Pocket Guide for Emergent Head CT Interpretation

1. Become familiar with normal neuroanatomy at **key levels** of the head.

A. **Figure 1 Posterior Fossa**
   - A. Orbit
   - B. Sphenoid Sinus
   - C. Temporal Lobe
   - D. External Auditory Canal
   - E. Mastoid Air Cells
   - F. Cerebellar Hemisphere

B. **Figure 2 High Pons 1st Key Level**
   - A. Frontal Lobe
   - B. Frontal Bone (Superior Surface of Orbital Part)
   - C. Dorsum Sellae
   - D. Basilar Artery
   - E. Temporal Lobe
   - F. Mastoid Air Cells
   - G. Cerebellar Hemisphere
Figure 3  Cerebral Peduncles 2nd Key Level

A. Frontal Lobe  
B. Sylvian Fissure  
C. Temporal Lobe  
D. Suprasellar Cistern  
E. Midbrain  
F. Fourth Ventricle  
G. Cerebellar Hemisphere

Figure 4  High Midbrain 3rd Key Level

A. Falx Cerebri  
B. Frontal Lobe  
C. Anterior Horn of Lateral Ventricle  
D. Third Ventricle  
E. Quadrigeminal Plate Cistern  
F. Cerebellum
E. Figure 5 Basal Ganglia Region

A. Anterior Horn of the Lateral Ventricle
B. Caudate Nucleus
C. Anterior Limb of the Internal Capsule
D. Putamen and Globus Pallidus
E. Posterior Limb of the Internal Capsule
F. Third Ventricle
G. Quadrigeminal Plate Cistern
H. Cerebellar Vermis
I. Occipital Lobe

F. Figure 6 Upper Cortex

A. Genu of the Corpus Callosum
B. Anterior Horn of the Lateral Ventricle
C. Internal Capsule
D. Thalamus
E. Pineal Gland
F. Choroid Plexus
G. Straight Sinus
CSF Facts

- 0.5-1 cc/minute in adults
- Adult CSF volume is 150 cc
- Adult CSF production is 500-700 cc/day, which means that CSF turns over 3-5 times/day.ii

2. Use “Blood Can Be Very Bad” to quickly scan for pathology.

As the blood becomes older and the globin breaks down, it loses this hyperdense appearance, beginning at the periphery. The precise localization of the blood is as important as identifying its presence.”iii

Blood will 1st become isodense with the brain (4 days to 2 weeks, depending on clot size), and finally darker than brain (>2-3 weeks).ii

C = Cisterns
Cerebrospinal fluid collections jacketing the brain; the following four key cisterns must be examined for blood, asymmetry, and effacement (representing increased intracranial pressure):

- **Circummesencephalic**—Cerebrospinal fluid ring around the midbrain; first to be effaced with increased intracranial pressure
- **Suprasellar (star-shaped)**—Location of the circle of Willis; frequent site of aneurysmal subarachnoid hemorrhage
- **Quadrigeminal**—W-shaped cistern at top of midbrain; effaced early by rostrocaudal herniation
- **Sylvian**—Between temporal and frontal lobes; site of traumatic and distal mid-cerebral aneurysm and subarachnoid hemorrhage

B = Brain
- **Symmetry**—Sulcal pattern (gyri) well differentiated in adults and symmetric side-to-side.
- **Gray-white differentiation**—Earliest sign of areas of ischemia is loss of gray-white differentiation (can be seen as early as 2-3 hrs); metastatic lesions often found at gray-white border
- **Shift**—Falx should be midline, with ventricles evenly spaced to the sides; can also have rostrocaudal shift, evidenced by loss of cisternal space; unilateral effacement of sulci signals increased pressure in one compartment; bilateral effacement signals global increased pressure
- **Hyper-/hypodensity**—Increased density with blood, calcification, intravenous contrast media; decreased density with air/gas (pneumocephalus), fat, ischemia, tumor
V = Ventricles
Pathologic processes cause dilation (hydrocephalus) or compression/shift; hydrocephalus usually first evident in dilation of the temporal horns (normally small and slit-like); examiner must take in the “whole picture” to determine if the ventricles are enlarged due to lack of brain tissue or increased cerebrospinal fluid pressure

B = Bone
Highest density on CT scan; diagnosis of skull fracture can be confusing due to the presence of sutures in the skull; compare other side of skull for symmetry (suture) versus asymmetry (fracture); basilar skull fractures commonly found in petrous ridge (look for blood in mastoid air cells)