CT IMAGING GUIDELINE FOR TRAUMATIC INJURIES (HEAD, CERVICAL SPINE, CT ANGIO NECK/HEAD, CHEST, ABDOMEN/PELVIS AND CT ANGIO EXTREMITY)

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PURPOSE: To establish a guideline in the use of Computed Tomography (CT) imaging for evaluation of the trauma patient injuries. This document is intended to be a general guideline for the care of most trauma patients. Trauma and ED Physicians may appropriately vary from the guideline to meet the individual patient's need.

PROCEDURE:

A. The trauma patient will be initially evaluated by Emergency Medicine and Trauma Surgery Service per standard trauma resuscitation protocols

B. Appropriate subspecialty services will be consulted in a timely manner for injuries identified during trauma evaluation and imaging.

C. Head Trauma - A non-contrast head CT should be obtained for anyone ≥ 16 y/o with LOC or post-traumatic amnesia with suspected TBI if any of the following are present: (Significant active scalp hemorrhage should be stopped with rapid wound closure prior to going to CT scanner)

   a. GCS < 15 or Focal neurologic deficit
   b. Suspected open or depressed skull fracture
   c. Signs of basilar skull fracture (e.g., raccoon eyes, Battle's sign)
   d. Age 60 years or older
   e. Post-traumatic seizure
   f. Coagulopathy or Anticoagulant/Antiplatelet use (Coumadin, LMWH, DOAC, Plavix, ASA)
   g. Drug or alcohol intoxication causing clinical impairment
   h. Two or more episodes of vomiting
   i. Amnesia before impact lasting more than 30 minutes
   j. Dangerous mechanism of injury (e.g., pedestrian struck by vehicle, ejection from vehicle, fall from > 3 feet or 5 steps, penetrating cranial injury)
   k. Imaging should be considered in head trauma patients with NO loss of consciousness or amnesia if one or more of the following is present:
      i. GCS score < 15 or focal neurologic deficit
      ii. Age > 65
      iii. Anticoagulant/Antiplatelet use or known coagulopathy (Coumadin, LMWH, DOAC, Plavix, ASA)
      iv. Severe headache
      v. Physical evidence of trauma above the clavicles
      vi. Dangerous mechanism of injury: ejection from a motor vehicle, motorcycle or bicycle crash without helmet, pedestrian struck, fall from a height of more than 3 feet or 5 stairs, penetrating cranial injury.

D. Cervical Spine Injuries: Evaluation by CT. A non-contrasted CT of the cervical spine is indicated in

bluntly injured trauma patients with any of the following:

a. Dangerous mechanism
    i. High Speed MVC
    ii. Crash with death at scene
    iii. Fall > 3ft or 5 stairs
    iv. Axial Load to head
b. Paresthesia in extremities
c. Immediate onset of neck pain
d. Significant head or facial injury
e. Age > 65 with blunt trauma to head
f. Tenderness at the posterior midline of cervical spine
g. Focal neurologic deficit
h. Decreased level of alertness
i. Patient uncooperative
j. Clinically apparent pain distracting the patient from the pain of cervical spine
k. Painful active range of motion

E. Blunt Cervical Vascular Injuries: Evaluation by CT. A contrasted CT angiography of the head and neck is indicated in bluntly injured trauma patient with any of the following:
    a. Cervical hematoma and/or seatbelt/clothesline mark
    b. Signs of ischemia or infarction on CT or MRI
    c. Focal neurologic deficit: TIA, hemiparesis, vertebrobasilar symptoms, Horner's syndrome
    d. Neurologic deficit inconsistent with head CT-scan
    e. Mandibular fracture
    f. Basilar skull fracture
    g. Cervical spine fractures
    h. Complex mid-face fractures (Lefort II or III)
    i. Near hanging
    j. Severe TBI / Intubated for depressed GCS

F. Chest Injuries: Evaluation by CT. A contrasted CT Chest is indicated in a trauma patient with any of the following:
    a. Gunshot wound to the chest unless clearly a tangential or superficial trajectory of the ballistic injury
    b. Stab wounds to the thorax with an ABNORMAL chest x-ray after tube thoracostomy
    c. Stab wounds to the thoracoabdominal region
    d. Blunt mechanism and at least one of the following:
        i. ABNORMAL chest x-ray (widened mediastinum >8 cm or signs of mediastinal pathology, pneumothorax with plan to observe, hemothorax, thoracic fractures including 1st and 2nd ribs, clavicle, scapula)
        ii. High energy or rapid deceleration mechanism (examples: fall > 20 feet, T-bone MVC, ejection from vehicle)
        iii. Thoracic spine or back tenderness on physical examination
        iv. Inability to participate in secondary survey (intubation, intoxication)

G. Blunt Abdominal and Pelvic Trauma: Evaluation by CT (see Penetrating Abdominal Trauma Management Guideline). A contrasted CT Abdomen/Pelvis is indicated in a trauma patient with

any of the following:

a. ABNORMAL Physical Examination: tenderness or pain, seatbelt sign, hematuria, bony pelvis instability
b. ABNORMAL Chest XR or Pelvis XR: low rib fractures or thoracoabdominal chest wall tenderness, elevation of hemidiaphragm, pelvic fractures
c. Inability to participate in secondary survey (intubation, intoxication)
d. High energy or rapid deceleration mechanism (examples: fall > 20 feet, T-bone MVC, ejection from vehicle)
e. Multiple extra-abdominal injuries: femur fracture, ≥2 extremity fractures
f. A contrasted CT of the Abdomen/Pelvis should be considered in a blunt trauma patient with any of the following:
    i. Age > 65
    ii. Anticoagulant use* or known coagulopathy - Coumadin, Lovenox, Eliquis, Pradaxa, Xarelto, Plavix

*If no CT Abdomen/Pelvis is obtained per the above guidelines, strongly consider CXR, PXR and FAST before disposition home with trauma surgeon discretion

H. Blunt and Penetrating Extremity Injuries: Evaluation by CT.
    a. If hard signs of vascular injury are present, proceed emergently to the operating room.
    b. If no hard signs of vascular injury are present in a traumatically injured limb, then a CT angiography of the extremity is indicated only if:
    c. API (Arterial Pressure Index) <0.9 (after fracture or dislocation reduction) *

*Proximity to named vessels alone is not an indication for CT Angiography.
*Presence of palpable pulse in a traumatically injured limb is insufficient to rule out vascular injury

RELATED POLICIES:
Cervical Spine Clearance Guideline
Management of Blunt Extra-Cranial Carotid and Vertebral Artery Injury (BCVI) Guideline
Traumatic Brain Injury Initial Management

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