MANAGEMENT OF TRAUMATIC SPLEEN INJURY

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History

- Spleen was the source of emotion
- Aristotle challenged this idea and argued that the spleen was unnecessary
- Gaius Pliny Secundus (Natural History) – remove the spleen to improve the speed of athletes.
- 1549 – first splenectomy performed by Adrian Zacarellie for hypersplenism
- 1590 – first traumatic splenectomy performed by Franciscus Rosetti. (Partial Splenectomy)
History Cont...

- Senn, N. 1903 – Described non-operative management of the spleen.
- Kocher 1911 – described high failure rate of NOP and advocated for surgical management for blunt traumatic injury.
- 1990s – successful NOP in adults.
Trauma Patient

- Traumatic injury to the LUQ
- Rib fractures 9-12 on the left
- “Seat belt sign”
- Hypotension
- Pain referred to the left shoulder increased with inspiration (Kehr’s sign)
- Penetrating trauma
Diagnostic Modalities

- FAST exam
- DPL
- CT scan
Grade I Injury

Subcapsular Hematoma: < 10% of surface area

Laceration: < 1cm into parenchyma
Grade II Injury

Subcapsular Hematoma:
10-50% of surface area

Laceration:
1-3cm in depth. Does not involve trabecular vessel
Grade III Injury

Subcapsular Hematoma:
- >50% of surface area
- Ruptured
- >5cm Intraparenchymal

Laceration:
- > 3cm
- Involving trabecular vessel

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Grade IV Injury

Laceration:
- Involves segmental or hilar vessels.
- >25% devascularization of the spleen

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Computed Tomography of Blunt Spleen Injury: A Pictorial Review
Grade V Injury

Shatter Spleen

Laceration of hilar vasculature.
Devascularized Spleen
Avulsion

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AAST Grading Chart

Grade I
- Laceration <1 cm
- Subcapsular hematoma <10% of surface area

Grade II
- Laceration 1-3 cm
- Subcapsular hematoma 10%-50% of surface area

Grade III
- Laceration >3 cm
- Subcapsular hematoma >50% of surface area
- Ruptured subcapsular or parenchymal hematoma

Grade IV
- Segmental or hilar vascular injury
- Devascularization >25% of spleen
- Hilar injury

Grade V
- Shattered spleen
- Hilar injury
To Operate or Not to Operate

80% of blunt splenic injuries can be managed non-operatively.
Eastern Association of Surgery for Trauma Guidelines

- **Level 1 Data:**
  1. Patient’s with hemodynamic instability or diffuse peritonitis should be taken urgently for laparotomy

- **Level 2 Data:**
  1. A routine laparotomy is not indicated in the hemodynamically stable patient presenting with an isolated spleen injury
  2. The severity of the injury, suggested by grade CT grade, neurologic status, age >55 and or the presence of associated injuries are not contraindications to a trial of NOP management.
  3. NOP should only be considered in an environment that has capabilities to monitoring, serial exams and available OR.
Failure of Non-operative Management Based on CT Grade

![Graph showing failure of non-operative management based on CT grade. The x-axis represents the grade of splenic injury (I to V), and the y-axis represents the failure rate (%). Grade V has the highest failure rate, while Grades I and II have the lowest.]

Grade I: Low failure rate
Grade II: Moderate failure rate
Grade III: Moderate failure rate
Grade IV: High failure rate
Grade V: Highest failure rate
Non-operative Management

- Serial Exams
- Serial hemoglobin/hematocrit
- Monitor vitals and urine output
- Period of immobility or bed rest

 +/- Follow up CT scan 24-48 hours

(Weinberg et al showed repeat CT scan at 24-48 hours for grades II and above diagnosed latent pseudoaneurysm that underwent embolization with improved outcomes.)
Embolization

- 1. AAST Grade III or Higher
- 2. Contrast Blush
- 3. Moderate Hemoperitoneum
- 4. Evidence of Ongoing Bleeding
Pros and Cons of Embolization

Cooney et al – showed use of selective arterial embolization to improve non-operative rates
Preservation of functional splenic tissue

Hann et al – 20% complication rate including failure to control bleeding, need for repeat embolization.
Failure to identify concurrent injuries
Splenic Abscess
Surgical Management

- 1. Midline incision
- 2. Evacuation of blood
- Packing of LUQ
- Medial/Downward rotation of spleen with posterior packing
- Pinch Hilum for control of bleeding.
- Exploration for concurrent injury.
Spleen Mobilization
Splenorrhaphy

- Linear lacerations or capusular tears may be managed by suture ligation of bleeding vessels, figure of eight closure, pledget butress or omental patch.
Splenic Mesh

- Useful with stellate or multiple lacerations to the spleen
- Specialized mesh bags
- Wrap spleen in conventional mesh.
- Tighten mesh around the spleen with stay sutures to tamponade bleeding.