KANSAS INITIATIVE FOR STROKE SURVIVAL
A PROJECT BY AND FOR KANSANS
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Imaging for Acute Stroke

"First Tuesdays" Lecture Series

http://www.kissnetwork.us/

Introduction and Goal of "First Tuesdays"

- Sabreena Slavin MD – Vascular Neurologist and Neurohospitalist at KU School of Medicine
- Craig Bloom RN, BSN, MBA – Senior Clinical Specialist Lytics, Genentech, Inc.
- Didactic lecture series as part of the Kansas Initiative for Stroke Survival
- Updates in Practice and FAQ's on Acute Stroke Care
- 20 minute didactic, 10 minutes for questions/discussion.

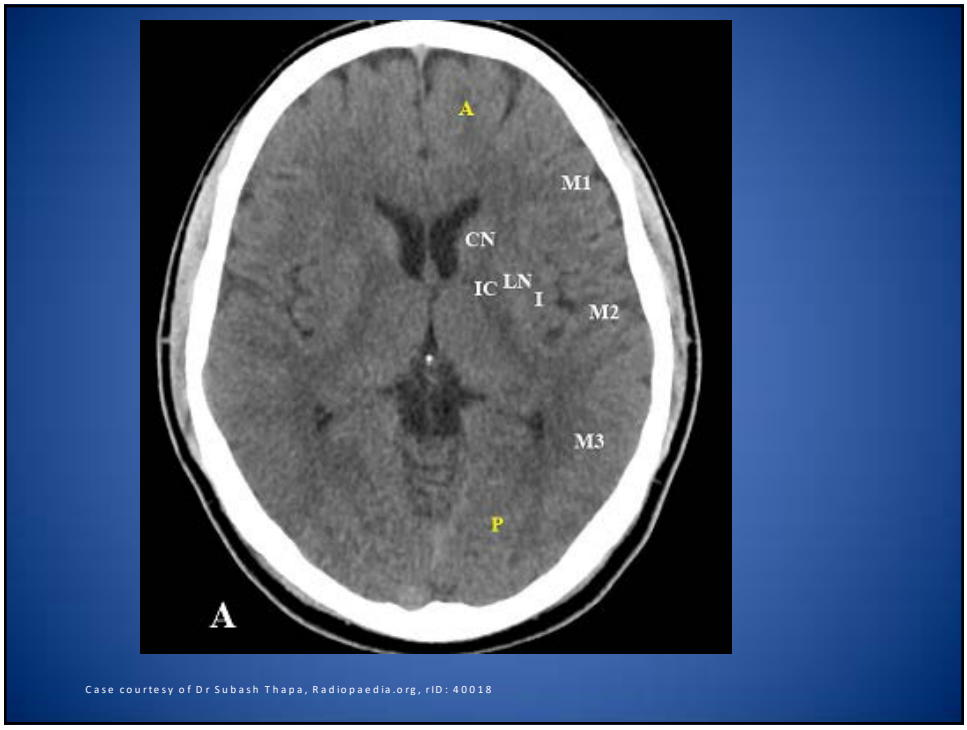
Review of Acute Stroke Interventions

- IV alteplase (tPA): get CT brain without contrast
- Mechanical thrombectomy : get CTA with without contrast and optionally CTP. Only hospital with capabilities (eg: comprehensive stroke center) can perform thrombectomy.
  - Patient who have a large vessel occlusion are candidates for thrombectomy. A higher NIHSS (10 or more) can be indicative of a large vessel occlusion.

Initial Imaging in Acute Stroke

- CT brain without contrast – required for all patients with suspicion of acute stroke. Primarily to rule out hemorrhage, but also to look for early/developing stroke.
- ASPECTS score: looking at subtle **hypodensity** (darkening), loss of gray/white differentiation, loss of sulci in ischemic territories:
  - Assign points for any territories affected, then subtract assigned points from 10
  - Caudate, lentiform nucleus, internal capsule, insula, M1, M2, M3, M4, M5, M6

Barber at al, *Lancet* 2000; Hill et al, *Stroke* 2014


A
M1
CN
IC
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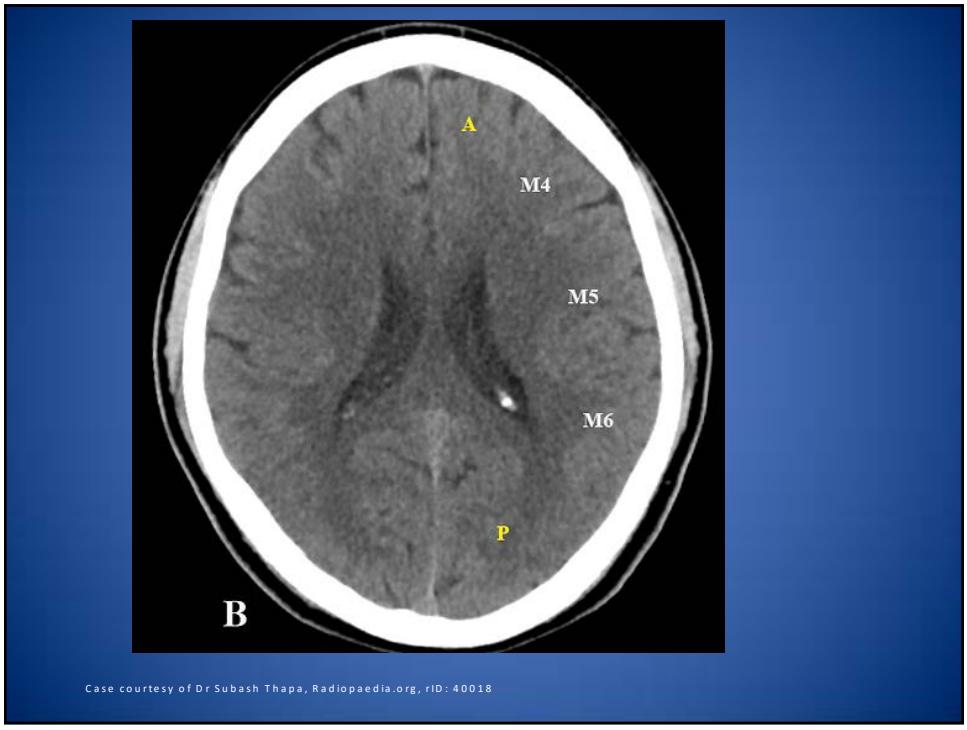
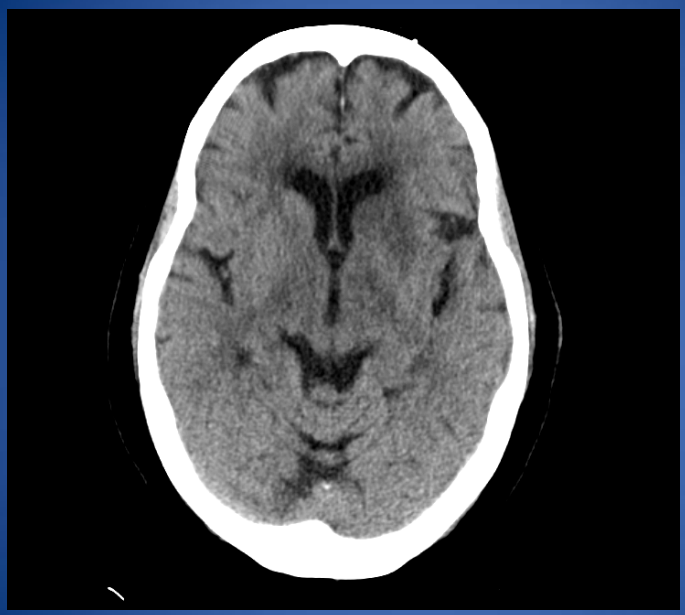
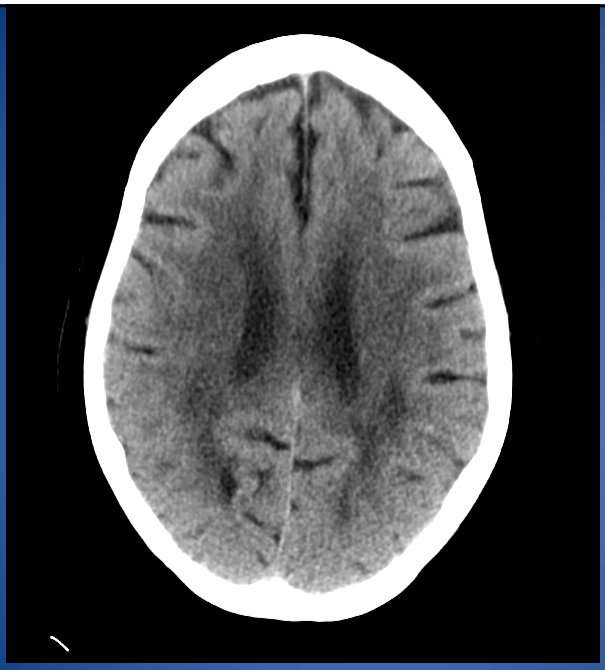
I
M2
M3
P
A
Case courtesy of Dr Subash Thapa, Radiopaedia.org, rID: 40018


A
M4
M5
M6
P
B
Case courtesy of Dr Subash Thapa, Radiopaedia.org, rID: 40018

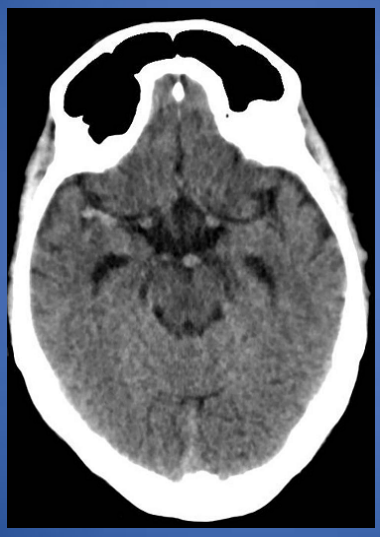
ASPECTS Score

- Higher ASPECTS = Better for intervention/more salvageable tissue
- Baseline ASPECTS score of 7 or less predicted poor outcome (higher mRS or symptomatic ICH) (Barber et al, *Lancet*, 2000).
- Patients with ASPECTS of 8-10 had RR of 1.8 of achieving recanalization and favorable outcome (in intervention) compared with those with ASPECTS of 0-8. (Hill et al, *Stroke* 2014).
- In clinical practice, we take ASPECTS to intervention ≥ 6
- Important note: ASPECTS score not used to make decision on IV tPA.





CT brain w/o contrast is also useful to identify hyperdense vessel:



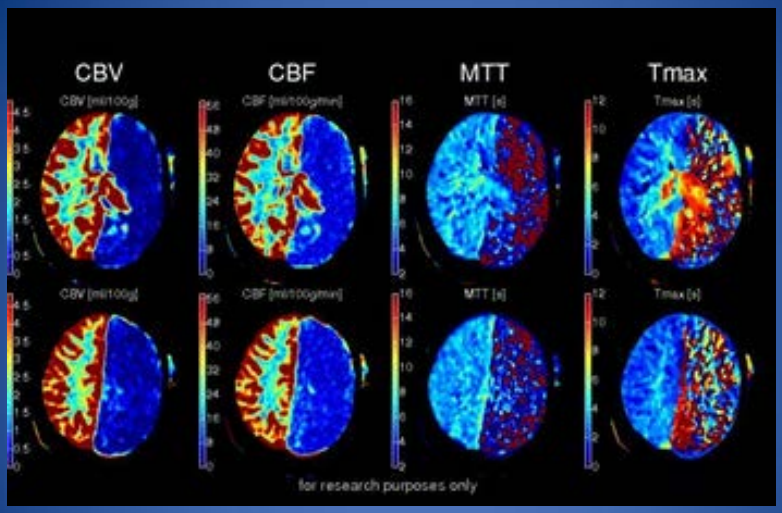
Case courtesy of Dr Brendon Friesen, Radiopaedia.org, rID: 30138

Advanced imaging - CT angiogram head and neck with and w/o contrast

- Looking for large vessel occlusion to decide on thrombectomy**: intracranial ICA, A1, M1/proximal M2, P1, basilar**
- Should be done ASAP on any patient where an LVO is suspected (higher NIHSS, hemispheric syndrome, basilar syndrome), but do not delay IV tPA to get CTA. (Can be done while tPA is mixing).
- If do not have stat capabilities for CTA at your facility and suspecting an LVO, then call stroke center.
- If contrast allergy, can consider premedicating for CTA vs. MRA w/o contrast if STAT MR available.

Advanced imaging – CT perfusion

- Indicated in cases where last known normal was between 6 and 24 hours before, to decide on thrombectomy.
- Measures of core: cerebral blood volume
- Measures of penumbra: mean transit time (ratio cerebral blood flow/cerebral blood volume), time to peak and T_{max} (measures of contrast arrival time to tissue).
- Looking for **mistmatch** between ischemic core (area already damaged) and ischemic penumbra (area at risk of damage).



Case courtesy of RMH Core Conditions, Radiopaedia.org, rID: 28678

Bottom Line:

- Get CT brain immediately on ED arrival. Can look at image before radiologist reads but call for a STAT read.
- If candidate for IV tPA, do not delay mixing/administration for advanced imaging! If suspicion for large vessel occlusion, can get CTA head/neck while waiting for tPA mixing or after treatment.
- If CTA positive for LVO, need to call comprehensive center for potential intervention. ASPECTS can help in this case.
- MRI brain/MRA only needed in special circumstances: contrast allergy to iodine and cannot premedicate in time, questionable diagnosis for stroke vs mimic (seizure or psychogenic features on exam) and ONLY if you can get MRI stat.

Questions?

- Call for help anytime!
- http://www.kissnetwork.us/
- info@kissnetwork.us