LARGE VESSEL OCCLUSION

FROM HOME TO HOSPITAL

1.2. EMS Assessment and Management

1.2. EMS Assessment and Management	COR	LOE	New, Revised, or Unchanged
1. The use of a stroke assessment system by first aid providers, including EMS dispatch personnel, is recommended.	**I**	**B-NR**	Recommendation reworded for clarity from 2015 CPR/ECC. Class and LOE unchanged. See Table LXXXIII in online Data Supplement 1 for original wording.
2. EMS personnel should begin the initial management of stroke in the field. Implementation of a stroke protocol to be used by EMS personnel is strongly encouraged.	**I**	**B-NR**	Recommendation revised from 2013 AIS Guidelines.
In 1 study, the positive predictive value for a hospital discharge diagnosis of stroke/transient ischemic attack (TIA) among 900 cases for which EMS dispatch suspected stroke was 51% (95% CI, 47–54), and the positive predictive value for ambulance personnel impression of stroke was 58% (95% CI, 52–64).[21] In another study of 21 760 dispatches for stroke, the positive predictive value of the dispatch stroke/TIA symptoms identification was 34.3% (95% CI, 33.7–35.0), and the sensitivity was 64.0% (95% CI, 63.0–64.9).[22] In both cases, use of a prehospital stroke scale improved stroke identification, but better stroke identification tools are needed in the prehospital setting.			See Table III in online Data Supplement 1.

VAN SCALE

- Unilateral weakness with…
- Visual
  - Gaze Deviation
- Aphasia
  - Expressive – inability to speak or get words out (test by asking to name objects)
  - Receptive – Not understanding or following commands (word salad)
  - Usually associated with right sided weakness
- Neglect
  - Ignoring one side
  - Difficulty recognizing ones own arm or unable to feel on one side when both sides are touched
  - Only looking or paying attention to one side of the room or people on that specific side
  - Usually associated with left sided weakness

DAWN

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Thrombectomy 6 to 24 Hours after Stroke with a Mismatch between Deficit and Infarct

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ABSTRACT

BACKGROUND

The effect of endovascular thrombectomy that is performed more than 6 hours after the onset of ischemic stroke is uncertain. Patients with a clinical deficit that is disproportionately severe relative to the infarct volume may benefit from late thrombectomy.

METHODS

We enrolled patients with occlusion of the intracranial internal carotid artery or proximal middle cerebral artery who had last been known to be well 6 to 24 hours earlier and who had a mismatch between the severity of the clinical deficit and the infarct volume, with mismatch criteria defined according to age (<80 years or ≥80 years). Patients were randomly assigned to thrombectomy plus standard care (the thrombectomy group) or to standard care alone (the control group). The coprimary end points were the mean score for disability on the utility-weighted modified Rankin scale (which ranges from 0 [death] to 10 [no symptoms or disability]) and the rate of

The authors' full names, academic degrees, and affiliations are listed in the Appendix. Address reprint requests to Dr. Jovin at the University of Pittsburgh Medical Center Stroke Institute, Department of Neurology, Presbyterian University Hospital, 200 Lothrop St., C-400, Pittsburgh, PA 15217, or at jovintg@upmc.edu.

*A complete list of sites and investigators in the DAWN trial is provided in the Supplementary Appendix, available at NEJM.org.

Drs. Nogueira and Jovin contributed equally to this article.

DEFUSE 3

ORIGINAL ARTICLE

Thrombectomy for Stroke at 6 to 16 Hours with Selection by Perfusion Imaging

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ABSTRACT

BACKGROUND

Thrombectomy is currently recommended for eligible patients with stroke who are treated within 6 hours after the onset of symptoms.

METHODS

We conducted a multicenter, randomized, open-label trial, with blinded outcome assessment, of thrombectomy in patients 6 to 16 hours after they were last known to be well and who had remaining ischemic brain tissue that was not yet infarcted.

The authors' full names, academic degrees, and affiliations are listed in the Appendix. Address reprint requests to Dr. Albers at the Stanford Stroke Center, 780 Welch Rd., Suite 350, Palo Alto, CA 94304-5778, or at albers@stanford.edu.

*A complete list of the DEFUSE 3 investigators is provided in the Supplementary Appendix, available at NEJM.org.

NEW AHA GUIDELINES

3.7. Mechanical Thrombectomy (Continued)	COR	LOE	New, Revised, or Unchanged
7. In selected patients with AIS within 6 to 16 hours of last known normal who have LVO in the anterior circulation and meet other DAWN or DEFUSE 3 eligibility criteria, mechanical thrombectomy is recommended.	I	A	New recommendation.
8. In selected patients with AIS within 16 to 24 hours of last known normal who have LVO in the anterior circulation and meet other DAWN eligibility criteria, mechanical thrombectomy is reasonable.	IIa	B-R	New recommendation.
The DAWN trial used clinical imaging mismatch (a combination of NIHSS score and imaging findings on CTP or DW-MRI) as eligibility criteria to select patients with large anterior circulation vessel occlusion for treatment with mechanical thrombectomy between 6 and 24 hours from last known normal. This trial demonstrated an overall benefit in function outcome at 90 days in the treatment group (mRS score 0–2, 49% versus 13%; adjusted difference, 33%; 95% CI, 21–44; posterior probability of superiority >0.999).[108] In DAWN, there were few strokes with witnessed onset (12%).The DEFUSE 3 trial used perfusion-core mismatch and maximum core size as imaging criteria to select patients with large anterior circulation occlusion 6 to 16 hours from last seen well for mechanical thrombectomy. This trial showed a benefit in functional outcome at 90 days in the treated group (mRS score 0–2, 44.6% versus 16.7%; RR, 2.67; 95% CI, 1.60–4.48; *P*<0.0001).[109] Benefit was independently demonstrated for the subgroup of patients who met DAWN eligibility criteria and for the subgroup who did not. DAWN and DEFUSE 3 are the only RCTs showing benefit of mechanical thrombectomy >6 hours from onset. Therefore, only the eligibility criteria from one or the other of these trials should be used for patient selection. Although future RCTs may demonstrate that additional eligibility criteria can be used to select patients who benefit from mechanical thrombectomy, at this time, the DAWN or DEFUSE-3 eligibility should be strictly adhered to in clinical practice.			See Table XXIII in online Data Supplement 1.
9. The technical goal of the thrombectomy procedure should be reperfusion to a modified Thrombolysis in Cerebral Infarction	I	A	Recommendation reworded for clarity from 2015 Endovascular.

TYPICAL PATIENT ENCOUNTER???

5 MOST IMPORTANT THINGS…

- Last Known Well
- Symptom onset
- Anticoagulation?
  - Coumadin/Warfarin, Eliquis (Apixaban), Xarelto (Rivaroxaban), Pradaxa (Dabigatran)
- Afib presence or history?
- Blood pressure

CASE 1

- “I came home from work and my dad is walking around the house confused”
- What is the first thing you should be thinking of as you head over?
  - LAST KNOWN WELL! LAST KNOWN WELL! LAST KNOWN WELL!
    - Symptom onset?
    - Anyone else with dad during the day? What does that mean for LKW?
    - Collateral history?
- Why is it important?
  - Timing could determine where patient is sent
  - Primary vs. Comprehensive

Stroke Protocol Performance Assessment

ARRIVAL TO HOUSE

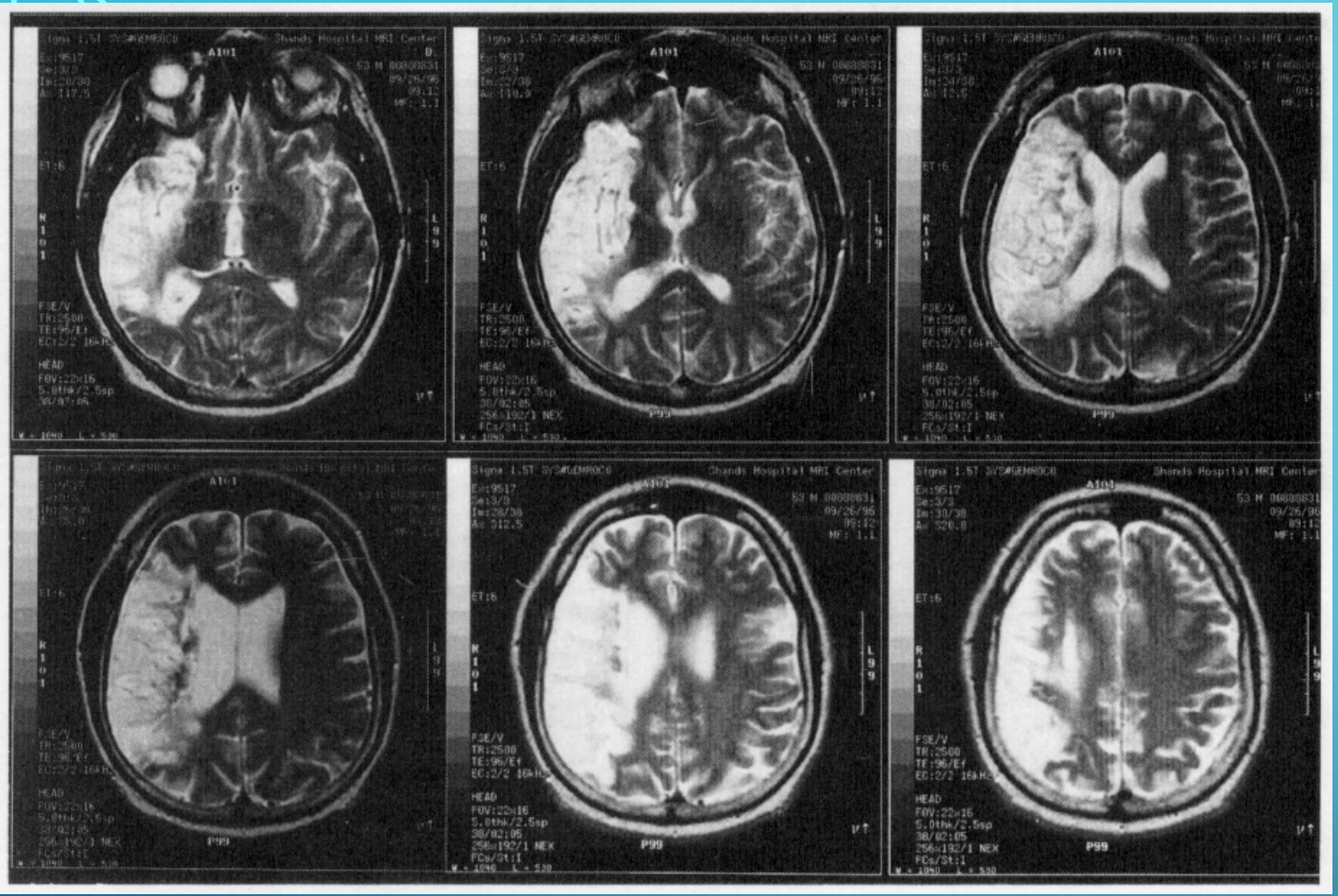
- Patient moving all extremities spontaneously but weaker with R arm
- When asked his name he looks at you and tries to get words out but can't
- You give him verbal commands to follow but he does not. He does mime
- Thoughts?
- LVO?

WHERE SHOULD PATIENT GO?

- Comprehensive
  - (time of transport to comprehensive) – (time of transport to primary) ≤ 20 minutes
- Primary
  - (time of transport to comprehensive) – (time of transport to primary) > 20 minutes
- Air Considerations?

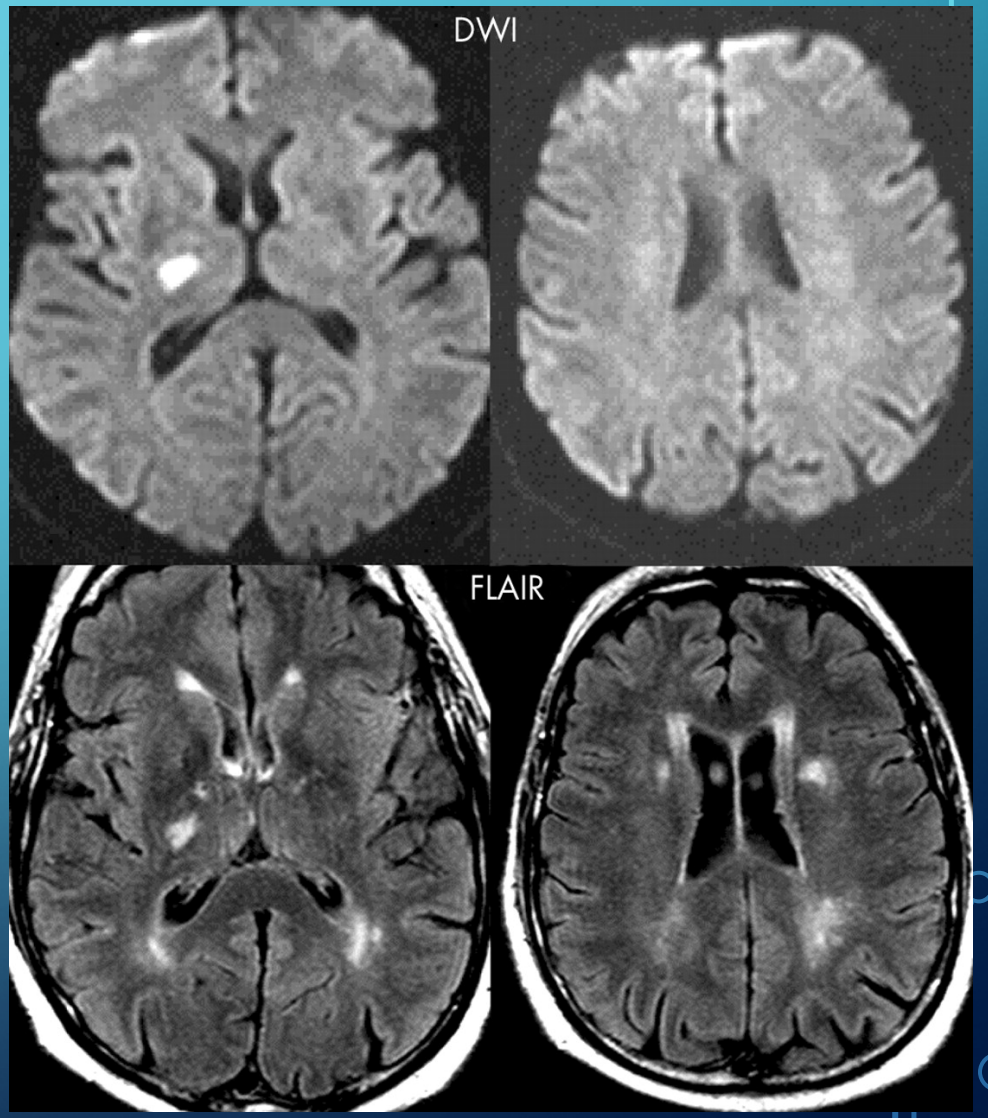
CASE 2

- Husband calls EMS and states during dinner, wife began slurring her words, drooping her face on the left and slumping to the left
- What are you thinking about?
- On arrival to the house, you see patient has L face drooping and can't move her L arm or L leg
- LVO or no?



Cortical

Subcortical



TESTING FOR NEGLECT

1. Does patient recognize he/she is weak?
2. Is patient only looking to or recognizing one side of their body or people/objects on one side of their body only? (usually will notice R and neglect L)
   - Depends on handedness
3. When both legs are touched simultaneously is only one leg recognized?
4. Visual neglect

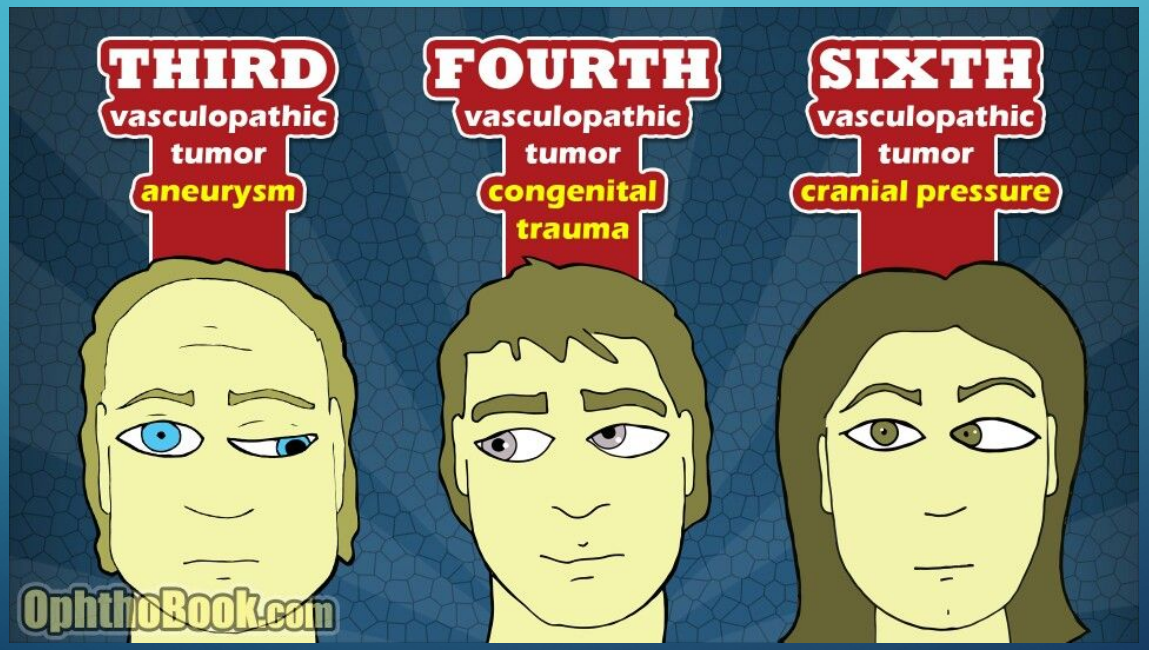
If neglect is seen, then what?

CASE 3

- Patient calls 911 – I can't feel the right side of my body (it is numb) and my vision is double
- What are you thinking as you head over to the house?
  - LKW vs. symptom onset
  - Will collateral history be needed?
  - Important exam techniques
    - EOM
    - Pre-hospital stroke scale
    - What does R sided weakness imply?

UPON ARRIVAL TO THE HOUSE

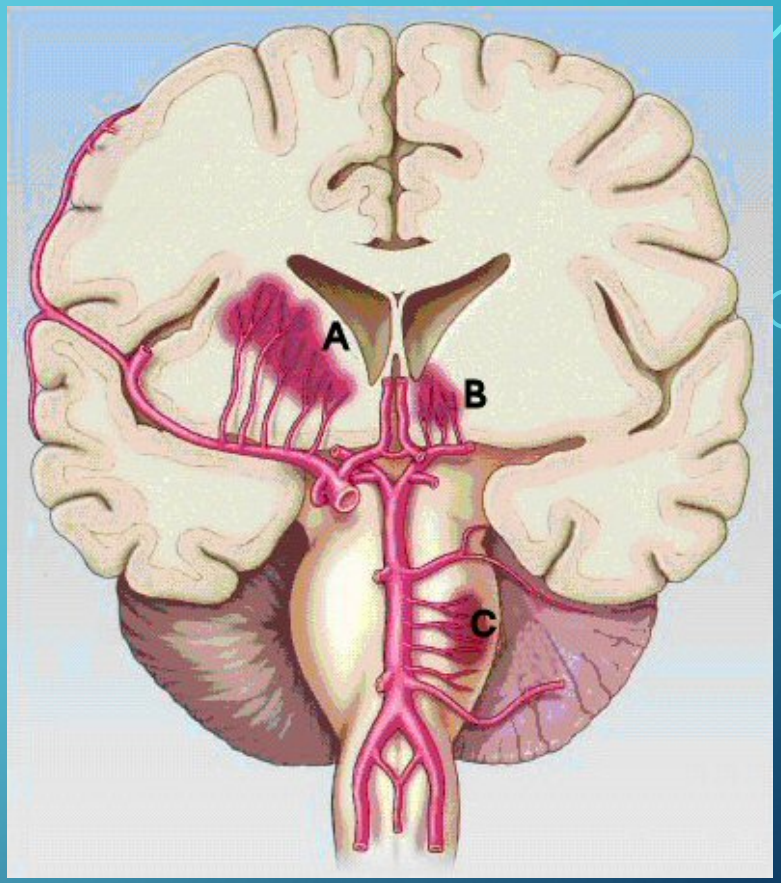
- Drift is noted in her RUE and her RLE seems to be dragging as well
- Lack of sensation on R side as well as R face tingling
- Eyes look crossed eyed and her eye movements aren't full

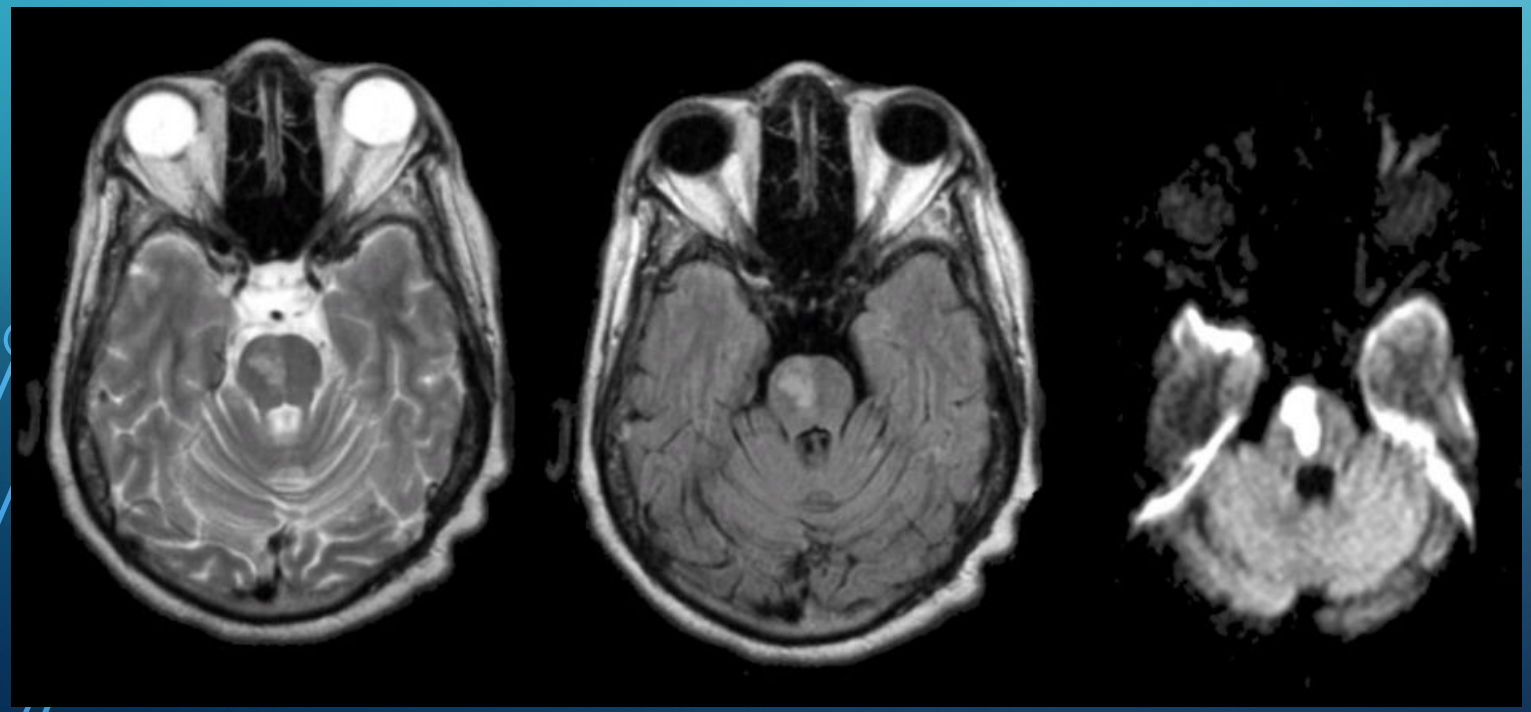


LVO OR NO?

PONTINE STROKE

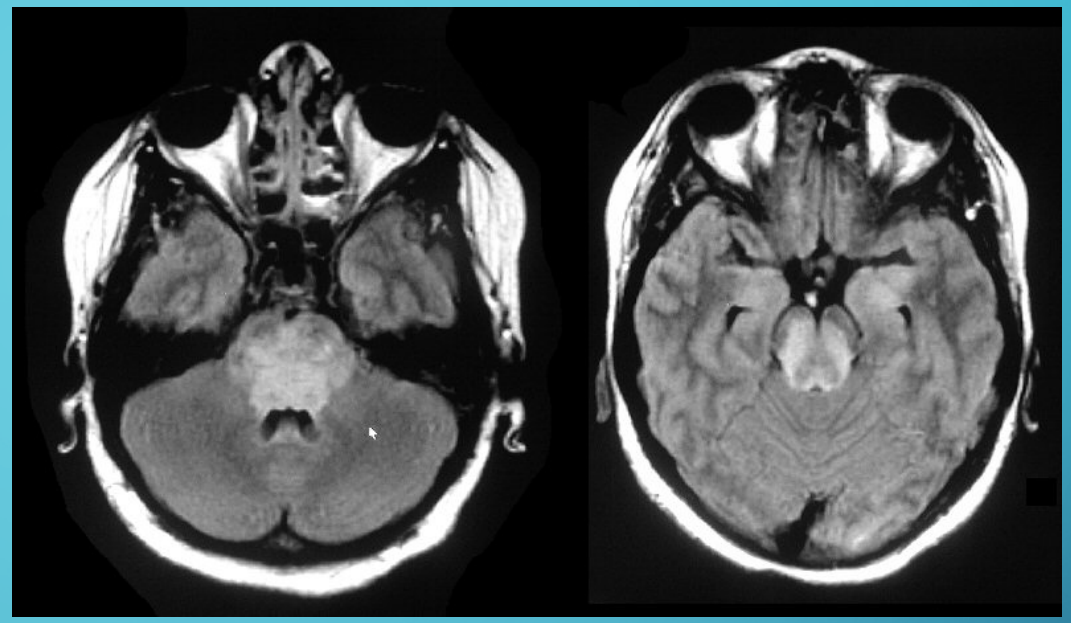
- Hemiparesis
- Facial droop
- Double vision (eye movement abnormalities)
- Nausea, vomiting, vertigo
- Ataxia
- Slurred Speech





BASILAR ARTERY OCCLUSION

- Bilateral symptoms (weakness, tingling, numbness)
- Complete facial paralysis
- Double vision, vertigo, nausea, vomiting
- Ataxia
- Eye movement abnormalities
- Slurred speech
- Headache
- Altered level of consciousness
  - Falling in and out of sleep/level of alertness



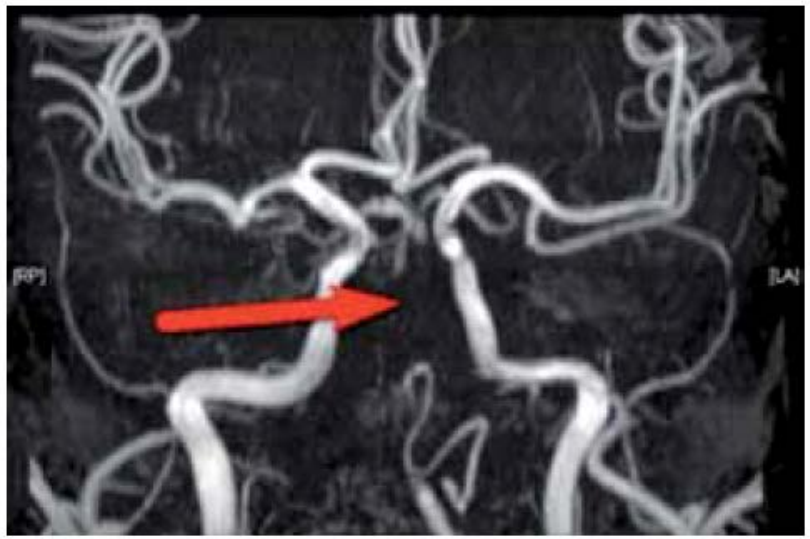
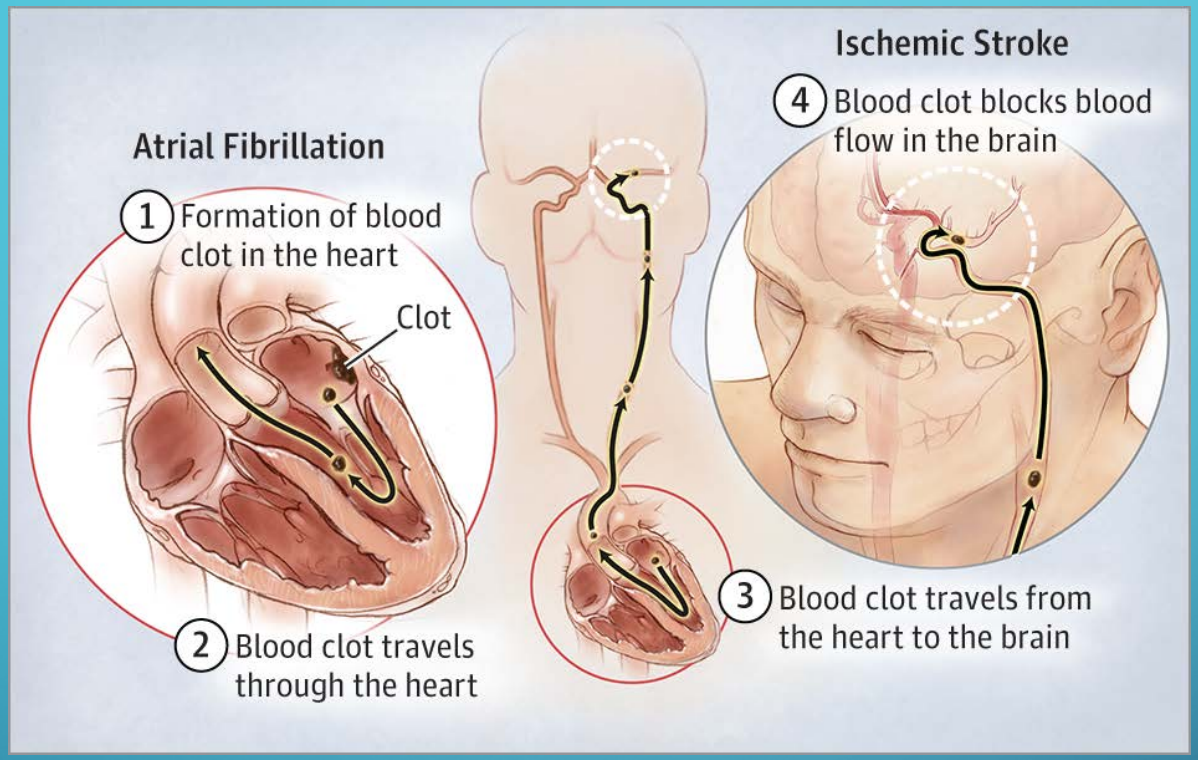


FIG 2. Time-of-flight magnetic resonance angiography shows absence of flow-related signal along the basilar artery (red arrow), highly suggestive of occlusion

5 MOST IMPORTANT THINGS…

- Last Known Well
- Symptom onset
- Anticoagulation?
  - Coumadin/Warfarin, Eliquis (Apixaban), Xarelto (Rivaroxaban), Pradaxa (Dabigatran)
- Afib presence or history?
- Blood pressure

ATRIAL FIBRILLATION AND LARGE VESSEL OCCLUSION



- Irregular heartbeat that causes hemostasis in the L atria and pooling of blood
- If someone has afib their stroke is more likely to be LVO

LARGE VESSEL OCCLUSION

Specific Factors to Predict Large-Vessel Occlusion in Acute Stroke Patients

Masato Inoue, MD, et al

,

1. Presence or history of atrial fibrillation
2. Systolic BP <170 mm Hg on presentation

Both significantly correlated with incidence of Large Vessel Occlusion (LVO) !!!!