



Trauma Center Practice Management Guideline

DISCLAIMER: These guidelines were prepared by Trauma Services at Mission Hospital. They are intended to serve as a general statement regarding appropriate patient care practices based upon available medical literature and clinical expertise at the time of development. They should not be considered to be policy, nor are they intended to replace clinical judgment or dictate care of individual patients.

Title: Pediatric – Trauma Imaging Guidelines	
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Guideline Applicability:

Trauma Center Practice Management Guideline for the care of the pediatric trauma injured patient who requires imaging studies is applicable to MH Mission Hospital, LLLP, and other locations where services of the hospital are being provided.

Purpose:

To rapidly identify, treat and manage pediatric trauma injured patients who may require imaging services in order to minimize radiation exposure.

Guideline Statements:

1. Children are at an increased risk for radiation exposure from diagnostic imaging. When ordering imaging in the pediatric trauma population, the provider should reduce radiation exposure in pediatric patients by:
 - a. Considering alternate exams with less or no radiation exposure (e.g. xray instead of CT, Ultrasound, MRI).
 - b. Ensuring patients receive the right dose and appropriate equipment when imaging necessary.
 - c. Checking patients' medical imaging history to avoid duplicate exams.
2. Initial management of the pediatric trauma patient should occur per Advanced Trauma Life Support (ATLS) guidelines in order to rapidly assess injuries, determine management priorities, and provide critical interventions.
3. Sedation may be required to manage unique factors with children to obtain imaging. Depending on study needed, age, size, and cognitive factors, the depth and length of sedation should be tailored if required.
4. Benefits of imaging must be weighed against the potential risks of radiation exposure.

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5. Plain films decrease radiation to the thyroid, cornea, and lymphoid tissue and are preferred when clinically indicated.
6. Imaging should be considered based on patient condition, physician discretion, and the below imaging guidelines:

Clinical Assessment	Imaging Recommendation
<ul style="list-style-type: none"> • Altered mental status • Loss of consciousness for > 5 seconds • Evidence of injuries centered on head/neck region • Age specific: <ul style="list-style-type: none"> ○ <2 years of age: <ul style="list-style-type: none"> ▪ Scalp hematoma (excluding frontal) ▪ Palpable skull fracture ○ ≥ 2 years of age: <ul style="list-style-type: none"> ▪ Vomiting ▪ Signs of skull fracture ▪ Severe headache 	CONSIDER HEAD CT
<ul style="list-style-type: none"> • GCS < 14 (or eye criterion = 1) • MVC mechanism of injury • Ages 24 – 36 months • Unable to clinically clear C-spine* • If patient meets Modified Memphis Criteria (Appendix 1) for obtaining a CTA of neck or concern for BCVI, reconstruction of cervical spine is appropriate but spine cannot be cleared based on CT alone 	<p style="text-align: center;">CONSIDER PLAIN FILMS</p> <p><small>*If unable to clear C-spine on exam, plain films may be used. Both AP and lateral views required. Flexion and extension views and inclusion of odontoid are not necessary.</small></p>
<ul style="list-style-type: none"> • GCS <9 • Focal neurological deficit • Concern for c-spine injury and <u>also</u> obtaining head CT 	CONSIDER CERVICAL SPINE CT
<ul style="list-style-type: none"> • Abnormal CXR in blunt trauma (widened mediastinum) • Penetrating trauma with concern for major vascular injury 	CONSIDER CHEST CT ANGIOGRAM
<ul style="list-style-type: none"> • Positive FAST • Abdominal wall bruising/seat belt sign • GCS <14 with concern for abdominal injury • Findings that suggest a significant risk for IAI in a patient with distracting injuries (eg. long bone fractures or substantial injury to the torso that warrants intervention) • Complaints of abdominal pain and/or tenderness to palpation • CXR consistent with pneumo- or hemothorax or pulmonary contusion with decreased breath sounds or hypoxemia in patients with concerning mechanism for IAI 	CONSIDER ABDOMEN/PELVIS CT WITH IV CONTRAST

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<ul style="list-style-type: none"> • Inability to full assess abdomen with concern for abdominal trauma • Initial serum AST >200 international unit/L or ALT >125 international unit/L • Initial elevated serum pancreatic enzymes • Gross hematuria or microscopic hematuria with ≥50 RBCs per high-powered field in otherwise asymptomatic patients • Declining or unexplained hematocrit or hematocrit <30 percent • Unclear etiology for persistent hemodynamic instability (ie, persistent tachycardia or hypotension) requiring IV crystalloid fluid boluses or blood requirements (imaging with CT versus operating room evaluation should be decided in collaboration with the trauma surgeon) 	<p>CONSIDER ABDOMEN/PELVIS CT WITH IV CONTRAST</p>
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Quality Metrics:

1. Per guideline monitoring process.

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Appendix 1 – Modified Memphis Criteria

The modified Memphis criteria are a set of screening criteria for blunt cerebrovascular injury (BCVI) in trauma. The presence of one or more of these criteria indicates the need for a complementary CTA or DSA study to exclude a BCVI. The screening protocol criteria for BCVI are:

Modified Memphis Criteria	
<ul style="list-style-type: none"> • Based of skull fracture with involvement of carotid canal or petrous temporal bone • Cervical Spine fracture • Neurological exam findings not explained by neuroimaging 	<ul style="list-style-type: none"> • Horner Syndrome • Le Fort II or III Fracture Pattern • Neck soft tissue injury (e.g. seatbelt sign, hanging, hematoma)

If a trauma patient meets one or many of these criteria, the diagnosis of BCVI should be excluded with CTA or DSA.