


Maine Medical Center Trauma Clinical Practice Guideline (MMCT-CPG)		
<p>Splenic Trauma (MMC-CPG ID: 2023-13)</p>		 Maine Medical Center MaineHealth <i>centered around you</i>
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Guidelines translate best evidence into best practice. A well-crafted guideline promotes quality by reducing healthcare variations, improving diagnostic accuracy, promoting effective therapy, and discouraging ineffective – or potentially harmful – interventions.		

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## PURPOSE

These guidelines are not intended to supplant physician/APP judgement. Rather, these guidelines are intended to provide a basic framework for the assessment and management of Splenic Trauma

## BACKGROUND

The liver and spleen are the most commonly injured intra-abdominal organs. The spleen has approximately 25% of the total lymphoid mass of the body. The spleen is important for opsonization of encapsulated organisms.

Relevant anatomy includes the splenic attachments posteriorly to the diaphragm and kidney with variable thickness, inferior attachments to the splenic flexure of the colon, and medial attachments to the greater curve of the stomach and tail of the pancreas. The splenic capsule is thicker in children making non-operative management more successful. The main splenic artery will arise medially from the celiac axis and course at the upper border of the pancreas with the arterial supply can be variable near the hilum. Short gastric vessels travel from the greater curvature of the stomach. On exam one should look for left rib pain, pain referred to the left shoulder (Kehr's sign), abdominal wall ecchymosis and the presence of peritonitis on exam which excludes non operative management.

AAST Grade of splenic injury:

Classification	Description
<b>Grade 1</b>	<ul style="list-style-type: none"><li>– Subcapsular hematoma &lt;10% surface area</li><li>– Parenchymal laceration &lt;1 cm depth</li><li>– Capsular tear</li></ul>
<b>Grade 2</b>	<ul style="list-style-type: none"><li>–Hematoma: Subcapsular, 10-50% surface area</li><li>– Subcapsular hematoma 10–50% surface area; intraparenchymal hematoma &lt;5 cm</li></ul>

	– Parenchymal laceration 1–3 cm
<b>Grade 3</b>	<ul style="list-style-type: none"> <li>– Subcapsular hematoma &gt;50% surface area; ruptured subcapsular or intraparenchymal hematoma <math>\geq 5</math> cm</li> <li>– Parenchymal laceration &gt;3 cm depth</li> </ul>
<b>Grade 4</b>	<ul style="list-style-type: none"> <li>– Any injury in the presence of a splenic vascular injury or active bleeding confined within splenic capsule</li> <li>– Parenchymal laceration involving segmental or hilar vessels producing &gt;25% devascularization</li> </ul>
<b>Grade 5</b>	– Any injury in the presence of splenic vascular injury with active bleeding extending beyond the spleen into the peritoneum

Note: Advance one grade for multiple splenic injuries up to grade 3.

#### Reference:

Kozar RA et al. (2018). Organ injury scaling 2018 update: Spleen, liver, and kidney. J Trauma Acute Care Surg; **85**(6):1119- 1122

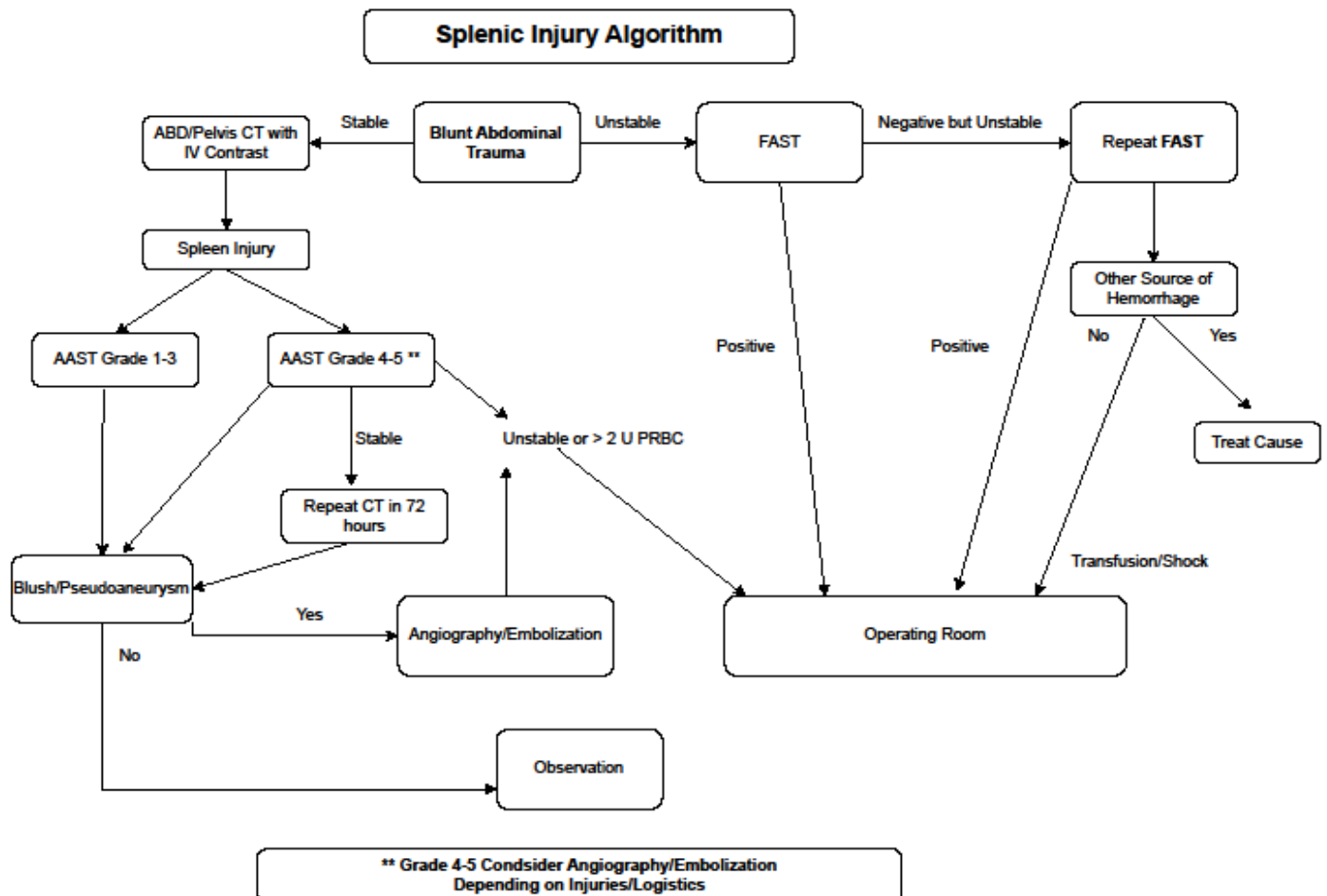
#### INITIAL MANAGEMENT

Initial evaluation and management should proceed with ATLS guidelines for primary survey. Patients may receive up to 1liter of fluid then blood as needed to maintain blood pressure. For patients with more advanced hemorrhagic shock principles of damage control resuscitation should be followed. Patients are categorized into hemodynamically stable and unstable groups. The presence of splenic injury may be suspected but it unknown at this stage.

- I. Hemodynamically unstable or transient responder- FAST (or Diagnostitc peritoneal aspiration)

- a. If positive OR exploratory laparotomy with possible splenectomy or splenorrhaphy based on findings
  - b. If negative search for other causes of shock
  
- II. Hemodynamically stable- CT scan with IV contrast
  - a. Blush/pseudoaneurysm- Angio and embolization regardless of injury grade
  - b. Consider this for high grade 4/5 injuries without blush, followed by non-operative management
  - c. No blush- non-operative management (80-94% successful in adults, >95% children).
  - d. Non operative management
    - i. Consider associated injuries i.e. head injury, age, severity of splenic injury and amount of hemoperitoneum but these do not preclude a trial of NOM (EAST guidelines level 2)
    - ii. Peritonitis goes to OR to evaluate for bowel injury
    - iii. Monitor for hemodynamic instability- Grade 3-5 in ICU for 24 hours, Grade 2 IMC
    - iv. Serial abdominal exams, NPO, bedrest for 24 hours with bathroom privileges for grades 2-5.
    - v. Serial hemoglobin measurements are a lagging indicator and are not reliable or useful for determining intervention. Use of frequent Hemoglobin measurements is discouraged. (Ref7,8)
    - vi. At 24 hours can start DVT prophylaxis if no contraindication
    - vii. Delayed splenic hemorrhage is uncommon after 24 hours of non-operative management. A recent AAST multi-institutional study found 12/383 (3.1%) patients with non operative management needed delayed splenectomy while hospitalized. This occurred between 24 hours and 9 days post injury. 1/366 patients had a delayed rupture at 12 days after discharge requiring splenectomy. Ref 4
  
- III. Postoperative complications after splenectomy include pancreatic tail injury, injury to greater curve of the stomach, delayed bleeding, subphrenic abscess and AV fistula.
  
- IV. For patients post splenectomy or truncal embolization, vaccines for Meningococcus, H flu and Strep Pneumoniae are given prior to discharge or at the 2 week post op timeframe. They can be repeated at 5 years. There are low risks of Overwhelming Post Splenectomy Infection (OPSI) in these patients estimated at less than 0.4% but associated with high mortality ref 5.
  
- V. For patients managed non-operatively, a repeat CT scan can be considered in the short term at 48-72 hours based on provider discretion to evaluate for pseudoaneurysm formation. Consider factors such as the grade of injury, trend in HB, splenic pathology and neurologic impairment. ( ref 1, 6)

- VI. Long term activity restrictions after non-operative management for blunt splenic injury include contact restriction for 4 weeks for grade 1, 8 weeks for grade 2-3 and 12 weeks for Grade 4-5 injuries (ref 1)



	<b>Low Grade (1,2,3) Recommendations</b>	<b>High Grade (4,5) Recommendations</b>
Vital Signs	q2° x 4, then q4° x 24°	q2° x 4, then q4° x 24°
Urine Output	q shift	q4°
IV access	16 Ga or better	16 Ga or better
IV Fluid	Maintenance Rate	Maintenance Rate
Diet	Regular	NPO for 24Hrs
Lab	Hgb on admission, and following day	Hgb on admission, 8 hrs after admission, then daily only at physician discretion
Activity	Up ad lib	Up ad lib

### **Discharge Instructions**

#### **Activity:**

- **Nonvigorous, normal activity weeks 0-6**
- **Vigorous activity weeks 7-12**
- **High impact activity / sports after 12 weeks**

**Expect mild increase in abdominal pain 7-10 days after injury.**  
**Should return to baseline after 1-2 days.**

#### **Call if:**

- **New, unrelenting pain**
- **Frequent light-headedness**
- **Persistent pain after 2 weeks**

## PERFORMANCE IMPROVEMENT MONITORING

### Intent / Expected Outcomes

1. Minimize delays in diagnosis and treatment
2. Optimize multidisciplinary management with Interventional Radiology, OR and Anesthesia

### Performance / Adherence Measures

1. Documentation of injury with reflect grading specified in CPG
2. Will assess adherence of documentation and adherence at morning sign out for all applicable patient and refer to PIPS process if indicated

### Data Source

Patient record

## SYSTEM REPORTING & FREQUENCY

The above constitutes the minimum criteria for PI monitoring of the MMCT-CPG. System reporting will be performed annually; additional PI monitoring and system reporting may be performed as needed.

The system review and data analysis will be performed by the MMC Trauma Service under the direction and responsibility of the MMC Trauma Medical Director and MMC Trauma Medical Program Manager.

## RESPONSIBILITIES

It is the Trauma Medical Director's responsibility to ensure familiarity, appropriate compliance, and PI monitoring with this MMCT-CPG.

## REFERENCES

1. Western Trauma Association (WTA) Critical Decisions in Trauma: Management of Adult Blunt Splenic Trauma-2016 updates. Rowell SE, Biffi WL et al. J Trauma. 2016;82:787-793.
2. Selective nonoperative management of blunt splenic injury: An Eastern Association for the Surgery of Trauma practice management guideline. Stassen, Nicole A. MD; Bhullar, Indermeet MD; Cheng, Julius D. MD; Crandall, Marie L. MD; Friese, Randall S. MD; Guillamondegui, Oscar D. MD; Jawa, Randeep S. MD; Maung, Adrian A. MD; Rohs, Thomas J. Jr MD; Sangosanya, Ayodele MD; Schuster, Kevin M. MD; Seamon, Mark J. MD; Tchorz, Kathryn M. MD; Zarzuar, Ben L. MD; Kerwin, Andrew J. MD. Journal of Trauma and Acute Care Surgery: November 2012 - Volume 73 - Issue 5 - p S294–S300
3. Injury to the Spleen. David Wisner. Trauma seventh edition. Mattox, Moore, Feliciano editors, 2013.
4. Zarzaur BL, Kozar R et al. The splenic injury outcomes trial: An American Association for the Surgery of Trauma multi-institutional study. J Trauma Acute Care Surg. 2015 Sep;79(3):335-42.
5. Peitzman AB, Harbrecht BG et al. Failure of observation of blunt splenic injury in adults: variability in practice and adverse consequences. J Am Coll Surg. 2005;201:179.
6. Coccolini F, Montori G et al. Splenic trauma: WSES classification and guidelines for adult and pediatric patients. World Journal of Emergency Surgery (2017) 12:40.
7. Frotan MA, Edmundson P, Cooper C, Tibbs B, Garlow L, Vandertulip K, Miller A, Aryal S, Roden-Foreman JW, Shires GT 3rd. Role of Serial Phlebotomy in the Management of Blunt Solid Organ Injury in Adults. J Trauma Nurs. 2023 May-Jun 01;30(3):135-141. doi: 10.1097/JTN.0000000000000718. PMID: 37144801.
8. Madbak F, Price D, Skarupa D, Yorkgitis B, Ebler D, Hsu A, Kerwin AJ, Crandall M. Serial hemoglobin monitoring in adult patients with blunt solid organ injury: less is more. Trauma Surg Acute Care Open. 2020 May 14;5(1):e000446. doi: 10.1136/tsaco-2020-000446. PMID: 32432171; PMCID: PMC7232739.
9. Regions Hospital Clinical practice Guidelines – Solid Organ Management Adult. <https://regionstrauma.org/protocols/solidorgan.pdf>. Accessed June 8, 2023.