PURPOSE

To provide an evidence-based framework for the evaluation of trauma patients with suspected or definitively identified hepatic injury.

DEFINITIONS

Expectant management: Intentional non-operative approach to hepatic injury management, after consideration of a patient's overall co-morbid illness and injury burden. Appropriate vigilance must be maintained to ensure patients failing non-operative management are identified without delay. Physician and nursing staff directly involved in a patient's care are to be aware of the patient's phase of care, particularly during the early period of inpatient hospital care.

On initial patient admission, a clear plan is to be communicated to resident and nursing staff for tracking a patient's (a) serum hemoglobin; (b) serial abdominal exam; and (c) vital signs. A typical schedule for serial lab draws will be every 6 to 12 hours for the first 24 to 48 hours then once or twice daily thereafter.

POLICY STATEMENTS

A carefully performed physical exam, with an awareness of limitations imposed by individual patient factors such as diminished mental status, remains central to decision making in the trauma bay. Appropriately selected adjunct diagnostic studies are used to minimize the risk of missed injury. A clinician deciding on which studies to recruit in the evaluation of a trauma patient will need to be cognizant of the hemodynamic stability of the patient. A modified hemodynamic instability scoring system cited in the Western Trauma Association Splenic Trauma Algorithm Guidelines provides a useful framework for classifying a trauma patient's hemodynamic status, with blunt abdominal trauma patients exhibiting Grade 4 and 5 hemodynamic instability generally requiring immediate laparotomy. Trauma patients requiring surgical intervention for hemorrhage control have better outcomes, and improved survival, if interval from injury to surgical control of bleeding is minimized. Abdominal CT scan with IV contrast is the most reliable method to identify and assess the severity of injury to the liver and other intra-abdominal solid organs. The severity of hepatic injury (as suggested by CT grade or degree of hemoperitoneum), neurological status, and/or the presence of associated injuries are not contraindications to nonoperative management. In the presence of ongoing bleeding, the decision to attempt angiographic embolization needs to be made with an awareness of the patient’s evolving hemodynamic status, overall injury burden, and available endovascular capabilities. There is a significant incidence of complications with non-operative management of hepatic injuries, with complication rates for Grade IV and V injuries being 21 and 63% respectively.

PROCEDURE STATEMENTS

1. ATLS precepts will guide the initial evaluation and management of trauma patients at IMMC.
2. A patient’s initial hemodynamic status and early response to resuscitation will dictate/determine the parameters within which the trauma team must act in planning the patient’s subsequent workup and injury management.

3. A FAST (+) patient who requires aggressive ongoing resuscitation (i.e. Grade 4 or 5) instability should be triaged to the OR. Extremely rare exceptions to this guideline may exist (e.g. assessing for futility due to brain injury, assessing for pelvic hemorrhage that may be more amenable to angioembolization).

4. A negative FAST in a hemodynamically unstable patient reliably rules out the abdomen as the source of hemodynamic instability, although FAST may need to be repeated during the patient’s resuscitation before this conclusion can be arrived at with appropriate certainty.

5. In patients with Grades 4 and 5 instability in whom there is reason to doubt intra-abdominal hemorrhage as the source for the instability, the trauma team should consider continuing resuscitation in the OR while further evaluation of refractory shock is continued.

6. Patients who are identified to have hepatic injuries on CT imaging should have these injuries graded according to the AAST Liver Injury Scale. Note, however, that the clinical status of the patient is the primary consideration in deciding whether the patient needs an intervention.

7. Any evidence of active ongoing hemorrhage on CT scan imaging should addressed by angioembolization or surgical intervention. The decision on where to perform the angioembolization (i.e. in radiology or in surgery) should be made by the trauma surgeon.

8. If non-operative management is attempted, monitor serum hemoglobin every 6 - 8 hours for 24 to 48 hours, and then less frequently as the patient's clinical status permits.

9. Any signs of recurrent hemorrhage should prompt a re-evaluation of the patient. A patient with recurrent hemorrhage may need emergent surgery, re-imaging, or more frequent monitoring of abdominal exam, labs and vitals.

10. Follow-up CT imaging of a patient's hepatic injury may be considered, particularly for higher grade injuries. In general, however, follow-up CT imaging is prompted by a clinical finding that raises concern for a complication (e.g. fever raising concern for abscess, or jaundice raising concern for biloma).

11. Bedrest or restricted activity in the hospital is not supported in the literature for isolated splenic injury. Nonetheless, various protocols have been proposed in the literature for stepwise return to normal activity.

Related References:


J Wayne Meredith et al, Nonoperative Management of Blunt Hepatic Trauma: The exception or the rule? J of Trauma 1994; 36 (4): 529 - 535
Initial Assessment

Hemodynamically unstable
Grade 3 – 5

FAST

FAST (-)  FAST (+)

Consider other causes for instability
Continue resuscitation in ER or in OR
Consider repeat FAST
Consider DPL

UNSTABLE

LAPAROTOMY

Hemodynamically stable
Grade 0 – 2

FAST

FAST (+)  FAST (-)  FAST (+)

Hemodynamic instability
Surgical pathology on CT

Responding to Resuscitation

Grade 3

CT Scan

Blush

No Blush

Blush

Grade 3 – 5 Injury

Unstable

Grade 0 – 2 Injury

ANGIOGRAPHY

ADMIT FOR EXPECTANT MANAGEMENT

Hemodynamic Instability Score

Grade 0  Never hypotensive or tachycardic
Grade 1  Resolved pre-arrival hypotension or tachycardia
Grade 2  Hypotension or tachycardia responded to < 2L initial volume loading, no ongoing volume requirement
Grade 3  Modest ongoing volume requirement
Grade 4  Large initial volume requirement, vigorous ongoing volume requirement
Grade 5  Hypotension and tachycardia unresponsive to volume
Blunt Splenic Injury (Suspected or Confirmed)

Predictive Factors for Intra-abdominal Injury
- Abnormal chest or pelvic x-rays
- Abnormal chest or pelvic exam
- Abnormal FAST
- Intubation and/or GCS < 14
- SBP <90 mmHg
- Multiple injuries
- Long bone fractures
- Seatbelt Sign
- Macroscopic hematuria

Predictive Factors for Laparotomy
- Physiologic deterioration
- Worsening abdominal exam
- High grade solid organ injuries
- High and/or increasing transfusion requirements
- Failed angioembolization
- Multiple intra-abdominal injuries
- Unexplained fever
- Hollow viscus injury on CT scan