PRACTICE GUIDELINE

Effective Date: **6-18-04** Manual Reference: **Deaconess Trauma Services**

TITLE: NON-OPERATIVE MANAGEMENT OF LIVER / SPLENIC INJURIES

PURPOSE:

- To define when non-operative management of liver and/or splenic injuries are safe and desirable.
- To define a clinical pathway for the non-operative management of liver and/or splenic injuries.

DEFINITIONS:

LIVER

1. Grade I Hematoma: Subcapsular, <10% surface area
2. Grade I Laceration: Capsular tear, <1 cm parenchymal depth
3. Grade II Hematoma: Subcapsular, 10-50% surface area
4. Grade II Laceration: Intraparenchymal, <10 cm in diameter Capsular tear, 1-3 cm parenchymal depth, <10 cm length
5. Grade III Hematoma: Subcapsular, >50% surface area or expanding
6. Grade III Laceration: Ruptured subcapsular or parenchymal hematoma Intraparenchymal hematoma >10 cm or expanding >3 cm parenchymal depth
7. Grade IV Laceration: Parenchymal disruption involving 25-75% of hepatic lobe or 1-3 Couinaud's segments within a single lobe
8. Grade V Laceration: Parenchymal disruption involving >75% of hepatic lobe or Vascular: >3 Couinaud's segments within single lobe, Vascular: Juxtahepatic venous injuries; i.e., retrohepatic vena cava/central major hepatic veins, and hepatic avulsion

SPLEEN

1. Grade I Hematoma: Subcapsular, <10% surface area
2. Grade I Laceration: Capsular tear, <1 cm parenchymal depth
3. Grade II Hematoma: Subcapsular, 10-50% surface area
4. Grade II Laceration: Intraparenchymal, <5 cm in diameter Capsular tear, 1-3 cm parenchymal depth which does not involve a trabecular vessel
5. Grade III Hematoma: Subcapsular, >50% surface area or expanding
6. Grade III Laceration: Ruptured subcapsular or parenchymal hematoma Intraparenchymal hematoma >5 cm or expanding >3 cm parenchymal depth or involving trabecular vessels
7. Grade IV Laceration: Laceration involving segmental or hilar vessels producing major devascularization (>25% of spleen)
8. Grade V Laceration: Vascular Completely shattered spleen or Hilar vascular injury which devascularizes spleen

GUIDELINES

1. Indications: Non-operative management of splenic and/or liver injury can be considered when all of the following conditions have been met
    b) Diagnosis of splenic and/or liver injury on CT scan.
    c) Hemodynamically normal patient that has not required or has responded quickly to the resuscitation.
    d) No other intra-abdominal injury requiring laparotomy.
    e) Available for monitoring except for short operative procedures.
    f) No other major sources of blood loss.
    g) No other premorbid illnesses that suggest the patient could not tolerate blood loss (e.g., severe ischemic heart disease).
    h) Willingness to take blood transfusion.

2. Non-operative management liver injury: Grade III or higher
    a) Consider admitting all Grades III or higher liver lacerations or those with significant blood around the liver to Intensive Care Unit.
    b) Monitor hourly vital signs until normal (e.g., pulse < 100/min).
    c) Bed rest.
    d) NPO, and draw serial hematocrit and hemoglobin every 6 hours until stable (within 2%) X 2, then:
        i) Transfer to regular floor
        ii) Advance diet
        iii) Ambulate
        iv) Hematocrit/Hemoglobin daily
        v) May consider chemical DVT prophylaxis
        vi) Discharge when stable, tolerating diet, and ambulating.
        vii) After discharge:
            a. No school or work for a week
            b. No physical education for six weeks
            c. No major contact sports: three months
            d. Return to trauma clinic in two weeks
            e. Instruct to return to the ED if
                1) worsening RUQ pain
                2) fever
                3) jaundice.
                4) dizziness/lightheadedness

3. Non-operative management of Grade I – II liver injuries without significant hemoperitoneum.
    a) Admit to floor
    b) Ambulate
    c) Diet as tolerated
    d) Hematocrit/Hemoglobin daily
    e) May consider DVT prophylaxis

f) Discharge when stable, tolerating diet, and ambulating
g) After discharge
    i) No school or work for a week
    ii) No physical education for six weeks
    iii) No major contact sports: six weeks
    iv) Return to Trauma Clinic in two weeks

4. Non-operative management splenic injuries
    a) Admit all Grade II or higher splenic injuries to Intensive Care Unit. Consider admitting stable Grade I splenic injuries to floor with telemetry.
        i) Draw serial hematocrit and hemoglobin every 6 hours until stable (within 2%) times 2
        ii) Monitor hourly vital signs
        iii) NPO & bed rest, until hemoglobin and hematocrit stable (within 2%) times 2
    b) When hematocrit is stable and there have been no adverse hemodynamic events
        i) Transfer to regular floor or discontinue telemetry
        ii) Advance diet
        iii) Hematocrit and hemoglobin daily
        iv) If stable and tolerating a diet, discharge 2 days after ambulation begins
    c) After discharge
        i) No school or work for a week
        ii) No physical education for six weeks.
        iii) No major contact sports (e.g., football) for 3 months.
        iv) Return to trauma clinic in two weeks.
        v) Instruct to return to ED if
            a. worsening left upper quadrant pain
            b. dizziness/lightheadedness
            c. syncope or hypotension
            d. fever

5. Indications for angiographic embolization of splenic injury
    a) Hemodynamically stable and 1 or more of the following
        i) Contrast blush or extravasation on CT scan
        ii) Grade 4 or 5 splenic injury
        iii) Grade 3 injury with evidence of ongoing splenic bleeding (i.e. transfusion of PRBCs required or trending downward of Hgb/Hct)
    b) Consider administering vaccinations typically given post splenectomy and same discharge instructions as non-op spleen management (see above).

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REFERENCES:

- Deaconess Trauma Guideline Manual, PENETRATING INJURIES TO THE ABDOMEN.
- Deaconess Trauma Guideline Manual, BLUNT ABDOMINAL TRAUMA.
- IU/ Eskenazi, Level 1 Trauma Center Trauma Care Protocols and Management Guidelines. Division of Trauma, Critical Care and Emergency Surgical Services.
- Stassen, et. al. EAST practice management guidelines work group. Selective nonoperative management of blunt splenic injury: An Eastern Association for the Surgery of Trauma practice management guideline. November 2012. http://www.east.org/resources/treatment-guidelines/blunt-splenic-injury,-selective-nonoperative-management-of (accessed 5/1/2013)
- Stassen, et. al. EAST practice management guidelines work group. Selective nonoperative management of blunt hepatic injury: An Easter Association for the Surgery of Trauma practice management guideline. November 2012. http://www.east.org/resources/treatment-guidelines/blunt-hapatic-injury,-selective-non-operative-management-of (accessed 5/1/2013)

REVIEWED DATE	**REVISED DATE**
Previous dates removed for space	SEP 2009
OCT 2012	MAY 2013
AUG 2014	
DEC 2015	
JAN 2016	
JAN 2017	
JAN 2018	
JAN 2019	
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Indications for Angiographic Embolization of Splenic Injuries