Pediatric Trauma
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Pediatric Trauma Program Manager
I Have No Financial Disclosures

(although like many nurses, I wish I did!)
What is Pediatric Trauma & Why is it Important?

• The focus of any trauma program is care provided in the emergency department by emergency care providers

• Pediatric trauma care is basically the same as adult trauma

• Pediatric trauma (injury) is the fourth leading cause of pediatric death in the United States, behind cancer, heart disease and second hand smoke

• EMS will ALWAYS transport all traumatically injured patients less than 18 years old to pediatric trauma centers
Trauma Programs Manage/Evaluate Care Across the Entire Continuum

- Pre-hospital
- Emergency Department
- Inpatient Admission
- Rehabilitation
- Discharge

PEDiatric Trauma Injury Prevention
Pre-Hospital Focus

• Trauma Centers are involved in the development in EMS protocols that included treatment, transport and destination

• Trauma Centers review run reports and care provided to ensure adherence to established medical control protocols

• Should also function as a resource for EMS personnel as it relates to education, follow up, outcomes, etc.
What is a Trauma Program

Trauma Center Verification is an evaluation process done by the American College of Surgeons (ACS) to evaluate and improve trauma care. The ACS does not designate trauma centers; instead, it verifies the presence of the resources listed in Resources for Optimal Care of the Injured Patient. These include commitment, readiness, resources, policies, patient care, and performance improvement.

Mission
The mission of the American College of Surgeons Committee on Trauma (ACS COT) is to develop and implement programs that support injury prevention and ensure optimal patient outcomes across the continuum of care. These programs incorporate advocacy, education, trauma center and trauma system resources, best practice creation, outcome assessment, and continuous quality improvement.

Vision
To eliminate preventable deaths and disabilities across the globe by preventing injury and improving the outcomes of trauma patients.

Sources: https://www.amtrauma.org/page/traumalevels
https://www.facs.org/quality-programs/trauma/about-trauma
Even the Internet Doesn’t Get It

“A trauma center is a hospital equipped and staffed to provide care for patients suffering from major traumatic injuries such as falls, motor vehicle collisions, or gunshot wounds.

A trauma center may also refer to an emergency department without the presence of specialized services to care for victims of major trauma.”

(https://en.wikipedia.org/wiki/Trauma_center)
Levels of Trauma Verification

Level I

• Level I Trauma Center is a comprehensive regional resource that is a tertiary care facility central to the trauma system. A Level I Trauma Center is capable of providing total care for every aspect of injury – from prevention through rehabilitation. A Level I trauma center provides the highest level of surgical care to trauma patients. (This is true for Pediatric specific resources as well)

• Transfer to a level I trauma center reduced absolute mortality risk in head injured patients by 10.1% (95% confidence interval 0.3%, 22.2%) compared with transfer to level II trauma centers*.

• Additionally, a Level I center has a program of research, is a leader in trauma education and injury prevention, and is a referral resource for communities in nearby regions.

Levels of Trauma Verification

Level II
- A Level II Trauma Center is able to initiate definitive care for all injured patients.
- Level II centers provide 24-hour availability of all essential specialties, personnel, and equipment. Lower volume requirements may depend on local conditions.
- These institutions are not required to have an ongoing program of research or a surgical residency program.

Level III (May be ACS verified or State of Michigan designated)
- A Level III Trauma Center has demonstrated an ability to provide prompt assessment, resuscitation, surgery, intensive care and stabilization of injured patients.
- It is the expectation that the most severely injured patients will be transferred to a Level I facility as soon as the patient is stabilized.
Levels of Trauma Verification

**Level IV** (designated by the State of Michigan)

- Emergency department facilities are able to implement ATLS protocols and 24-hour laboratory coverage. Available trauma nurse(s) and physicians available upon patient arrival.
- May provide surgery and critical-care services if available.
- Has developed transfer agreements for patients requiring more comprehensive care at a Level I or Level II Trauma Center.
- Incorporates a comprehensive quality assessment program
- Involved with prevention efforts and must have an active outreach program for its referring communities.
When Adult and Pediatric Trauma Centers are Alike

• In the State of Michigan, Level I & II trauma centers are verified by the American College of Surgeons
• Each is required to have a Trauma Medical Director, Trauma Program Manager, Trauma Registrar and Injury Prevention programming
• There is a requirement of research at ALL Level I centers
• All programs are required to have Process Improvement and Quality Assurance procedures in place
## Current State of Michigan Trauma Centers

<table>
<thead>
<tr>
<th>Trauma Facility Name</th>
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<th>Pediatric Expiration</th>
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Summary: 10 Level I Centers, 24 Level II Centers, 19 Level III Centers, 29 Level IV Centers
3 Level I Pediatric Centers, 4 Level II Pediatric Centers
Tracking Performance

- A trauma registry is a disease specific data collection composed of a file of uniform data elements that describe the injury event, demographics, prehospital information, diagnosis, care, outcomes and costs of treatment for injured patients. Trauma registry data must be collected and analyzed by every trauma center.
- Valuable resource for retrospective and prospective research and performance improvement
What is a Trauma Patient – The Simple Answer

• A person that has suffered any intentional or unintentional injury that has the potential to cause serious bodily harm, loss of life or limb
Although like most things, it’s not that simple

Just because it quacks like a duck.....

Doesn’t mean it’s a duck!
• Key component of trauma care is the delivery of timely resources to the most critically injured patient.
• Attending Pediatric Surgeons have a response threshold of 15 minutes to arrive at the bedside of the highest activated (most critically injured patients)
• Activation criteria is based on injury, hemodynamic stability and need for additional resource (OR, IR, etc.)
Pediatric Criteria should accommodate for age specific parameters for vital signs – otherwise, much of the activation criteria is similar.

### C. S. Mott Children’s Hospital
**Pediatric Trauma & Burn Activation Criteria**

#### Traumatic Injury with Unstable Vital Signs (determined by age parameters below) OR:
- Gunshot wounds, impaled objects or penetrating wounds to the head, neck, chest or abdomen
- High voltage electric injury/lightning strike
- Threatened limb to include: amputation, near amputation, degloving, significant crush injury (i.e. lawnmower) or pulseless extremity (any of these present in more than just fingers and toes)
- Any burn with unstable vital signs or inhalation injury with threat of airway compromise
- GCS < 8 with mechanisms attributed to trauma
- Documented decline in neuro status
- Paralysis following traumatic injury
- Focal neurologic deficit
- Subdural/epidural (> 1cm thickness or w/ midline shift) in patient transferred from another facility
- Respiratory compromise/obstruction
- Intubated trauma patients
- Rescue airway in place
- Transfer patients from other hospital receiving blood or fluids to maintain vital signs

**Physician discretion**

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<td>&gt;12 years</td>
<td>&lt; 10 or &gt; 30/minute</td>
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#### Traumatic Injury with Stable Vital Signs (determined by age parameters below) with:
- Multi-system injuries
- Open long bone fractures
- Burns >20% (Full- or partial-thickness)
- Full thickness circumferential burns
- All solid organ injury
- Depressed or open skull fracture
- GCS 9-13 (not related to medication administration)
- No change in GCS from initial evaluation
- No focal finding
- Stable respiratory status
- No respiratory distress or need for emergent invasive airway
- No signs or symptoms of shock (SBP within range below)
- No ongoing fluid infusion to maintain

**Physician discretion**

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<td>10 - 30/minute</td>
<td>Or &gt; 90 mmHg</td>
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**Class I Trauma**
- Auto, pedestrian/lost control, run over, or with significant (> 20mph) impact
- Motorcycle crash > 20 mph
- High energy dislocation or rapid decelerating incidents such as:
  - Ejection from vehicle, motorcyclist, ATV, animal
  - Stabbing with object with cementum
  - Shatter explosion

**Class II Trauma**
- Falls: Child > 30th or 3 height of child
- Blunt abdominal injury with firm or distended abdomen or injury evidence (e.g. belt sign, tendinous arc)
- High risk auto crash with:
  - Intoxication of vehicle > 0.2
  - Occupant compartment killed or other seat
  - Death in same passenger compartment
Pediatric Trauma Activations

Level I Activations:

- High Intensity
- High Complexity
- Low Frequency

HIGH STRESS
• Utilizing a sticker system with necessary roles identified is helpful in reducing the number of staff around the bedside during the initial resuscitation
• Too many staff members can hinder staff having the ability to provide interventions
• Two roles that we include in our crucial roles are:
  • Social work to support the parent/caregiver
  • Child Life to support the patient
    • Child life specialists are pediatric health care professionals who work with children and families in hospitals and other settings to help them cope with the challenges of hospitalization, illness, and disability
CHILD LIFE WAITING FOR THE TRAUMA WITH THE REST OF THE TRAUMA TEAM
Pediatric Trauma Patients are NOT Little Adults

Some differences are obvious:

- Variations in size
- Breathing patterns
- Big heads in proportion to body
- Gathering history
Pediatric Trauma Patients are NOT Little Adults

Some differences are not so obvious:

- Airway is smaller, flexible and the larynx is more anterior
- Chest wall is thin and flexible
- Hypotension is a late sign of shock
- Abdomen often protrudes due to weak abdominal muscles
- A child’s response to trauma is unpredictable
Pediatric Trauma Patients are NOT Little Adults

Variations in resuscitation:

• Difficult to estimate equipment due to variations in child size

• Medication dosages are based on weight

• Volume resuscitation is also based on weight

• Do we still follow the ABCs?
Use of Protocols

- Use of standard protocols can reduce variances of care between providers – established guidelines for care based on injury
- Ensures minimum, established care guidelines are followed. Can also minimize over treatment and testing
- Allows for tracking of adherence to established guidelines
Use of Protocols

- Guide care of pediatric patients during hospitalization, and ensures consistency with discharge standards

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<tr>
<td>CBC</td>
<td>Q 6 hours until stable*</td>
<td>Q 6 hours until stable*</td>
<td>Q 6 hours until stable*</td>
<td>Q 2-4 hours until stable*</td>
</tr>
<tr>
<td>Vitals</td>
<td>Q4 hours x24 On monitor</td>
<td>Q4 hours x24 On monitor</td>
<td>Q2 hours x 8 then q4 on monitor</td>
<td>Per ICU</td>
</tr>
<tr>
<td>Bedrest</td>
<td>Until CBC is stable</td>
<td>Until CBC is stable</td>
<td>Until CBC is stable</td>
<td>48 hours Then ambulation for 12 hours prior to D/C</td>
</tr>
<tr>
<td>Minimum Hospital LOS</td>
<td>1 day</td>
<td>2 days</td>
<td>3 days</td>
<td>4 days</td>
</tr>
<tr>
<td>Routine pre/post discharge imaging**</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Restricted Activity non contact</td>
<td>4 weeks</td>
<td>4 weeks</td>
<td>4 week</td>
<td>4 weeks</td>
</tr>
<tr>
<td>Restricted Activity contact</td>
<td>3 months</td>
<td>3 months</td>
<td>3 months</td>
<td>3 months</td>
</tr>
<tr>
<td>Return to School</td>
<td>&lt;1 week</td>
<td>1 week</td>
<td>2 weeks</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Follow up</td>
<td>1 month</td>
<td>1 month</td>
<td>1 month</td>
<td>1 month</td>
</tr>
</tbody>
</table>

*Stable is when 3 HCT/HB are within 10% of each other

** US imaging may be performed if injury involved hilar area and concerned about pseudoaneurysm. Please note that this is not supported or refuted in the literature.

Hospital LOS / Minimum Stay = Grade of Injury
Gathering History - Ensuring the Injuries Match the Story

Some things to consider:

- Does the mechanism of injury make sense?
- Was care sought right away?
- Does the story match the child’s developmental stage?
- Does the story change?
- Are there other injuries present?
- Are there distinct patterns of bruising?
- Are there bruises in areas of the body not routinely bruised?
# Suspicious Bruising

<table>
<thead>
<tr>
<th>Accidental Bruising</th>
<th>Abnormal or Suspicious Bruising</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forehead</td>
<td>Cheeks of the face</td>
</tr>
<tr>
<td>Head</td>
<td>Buttocks</td>
</tr>
<tr>
<td>Chin</td>
<td>Ears</td>
</tr>
<tr>
<td>Knees</td>
<td>Neck</td>
</tr>
<tr>
<td>Elbows</td>
<td>Back</td>
</tr>
<tr>
<td>Outer arms</td>
<td>Genitals</td>
</tr>
<tr>
<td>Shins</td>
<td></td>
</tr>
</tbody>
</table>
Patterned Bruising

Slap mark

Ear grab

Pattern bruise to abdomen (shoe)

Grab mark

Follow the Clues

• Along with mechanism of injury, physical exam findings are key to guiding pediatric trauma care

• One example:
  – Seat belt sign after an MVC – was it a lap belt only, five point harness, or no seat belt sign. Cannot always rely on driver/parent/patient to know or relay how the child was riding
  – Was the infant still rear facing? Was the car seat still in the vehicle? Gather as much information as possible from those on scene
  – If an older patient, were they wearing the shoulder belt correctly?
Follow the Clues

“Yes, of course my child was in a booster….”

- Gather as much information from EMS as possible
- Not all boosters are the same nor are they all appropriate for every child
- Parents will often transition children into or out of boosters too early
- Pictures from EMS are helpful

Picture from scene (yes, this is a restaurant booster and offers no safety value when used as a car booster)
Case Example: The Importance of Seatbelts

• 18 year old female – presented after involved in an MVC. She was a front seat passenger wearing her seatbelt (lap belt only – shoulder harness was behind back)

• Immediately upon extrication, patient c/o pain to abdomen, low back and left arm. On arrival to CES, EMS reported “possible deformity to lumbar spine”. Pt was able to move lower extremities, but had decreased strength/sensation.

• Large seatbelt sign – “V” of belt was noted across mid, lateral abdomen, just below umbilicus.
Why This is Important?

This type of flexion of the spine can result in Chance fractures of the lumbar spine. Seat belt moving through abdomen increase risk of solid organ injury.
CT Scan Results
Catalog of Injuries

1. Complex laceration of left lobe of liver (grade IV-V).
2. Complex (shattered) laceration of spleen with extensive devascularization (grade V). Extensive perisplenic hematoma.
3. Large hematoma medial to spleen in region of left adrenal gland with foci of active extravasation of contrast.
4. Large amount of free intraperitoneal fluid.
5. Displaced Chance type fracture of the of the L1 vertebra with impingement of the spinal canal. Mild compression fracture and right transverse process fracture of L2.
7. No thoracic or abdominal aortic injury.
8. No gross bowel injury
Double Transfers

• When patient are transported to and between multiple emergency departments
• Occurs frequently in pediatric trauma care. Often centers don’t realize what pediatric specific resources are needed or if the resource is comfortable treating children
• Ensure that anticipated resource is available at accepting facility
• Ensure that anticipated resource is currently available at accepting facility
• Goal of all trauma care is arrival to definitive care as soon as possible
Case Example

2 month old male who was being carried by dad who reportedly fell down a flight of stairs on 10/22. Parents became concerned when patient became lethargic and transported patient to local emergency department.

• 1500 – approximate time of injury. Pt to tertiary care facility and CT scan obtained. CT revealed a left subdural hematoma with midline shift, in addition to a left non-displaced parietal skull fracture and posterior galeal hematoma. Cervical spine negative

• 1833 – arrival to second hospital via flight crew. Physical exam reveals a full fontanelle, ecchymosis to eyelids and a right occipital hematoma

• 1840 – documentation states “decision to transfer per neurosurgery due to inavailability of neurosurgeon”

• 1949 – pt transferred to C. S. Mott for definitive care – accompanied by second flight crew.

• 2044 – pt arrives to C. S. Mott
Case Example

• Neurosurgery was consulted in the ER. Repeat STAT Head CT at Michigan Medicine showed resolution of midline shift decrease in thickness of the subdural hematoma as well as more isodense accumulations that could represent chronic subdural hematoma. Fontanelle was full, but soft. He had a L gaze preference, but pupils were symmetric and equal and he was vigorously moving all 4 extremities. He received Keppra for post traumatic seizure prophylaxis. He was admitted to the PICU on the Pediatric Surgery Trauma service.

• Child Protection Team, Child Protection Services and Social Work involved in care. Pt discharge after 4 days.
Epidemiology

Leading Causes of Death Among Children Aged 1-14 Years, 2009*

1–4 Years
- Unintentional Injury: 8.5
- Congenital Anomalies: 2.8
- Homicide: 2.3
- Malignant Neoplasms (cancer): 2.0
- Heart Disease: 0.9
- Influenza and Pneumonia: 0.8
- Septicemia: 0.4
- Cerebrovascular Diseases: 0.4
- Conditions Originating in the Perinatal Period: 0.3
- In situ, Benign or Other Neoplasms: 0.3

5–14 Years
- Unintentional Injury: 4.1
- Malignant Neoplasms (cancer): 2.2
- Congenital Anomalies: 0.9
- Homicide: 0.8
- Suicide: 0.7
- Heart Disease: 0.5
- Chronic Lower Respiratory Diseases: 0.3
- Cerebrovascular Diseases: 0.2
- Influenza and Pneumonia: 0.2
- In situ, Benign or Other Neoplasms: 0.2

*Data are preliminary.

The Facts About Pediatric Trauma

Level 1 pediatric trauma centers currently verified by the American College of Surgeons: 39

Federal research dollars spent on:
- Cancer: $17.00
- Diabetes: $7.00
- Heart Disease: $4.00
- Childhood Injury: $0.18

Nonfatal hospitalized injuries result in annual cost of over $24 Billion

175,149
Number of injured kids that were hospitalized in 2011

Unintentional injuries: 6,190
- Motor vehicle: 51.7%
- Drowning: 14.8%
- Poisoning: 8.6%
- Fire/Burn: 5.3%
- Firearms: 1.8%
- Falls: 1.4%

Intentional injuries: 3,333
(homicides and suicide)

Injury kills more kids than all other causes combined
9,523
Annual deaths from traumatic injury

1 child dies from injury every hour

Source: https://saveinjuredkids.org/wp-content/uploads/2015/03/CIPT-infographic-FINAL-2-4-14-resize-crop.jpg

PEDIATRIC TRAUMA INJURY PREVENTION
“If a disease were killing our children in the proportion that injuries are, people would be outraged and demand that this killer be stopped.”

C. Everett Koop, MD
Surgeon General of the United States, 1982-1989
Pediatric Trauma Injury Prevention Program

- We see approximately 600 children admitted to C.S. Mott Children's Hospital each year, as a result of a serious injury.
- Another 6,500 are treated for an injury in our Pediatric Emergency Department.
  - Injuries from trauma—ranging from schoolyard falls to high-speed automobile collisions—are the leading cause of death and disability in children. To reduce the incidence of childhood injuries, an array of injury prevention outreach programs have been designed to educate children, parents and community members.

Our work involves:
- Educating children and adults
- Advocating for effective laws
- Providing reduced cost safety products to low-income families
- Conducting research
- Creating safe environments
Pediatric Trauma Injury Prevention Program

Fig. 1 - “The Injury Pyramid”

- Fatal injuries
- Injuries resulting in hospitalizations
- Injuries resulting in visits to emergency departments
- Injuries resulting in visits to primary care facilities
- Injuries treated outside the health system, not treated, or not reported

https://www.who.int/violence_injury_prevention/key_facts/VIP_key_fact_5.pdf
Pediatric Trauma Injury Prevention Program

- Safe Kids Huron Valley
  - [www.safekids.org](http://www.safekids.org) Safe Kids Worldwide
- Child Passenger Safety
- Distracted Driving
- Pedestrian Safety
- Wheeled Sports Safety
- Winter Sports Safety
- Water Safety
- Home Safety
- Medication Safety
  - Opioid Education
  - Proper Dosing/Storage/Disposal
Pediatric Trauma Injury Prevention Program

Finding New Ways to “Put the Broccoli in the Brownies”

- Education presented in electronic formats
- Presenting education at centers within the community
- Including kids in the development of programs
- Placing education messaging in unexpected places
- Video and virtual reality games to reinforce and teach safety behaviors
Pediatric Trauma Injury Prevention Program

Roller Buggy video game

This app is a video game that encourages safe pedestrian habits to players. To start, players choose a character based on preference. Each character is wearing rollerskates, helmet, and elbow/knee pads. The player then has to navigate a city sidewalk, searching for and "collecting" bugs. The player may have to cross busy city streets, and are required to cross at a crosswalk or the game ends. They are also encouraged to push the crosswalk button and receive a speed boost when they cross at the crosswalk after hitting the button. The game is timed and ends when they collect all of the bugs scattered throughout the game. Players may choose to play multiple times attempting to improve their time.
Pediatric Trauma Injury Prevention Program


Situation: A 2 1/2 yo male who was found by mom to be lethargic and crying after falling out of bed twice earlier in the day. By the afternoon, he was not appropriately responsive and was vomiting. An ambulance was called. He was transferred to a Level I Pediatric Trauma center via EMS. En route he was reportedly hypotensive to 50/30 just prior to arrival at the emergency department.
Assessment: Child was activated as a Level I trauma patient based on EMS report. On assessment, he presents to the Emergency Department lethargic, tachypneic with grunting respirations, LCTA, old bruising noted to left cheek and left eye, multiple scattered bruises of various stages noted to abdomen and back. Abdomen is soft, non-distended. Skin pale and dusky, cool extremities noted. BP is 65/36 RR 40 HR 161 Temp 38.3

Is this patient stable or unstable?

Unstable and we need to work quick!
Management: IV started x 2 and a bolus of 320 mL was begun (pt weight 16 kg) and bolus was repeated x 2 for continued hypotension. Laboratory values and radiology testing, including bedside ultrasound (FAST) were ordered.

FAST scan at the bedside revealed free fluid in Morison’s pouch in the splenorenal recess as well as posterior to the bladder.

CT of the abdomen, pelvis and lumbar spine revealed a Grade 5 liver laceration (hepatic vasculature, portal system & IVC appeared intact), splenic lacerations, multiple bilateral Grade 2 kidney lacerations, hemoperitoneum & acute bilateral lower rib fractures. Head and C-Spine CTs were negative.

Despite bolus, patient had continued hypotension and he remained tachycardic at 165 bpm. He was noted to have increasing abdominal girth and distention, at this point a decision was made by the Pediatric Trauma Surgeon to take the patient to the OR for operative management. A blood transfusion of PRBC was continued en route to the OR.
Grade V Liver laceration
Pediatric Trauma Case Review

In the case of solid organ injury, a clinical pathway is in place to guide care.

### ISOLATED Spleen (Liver) Injury Clinical Pathway Guideline

**Inclusion Criteria**
- Single system abdominal trauma
- Multisystem injuries if patient has normal vitals for age and is hemodynamically stable

**Exclusion Criteria**
- Multisystem when spleen or liver is not the driving force behind the patient’s plan of care
- Hemodynamically unstable

**Flowchart Diagram**

1. **Child arrives in ED with traumatic injury (Class I or II)**
   - ATLS Trauma resuscitation per protocol

2. **Abdominal Trauma?**
   - By history
   - Pain on Exam
   - Hematuria
   - Unconscious or unable to cooperate
   - Intubated
   - No abdominal injury, treat as indicated

3. **Abdominal CT IV contrast**
   - Radiologist reads and Grades injury
   - No, Further Work up as indicated

4. **Liver Spleen Injury Grade I-IV**

*If patient is hemodynamically unstable consider operating room or embolization*

### Table

<table>
<thead>
<tr>
<th>CT Grade</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU LOS</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>24 hours *</td>
</tr>
<tr>
<td>CBC</td>
<td>Q 6 hours until stable*</td>
<td>Q 6 hours until stable*</td>
<td>Q 6 hours until stable*</td>
<td>Q 2-4 hours until stable*</td>
</tr>
<tr>
<td>Vital</td>
<td>Q4 hours x24 On monitor</td>
<td>Q4 hours x24 On monitor</td>
<td>Q2 hours x 8 then q4 on monitor</td>
<td>Per ICU</td>
</tr>
<tr>
<td>Bedrest</td>
<td>Until CBC is stable</td>
<td>Until CBC is stable</td>
<td>Until CBC is stable</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>48 hours Then ambulation for 12 hours prior to D/C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum Hospital LOS</td>
<td>1 day</td>
<td>2 days</td>
<td>3 days</td>
<td>4 days</td>
</tr>
</tbody>
</table>

- **Routine pre/post discharge imaging**
- **Restricted Activity non contact**
- **Restricted Activity contact**
- **Return to School**
- **Follow up**

### Notes
- *Stable is when 3 HCT/HB are within 10% of each other
- **US imaging may be performed if injury involved hilar area and concerned about pseudoaneurysm. Please note that this is not supported or refuted in the literature.
- **Hospital LOS / Minimum Stay = Grade of Injury**
Course of Care: The patient was transported to the operating room with the Pediatric Trauma Surgeon. After infusion of blood products, the patient became more responsive, vital signs stabilized (BP was 141/89, HR 121 and RR 34).

The surgeon opted to attempt PICU observation before proceeding with operative intervention. The patient received an NG tube and arterial line prior to transport to PICU.
Outcome: Following a defined algorithm can avert confusion and prevent unnecessary surgery. This patient did not require resection of solid organs in an unstable state and was able to be resuscitated with crystalloid and blood. Non-operative management allowed the patient to tamponade the injuries and recover uneventfully without a laparotomy. If the patient did not respond to the blood transfusion, further operative management would likely be needed. In this situation, however, the algorithm was successful in avoiding a potentially difficult surgery with major morbidity. It was later discovered that this child was injured after being kicked and beaten. Charges were filed against the perpetrator.
Conclusion

• Pediatric Trauma is more than an acute event or a finite period of time, but spans the continuum of pediatric care.

• Injury Prevention is a major component – we are here to help! In the community or in the hospital, we will do what we can to keep kids safe.

• Pediatric Trauma care often requires thinking beyond immediate event and resource needs.
Resources for Non-Pediatric Centers

• Visit websites of your local pediatric trauma center – often have resources available.
• C. S. Mott Pediatric Trauma department website: www.pediatrictrauma.org
• Amazing injury prevention resources at www.safekidsworldwide.com
• Pediatric specific resources on the Michigan Trauma Coalition Website – Pediatric Committee has de-identified examples of resources available (MTP, activation criteria) for members to download www.mitrauma.org
• Pediatric Trauma Society has resources available – do not have to be a member to access: www.pediatrictraumasociety.org
• Inter Facility Transfer Tool Kit for the Pediatric Patient. Can be found on the STN, ENA or EMSC websites.
Thank you for your time and thank you for all you do!

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734-615-3301