Splenic Trauma: Should we treat Differently?

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Abstract

A 36 year old male was admitted to Accident and Emergency Department following a motor vehicle accident. Clinical examination revealed a haemodynamically stable patient. Abdominal examination showed tenderness in right upper quadrant. Ultrasonography of the abdomen was normal. Haemoglobin on admission was 13 gm/dl. A repeated haemoglobin six hours later revealed a Hb of 10 gm/dl. Computerized tomography(CT) of the abdomen showed a ruptured spleen. As the patient was haemodynamically stable, it was decided to treat the patient in the HDU setting. His condition remained stable and he was fit to be discharged home on the fifth post-operative day.

Keywords

Splenic trauma, non-operative, abdominal CT, HDU.

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Introduction

''Medicine is not an exact science. Treatment modalities change according to the limits of the time.'' This statement is nowhere so appropriate as in the case of splenectomy following trauma. Zacarello performed the first splenectomy in 1549. However, splenectomy following trauma became more common in the 20th century with the introduction of the motor vehicle. The large number of patients who develop Overwhelming Post Splenectomy syndrome (OPSS) after splenectomy made splenic conservation an important consideration and the first partial splenectomy was performed in the 19th century. However this conservative approach only gained favour a century later.

In this paper we would like to report a case of non- operative treatment of splenic trauma locally and discuss the management of this condition.

Case Summary

A 36 year old male was admitted to St. Luke's Hospital after having been involved in a motor vehicle accident. Examination revealed a haemodynamically stable patient with a pulse rate (PR) of 100 min^{-1}, blood pressure (BP) of 110/70 mmHg and with a Glasgow Coma Scale (GCS) of 15. He complained of pain in the upper abdomen. Abdominal examination revealed tenderness in left upper quadrant and epigastrium. The chest X-ray was unremarkable and the abdominal X-ray showed no abnormality. Haemoglobin (Hb) at the time of admission was 13 gm/dl, hematocrit (hct) was 36. Ultrasonography of the abdomen was requested and this was reported as normal.

Clinical observation over 24 hr showed minor fluctuations in PR and BP. A repeated Hb six hours later revealed a Hb of 10 gm/dl. Despite this change, the physical examination remained unchanged.

A CT abdomen was performed the following morning. This revealed a grade II splenic rupture (Figure 1). There were no other abdominal injuries.

The patient was transferred to the High Dependency Unit (HDU) for observation. He was transfused four units of packed cells. He remained stable over the subsequent 24 hrs. CT scan was repeated 48 hrs after admission and no deterioration was noted (Figure 2). He was discharged home on the fifth day post-admission.

Figure 1: *Grade II splenic injury (parenchymal laceration 3cm and haematoma <5cm in diameter) free fluid in the peritoneal cavity.*

Figure 2: *Repeat CT scan 48hrs after admission, showing resolving post traumatic changes.*

Discussion

The spleen is the most frequently injured abdominal organ. Splenectomy for trauma was the gold standard until 1952 when King and Schumacker discovered the role of the spleen in the immune defense system[1].

Non-operative management of splenic injury in children is successful in over 90% of cases. In adults, it remains a controversial issue[2,3]. Total splenectomy is carried out in 25% of patients, splenorrhaphy in 50% and non-operative management in the remaining 25%[4] .

In patients with suspected splenic injury, who are admitted haemodynamicaly stable, repeated clinical examination is mandatory. CT is the investigation of choice. This allows staging of splenic injuries, estimation of intraperitoneal blood collection and selection of patients for non-operative treatment.

Grading of splenic injury based on CT scan findings is the most important predictor of non-operative treatment of blunt splenic trauma (Table 1)[5]. Exclusion of concomitant organ injuries is also important. Several studies have addressed non-operative management of splenic trauma. Elmore et al[6] successfully employed non-operative treatment in 35 of 41 selected patients; requirement for blood transfusion was found to be less in the non-operative group. Malangoni[7] has recommended non-operative treatment for grade I and II splenic injuries. The frequency of delayed bleeding is reported to be 0.3% to 1% of all splenic injuries. Delayed bleeding may occur at any time between 72hrs and four weeks[8]. Other complications of non-operative treatment include missed abdominal injuries, parenchymal infarction, infection, aseptic infarcts, and infected haematomas. Carlin[9] has published a review of 546 patients with splenic injury. Of the 298 that had blunt abdominal trauma, 99 (33%) did well with non-operative treatment

However, relatively small numbers of adults with splenic trauma can be treated non-operatively. This is because up to 60% are intoxicated or have an associated head injury, 15-20% have associated intra-abdominal injuries requiring treatment and 10-20% are or have been haemodynamically unstable. This was confirmed in Cogbill's multicentric study in which only 15% of patients were eligible for non-operative treatment[10]. The published experience with non-operative management of adults is limited and most of the studies do not clearly separate adult data from that of children. Shackford has found several studies from 1983 to 1989 where 237 adults were treated non-operatively and 69% of these were managed successfully, whilst the rest failed non-operative therapy and required splenectomy to achieve hemostasis[11].

The decision for non-operative treatment should be based on the following criteria:

1. Haemodynamically stable patient without signs of diffuse peritonitis.
2. CT scan staging splenic injury grade I and II.
3. No free fluid or small amount in the abdominal cavity.
4. No associated abdominal injuries requiring surgery.
5. No severe head injury.
6. The age of the patient should not be an indicator for operative treatment[12].

Table1: *Splenic Injury Scale*

AAST Organ Injury Scale - Spleen Injury [5]

Grade	Injury	Description
I	Haematoma	Subcapsular, <10% surface area
	Laceration	Capsular tear, <1cm parenchymal dept
II	Haematoma	Subcapsular, 10-50% surface area Intraparenchymal, <5cm diameter
	Laceration	1-3cm parenchymal depth not involving a parenchymal vessel
III	Haematoma	Subcapsular, <50% surface area or expanding Raptured subcapsular or parenchymal haematoma Intraparencymal haematoma >5cm
	Laceration	>3cm parenchymal depth or involving trabecular vessels
IV	Laceration	Laceration of segmental or hilar vessels producing major devascularization (>25% of spleen)
V	Laceration	Completely shattered spleen
	Vascular	Hilar vascular injury which devascularized spleen

Advance one grade for multiple injuries to same organ up to Grade III

On the basis of these criteria, if a conservative policy is adopted, the patient should be carefully followed up by a surgeon in an HDU setting. Hematocrit, Hb and WBC are repeated at frequent intervals.

Failure of non-operative treatment include:

1. A repeated CT scan after 12hrs which shows an increase in free fluid in peritoneal cavity.
2. Transfusion of more than two units of packed cells in 24 hrs.

Failure of this management frequently occurs within 72 hrs[13]. So, unless contra-indicated for other reasons, the patient can be fed after the 72 hrs observation period.

Conclusion

Splenic preservation or salvage should be practiced when feasible to prevent OPSS. However, it requires an experienced surgeon capable of recognizing and treating failed conservative therapy and a radiologist specialized in trauma. The patient should be monitored in HDU. This non-operative management would be indicated in type I and II splenic injuries.

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