Acute Stroke Intervention due to Cardioembolic Etiology: Case Examples

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DISCLOSURE STATEMENT OF FINANCIAL INTEREST

I, (Omer Goktekin) DO NOT have a financial interest/arrangement or affiliation with one or more organizations that could be perceived as a real or apparent conflict of interest in the context of the subject of this presentation.

Cardioembolic Stroke

- Cardiac embolism accounts for an increasing proportion of ischemic strokes and might multiply several-fold during the next decades.
- Recent clinical trials have indicated that embolic stroke of undetermined source may often stem from subclinical atrial fibrillation

- **High Risk Source of Cardiac Embolism**

Mechanical prosthetic valve
Atrial fibrillation or flutter Left atrial or ventricular thrombus
Recent myocardial infarction (<4 wk)
Dilated cardiomyopathy
Infective endocarditis
Regional left ventricular akinesis Atrial myxoma
Rheumatic heart disease

Cardioembolic Stroke Treatment

- Patients with cardiac disease can present with stroke, despite therapeutic levels of anticoagulation
- Observational data support the long-standing recommendation to proceed with intravenous thrombolysis even given active vitamin K antagonist use as long as the international normalized ratio is <1.7
- Expert opinion recommends avoiding thrombolytic therapy unless it can be firmly established that the patient did not take a NOAC for at least 48 hours
- Cardioembolic stroke can also occur in the setting of a recent surgery or invasive procedure, such as in patients with recent valve surgery or acute MI leading to percutaneous coronary intervention

Indication of Endovascular Treatment in Patients with Acute Stroke

- Adult with no prestroke disability (modified Rankin Scale score ≤1);
- Acute ischemic stroke from occlusion of the intracranial internal carotid artery or first segment of the middle cerebral artery;
- National Institutes of Health Stroke Scale score ≥6;
- ASPECTS CT imaging score ≥6;
- Intravenous thrombolysis given within 4.5 hours of stroke onset; and
- Groin puncture can occur within 6 hours of stroke onset.

CASE 1

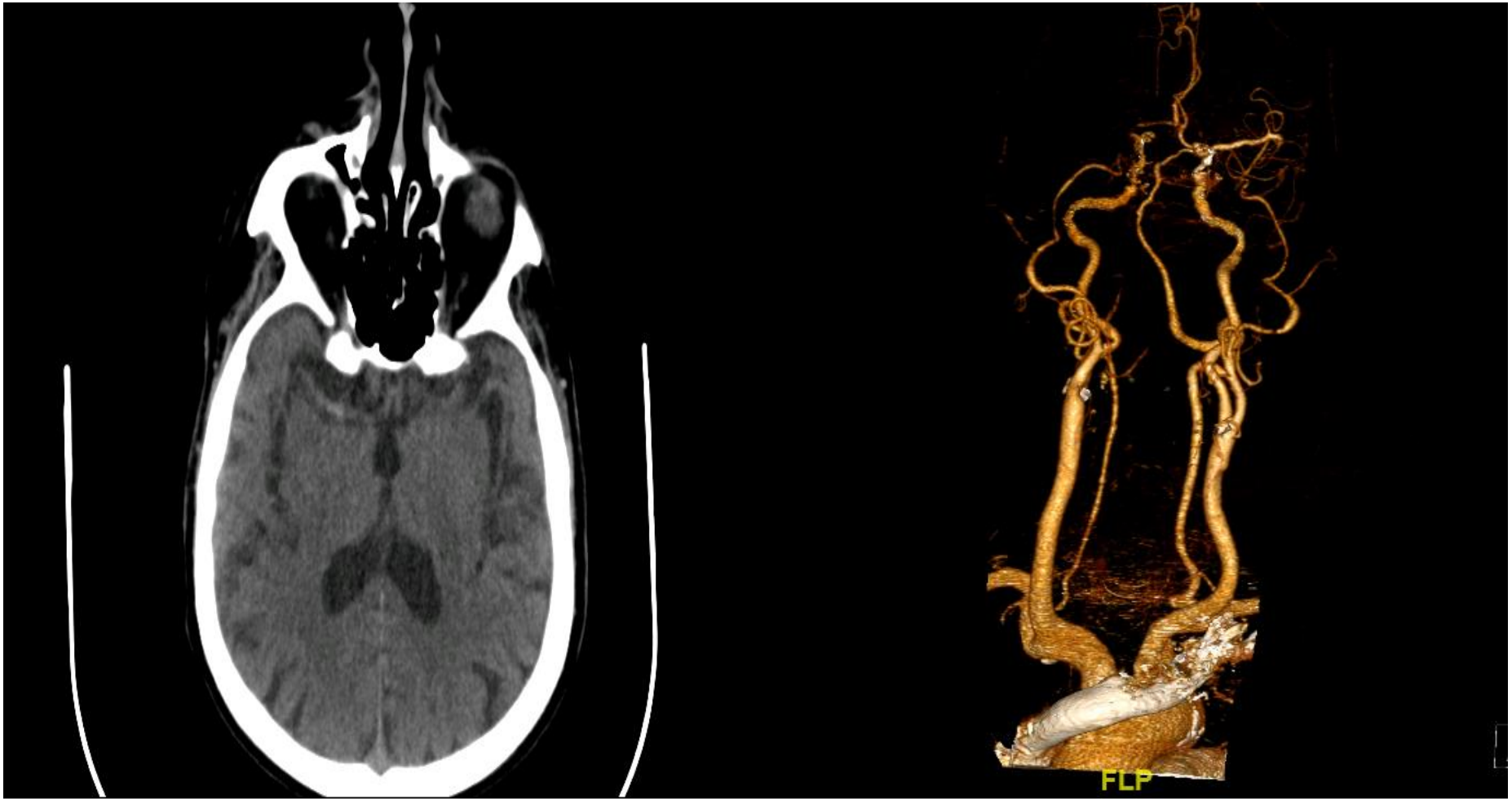
85 Yo Male

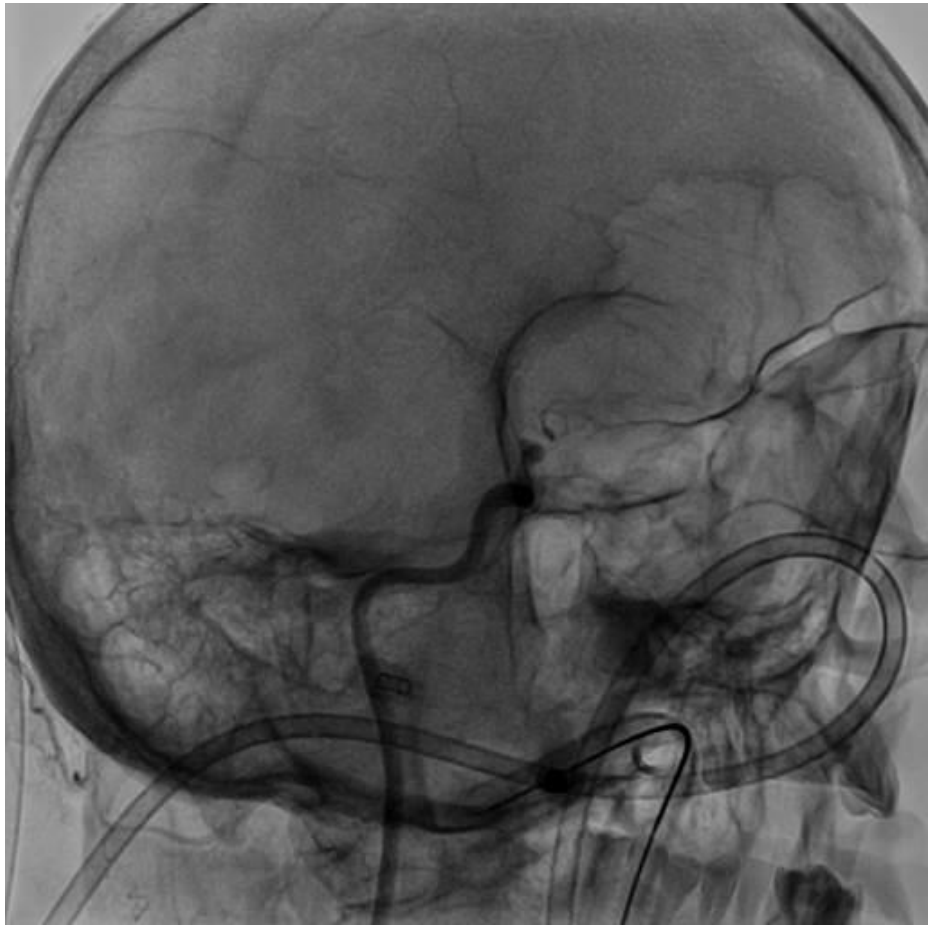
HTN, DM and Chronic renal failure

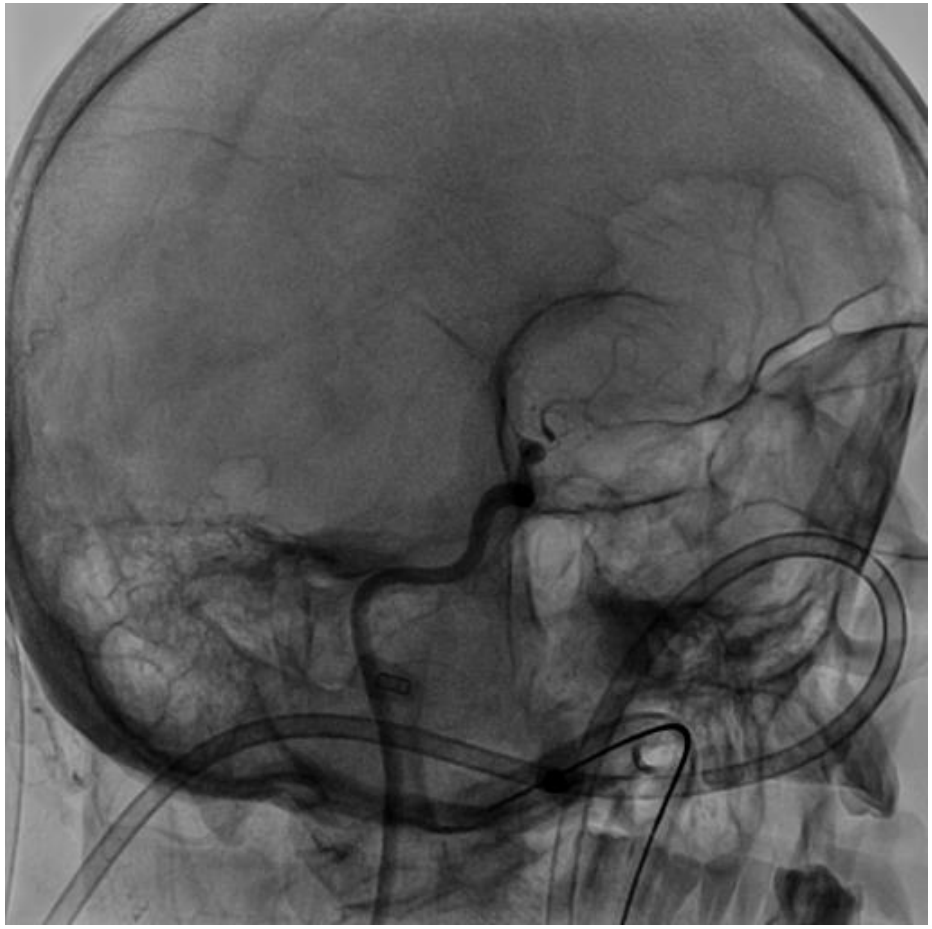
Left hemiparesis and dysatria

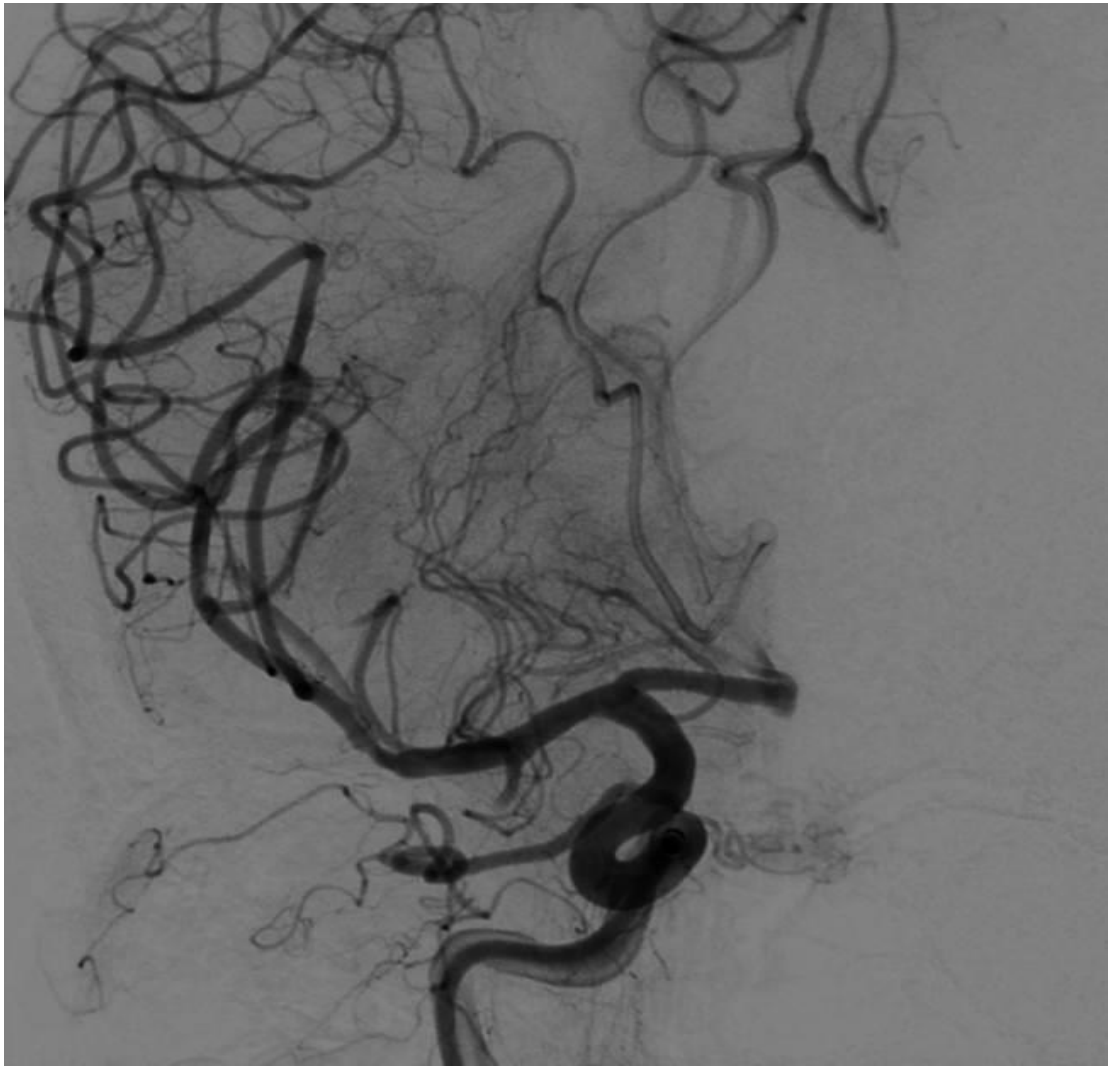
Stroke onset 3.5 hours ago

NIH scores were 18

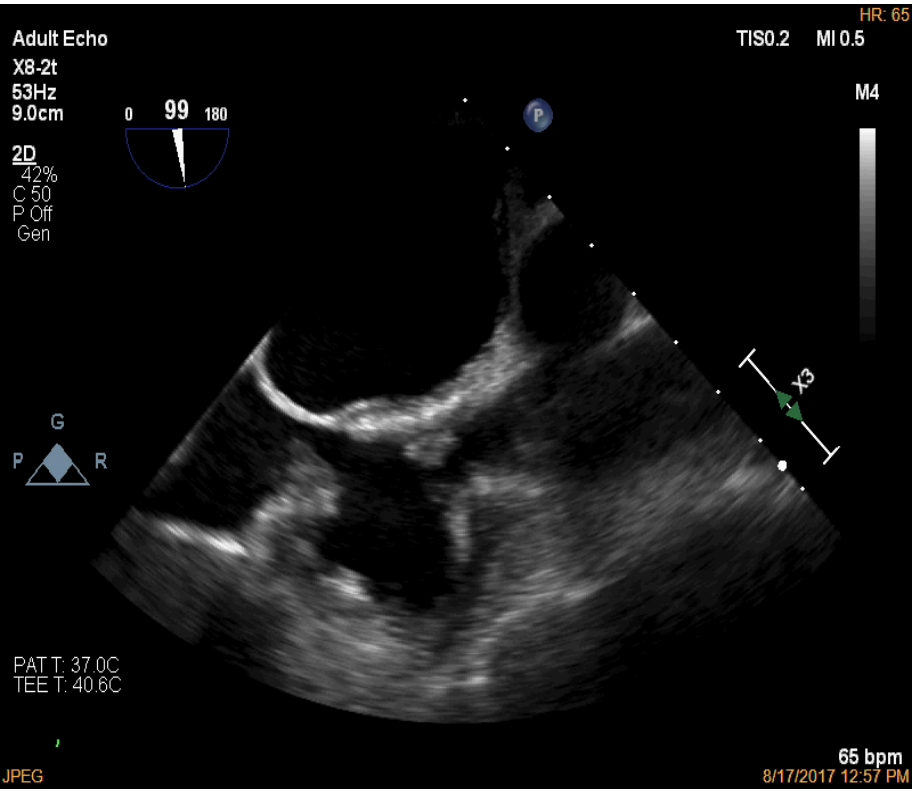

FLP







After 3 passes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X8-2t
53Hz
9.0cm
0 99 180
M4
2D
42%
C 50
P Off
Gen
G
P R
X3
PAT T: 37.0C
TEE T: 40.6C
65 bpm
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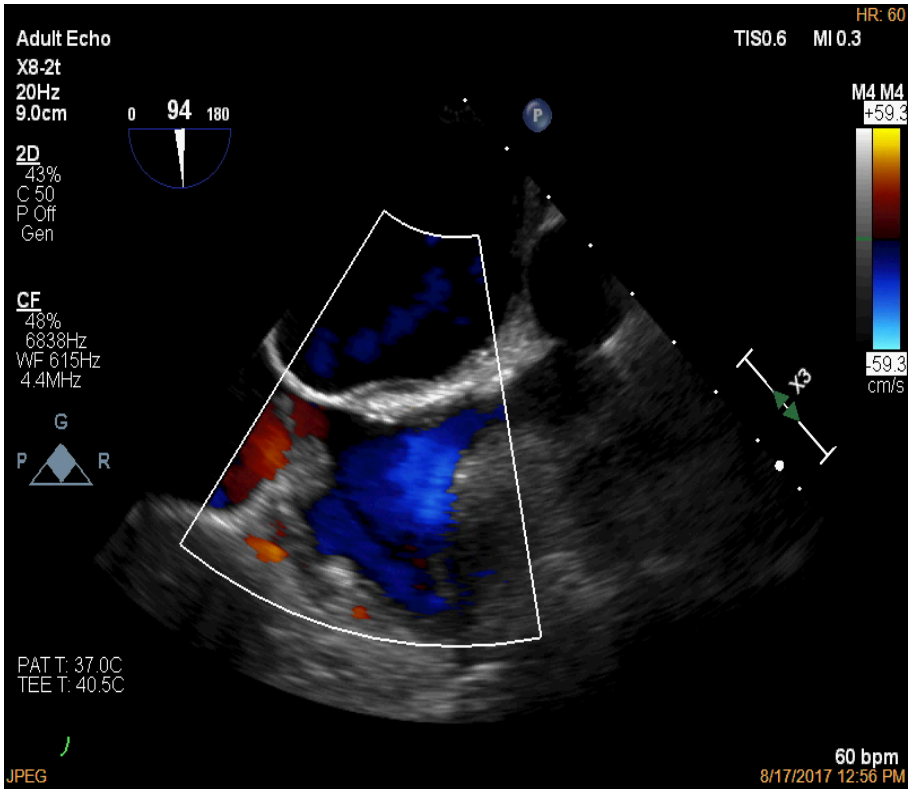
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Adult Echo
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X8-2t
20Hz
9.0cm
0 94 180
M4 M4
+59.3
-59.3
cm/s
2D
43%
C 50
P Off
Gen
CF
48%
6838Hz
WF 615Hz
4.4MHz
G
P R
X3
PAT T: 37.0C
TEE T: 40.5C
60 bpm
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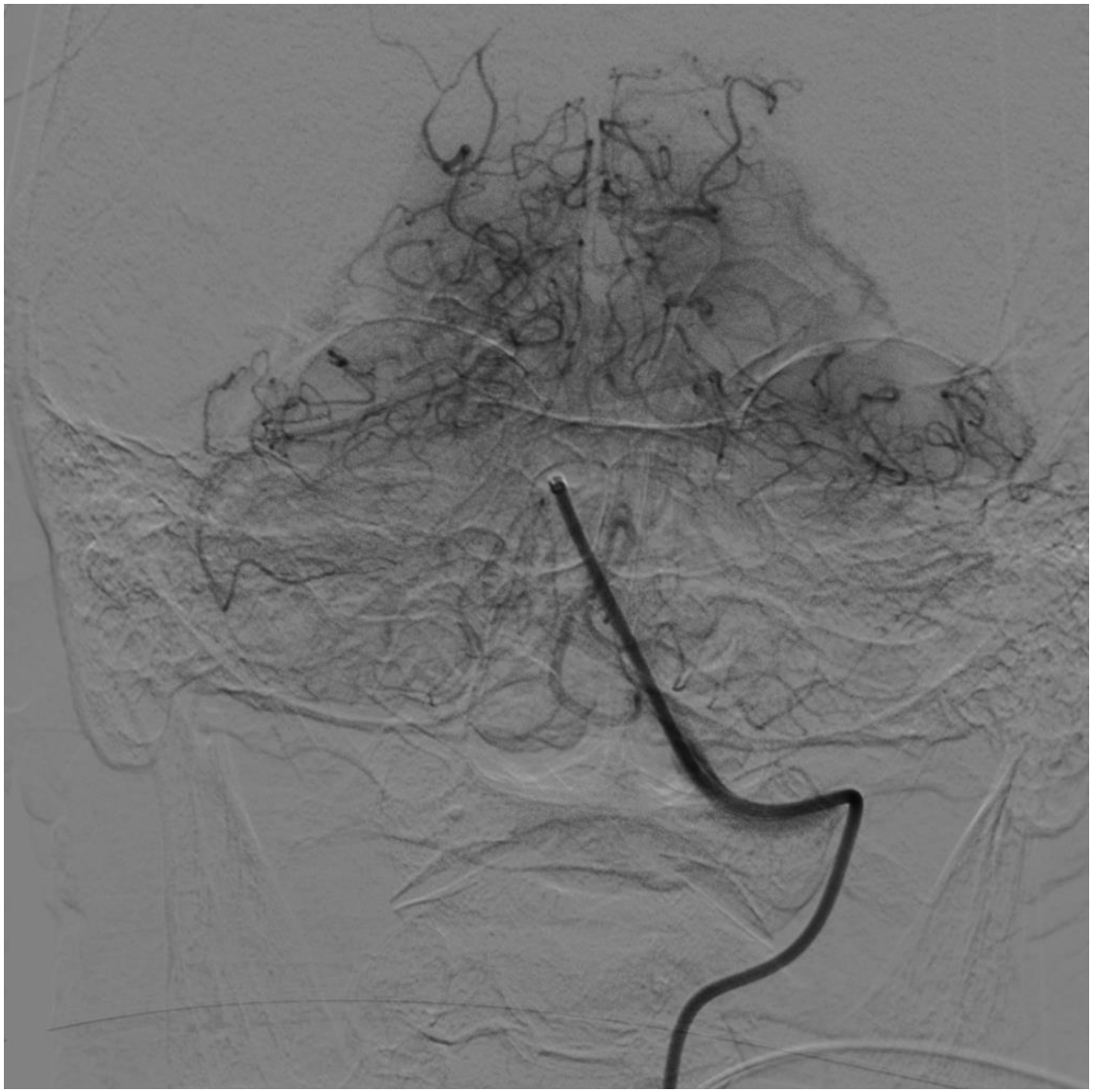
CASE 2

- 83 Yo Male
- HTN, DM
- The patient did not wake up after TAVR operation
- Exam: Confused, Pinpoint pupils and scew deviations of gazes, quadriparesia
- NIH scores were 24
- Cranial CT Normal ASPECT score: 10



- Stroke after TAVR is a special situation
- The incidence of stroke after TAVR exceeds that of any other interventional procedure.
- The cause of the stroke is likely NOT clot, but atherosclerotic debris and not likely lyse
- TAVR patients cannot receive IV thrombolysis because of fresh access sites which could bleed.
- Patients are under anesthesia when the stroke occurs. May be hours before they regain consciousness and can be assessed for stroke which reduces the time available for stroke intervention.

Predictors Neurological Events after TAVR

Table 3. Univariable and Multivariable Predictors of Any Stroke: Days 11 to 365

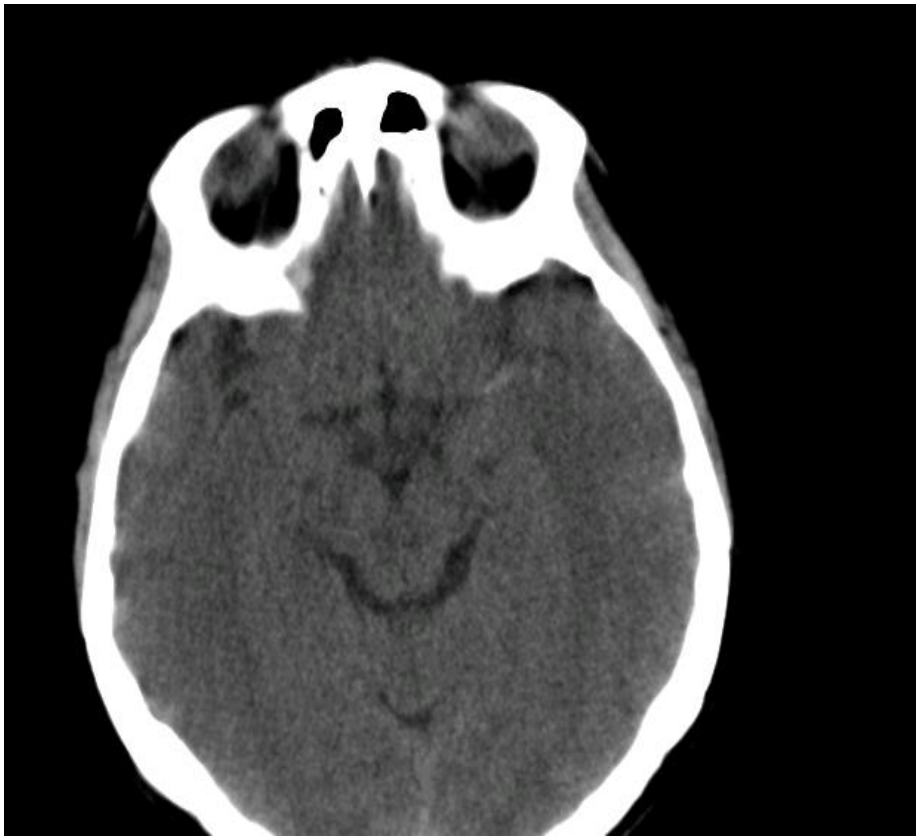
Variable	Univariable				Multivariable	
	Yes/No (N)	K-M Rate (95% CI)	Hazard Ratio (95% CI)	*P* Value	Hazard Ratio (95% CI)	*P* Value
Predictors of Neurological Events After TAVR						
Model 1: Baseline demographic predictor: There were no significant imaging or procedural predictors; therefore, the results for model 2 and model 3 were the same as those for Model 1.						
Body surface area, m^2	(3420)		0.443 (0.214, 0.917)	0.03	0.485 (0.235, 1.001)	0.05
Severe aortic calcification	No (3007)	4.3% (3.5%, 5.2%)				
	Yes (409)	6.9% (4.5%, 10.3%)	1.613 (1.017, 2.558)	0.04	1.568 (0.988, 2.488)	0.06
Falls in past 6 mo	No (2767)	3.8% (3.0%, 4.7%)				
	Yes (654)	8.0% (5.9%, 10.8%)	2.089 (1.432, 3.046)	0.0001	2.057 (1.410, 3.002)	<0.001

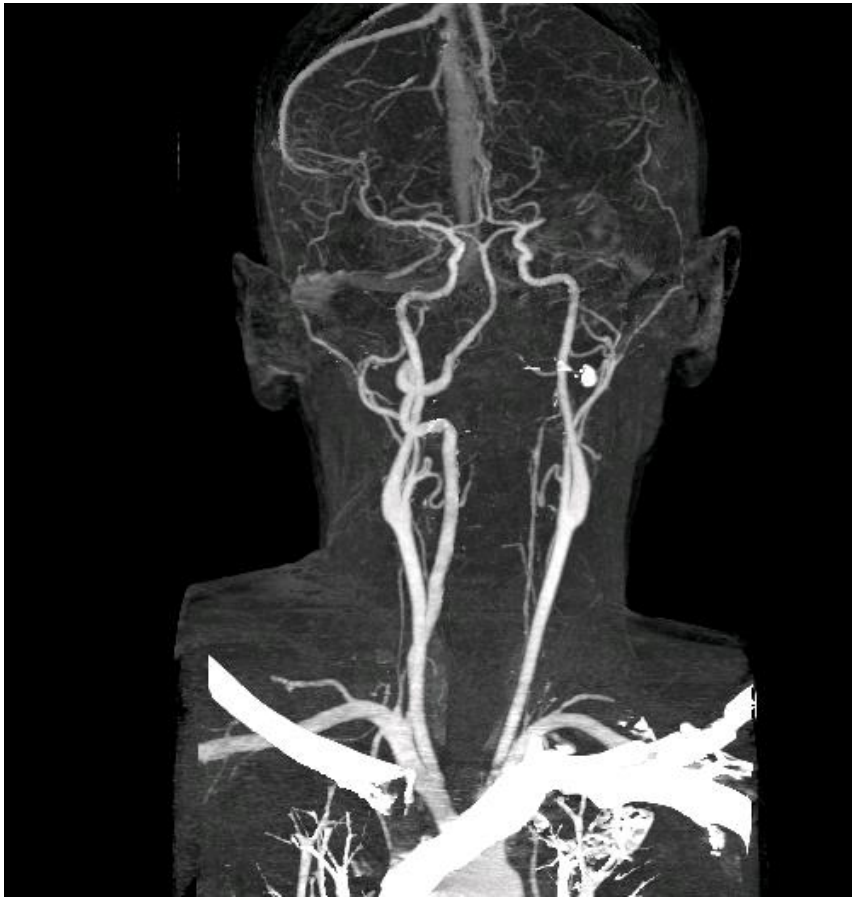
Kleiman et al. Circ Cardiovasc Interv. 2016

- TAVR device manipulation causes embolic debris in every case which can cause stroke.
- This is especially important in the context of embolised calcific valve, as this will not respond to conventional stroke treatment with thrombolysis.
- Treating stroke after TAVR is not like treating usual embolic stroke so prevention is much better than treatment.
- Broad acceptance of embolic protection devices in TAVR awaits randomized trial
- Available information and common sense dictate that some form of embolic protection will become standard treatment in TAVR

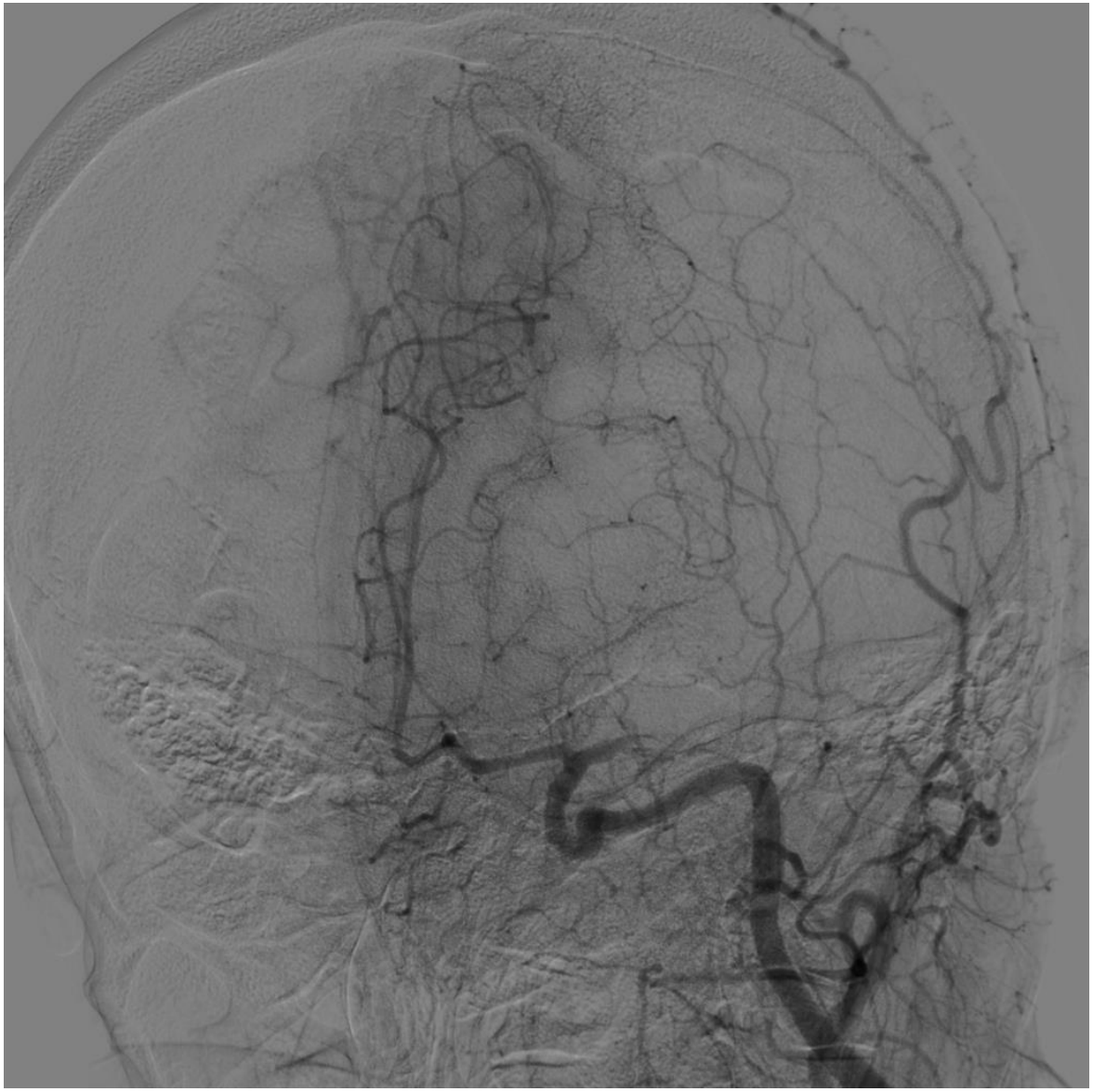
CASE 3

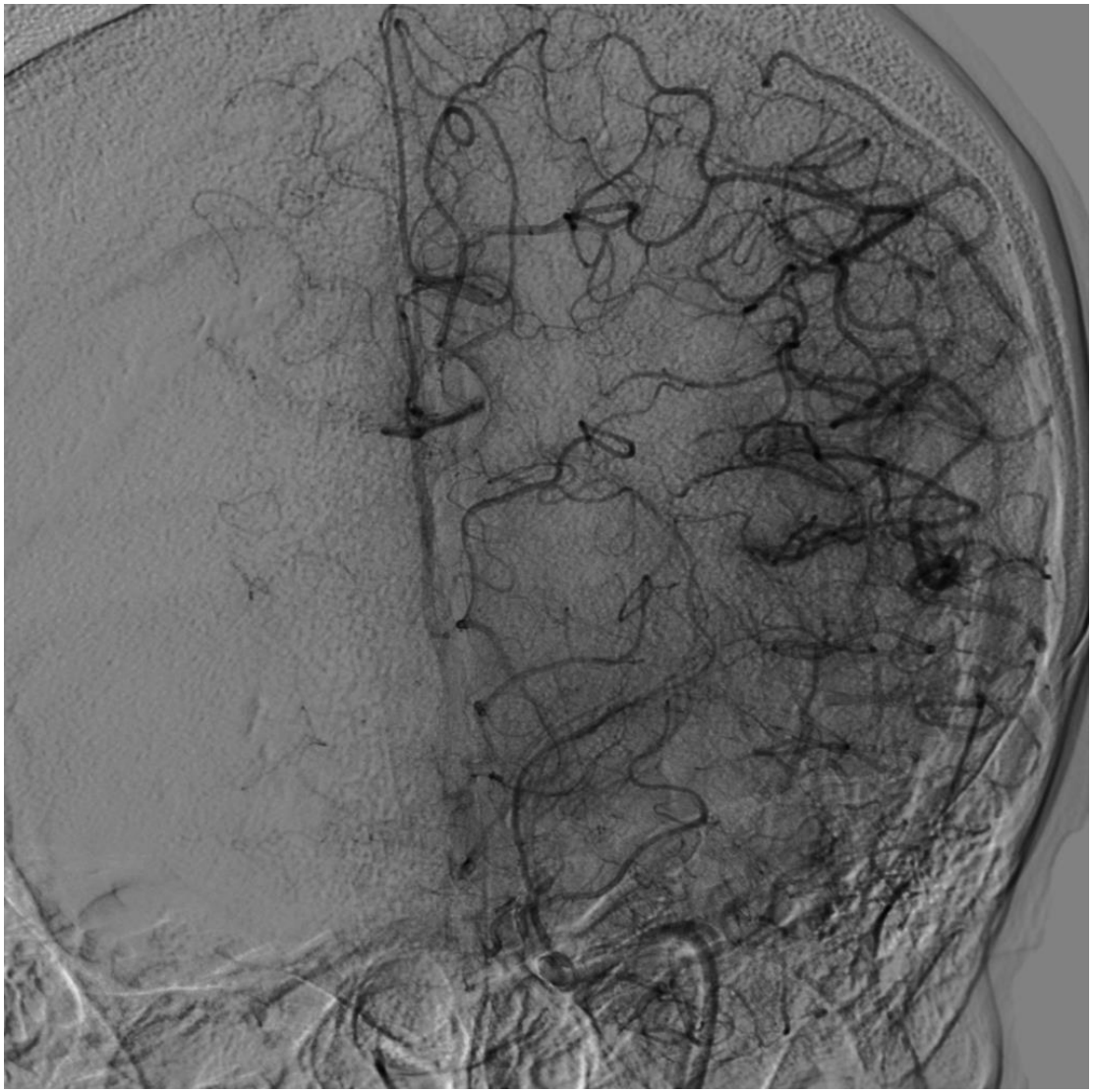
- 43 Yo Female
- MVR operation 3 years ago
- On warfarin INR 2.2
- Presented right sided hemiparesis and aphasia
- NIH scores: 17





ASPECT score: 8





MT in Cardioembolic Stroke

- It can be due to thrombus formation or embolisation of calcified and organised in cardioembolic stroke
- Thrombus can be resistant to stentriever or aspiration because of instruction to calcified and more organised
- repetitive passes can be required
- It may be more appropriate to apply combined techniques Mechanic Thrombectomy plus thromboaspiration