

Evidence Discussion (HD-13)

- For evaluation of acute mild head trauma, less than 10% will have positive findings on CT head, and of this group, less than 1% will require neurosurgical intervention.^{1,10}
- The American College of Emergency Physicians and the Choosing Wisely Initiative recommend avoiding CT scans of the head in emergency department patients with minor head injury who are at low risk based on validated decision rules.^{6,7} This recommendation was based on the concern for patient exposure to ionizing radiation and the increased life time risk of cancer with such exposure.^{6,7}
- Selective CT scanning is recommended by validated clinical practice guidelines, including the New Orleans Criteria and the Canadian CT Head Rule.^{1,3,10} Both guidelines are 100% sensitive for mild head trauma requiring neurosurgical intervention.^{1,10} The New Orleans Criteria has a sensitivity > 97% for any traumatic finding on CT, with a specificity less than 6%.^{1,10} The Canadian CT Head Rule has a sensitivity between 83.4% - 87.2% with a specificity between 37.2% – 39.7%.^{1,3,10} The Canadian CT Head Rule has a 100% sensitivity and 29% specificity in cases of intracranial hemorrhage.^{1,3,10}
- When imaging is indicated by a validated clinical decision rule, CT head is the preferred imaging modality for evaluation of acute head trauma.^{1,7,8,10}
- If the initial CT head confirms subdural hematoma, follow up CT head is supported to monitor progression.^{1,9}
- For follow up in patients with persistent neurologic deficits without etiology identified on initial CT head, MRI brain is more sensitive, and can visualize cortical contusions, subdural hematomas, and white matter lesions in diffuse axonal injury.¹ Up to 27% of patients with mild traumatic brain injury (TBI) with normal initial CT head show abnormalities on MRI brain.^{1,9}
- When vascular injury is suspected in the setting of head trauma, CT Angiography (CTA) head and neck is a non-invasive, rapid, and useful modality to evaluate for arterial injury.^{1,11} MR Angiography is an alternative option.^{1,11} For suspected intracranial venous injury, CT Venography (CTV) is indicated, with MR Venography (MRV) an alternative option.^{1,11}
- There is insufficient evidence to support the use of single-photon emission computed tomography (SPECT), FDG-PET/CT brain, CT/MRI-Perfusion, MR spectroscopy (MRS), functional MRI (fMRI), or diffusion tensor imaging (DTI) in the evaluation of head trauma.¹
- Patients with head trauma are also at risk for orbital, facial and temporal bone injuries.² CT of the orbit can diagnose fractures, displaced fracture fragments, foreign bodies, traumatic hematoma, and extraocular muscle injury.² CT head is also recommended in the evaluation of suspected orbital fractures due to concomitant intracranial injury incidence of 9%.¹¹
- CT maxillofacial is useful in diagnosing maxillofacial injuries including non-displaced fractures.¹¹ CT provides multiplanar and 3-D image reconstructions, allowing for better characterization of complex fractures, which is useful for surgical planning.¹¹
- Over one-third of patients with frontal sinus fractures are likely to have a concomitant intracranial injury, thus concurrent CT head imaging is recommended

in patient with suspected frontal sinus fractures.¹¹ In addition, between 8% to 10% of patients with frontal sinus fractures have subdural or epidural hematomas requiring surgical treatment.¹¹

- High resolution CT (HRCT) facial and temporal bone are sensitive modalities for subtle or non-displaced skull base defects, with sensitivity of 92% for identifying cerebrospinal fluid leak.^{1,8}

References

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