CLINICAL PATHWAY:

Blunt Liver and Spleen Injury

THIS PATHWAY SERVES AS A GUIDE AND DOES NOT REPLACE CLINICAL JUDGMENT.

Inclusion Criteria: Blunt trauma to abdomen or torso with concern for liver/spleen injury
Exclusion Criteria: Penetrating injury to chest or abdomen, clinically significant CNS or thoracic injury, suspected physical abuse (see **Suspected Physical Abuse Pathway**)

Initial Care in the ED:

- Consult Pediatric Surgery/Trauma via Voalte or call/text 860-578-5071
- History and physical exam
- Trauma labs (CBC, type and cross), amylase/lipase, "trauma panel"
- CXR
- Consider pelvis X-ray
- Consider Focused Assessment with Sonography for Trauma (FAST) exam
- Establish reliable IV access

Seatbelt sign mandates a hospital admission

Hemodynamic instability and/or peritonitis?

Yes →

OR for laparotomy

- Initiate pRBC transfusion and Massive Transfusion Protocol (MTP)
- Notify OR and anesthesia immediately
- Treat off pathway

No ↓

CT scan abdomen/pelvis with IV contrast

CT shows isolated liver or spleen injury?[1,2]

No → Evaluate off pathway for other injuries

Yes ↓

[1]Consider Interventional Radiology (IR) embolization for recurrent hypotension or Hgb <7 (see **Appendix A: Process for Activating IR**)
[2]"Blush" on CT scan is not necessarily an indication for IR embolization in pediatric patients

Grade I-III Liver/Spleen Injury

Admit to MS Unit:

Labs:

- CBC on admission then q6hr x1
- Further labs at the discretion of pediatric surgeon

FEN/GI:

- Advance as tolerated
- **Miralax** 1 g/kg/day PO once daily (max 17 g/day) until stooling

Pain:

- **Acetaminophen** 15 mg/kg/dose PO q6hr (max 1000 mg/dose, not to exceed 4000 mg/day)
- Consider **oxycodone** 0.1 mg/kg/dose (max 5 mg/dose) PO q4hr **or morphine** 0.05 mg/kg/dose (max 5 mg/dose) IV q3hr **or hydromorphone** 0.015 mg/kg/dose (max 0.5 mg/dose) q3hr PRN if acetaminophen is insufficient

Other:

- Vital signs q4hr
- Activity as tolerated
- Sequential compression devices (SCD) if age ≥12 years
- Tertiary survey and CRAFFT screen (for alcohol and substance misuse) by MS nurses within 24 hrs

Discharge Criteria:
Hgb/Hct stable x3; afebrile; normal HR & UOP; tolerating diet; minimal abdominal pain

Discharge Medications:

- **Miralax** 1 g/kg/day PO once daily (max 17 g/day) PRN constipation
- **Acetaminophen** 15 mg/kg/dose q6hr PRN pain (max 75 mg/kg/day or 4000 mg/day)

Discharge Instructions:

- No strenuous activity or contact sports for grade of injury + 2 weeks. Only activities that keep 2 feet on the ground (no trampolines, no bikes, no dirt bikes, no horseback riding, no ATV, no skiing, etc)
- Follow up with pediatric surgery in 4-6 weeks after discharge

Grade IV-V Liver/Spleen Injury

Consider Admission to PICU:

Labs:

- Hct q6hr until vitals are normal for age

FEN/GI:

- NPO until vitals are normal for age and Hct stable

Pain:

- **Acetaminophen** 15 mg/kg PO q6hr (max 1000 mg/dose, not to exceed 4000 mg/day)
- Consider **oxycodone** 0.1 mg/kg/dose (max 5 mg/dose) PO q4hr **or morphine** 0.05 mg/kg/dose (max 5 mg/dose) IV q3hr **or hydromorphone** 0.015 mg/kg/dose (max 0.5 mg/dose) q3hr PRN if acetaminophen is insufficient
- Consider **morphine or hydromorphone PCA** – **Please see PCA policy**

Other:

- Vital signs q2hr x24 hrs, then q4hr if stable
- Bedrest until vitals normal for age, then activity as tolerated
- Sequential compression devices (SCD) if age ≥12 years
- Foley catheter (remove prior to transfer to MS floors)

Consider transfusion for:

- Unstable vitals after 20 mL/kg bolus of isotonic IVF
- Hemoglobin <7 g/dL
- Signs of ongoing or recent bleeding

Hemodynamically stable x12 hrs?

Yes → (to Grade I-III Admit to MS Unit)

No ↓

Failure of non-operative management

Management strategy at the discretion of the attending pediatric surgeon.

1. Continue non-operative management
or
2. Angiography and embolization
or
3. Exploratory laparotomy

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LAST UPDATED: 10.20.26

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CLINICAL PATHWAY:
Blunt Liver and Spleen Injury
Appendix A: Process for Activating IR

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Management Algorithm for Trauma/Surgery Patients Requiring Interventional Radiology Procedures

Pediatric Patient with injury or surgical problem

***Connecticut Children's Anesthesia Team will contact the HH Anesthesia provider and discuss the anesthesia plan based on patient's age and nature of injury.**

Indications for a stat IR procedure:

- **Solid Organ Injury with hemodynamic instability**
- **Sepsis secondary to organ space infection**
- **Pelvic fracture with hemodynamic instability**
- **Surgically inaccessible vascular injury**
- **Refractory T&A bleed**

Is an IR procedure needed in <60 minutes?

Yes

- Pediatric Surgery Attending will contact the IR Attending Directly (use QR code for schedule)
- IR Attending will activate the IR team
- Page Pediatric Anesthesia (860-220-7770)*
- Complete paper requisition, fax with recent H&P and patient face sheet to 860-545-0130 (IR) and 860-545-1065 (admitting)
- Call HH Admitting to confirm receipt
  - Regular Hrs 860-972-2706
  - After Hrs 860-972-2009
- Place Consult IR order in CT Children's EPIC
- Order appropriate test/intervention as directed by IR Attending
- Trauma to accompany patient to IR for procedure
- 1-2 guardians may accompany patient to IR

Post-IR procedure Is patient hemodynamically stable?

No

Recover in PICU as appropriate

Yes

Recover in PACU and then admit to Med/ Surg Floor

No

Use standardized process for scheduling an IR procedure

- Place "Consult IR" order in EPIC
- Call Radiology Facilitator
- INR <1.8
- Order cultures if abscess drain placed
- Contact Pedi Anesthesia if required*

IR Call Schedule
Scroll to "Primary IR call"

Phone numbers:

- **HH Radiology Facilitator (860-972-2273)**
- **HH IR fax (860-545-0130)**
- **Pedi Anesthesia* (860-220-7770)**
- **Blood Bank (860-972-2845**

Metrics:

- **Door to Decision (minutes)**
- **Time interval between request and arterial puncture**

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