The following training module was developed as a quality improvement project to serve as an educational tool for junior radiology residents. The following diagnostic radiology protocoling modules were developed by University of Washington radiology residents Patricia Ojeda and Mariam Shehata.

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Neurology

Common Clinical Scenarios

Protocoling Module
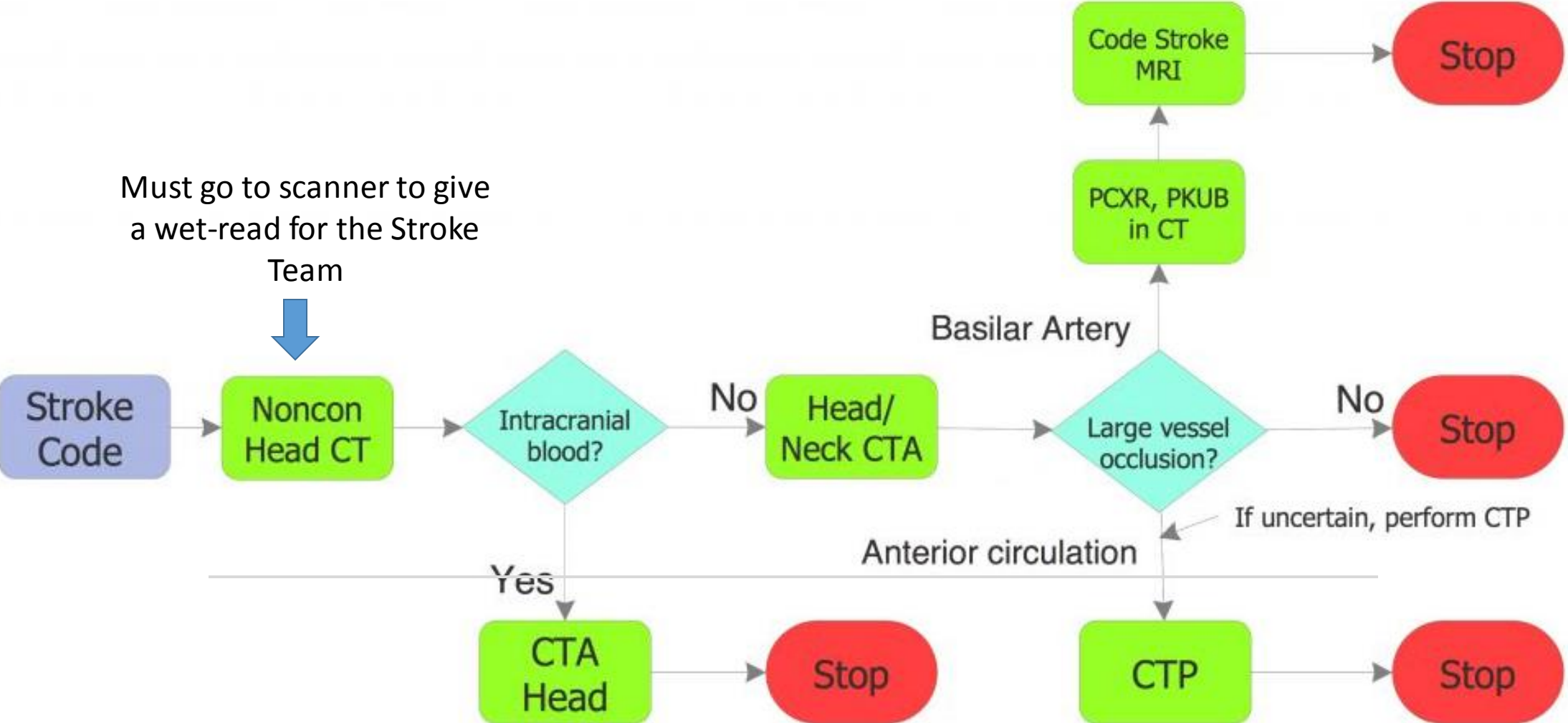
Patty Ojeda & Mariam Shehata

Outline

Neurology – related protocols to be covered:

- Stroke Algorithm

- CTA Head and Neck

- CT Perfusion

- CT Maxillofacial

Stroke Algorithm

Image Courtesy of ED Radiology Department

Stroke Algorithm

Acute Ischemic Infarct
Insular ribbon sign

Subarachnoid hemorrhage

Stroke Algorithm

Head and Neck CTA

Head CTA
Right MCA Stenosis

Stroke Algorithm After Intervention

- Virtual Non-Contrast
  - Subtracts out contrast to differentiate it from new hemorrhage
  - The contrast is residua from the recent procedure

- MRI without Gadolinium
  - 24h after stroke event

CT Perfusion RAPID

- To determine stroke intervention in the extended stroke window of 6-24 hours from symptom onset[1]
  - However, also performed in all stroke cases with large vessel occlusion

- Differentiates between salvageable brain tissue (penumbra) versus infarcted tissue.

- Important for treatment decisions
  - Medical thrombolysis versus clot retrieval

- 3 values must be reported:
  1. Cerebral Blood Flow (CBF)
  2. Brain volume with Tmax >6 seconds for perfusion
  3. Mismatch Ratio

[1]Based on the DEFUSE-3 and DAWN trials

CT Perfusion

CBF<30% volume: 46 ml
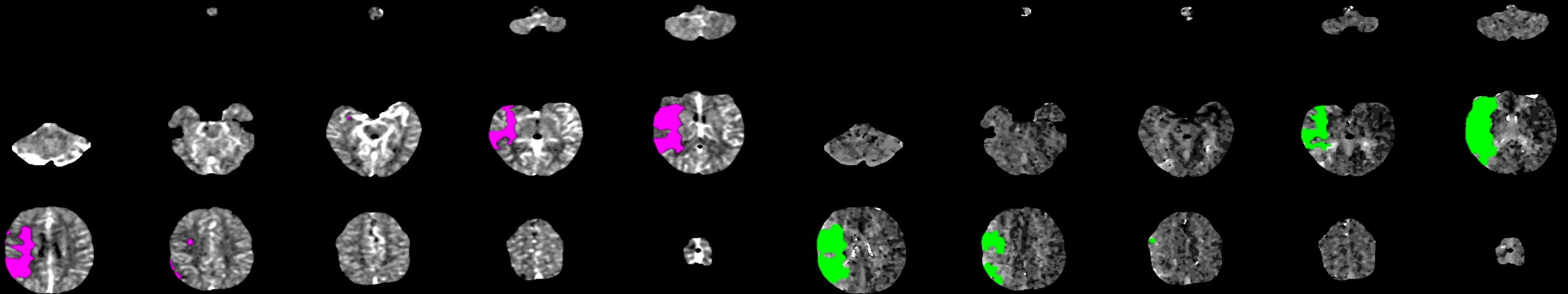
Tmax>6.0s volume: 81 ml

Mismatch volume: 35 ml
Mismatch ratio: 1.8

iSchemaViewRAPID

CT Perfusion RAPID

- Be sure to check the arterial and venous density regions of interest (ROI) are appropriately positioned
  - If not, this could affect the CTP calculations

- ➤ Arterial ROI
  - Any patent cerebral artery is acceptable if proximal to the MCA bifurcation
  - Typically seen in the distal ICA

- ➤ Venous ROI
  - Any patent venous sinus is acceptable
  - Typically seen within the sagittal sinus

- Be sure to check the contrast enhancement curve is completed, otherwise the maps may be erroneous.
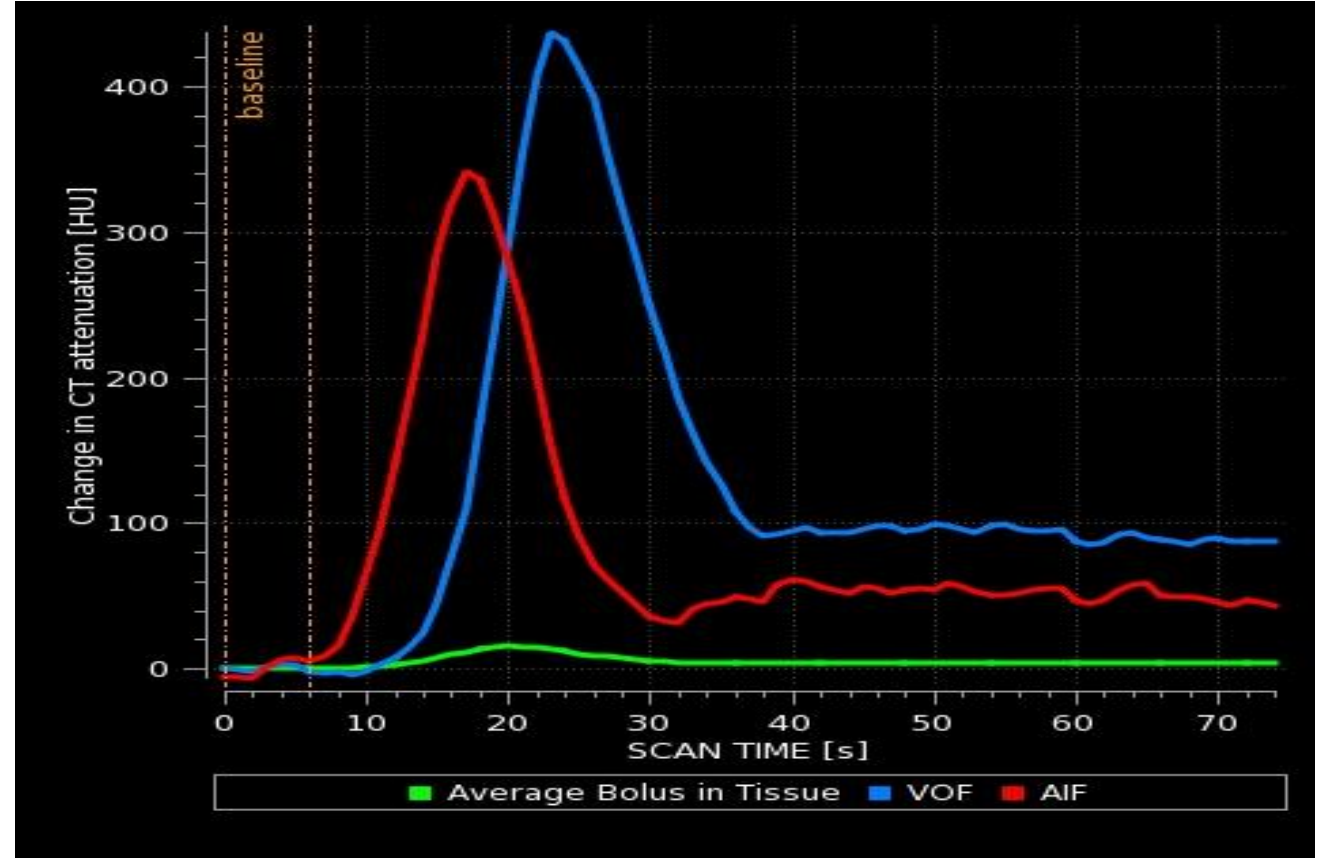 - Ensure the curve demonstrates a full rise and return to baseline

CT Perfusion RAPID ROIs
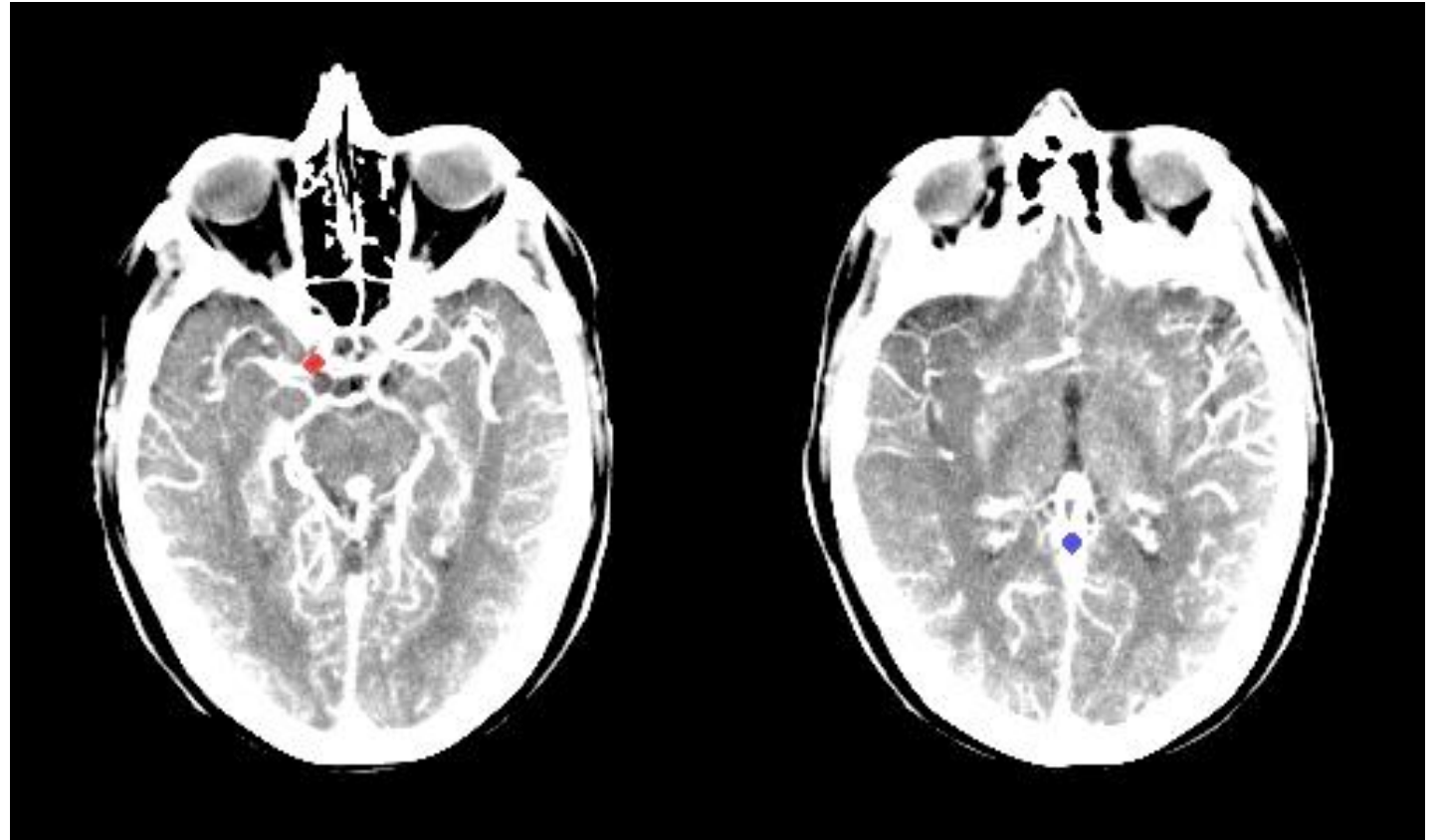
Arterial ROI
On Right MCA

Venous ROI
On Sagittal sinus

CT Perfusion Contrast Enhancement Curve

Curve goes rises from baseline and completely returns to baseline

CT Maxillofacial

- Indication: Trauma

- CT Max Face without contrast
  - Trauma
  - Can be done either retrospectively from a Head CT or be scanned as a Max Face
  - No contrast, since you are primarily evaluating bone

- CT Max Face with contrast
  - Mainly ordered by ENT/dentists
  - For evaluation of a tumor or dental abscess

CT Maxillofacial

Coronal
Fracture of Lateral Maxillary Sinus
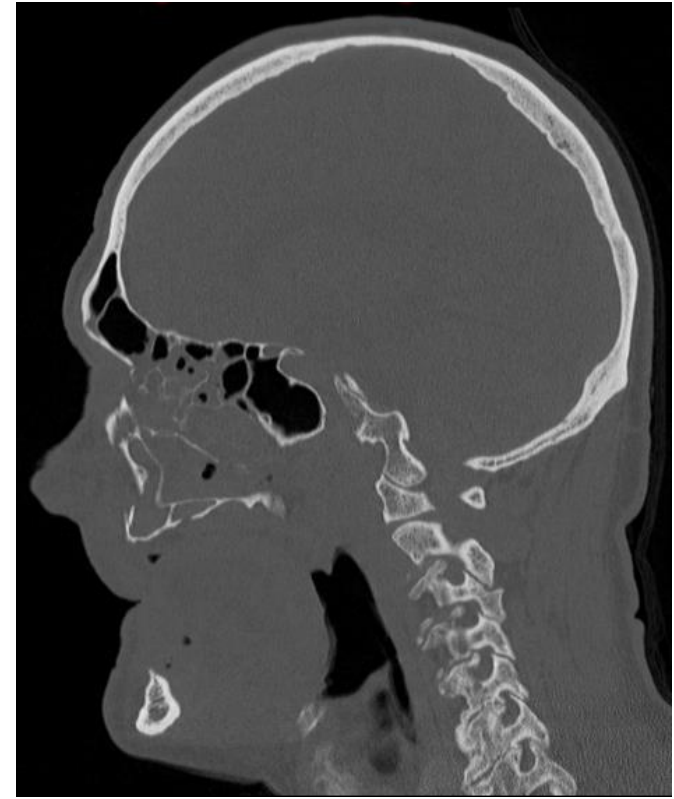
Saggital
Fracture of Anterior Maxillary Sinus

Studies you should NOT protocol

- Brain MRI
  - Unless discussed directly with a neuroradiology fellow or an attending
  - This applies to first year radiology residents only