



**KANSAS INITIATIVE FOR
STROKE SURVIVAL**
A PROJECT BY AND FOR KANSANS

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Diagnosis and treatment of Large
Vessel Occlusions in acute stroke

“First Tuesdays” Lecture Series

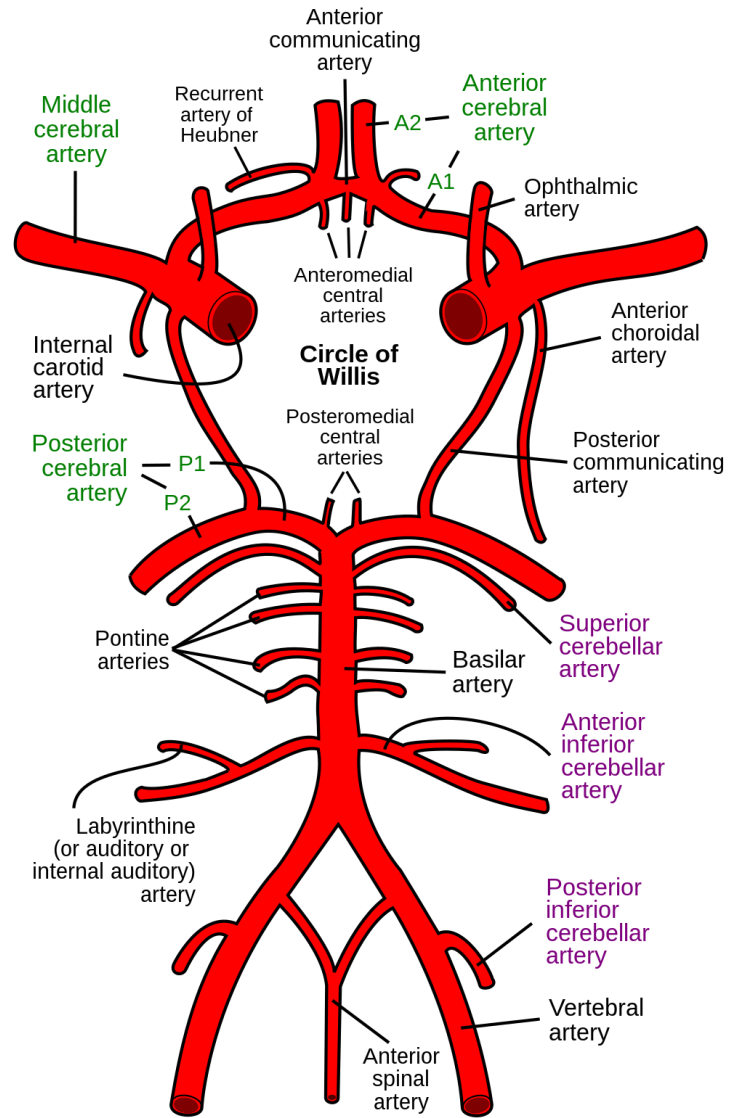
Introduction and Goal of “First Tuesdays”

- Sabreena Slavin MD – Vascular Neurologist and Neurohospitalist at KU School of Medicine
- Didactic lecture series as part of the Kansas Initiative for Stroke Survival
- Updates in Practice and FAQ’s on Acute Stroke Care
- 30 minutes for didactics and questions/discussion

Mechanical thrombectomy

- Only hospitals with capabilities (eg: comprehensive stroke center) can perform thrombectomy. Mechanical thrombectomy performed on LVO's:
 - Internal carotid artery
 - Middle cerebral artery (M1 segment or proximal half of M2)
 - Anterior cerebral artery (A1 segment)
 - Posterior cerebral artery (P1 segment)
 - Basilar artery

*In clinical practice, thrombectomies are frequently performed on proximal M2 segments



Prehospital diagnosis of LVO's

- Prehospital scales: Field Assessment Stroke Triage for Emergency Department (FAST-ED), Los Angeles Motor Scale (LAMS), Cincinnati Prehospital Stroke Severity Scale (CPSSS), Rapid Arterial Occlusion Evaluation (RACE)
- Relies on main clinical features of LVO:
Unilateral weakness and/or “cortical signs”
 - Aphasia, neglect, gaze deviation

Example of scale: Field Assessment Stroke Triage for Emergency Destination (FAST-ED) scale:

-Tested on prospective cohort of 240 patients

Facial palsy	
Normal or minor paralysis	0
Partial/complete paralysis	1
Arm weakness	
No drift	0
Drift	1
No effort against gravity	2
Speech changes	
Absent	0
Mild to moderate	1
Severe/global	2
Eye deviation	
Absent	0
Partial	1
Forced deviation	2
Denial/neglect	
Absent	0
Extinction in only 1 sensory modality	1
Does not recognize own hand/orients to one side only	2
Total score	0-9

FAST-ED ≥ 4 had sensitivity of 0.60, specificity of 0.89

Table 3.

Proportion of Agreement Between LVO Scales and CT Imaging for Typical and Atypical Groups

Scale	Typical		Atypical	
	LVO (95% CI)	Non-LVO (95% CI)	LVO (95% CI)	Non-LVO (95% CI)
RACE \geq 5	0.96 (0.91–1.0)	0.97 (0.95–0.99)	0.16 (0.02–0.30)	0.30 (0.17–0.43)
LAMS \geq 4	0.94 (0.87–1.0)	0.95 (0.93–0.97)	0.19 (0.05–0.34)	0.08 (0.0–0.16)
FAST-ED \geq 4	0.98 (0.94–1.0)	0.97 (0.96–0.99)	0.23 (0.07–0.38)	0.04 (0.0–0.10)
PASS \geq 2	0.96 (0.91–1.0)	0.92 (0.90–0.95)	0.29 (0.12–0.46)	0.06 (0.0–0.13)
CPSSS \geq 2	0.88 (0.79–0.97)	0.94 (0.92–0.96)	0.03 (0–0.10)	0.10 (0.01–0.19)

CI indicates confidence interval; CPSSS, Cincinnati Prehospital Stroke Severity Scale; CT, computed tomography; FAST-ED, Field Assessment Stroke Triage for Emergency Destination; LAMS, Los Angeles Motor Scale; LVO, large vessel occlusion; PASS, Prehospital Acute Stroke Severity scale; and RACE, Rapid Arterial Occlusion Evaluation.

Poor agreement in “Atypical” group:

- (1) no symptoms of arm weakness/cortical sign and presence of LVO
- (2) Symptoms of arm weakness/cortical sign and NO LVO

Limitations of clinical scales

- Not designed to test for posterior circulation strokes
- Some (eg RACE, FAST-ED) are lengthy
- Need extensive training of EMS; few validation studies conducted show moderate sensitivities and specificities, will have some amount of false positives and negatives
- Patients may have other need for CSC than just having a large vessel occlusion

Diagnosis of LVO in Emergency Departments

- CT angiogram head and neck
- Should be done ASAP on any patient where an LVO is suspected (cortical signs or basilar symptoms), 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 obtain MRA w/o contrast if STAT MR available

Hyperdense vessel on CT brain w/o contrast



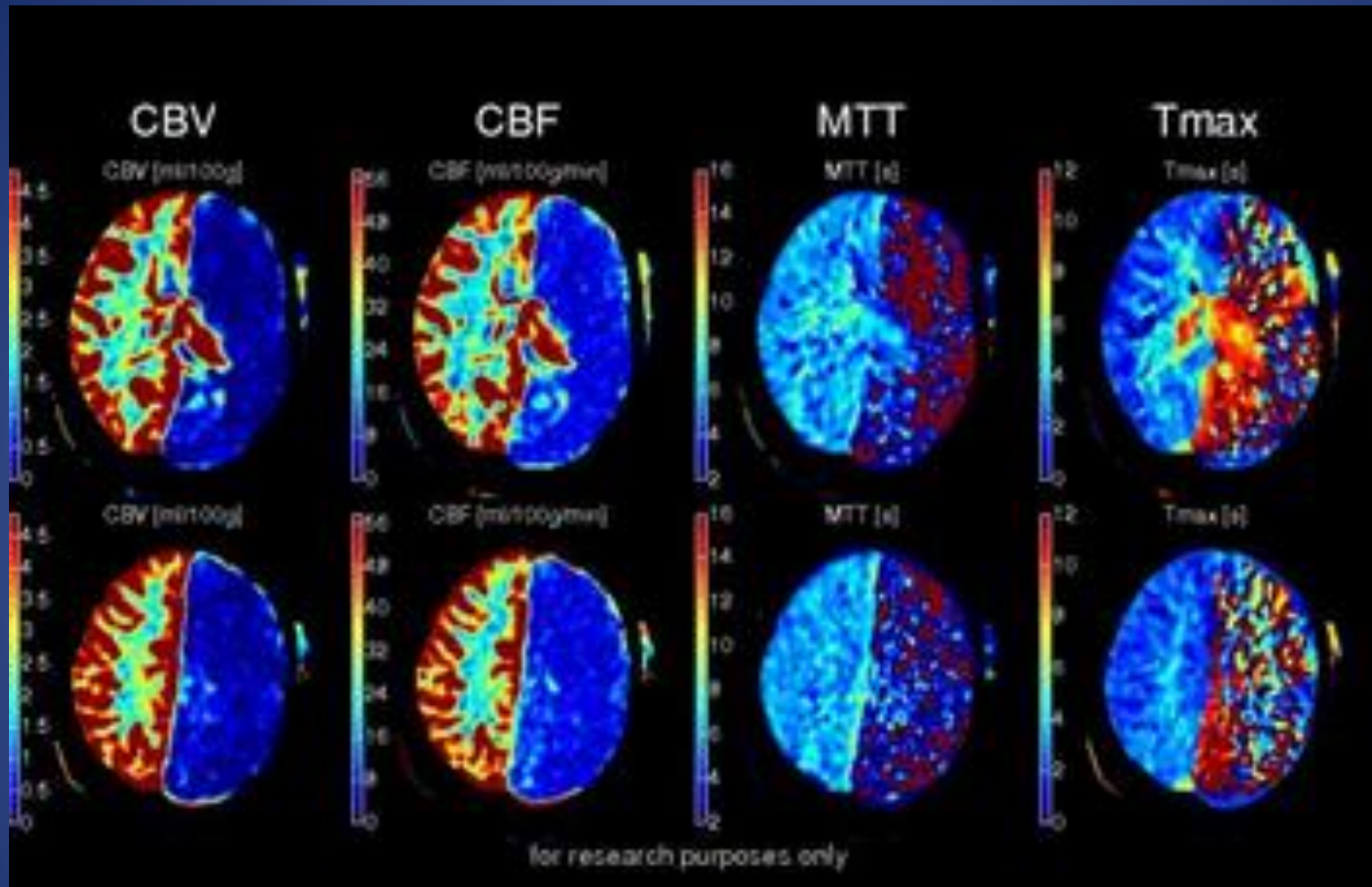
Case courtesy of Dr Brendon Friesen, Radiopaedia.org, rID: 30138

Diagnosing LVO's with CTA

- <https://www.youtube.com/watch?v=YR9hnbdmAAy>
- Get stat read with radiology

When are CT perfusions helpful

- When it will be > 6 hours from last seen well by the time the patient arrives to CSC
 - Looking for **mismatch** between ischemic core (area already damaged) and ischemic penumbra (area at risk of damage).
 - DAWN¹ and DEFUSE 3² trials showing significant benefit for patients 6-24 hours from last well if they have a mismatch
- There is still a benefit for thrombectomies in large cores (>50 mL per CTP)³



Extracranial ICA occlusions

- Tandem occlusions: Presence of both cervical ICA + intracranial ICA or MCA occlusions.
 - To get past the ICA, need to angioplasty and likely stent to keep it open (requires high dose antiplatelet medications, increasing risk of hemorrhage in acute stroke).
- Isolated cervical ICA occlusion: Presence of only extracranial ICA occlusion with patent intracranial vasculature
 - Blood flow to the brain is open via collaterals
- What do you do in second case?

Isolated cervical ICA occlusions

- Retrospective study of 75 patients with 46 having tandem occlusions and 29 only cervical ICA occlusions
- All patients had successful stenting
- There was no difference in favorable outcome (mRS at 90 days 0-2): 68.9% in isolated cervical occlusion group vs 63% in tandem occlusion group
- More studies needed on this intervention

Thrombectomy for distal vessel occlusions?

- One study on 461 patients showed no difference in proportion of successful reperfusion or mortality between M1 and M2 thrombectomies¹
- Another study evaluated 138 patients for occlusions in the distal M2, M3, and ACA and compared thrombectomy with standard medical treatment. Evaluated improvement in NIHSS and mRS at discharge. Successful reperfusion was achieved in 72.9% of patients. Only statistically benefit seen in successful reperfusion patients.²

Subgroup analysis on successful reperfusion

3a						
	Before PSM			After 1:1 PSM		
	MT	SMT	P	MT	SMT	P
Subgroup	≥ TICI 2b			≥ TICI 2b		
N	35	90		30	41	
<i>NIHSS improvement</i>						
Median	5	1.5	0.000	5	1.0	0.010
IQR	1.0–8.0	0.0–4.0		1.0–8.25	0.0–5.0	
<i>mRS improvement</i>						
Median	1	0	0.024	1	0.0	0.098
IQR	0.0–2.0	0.0–1.0		0.0–2.25	0.0–1.0	
mRS improvement ≥ 1 (N)	23	37	0.017	19	15	0.027
%	65.7%	41.1%		63.3%	36.6%	
SH (N)	1	2	1.0	1	1	1.0
%	2.9%	2.2%		3.3%	2.4%	
iHM (N)	3	6	0.709	3	5	1.0
%	8.6%	6.7%		10.0%	12.2%	

Conclusions

- Early CTA for all patients with suggestion of LVO's (dense weakness, aphasia, neglect, gaze deviation, posturing/obtundation)
- CTP for patients > 6 hours from last well to assess for mismatch
- In cases with intracranial ICA, M1/proximal M2, P1, A1, or basilar, easier decision to take for intervention
- In cases with isolated extracranial ICA occlusion or more distal vascular occlusion, more difficult decision but can still consider monitoring
- Remember to cloud imaging asap. RAPID AI app has also been helpful.

Questions?

- Call for help anytime!
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