



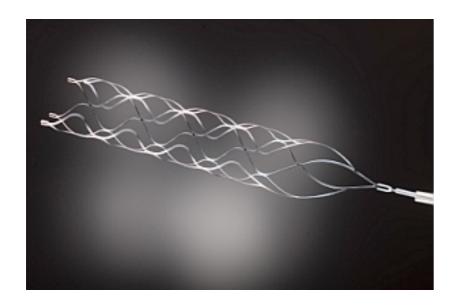
# ELVO update

Michael Wilder, MD
Director, Neurointerventional Program
PeaceHealth Sacred Heart
Springfield, Oregon

## Riverbend

- 24/7 thrombectomy
- ELVO alert
- Access PH
- PACU
- Anesthesia

### Goyal et al. Lancet. 2016



#### THE REW ENGLAND HOUSEAL SENSING, A.C.

#### CROSCHAL ARTRCLS

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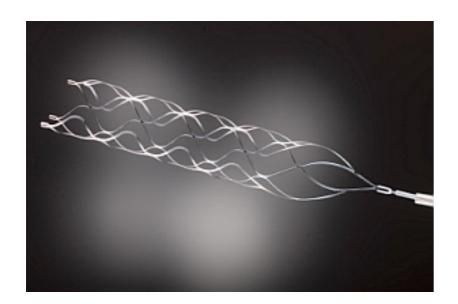
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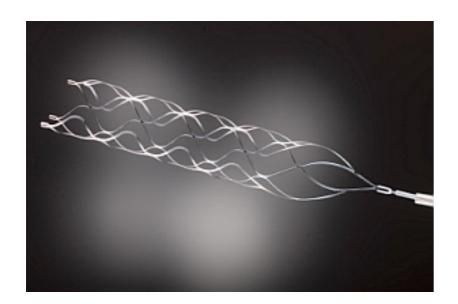
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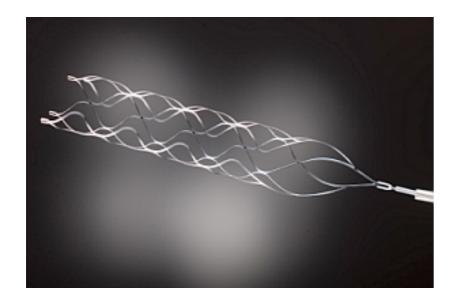
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### – Meta-analysis:

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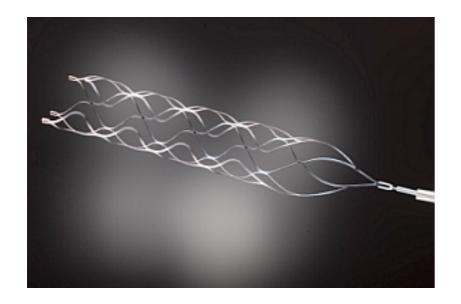
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Harro Christoph Dienes, M.D., Pluth, Elef L. Evry, M.D., Vitor M. Pereira, M.D.,
Gregory, W. Albern, M.D., Christophe Cognard, M.D., David J. Cohen, M.D.,
Werner-Nadia, M.D., Ph.D., Olay Janses, M.D., Ph.D., Tudbr G., Joan, M.D.,
Helmich P. Matte, M.D., Stall G. Naguelin, M.D., Adnah H. Siddiqui, M.D., Ph.D.,
Chers, S. Yanagol, M.D., Staller W. Burter, M.D., Thomas G. Devlin, M.D., Ph.D.,
Demetrius K. Lose, M.D., Vivik K. Neddy, M.D., Richard d. Mernil de Rocherton, M.D.,
Chive C. Singer, M.D., and Sexa Jahan, M.D., for the SWET PSIME Investigatory

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#### THE NEW ENGLAND POWERAL & MEDICINE

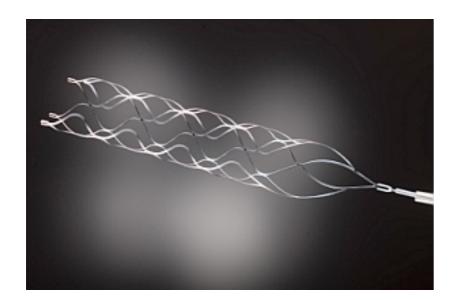
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- Meta-analysis:
  - n = 1287
  - NNT 2.6

Goyal et al. Lancet. 2016



#### THREW EMPLAND JOHNHAL O'N CORCING

#### CROSCHAL ARTRCLS

#### A Randomized Trial of Intraarterial Treatment for Acute Ischemic Stroke

G.A. Bernherres, P.A.A. Hassber, D. Bestmer, L.A. van Bentherg, H.A. Lingsma, A.J. Tak, W.J. Schmanstelle, J.A. Yao, P., Merleskouter, M.J. H. Wermer, M. A. Kan Mardemann, J. Stack, J. Harling, J.A. van Gersterlander, J. Stack, J. Harling, J. J. Lingsma, P.A. Browers, B.J. Ermen, S.F. de Bruijn, L.C. van Dijk, L.J. Kapoelle, R.H. Lin, B.J. van Note, J. L. Van der Berg, R.A. A. van Gerster, B.J. Lingsman, D. Schmanstelle, J. L. M. Berder, B.J. Lingsman, M.C. Virenz, J.J. Berg, J. R. W. Schmanstelle, J. L. M. Berg, R.J. Lingsman, M. C. Virenz, J. F. Rott, R. M. Virenz, R. M. Virenz, R. S. Berg, R. S. Schmanstelle, R. J. Hergisten, R. Schmanstelle, B. M. Schmanstelle, R. J. Hergisten, R. S. Berg, R. S. Mann, B. W. Stephen, R. S. H. M. Martin, R. M. Stephen, R. S. M. Stephen, R. S. H. M. Martin, R. S. M. Stephen, R. S. H. M. Martin, R. S. M. Stephen, R. S. H. M. Martin, R. S. M. Stephen, R. S. H. M. Martin, R. S. M. Stephen, R. S. H. M. Martin, R. M. Naton, R. S. M. Stephen, R. S. M. S

#### THE MEN'S SECLARD TO VEHAL IT MEDICANS

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#### Randomized Assessment of Rapid Endovascular Treatment of Ischemic Stroke

M. Gayal, A.V. Demchulk, S.K. Mentan, M. Lesa, J.L. Nompel, J. Thernton, D. Rey, T.G. Joein, R.A. Willinsky, B.L. Saylotta, D. Dewischarki, D.F. Frei, N.R. Earnal, W.J. Montanera, A.Y. Roppe, K.J. Byckhonz, R.L. Silver, A. Shasib, D. Tampini, D. Williams, G.Y. Barrg, R.W. Rozer, R.A. Burre, H. Chan, J.-H. Hen, C.A. Holmstad, B. Jankowitz, M. Kally, G. Linams, J. L. Mandda, J. Shankar, S. L. Sahn, R.H. Swartz, R.A. Barker, S. E. Goutts, Lab. Sendy, W.F. Marrich, A. Well, S. Subrawaniam, A.F. Matta, J.H. Wang, M.W. Lawertson, T.T. Sajobi, and M.D. Hill for the ESCAPT frial Innocripators\*

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### AHA/ASA Guideline

2015 American Heart Association/American Stroke Association Focused Update of the 2013 Guidelines for the Early Management of Patients With Acute Ischemic Stroke Regarding Endovascular Treatment

A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association

## • ELVO

- Emergent Large Vessel Occlusion

- Emergent Large Vessel Occlusion
  - <6 hours from onset</li>

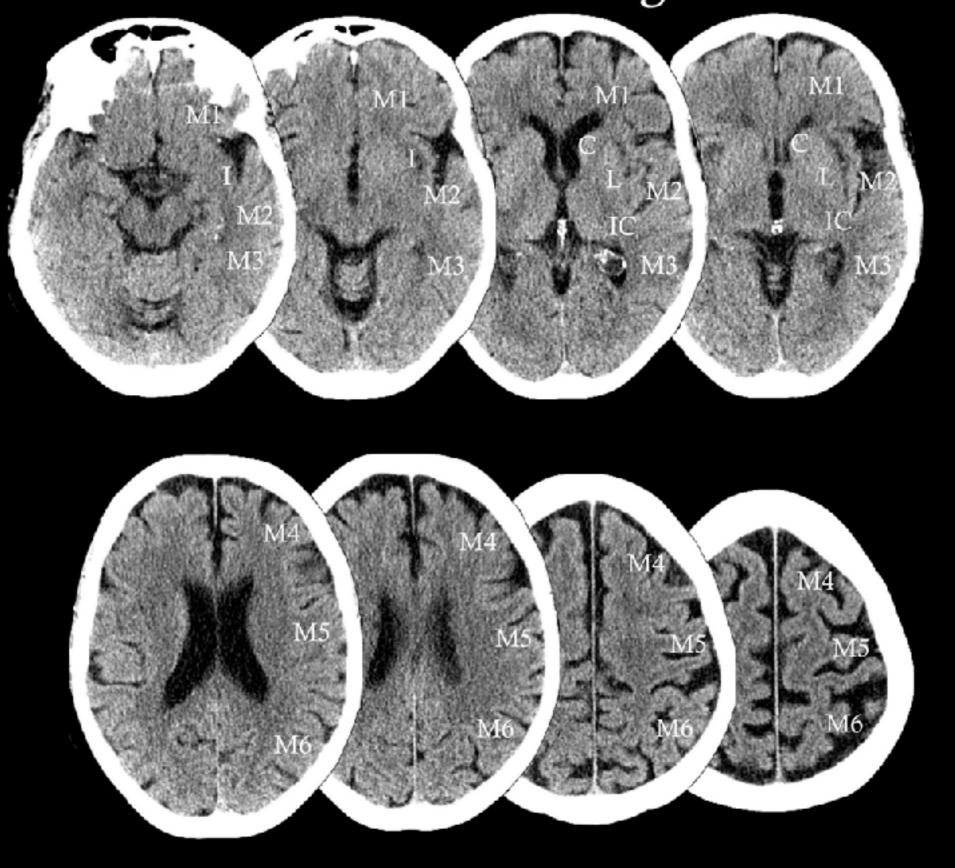
- Emergent Large Vessel Occlusion
  - <6 hours from onset</li>
  - Without large completed infarct

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    - ASPECTS ≥6

- Emergent Large Vessel Occlusion
  - <6 hours from onset</li>
  - Without large completed infarct
    - ASPECTS ≥6
  - NIHSS ≥ 6

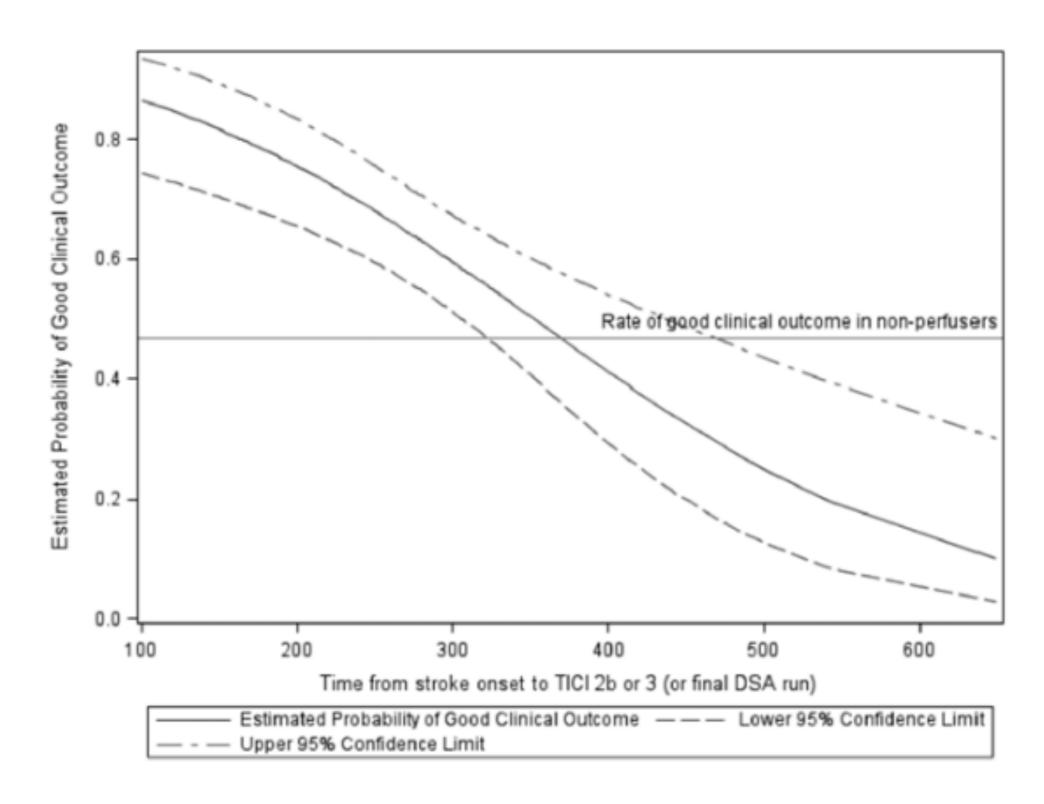
- Emergent Large Vessel Occlusion
  - <6 hours from onset</li>
  - Without large completed infarct
    - ASPECTS ≥6
  - NIHSS ≥ 6
  - Large vessel occlusion

## Ganglionic Level



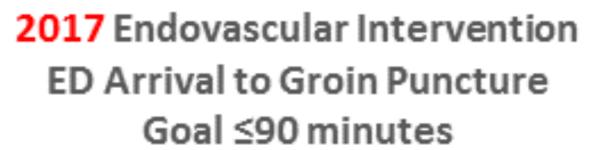
Supraganglionic Level

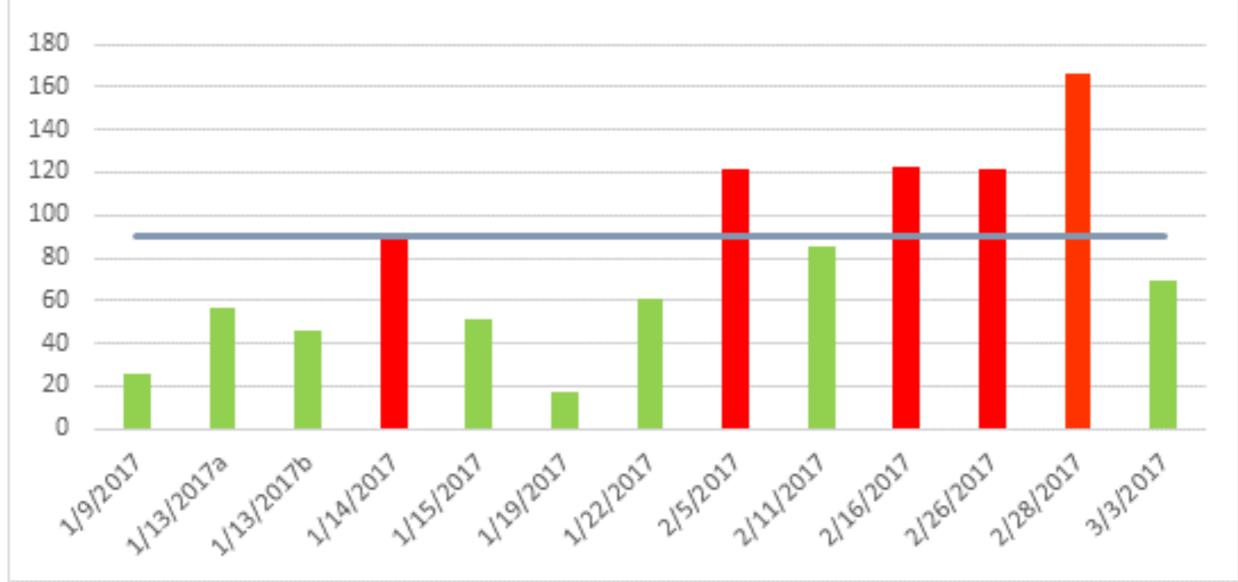
• All patients still get IV tPA if eligible



Every hour of delay leads to 38% decrease in likelihood of good outcome

• Door to groin goal ≤90 minutes





- Earlier involvement of interventionist
  - Prior to CT scans being done
  - CTA head & neck on all stroke alerts

## Field identification of ELVO



# Two questions in the field

# Two questions

# Two questions

1. Is the patient having a stroke?

# Two questions

- 1. Is the patient having a stroke?
- 2. Does the patient need endovascular therapy? (ELVO)

Stroke?

## Cincinnati

# Los Angeles







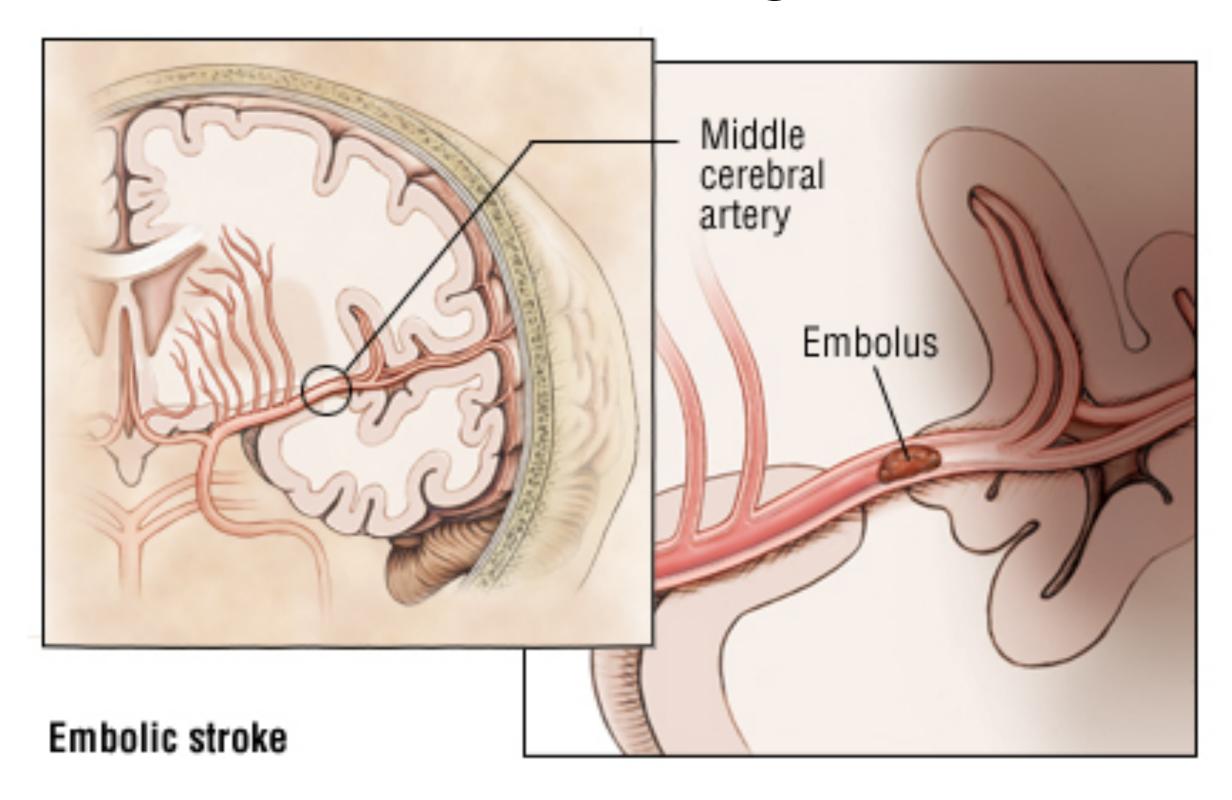


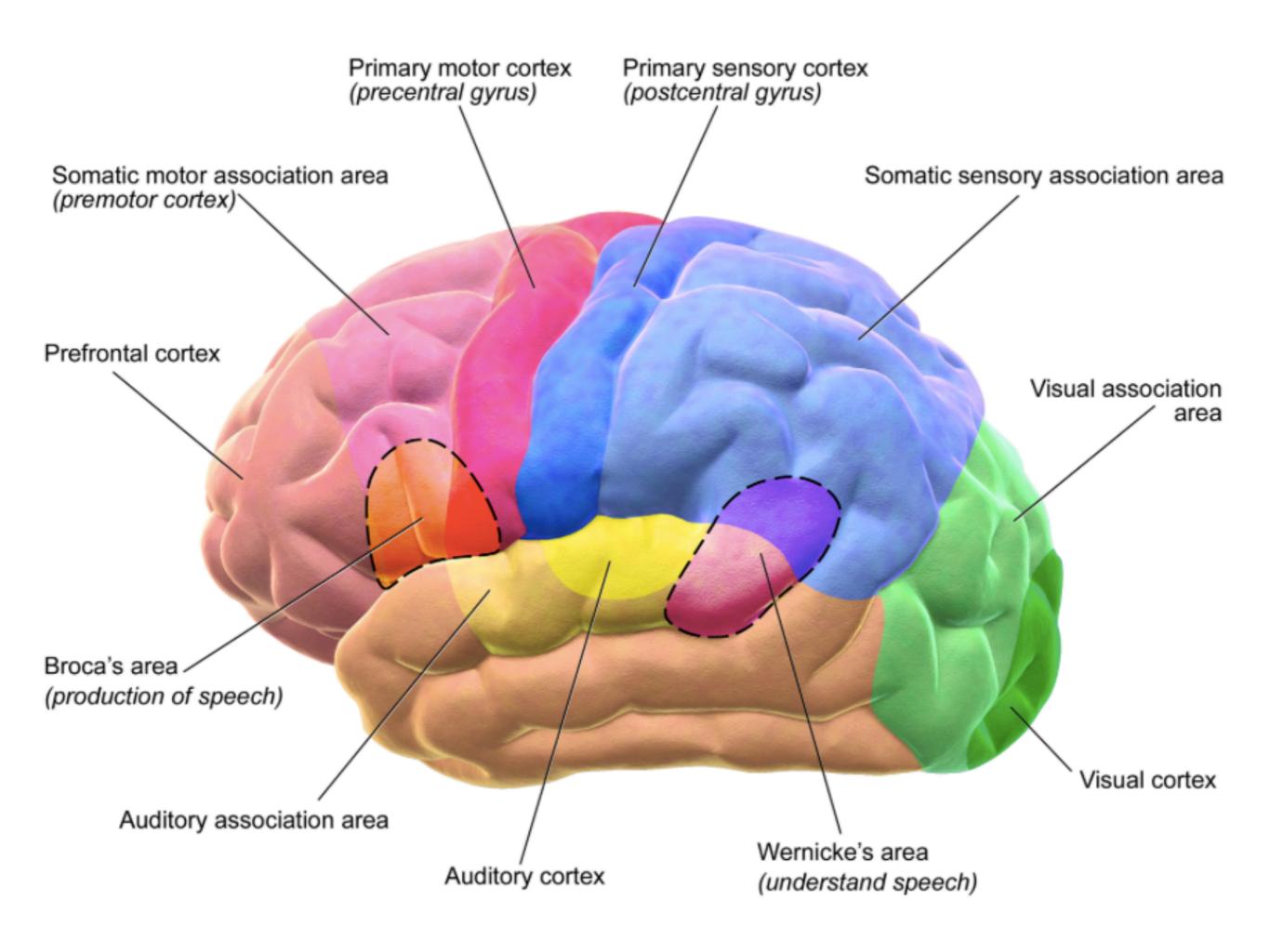
sc	REENING CRITERIA:				Yes	Unknown	No
4.	Age > 45				[]	[]	[]
5.	History of seizures or epilepsy absent					[]	[]
6.	,					[]	[]
7.	At baseline, patient is no	ot wheelch	air bound or bed	ridden	[]		[]
8.	Blood glucose between	60 and 400	D:		Yes []		No []
9.	Exam: LOOK FOR OBV	/IOUS AS\ Normal	MMETRY Right	Left			
	Facial Smile/Grimace:		□ Droop	□ Droop			
	Grip:		□ Weak Grip □ No Grip	□ Weak Grip □ No Grip			
	Arm Strength:		☐ Drifts Down ☐ Falls Rapidly	☐ Drifts Down ☐ Fells Rapidly			
					Yes		No
	Based on exam, patient	has only u	unilateral (and n	ot bilateral) weakn	ess: []		[]
10.	Items 4,5,6,7,8,9 all YE criteria met:	S's (or un	$known) \rightarrow LAP$	SS screening	Yes []		No []

11. If LAPSS criteria for stroke met, call receiving hospital with a "code stroke", if not then return to the appropriate treatment protocol. (Note: the patient may still be experiencing a stroke even if LAPSS criteria are not met.)

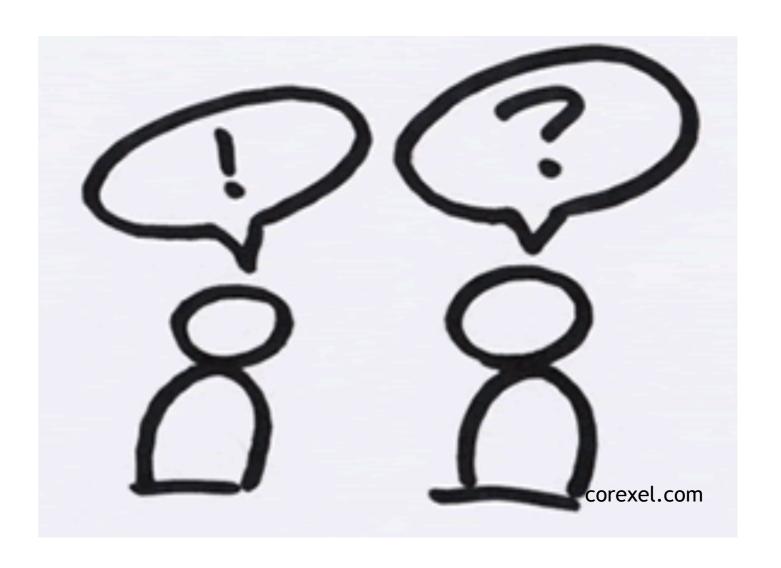
# ELVO?

# Cortical Signs

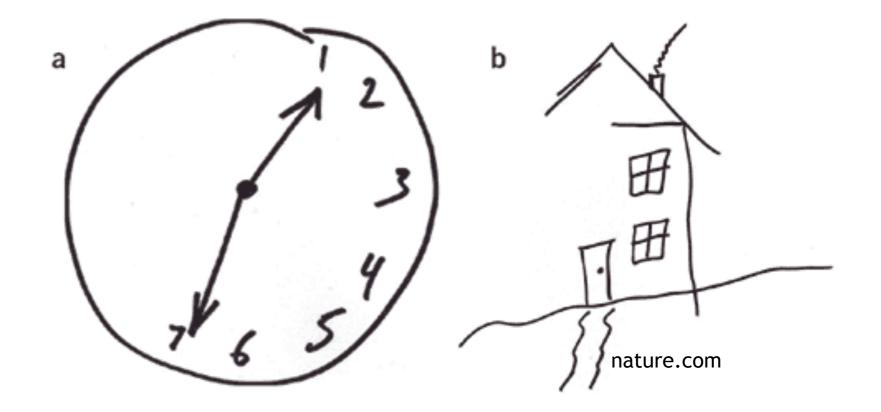


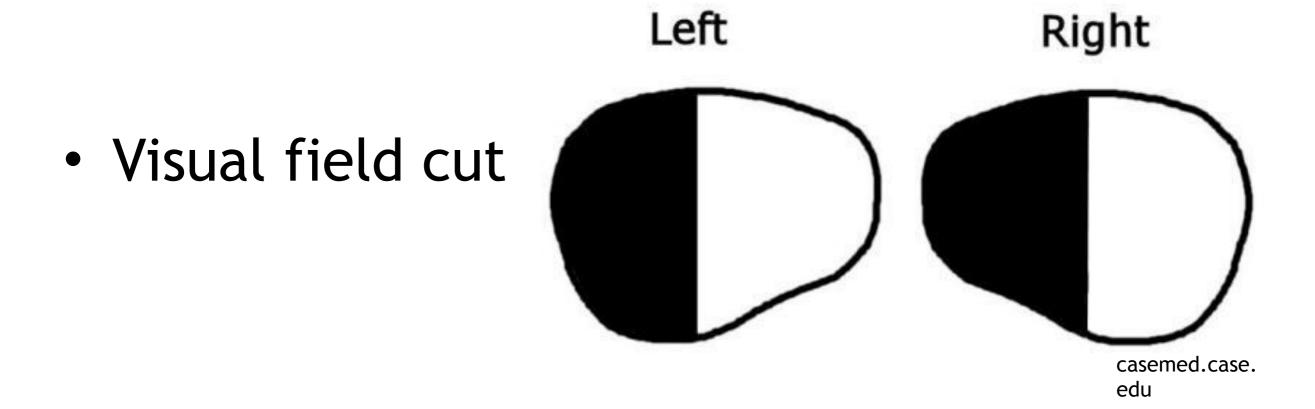


Aphasia

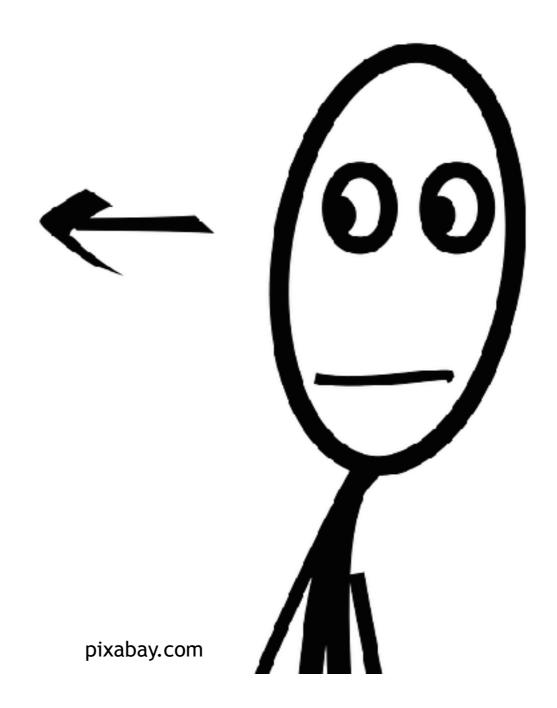


Neglect





Gaze palsy



#### RACE

Item	Instruction		RACE score	NIHSS score equivalence
Facial palsy	Ask the patient to show teeth	Absent (symmetrical movement)	0	0
		Mild (slightly asymmetrical)	1	1
		Moderate to severe (completely asymmetrical)	2	2-3
Arm motor function	Extending the arm of the patient 90 degrees (if sitting) or 45	Normal to mild (limb upheld more than 10 seconds)	0	0-1
	degrees (if supine)	Moderate (limb upheld less than 10 seconds)	1	2
		Severe (patient do not rise the arm against gravity)	2	3-4
Leg motor function	Extending the leg of the patient 30 degrees (in supine)	Normal to mild (limb upheld more than 5 seconds)	0	0-1
		Moderate (limb upheld less than 5 seconds)	1	2
		Severe (patient do not rise the leg against gravity)	2	3-4
Head and gaze deviation	Observe eyes and cephalic deviation to one side	Absent (eye movements to both sides were possible and no cephalic deviation was observed)	0	0
		Present (eyes and cephalic deviation to one side was observed)	1	1-2
Aphasia	Ask the patient two verbal orders	Normal (performs both tasks correctly)	0	0
(if right hemiparesis)	- "close your eyes"	Moderate (performs one task correctly)	1	1
	- "make a fist"	Severe (performs neither tasks)	2	2
Agnosia (if left hemiparesis)	Asking: - "Who is this arm" while showing him/her the paretic arm (asomatognosia)	Normal (no asomatognosia nor anosognosia)	0	0
		Moderate (asomatognosia or anosognosia)	1	1
	<ul> <li>"Can you move well this arm?" (anosognosia)</li> </ul>	Severe (both of them)	2	2
RACE Score total			0-9	

Table 6 Vision, Aphasia, Neglect (VAN) screening tool<sup>68</sup>

Item	Responses		
Motor arm			
Raise both arms	Mild-minor drift Moderate-severe drift Severe-flaccid or no antigravity No weakness-VAN negative		
Vision			
Assessment of visual fields, vision, diplopia	Field cut Double vision New blindness None		
Aphasia			
Repeat and name two objects Open and close eyes and fist	Expressive Receptive Mixed None		
Neglect			
Gaze preference, tactile or spatial neglect	Forced gaze or inability to track to one side Unable to feel both sides at the same time or unable to identify own arm Ignores one side None		

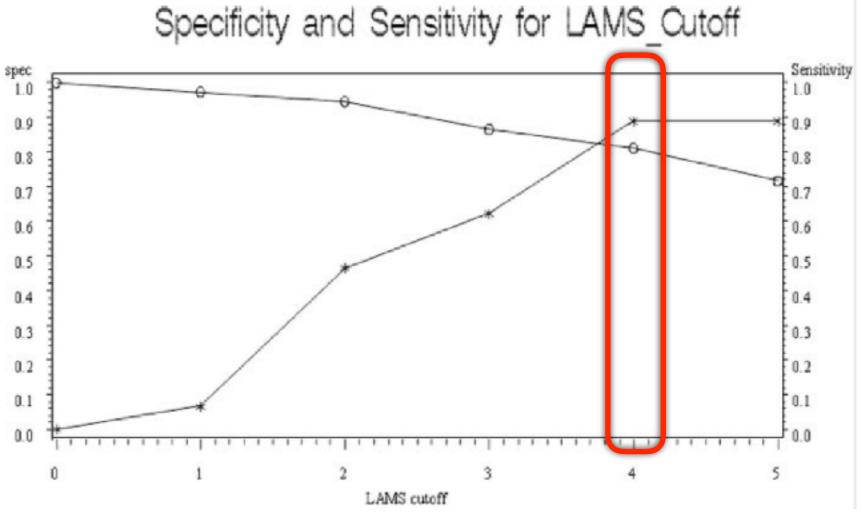
VAN+, motor involvement plus any VAN.

VAN+, 100% sensitivity, 90% specificity, 0.0 negative likelihood ratio for large vessel occlusion.

#### LAMS

#### The Los Angeles Motor Scale (LAMS)

Facial droop Absent Present	0 1	spec 1.0 0.9
		0.7
Arm drift		0.6
Absent	0	0.5
Drifts down	1	0.4
Falls rapidly	2	0.3
rails rapidly	2	0.2
		0.1
Grip strength		0.0
Normal	0	
Weak grip	1	
No grip	2	



### C-STAT

ltem	Findings	Score
Gaze	Absent	0
	Present	2
Arm Weakness	Absent	0
	Present	
Alteration of consciousness	Absent	0
	Present	
C-STAT Positive		2 or greater

 Conjugate gaze deviation (≥1 NIHSS)

• 2 points - highest weight in scale



No



Item	Findings	Score
Gaze	Absent	0
	Present	2
Arm Weakness	Absent	0
	Present	
Level of consciousness	Absent	0
	Present	
C-STAT Positive		2 or greater

Item	Findings	Score
Gaze	Absent	0
	Present	2
Arm Weakness	Absent	0
	Present	
Level of consciousness	Absent	0
	Present	
C-STAT Positive		2 or greater

 Arm (right or left or both) falls to bed before 10 seconds (≥2 NIHSS)

Item	Findings	Score
Gaze	Absent	0
	Present	2
Arm Weakness	Absent	0
	Present	
Level of consciousness	Absent	0
	Present	
C-STAT Positive		2 or greater

Item	Findings	Score
Gaze	Absent	0
	Present	2
Arm Weakness	Absent	0
	Present	
Level of consciousness	Absent	0
	Present	
C-STAT Positive		2 or greater

- Incorrectly answers at least 1 of 2 of LOC questions on NIHSS (age, month) and
- Does not follow at least one of two commands (close eyes, make a fist)
  - ≥1 on NIHSS items 1b and 1c

Item	Findings	Score
Gaze	Absent	0
	Present	2
Arm Weakness	Absent	0
	Present	
Alteration of consciousness	Absent	0
	Present	
C-STAT Positive		2 or greater

Item	Findings	Score
Gaze	Absent	0
	Present	2
Arm Weakness	Absent	0
	Present	
Alteration of consciousness	Absent	0
	Present	
C-STAT Positive		2 or greater

#### **C-STAT Performance on Detection of LVO**

	Sensitivity	Specificity	Positive Likelihood Ratio	Negative Likelihood Ratio
Severe Stroke NIHSS > 15	89%	73%	3.3	0.15
Moderate Stroke NIHSS > 10	75%	85%	5.00	0.29

Katz: Stroke 2015;46:1508-1512

- EMS training next week
  - Radio in as "C-STAT positive" if score ≥ 2
  - Page out stroke alert as "C-STAT positive"
  - Will enable early involvement of interventionist for diagnosis and treatment of ELVO

#### Conclusion

- Early recognition is key
- Will allow improved door to groin times

# Suggestions

- CTA head and neck on all stroke alerts
- Alert interventionist prior to imaging if cortical findings and weakness
- C-STAT
- Stroke activation order set placed prior to pt arrival

# Thank you