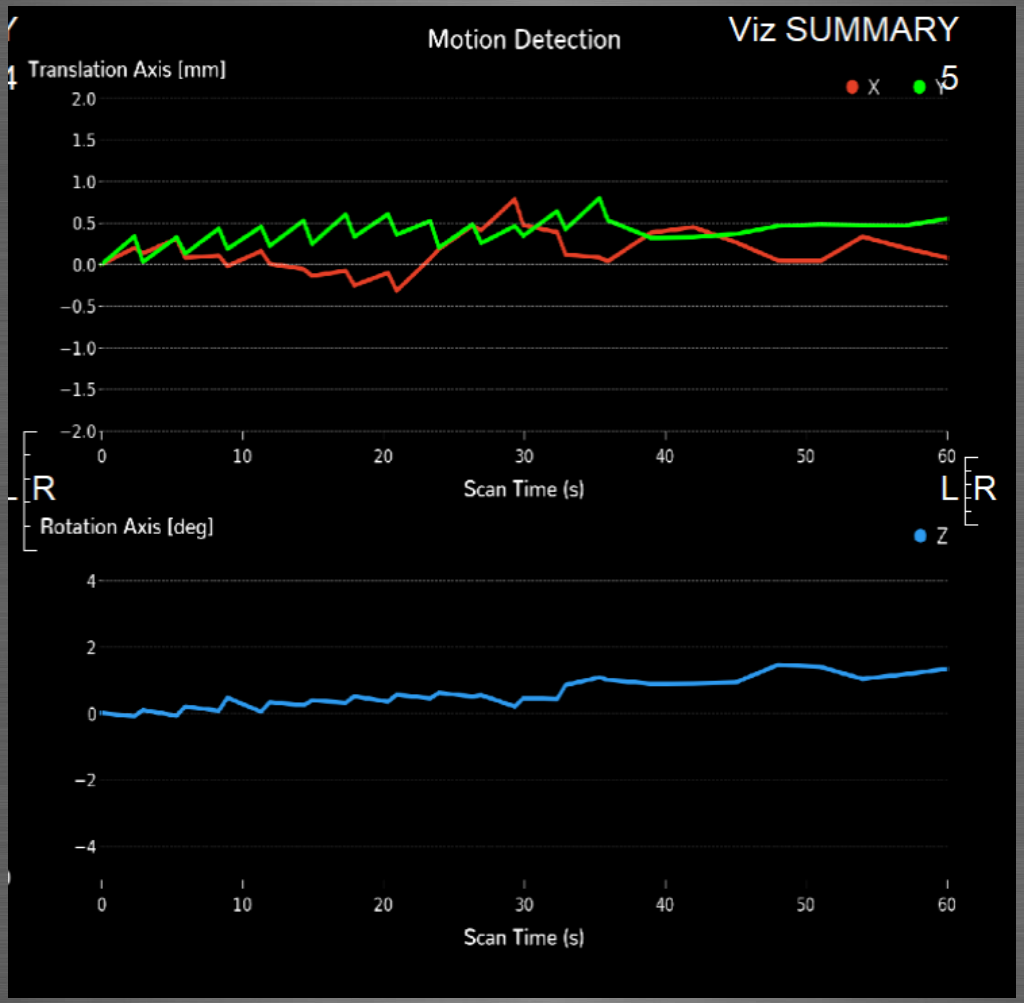
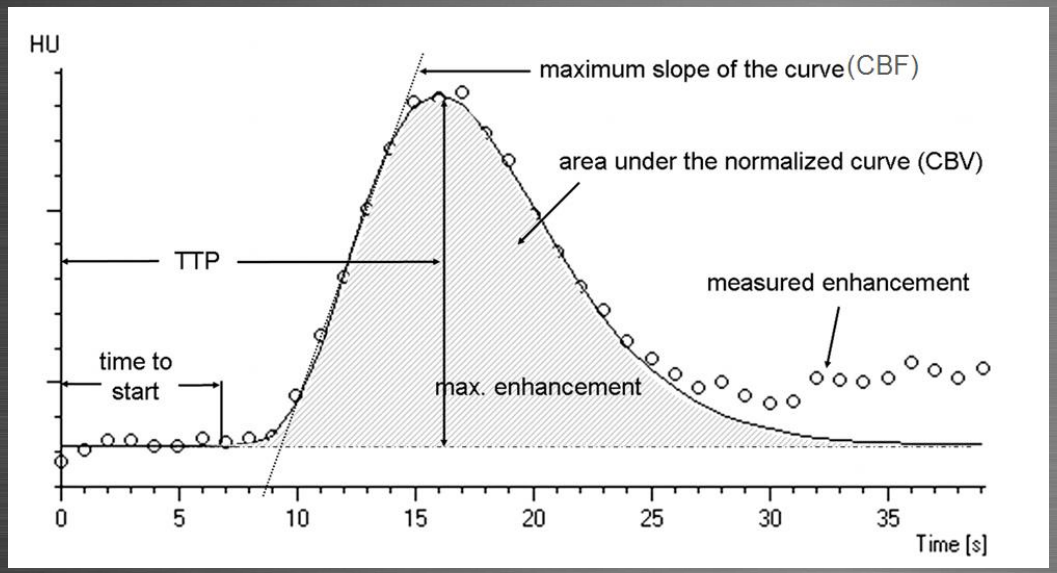
CT Perfusion Basics

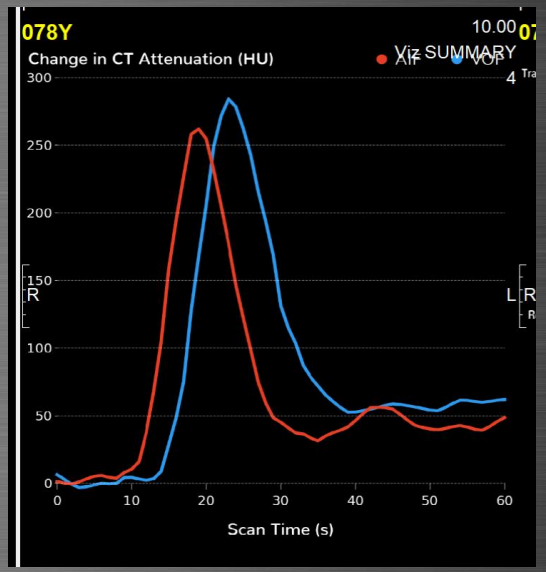
- CBV = Core infarct = DWI
- MTT = Core + reversible ischemia
- Mismatch = Penumbra = MTT – CBV
- MTT – Similar to TTD & TTP

Mild motion (lines should be straight)



Normal Perfusion Curve





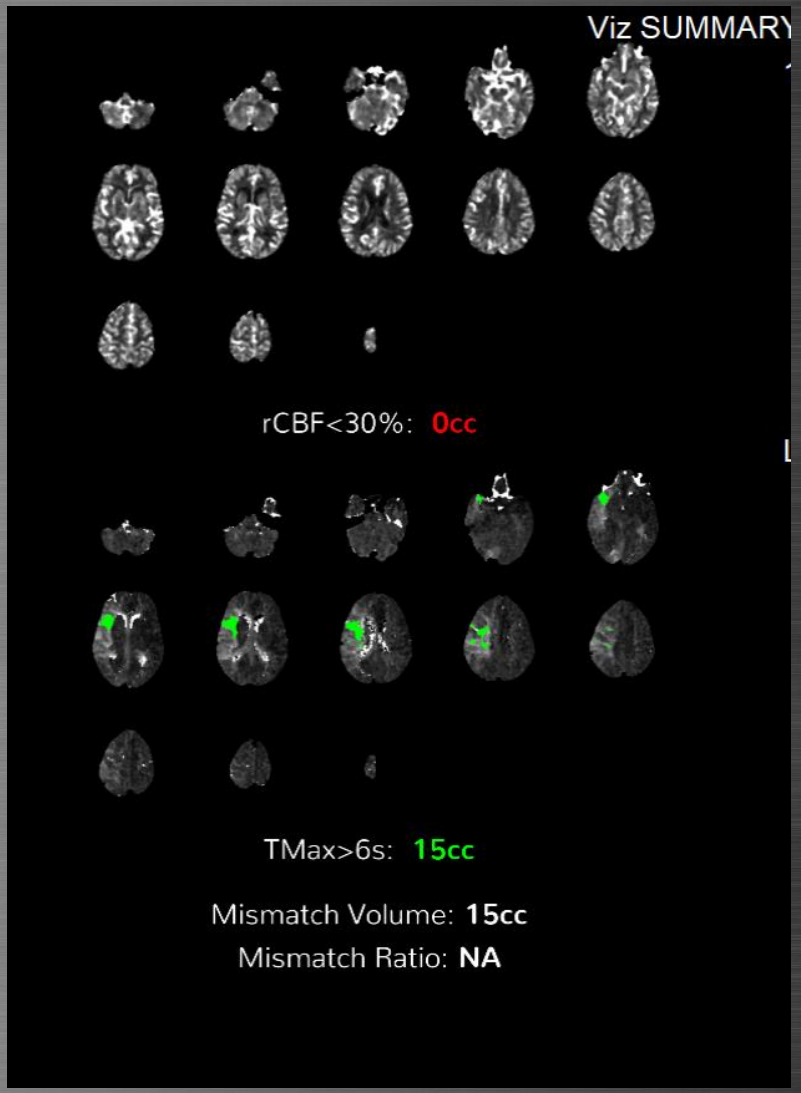
- Good bolus
- Red = arterial
- Blue = venous

Time-to-Maximum (Tmax)

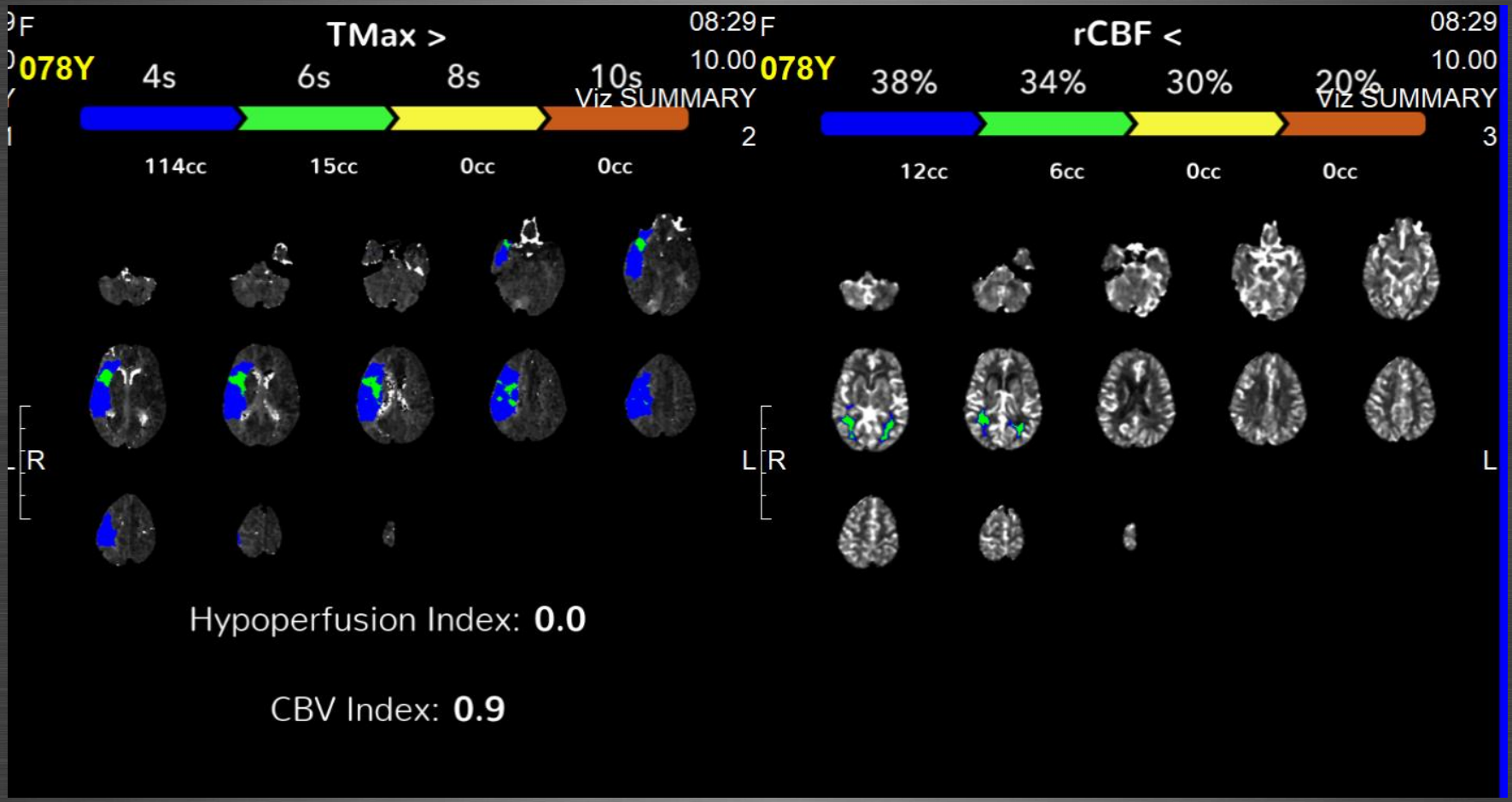
- Perfusion parameter used both in CT perfusion and MRI perfusion and reflects the time delay between the contrast bolus arriving in the proximal large vessel arterial circulation (arterial input function) and the brain parenchyma.
- It is calculated by deconvoluting the arterial input function.
- Although Tmax is widely used in defining tissue at risk of infarction in the setting of ischemic stroke it is susceptible to a variety of distortions particularly in the setting of inflow vascular abnormalities [1,2]

Viz.ai

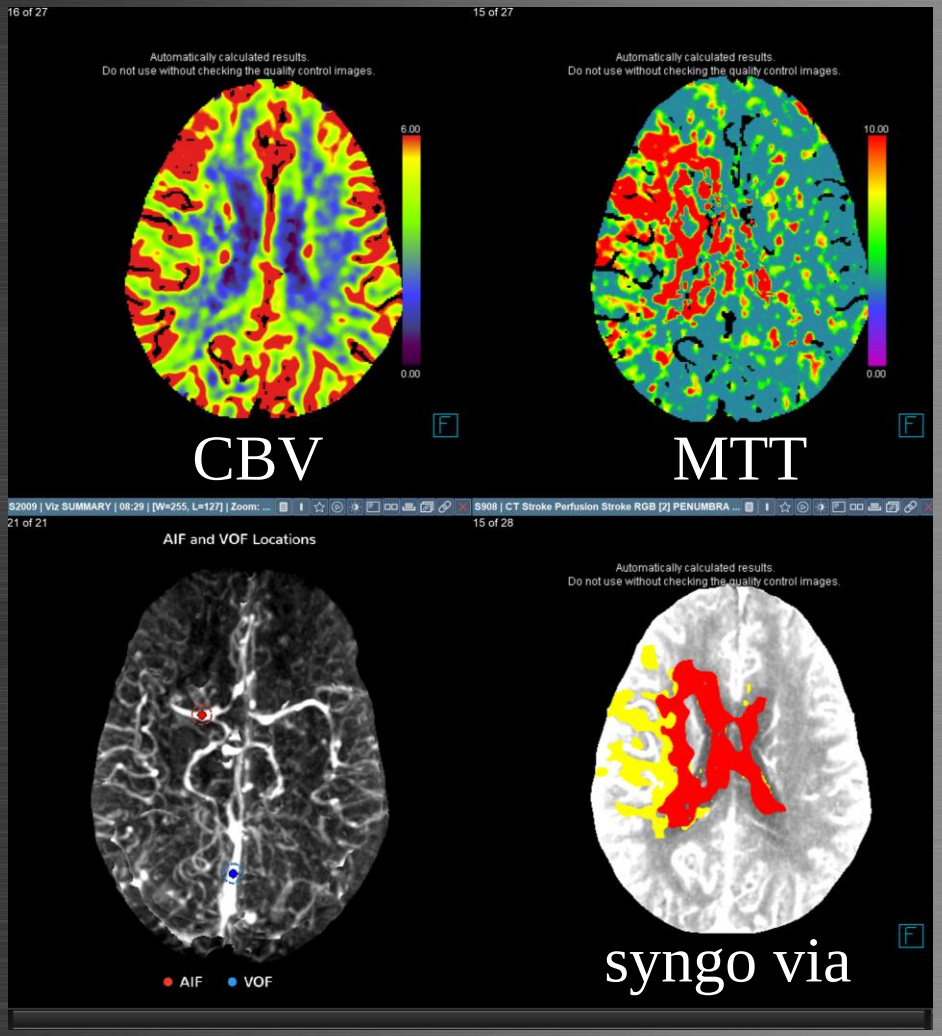
- CBF < 30 % = stroke
  - Increasing, % will increase sensitivity
- Tmax > 6 seconds
  - Tissue at risk of infarction
  - Decreasing # will increase sensitivity



Tmax and CBF with different thresholds



Hyper-perfusion



- CBV –
  - Increased in Right MCA
  - Would be decreased in infarct
- MTT increased in Right MCA
- Large mismatch penumbra MTT >>> CBV
- Lower right is from syngo via
  Red = infarct
  - Yellow = tissue at risk
  - If there is red in the ventricles, then there is artifact, and this image is not reliable