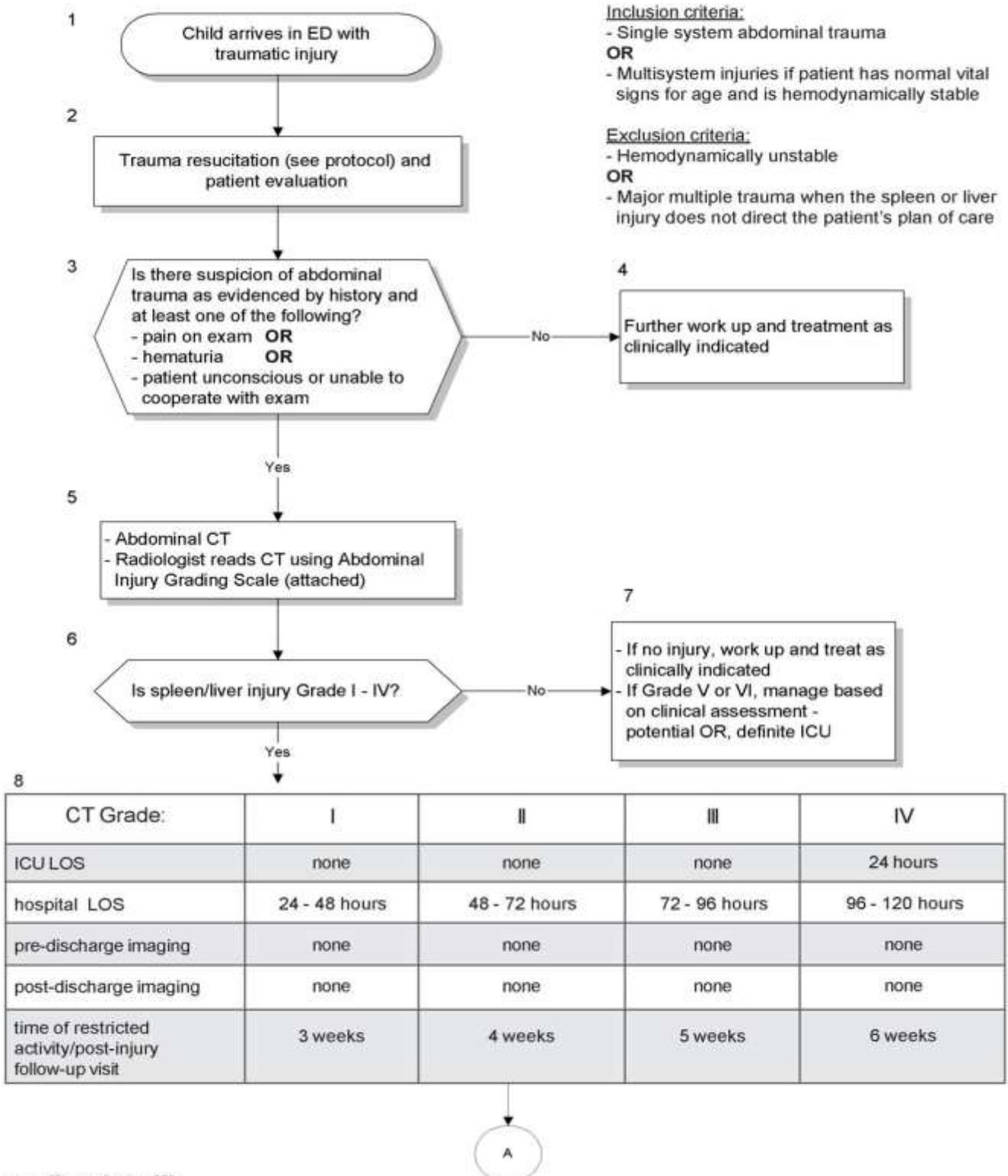
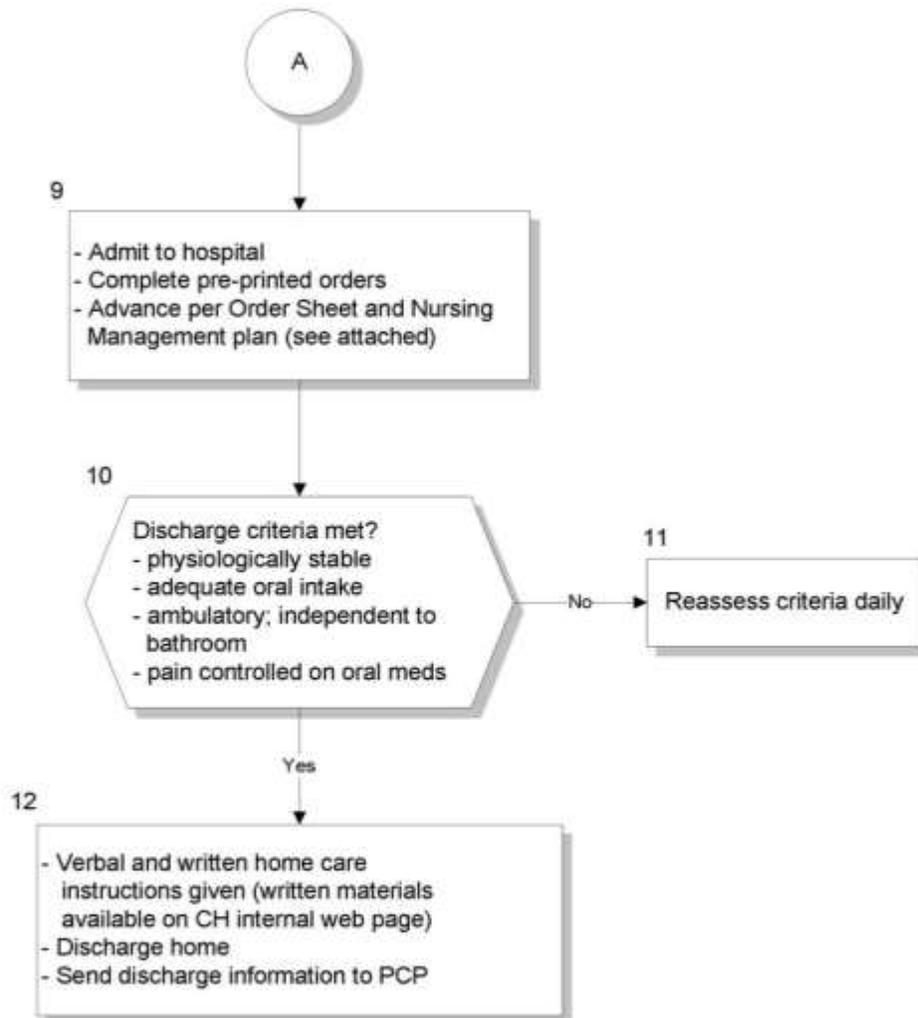


ISOLATED LIVER / SPLEEN INJURY CPG ALGORITHM





Isolated Liver and Spleen Injury Guidelines

The purpose of the following guidelines is to facilitate standardized, up-to-date, evidenced based management of the physiologically stable pediatric trauma patient with an isolated liver or spleen injury. Patients with additional minor injuries may also be managed according to the guidelines, if the liver or spleen injury is their predominant injury. The plans of care as outlined below are intended to supplement the ongoing assessment and management of a patient's treating physician. They do not supersede clinical judgment and ought to be adjusted as necessary for the care of an individual patient. The guidelines themselves are subject to revision in the future as our knowledge of the optimal care of the injured child increases.

| | Grade I | Grade II | Grade III | Grade IV |
|---|---|--|--|---|
| Admit to | floor | floor | Floor / ICU x 24hrs (depending on need for increased monitoring capability) then floor if stable | ICU x 24hrs then floor if stable |
| Hospital LOS | 2 days | 3 days | 3-4 days | 4-5 days |
| Lab Tests | HCT 12hrs post injury | HCT 12hrs post injury | HCT 12hr, 36hr post injury | HCT 6hrs, 18hrs & 48hrs post injury |
| Clinical Assessment & monitoring | VSq 2hrs x 8hrs, then q 4hrs; C/R/Pox monitoring x 24hrs; Strict I & O | VSq 2hrs x 8hrs, then q 4hrs; C/R/Pox monitoring x 24hrs; Strict I & O | VSq 2hrs x 8hrs, then q 4hrs; C/R/Pox monitoring x 24hrs; Strict I & O | VSq 1hr x 12hrs, then q 2hrs x 12hrs, then q 4hrs; C/R/Pox monitoring x 24hrs; Strict I & O |
| Treatments & procedures | Incentive Spirometry prn | Incentive Spirometry prn | Incentive Spirometry q 2hrs until ambulatory; NG/Foley as indicated | Incentive Spirometry q 2hrs until ambulatory; NG/Foley as indicated |
| Nutrition | NPO x 8hrs, clears, then ADAT | NPO x 12hrs, clears, then ADAT | NPO x 24hrs, clears then ADAT | NPO x 24hrs, clears then ADAT |
| Activity | Bedrest x 8hrs then OOB to toilet only. Ambulation 12hrs prior to discharge | Bedrest x 24hrs then OOB to toilet only. Ambulation 12hrs prior to discharge | Bedrest x 24hrs then OOB to toilet only. Ambulation 12hrs prior to discharge | Bedrest x 48hrs then OOB to toilet only. Ambulation 12hrs prior to discharge |
| IV Fluids | Maintenance IV while NPO then saline lock with good PO intake | Maintenance IV while NPO then saline lock with good PO intake | Maintenance IV while NPO then saline lock with good PO intake | Maintenance IV while NPO then saline lock with good PO intake |

| | Grade I | Grade II | Grade III | Grade IV |
|---|---|---|---|---|
| Medications | Mild pain - Tylenol 15mg/kg po/pr q 4hrs prn | Mild pain - Tylenol 15mg/kg po/pr q 4hrs prn Moderate Pain - Tylenol with Codeine 1mg/kg po q 4hrs prn Severe Pain - Morphine 0.1mg/kg IV q 2-4hrs prn | Mild pain - Tylenol 15mg/kg po/pr q 4hrs prn Moderate Pain - Tylenol with Codeine 1mg/kg po q 4hrs prn Severe Pain - Morphine 0.1mg/kg IV q 2-4hrs prn | Mild pain - Tylenol 15mg/kg po/pr q 4hrs prn Moderate Pain - Tylenol with Codeine 1mg/kg po q 4hrs prn Severe Pain - Morphine 0.1mg/kg IV q 2-4hrs prn |
| Pre and Post discharge imaging | none | none | none | none |
| Restricted activity for normal age appropriate activities | 3 weeks | 4 weeks | 5 weeks | 6 weeks |
| Restricted activity for full contact/competitive sports or play | *6 weeks | *8 weeks | *12 weeks | *16 weeks |
| Return to school | 1 week | 1 week | 1-2 weeks | 1-2 weeks |
| Follow-up clinic visit | 2 weeks | 2 weeks | 2 weeks | 1-2 weeks |
| <p>*Return to full-contact / competitive sports or play (Gymnastics, dance, Biking, Skiing, Snow boarding, Sled riding, Swimming, Jungle Gyms, Skateboarding, Rollerblading, Running and Jogging, Basketball, Soccer, Football, Boxing, Diving, Ice/Field Hockey, Lacrosse, Martial Arts, Rodeo, Rugby, Wrestling, Handball, Mountain Climbing, etc) is at the discretion of the individual's pediatric trauma surgeon.</p> | | | | |

Splenic and Liver Trauma Guideline

- 1) Indications for nonoperative treatment:
 - a) Single system abdominal trauma.
 - b) Multisystem injuries if patient has normal vital signs for age and is hemodynamically stable
 - c) CT Scan with IV contrast shows entire spleen perfused or fully vascularized
 - d) No associated intra-abdominal injuries
 - e) No systemic illness such as mononucleosis or blood clotting abnormalities
 - f) Stable vital signs with modest volume transfusions
- 2) Indications for operative treatment:
 - a) Major multiple trauma when the spleen or liver injury does not primarily direct the patient's plan of care

- b) Refractory hemodynamic instability, implying ongoing hemorrhage, that is refractory to embolization
- c) Blood loss >1/2 of total blood volume (40cc/kg)

3) Refer to Liver and Spleen Injury CPG for management

Spleen and Liver Injury Grading Scales

| <i>Spleen injury scale (1994 revision)</i> | | |
|---|------------|--|
| Grade | Injury | Description |
| I. | Hematoma | Subcapsular, <10% surface area |
| | Laceration | Capsular tear, <1cm parenchymal depth |
| II | Hematoma | Subcapsular, 10-15% surface area; intraparenchymal, <5cm diameter |
| | Laceration | 1-3cm parenchymal depth which does not involve a trabecular vessel |
| III | Hematoma | Subcapsular, >50% surface area or expanding; ruptured subcapsular or parenchymal hematoma Intraparenchymal hematoma >5cm or expanding |
| | Laceration | >3cm parenchymal depth or involving trabecular vessels |
| IV | Laceration | Laceration involving segmental or hilar vessel producing major devascularization (>25% of spleen) |
| V | Laceration | Completely shattered spleen |
| | Vascular | Hilar vascular injury which devascularizes spleen |

| <i>Liver injury scale (1994 revision)</i> | | |
|--|------------|---|
| Grade | Injury | Description |
| I | Hematoma | Subcapsular, <10% surface area |
| | Laceration | Capsular tear, <1cm parenchymal depth |
| II | Hematoma | Subcapsular, 10-50% surface area; intraparenchymal, <10cm in diameter |
| | Laceration | 1-3cm parenchymal depth, <10cm in length |
| III | Hematoma | Subcapsular, >50% surface area or expanding; ruptured subcapsular or parenchymal hematoma Intraparenchymal hematoma >10cm or expanding |
| | Laceration | >3cm parenchymal depth |
| IV | Laceration | Parenchymal disruption involving 25-75% of hepatic lobe or 1-3 Couinaud's segments within a single lobe |
| V | Laceration | Parenchymal disruption involving >75% of hepatic lobe or >3 Couinaud's segments within a single lobe |
| | Vascular | Juxtahepatic venous injuries; i.e. retrohepatic vena cava/central major hepatic veins |
| VI | Vascular | Hepatic avulsion |

From: Moore EE, Cogbill, TH, et al. Organ injury scaling: spleen and liver (1994 revision). J Trauma 1995; 38:323.

Home Care Instructions Following a Liver or Spleen Injury

Informational:

This sheet gives you information on how to care for your child at home following an injury causing a liver or spleen laceration.

Nutrition

Although your child may not feel like eating a regular meal, it is important that your child eat a balanced diet and drink as much fluid as he or she did before the injury. If your child needs to increase the type or amount of meat or vegetables needed, the nutritionist will give you suggestions.

Activity

- Plan quiet activities for the first 7 days at home. Your child does not need to stay in bed, but should walk and play quietly.
- Have your child avoid rough play with family, friends and pets.
- Your child should not participate in any activities or sports that involve jumping, climbing, or rolling such as, bike riding, in-line skating, dance, gymnastics, football, basketball, soccer or track.
- Do this until your child's doctor says it is okay to return to normal play.

Day care or School

- Your child can return to day care or school after one full week at home.
- At school, your child should not be taking gym class until the doctor says it's okay.
- Your child should leave class 5 minutes before the other students, to avoid bumping into other children in the halls.
- Your child should not be carrying or lifting more than 1 to 2 textbooks at a time, even if they are in a book bag or backpack.

Medications

- Give your child the medication that he or she took before the injury.
- **Do not** give your child ibuprofen (also known as Motrin[®], Advil[®], Aleve[®]), until the doctor says it is okay.

Pain

- Your child may have some discomfort and soreness at home
Give acetaminophen (also known as Tylenol[®]) for pain relief. Acetaminophen comes as a tablet, caplet, and liquid. It is used to relieve mild to moderate pain and to reduce fever. It is very important to take acetaminophen exactly as directed by your doctor. Follow the directions on the package and ask your doctor or pharmacist to explain any part you do not understand. Do not take more or less of it than prescribed by your doctor. Do not take it any more often than prescribed by your doctor.
- Your child's doctor may give you a prescription for pain medication. Give the pain medicine if the pain does not go away 1 hour after giving acetaminophen. Follow the instructions on the bottle. Give pain medicine as prescribed and instructed by your doctor and nurse.

Wound and Skin Care

- Your child may shower or take a tub bath, but may need help for several days after going home.

- If your child has cuts or scrapes on the skin from other injuries, wash the areas with warm, soapy water and patted dry.
- If your child has stitches, follow the specific instructions on caring for them.

Emotional Recovery

- After the injury, your child may be tired and irritable. It takes time to heal. Use this time for rest and quiet activities. Reassure your child that he or she will feel better soon.
- Have your child play board games, read, or do small craft projects for short periods of time.
- Infants and toddlers are a bit more difficult to distract and will be more difficult to confine. Try putting your infant or toddler in a large crib or playpen.
- Ask family and friends to visit, but for short periods of time and not at the same time to minimize activity.

Follow-up

- A follow-up appointment with your Pediatric Surgeon or Primary Care Provider will be scheduled if possible before you leave the hospital.
- The doctor's telephone number will be given to you on the discharge instruction sheet.

Call the Medical Center Surgeon Who Cared for Your Child in the Hospital if:

- Your child develops any new or different back, side or shoulder pain or discomfort from the injury.

Call Your Child's Regular Doctor or Nurse Practitioner (Primary Care Provider):

- For all new or different health concerns.