional hospital, without access to interventional radiology, manages splenic injuries in Australia. The aim of this study is to look at the outcomes of management of splenic injury in a regional hospital in Queensland.

Methods

A retrospective audit of splenic injuries that presented to Mackay Base Hospital between 1999 and 2012 was conducted. Demographics, mechanism of injury and factors related to treatment were recorded.

Results

We reviewed 101 splenic injuries between 1999 and 2012. A total of 59 (58.4%) were treated with NOM and 42 (41.6%) were treated surgically. The number of splenic injury cases by age and sex are shown in Figure 1.

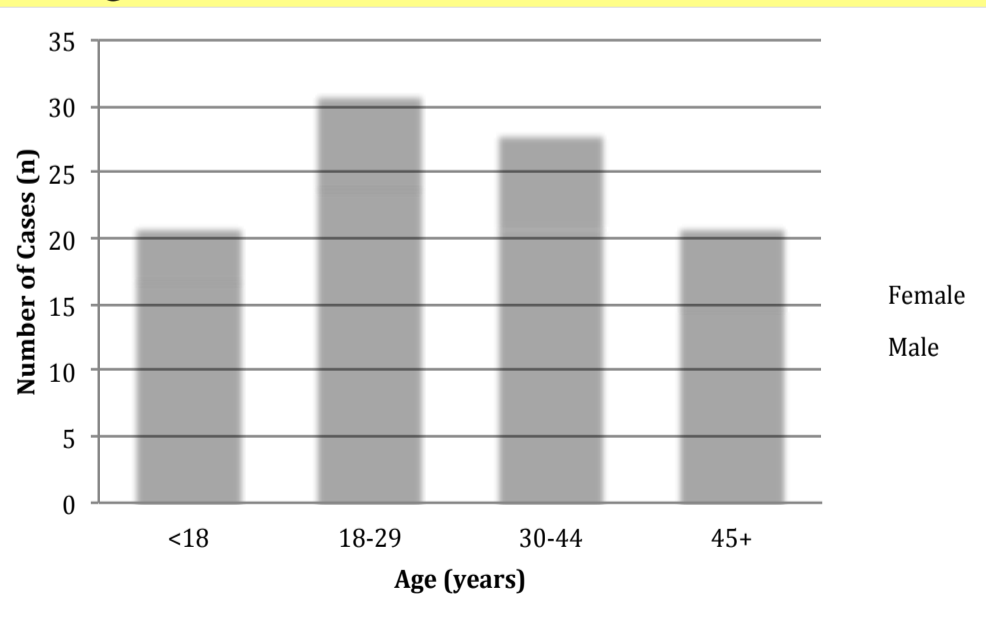


Figure 1. Number of cases of splenic injury by age and sex.

The causes of splenic injury can be seen in Figure 2. The numbers of patients that were stable vs. unstable and the management based on grade of splenic injury are shown in Table 1. The number of NOM vs surgical management by grade can be seen in Figure 3.

Figure 2. Mechanism of splenic injury as a percentage.

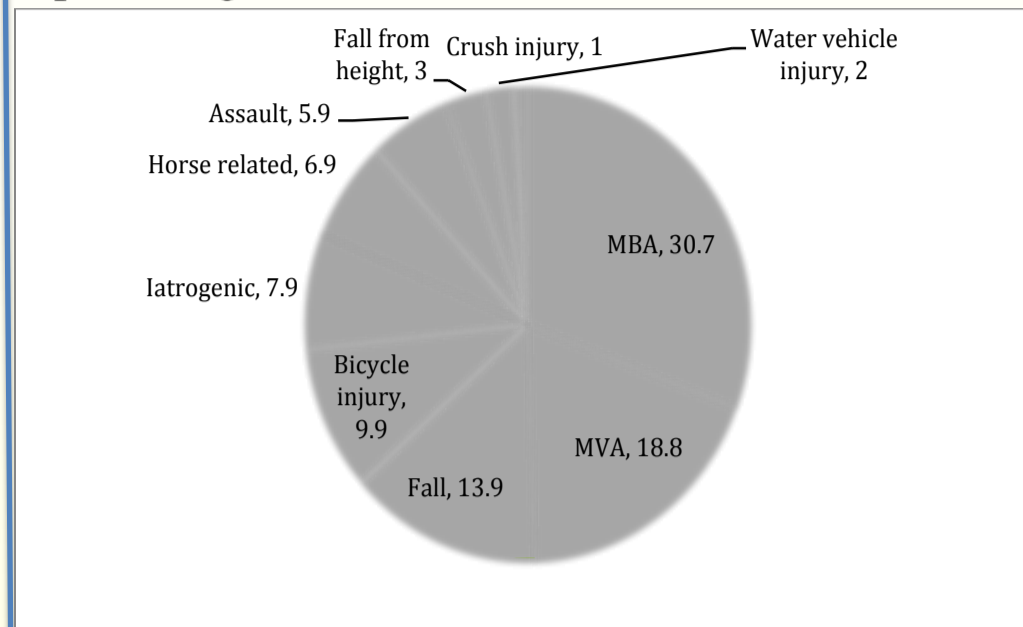
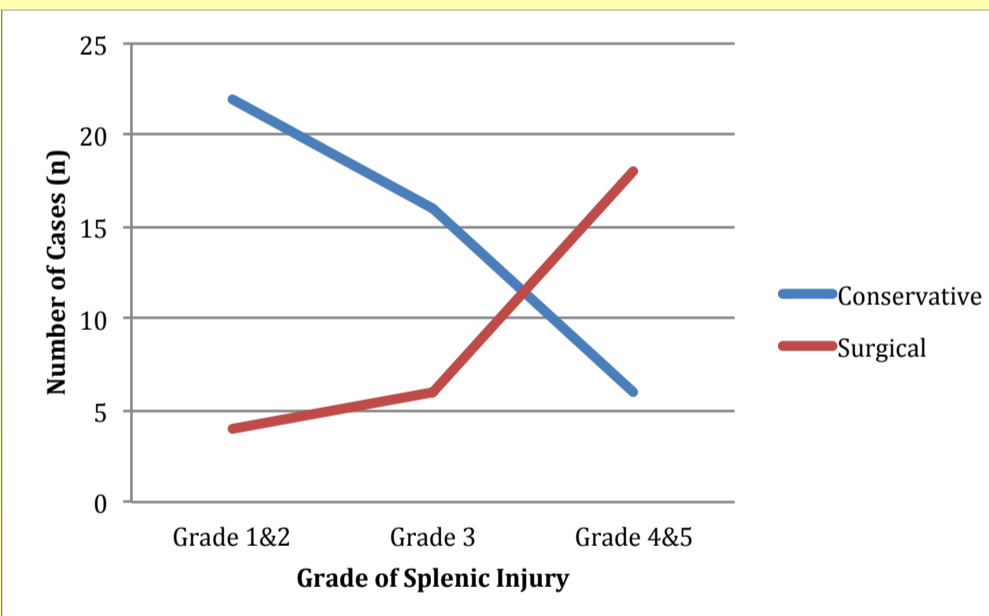


Table 2. Haemodynamic stability and management of splenic injury cases based on grade of splenic injury (AAST).

	Stable	Unstable	Conservative Management	Surgical Management
No grade	13 (20.6%)	16 (42.1%)	15 (25.4%)	14 (33.3%)
Grade 1&2	19 (30.2%)	7 (18.4%)	22 (37.3%)	4 (9.5%)
Grade 3	17 (27.0%)	5 (13.2%)	16 (27.1%)	6 (14.3%)
Grade 4&5	14 (22.2%)	10 (26.3%)	6 (10.2%)	18 (42.9%)
Total	63 (100.0%)	38 (100.0%)	59 (100.0%)	42 (100.0%)

Note: If imaging was not done (i.e. due to haemodynamic instability) or the imaging could not be found, patients were given no grade of injury. Haemodynamic stability was defined as heart rate >100 beats/min or systolic blood pressure >100 mm Hg.

Figure 3. Comparison of number managed conservatively versus surgically by grade of splenic injury (AAST).



Grade of injury, age and haemodynamic stability were significantly associated with whether a patient was managed surgically or with NOM ($p < 0.05$). Six patients needed to be taken to theatre after initial conservative management.

The only factor that was significantly associated with progression onto surgery was an increase in haematoma size ($p = 0.005$).

The mean number of transfusions in the NOM group was 1.02, whereas the mean number of transfusions in the surgical group was 7.62 (significantly different $p = 0.000$).

All of the NOM patients survived, while 6 surgically managed patients died. Mortality was significantly associated with surgical treatment ($p = 0.002$), mechanism of injury ($p = 0.041$) and haemodynamic status ($p = 0.011$).

Discussion

NOM continues to be reported as a successful approach in haemodynamically stable patients. Rates of attempted NOM internationally are similar to those in this study [4]. In keeping with previous studies, a patient's haemodynamic status, age and grade of splenic injury has significant impact in the decision making process for management [1, 5].

A study of 27 trauma centres in the USA demonstrated a failed NOM rate of 10.8% [6]. In this study, there was failure of conservative management in 6 cases (10.2% failure rate). Previous studies have recognized that factors associated with failed NOM include delayed or persistent haemodynamic instability, increased age, increased number of blood transfusions, worsening peritoneal signs on physical examination, and worsening imaging [7]. An increase in haematoma size was the only factor significantly associated with failed NOM in this study. A number of studies agree that failure of NOM can be recognised by the requirement of 2-6 blood transfusions in the first 24 hours [8]. This is consistent with our failed NOM patients who required >4 transfusions.

It is not surprising that surgical management was significantly associated with mortality, as these are more critically ill patients.

Conclusion

Management of splenic injury within a regional setting appears safe and effective. The proportion of patients successfully managed with NOM and those proceeding to operative management is in keeping with other published studies despite the lack of interventional radiology services

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