



# Does etiology matter in endovascular acute stroke management

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Acute Stroke Unit

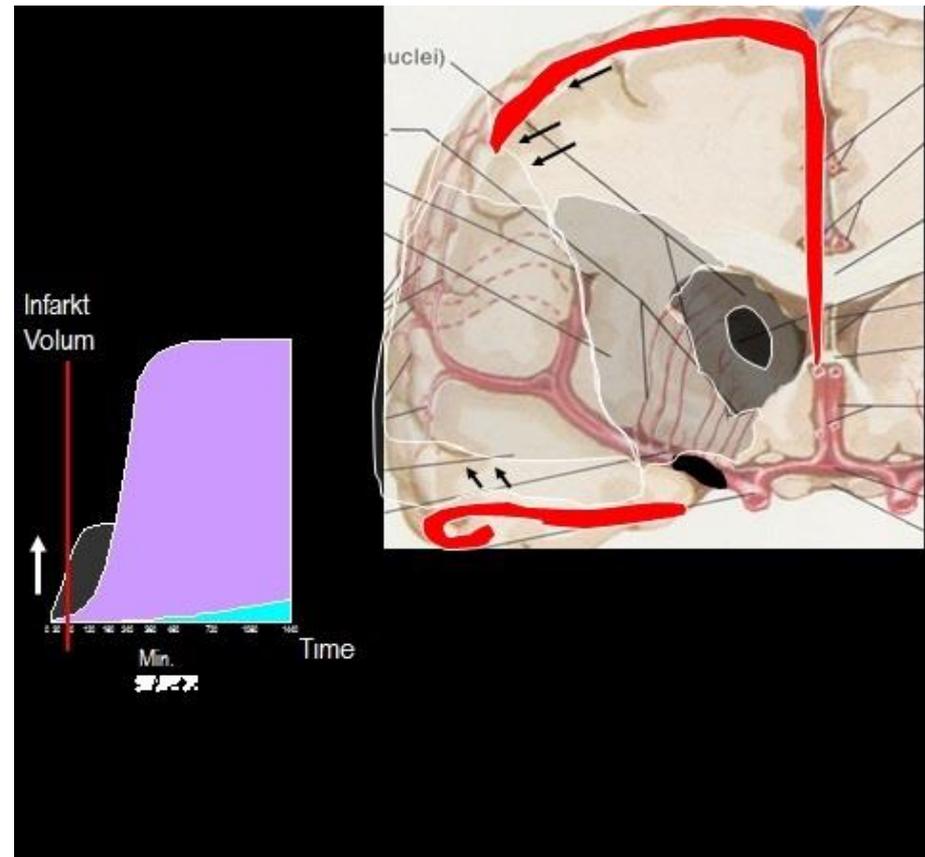
Istanbul Turkey



# DISCLOSURE STATEMENT OF FINANCIAL INTEREST

I, Talip Asil 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.

- Recanalization and reperfusion strategies represent the only management strategy with proven efficacy in patients with acute ischemic stroke



# Is IV rtPA an effective therapy for recanalization of proximal vessel occlusions ?

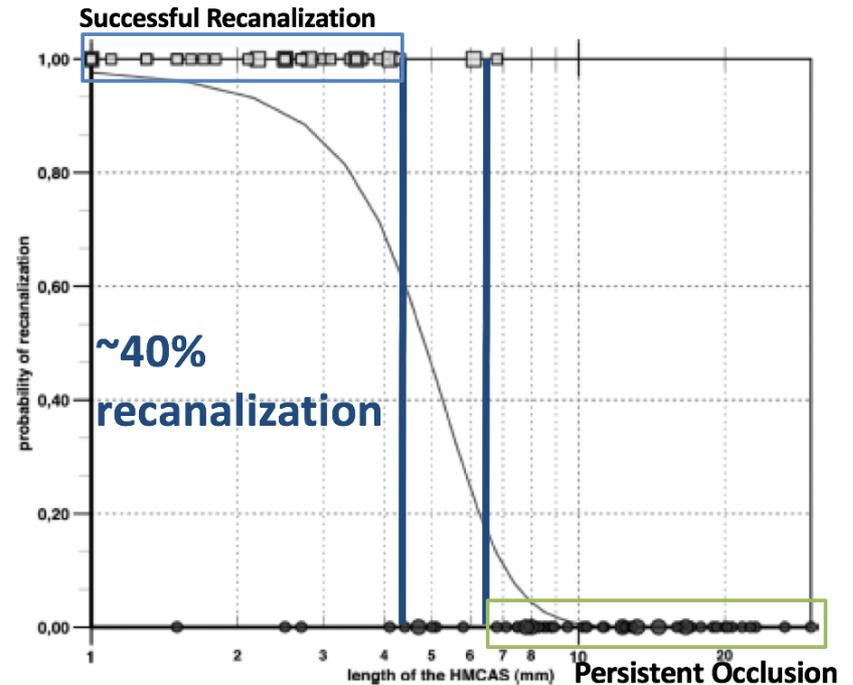
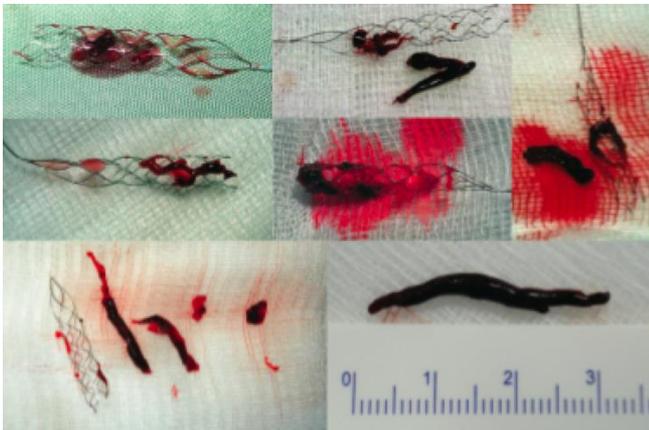
## The Importance of Size

### Successful Recanalization by Intravenous Thrombolysis in Acute Anterior Stroke Depends on Thrombus Length

Christian H. Riedel, MD; Philip Zimmermann, MD; Ulf Jensen-Kondering, MD; Robert Stingele, MD; Günther Deuschl, MD; Olav Jansen, MD

*Stroke*. 2011;42:1775-1777.

- 2.5 mm slice CT
- MCA stroke
- Thrombus length >8 mm, no recanalization with IV rtPA
- 5 mm < thrombus length, high likely to be dissolved



Thrombus length and recanalization rate-logistic regression curve

ORIGINAL ARTICLE

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

O.A. Berkhemer, P.S.S. Fransen, D. Beumer, L.A. van den Berg, H.F. Lingsma, A.J. Yoo, W.J. Schonewille, J.A. Vos, P.J. Nederkoorn, M.J.H. Wermer, M.A.A. van Walderveen, J. Staals, J. Hofmeijer, J.A. van Oostayen, G.J. Lycklama à Nijeholt, J. Boiten, P.A. Brouwer, B.J. Emmer, S.F. de Bruijn, L.C. van Dijk, L.J. Kappelle, R.H. Lo, E.J. van Dijk, J. de Vries, P.L.M. de Kort, W.J.J. van Rooij, J.S.P. van den Berg, B.A.A.M. van Hasselt, L.A.M. Aerden, R.J. Dallinga, M.C. Visser, J.C.J. Bot, P.C. Vroomen, O. Eshghi, T.H.C.M.L. Schreuder, R.J.J. Heijboer, K. Keizer, A.V. Tielbeek, H.M. den Hertog, D.G. Gerrits, R.M. van den Berg-Vos, G.B. Karas, E.W. Steyerberg, H.Z. Flach, H.A. Marquering, M.E.S. Sprengers, S.F.M. Jenniskens, L.F.M. Beenen, R. van den Berg, P.J. Koudstaal, W.H. van Zwam, Y.B.W.E.M. Roos, A. van der Lugt, R.J. van Oostenbrugge, C.B.L.M. Majoie, and D.W.J. Dippel, for the MR CLEAN Investigators\*

## Endovascular Therapy for Ischemic Stroke with Perfusion-Imaging Selection

B.C.V. Campbell, P.J. Mitchell, T.J. Kleinig, H.M. Dewey, L. Churilov, N. Yassi, B. Yan, R.J. Dowling, M.W. Parsons, T.J. Oxley, T.Y. Wu, M. Brooks, M.A. Simpson, F. Miteff, C.R. Levi, M. Krause, T.J. Harrington, K.C. Faulder, B.S. Steinfurt, M. Priglinger, T. Ang, R. Scroop, P.A. Barber, B. McGuinness, T. Wijeratne, T.G. Phan, W. Chong, R.V. Chandra, C.F. Bladin, M. Badve, H. Rice, L. de Villiers, H. Ma, P.M. Desmond, G.A. Donnan, and S.M. Davis, for the EXTEND-IA Investigators\*

## Randomized Assessment of Rapid Endovascular Treatment of Ischemic Stroke

M. Goyal, A.M. Demchuk, B.K. Menon, M. Eesa, J.L. Rempel, J. Thornton, D. Roy, T.G. Jovin, R.A. Willinsky, B.L. Sapkota, D. Dowlathshahi, D.F. Frei, N.R. Kamal, W.J. Montanera, A.Y. Poppe, K.J. Ryckborst, F.L. Silver, A. Shuaib, D. Tampieri, D. Williams, O.Y. Bang, B.W. Baxter, P.A. Burns, H. Choe, J.-H. Heo, C.A. Holmstedt, B. Jankowitz, M. Kelly, G. Linares, J.L. Mandzia, J. Shankar, S.-I. Sohn, R.H. Swartz, P.A. Barber, S.B. Coutts, E.E. Smith, W.F. Morrish, A. Weill, S. Subramaniam, A.P. Mitha, J.H. Wong, M.W. Lowerison, T.T. Sajobi, and M.D. Hill for the ESCAPE Trial Investigators\*

## Thrombectomy within 8 Hours after Symptom Onset in Ischemic Stroke

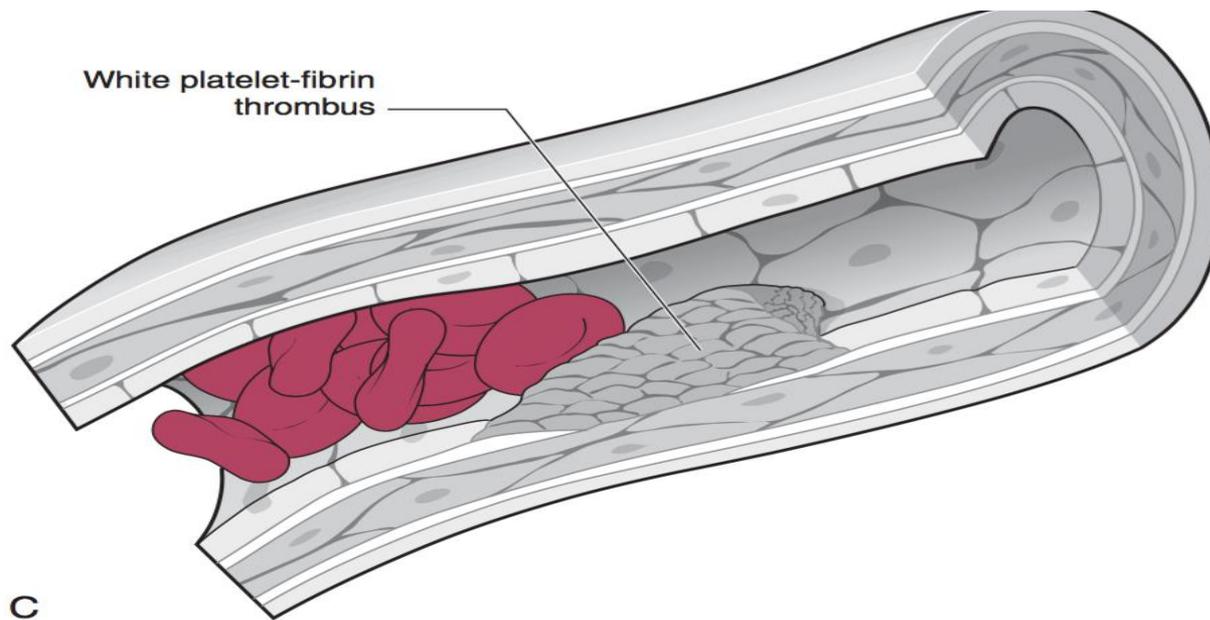
T.G. Jovin, A. Chamorro, E. Cobo, M.A. de Miquel, C.A. Molina, A. Rovira, L. San Román, J. Serena, S. Abilleira, M. Ribó, M. Millán, X. Urra, P. Cardona, E. López-Cancio, A. Tomasello, C. Castaño, J. Blasco, L. Aja, L. Dorado, H. Quesada, M. Rubiera, M. Hernández-Pérez, M. Goyal, A.M. Demchuk, R. von Kummer, M. Gallofré, and A. Dávalos, for the REVASCAT Trial Investigators\*

## Stent-Retriever Thrombectomy after Intravenous t-PA vs. t-PA Alone in Stroke

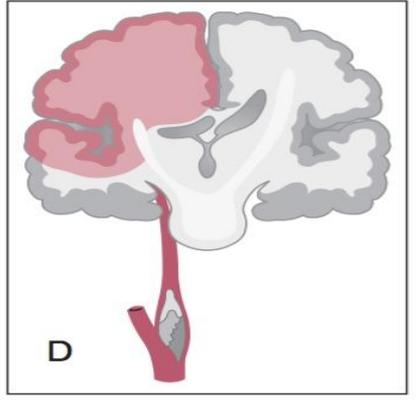
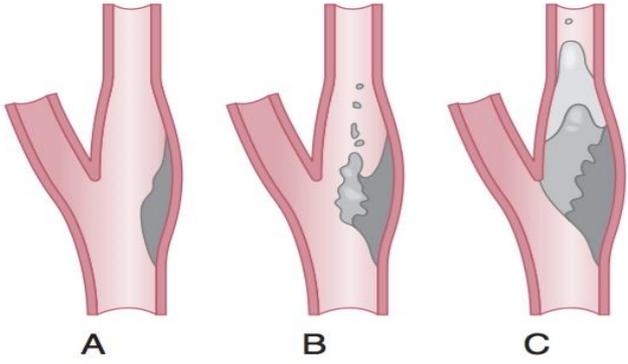
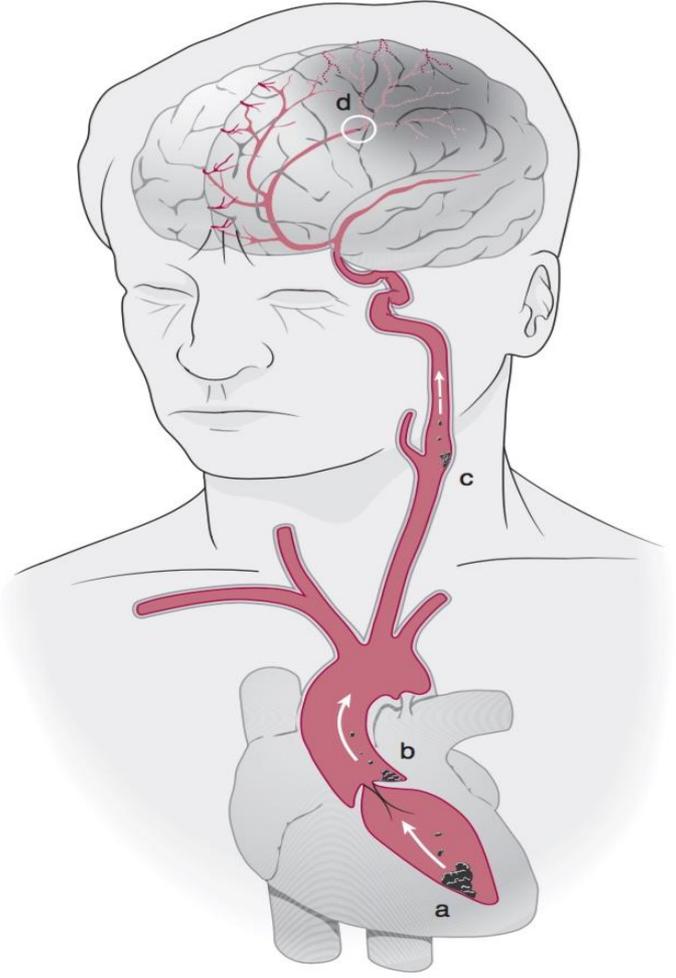
Jeffrey L. Saver, M.D., Mayank Goyal, M.D., Alain Bonafe, M.D., Hans-Christoph Diener, M.D., Ph.D., Elad I. Levy, M.D., Vitor M. Pereira, M.D., Gregory W. Albers, M.D., Christophe Cognard, M.D., David Cohen, M.D., Werner Hacke, M.D., Ph.D., Olav Jansen, M.D., Ph.D., Tudor G. Jovin, M.D., William H. Mealy, M.D., Paul G. Veith, M.D., Agilan C. Siddiqui, M.D., Ph.D., Dileep R. Yavagal, M.D., Blaise W. Baxter, M.D., Thomas G. Devlin, M.D., Ph.D., Demetrius K. Lopes, M.D., Vivek K. Reddy, M.D., Richard du Mesnil de Rochemont, M.D., Oliver C. Singer, M.D., and Reza Jahan, M.D., for the SWIFT PRIME Investigators\*

Endovascular treatment of acute occlusion of a proximal large artery in the anterior circulation is currently the standard of care

- In the cerebral arteries, the lumen of the vessel is narrowed or occluded by a clot, cerebral perfusion reduced and stroke develops



# Stroke Mechanisms (etiopathogenesis)

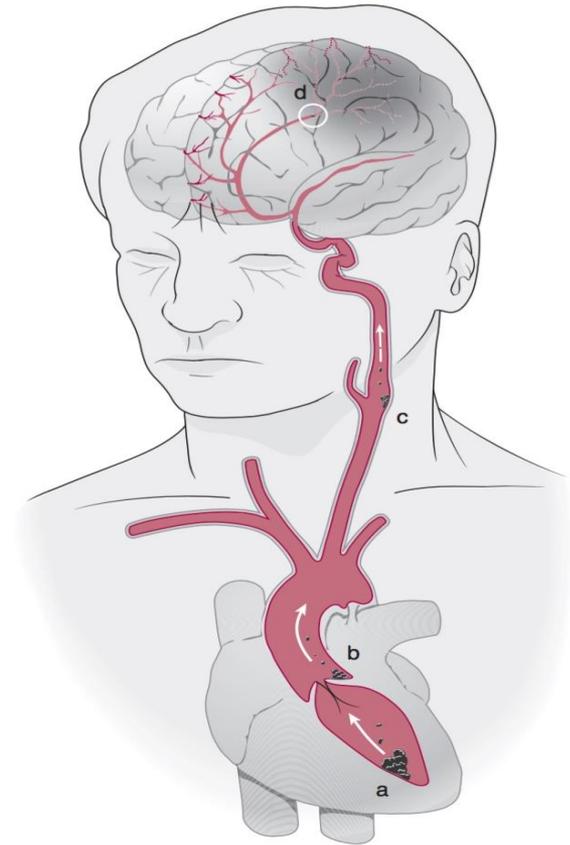


Large artery atherotrombosis  
Extracranial  
Intracranial

Embolism

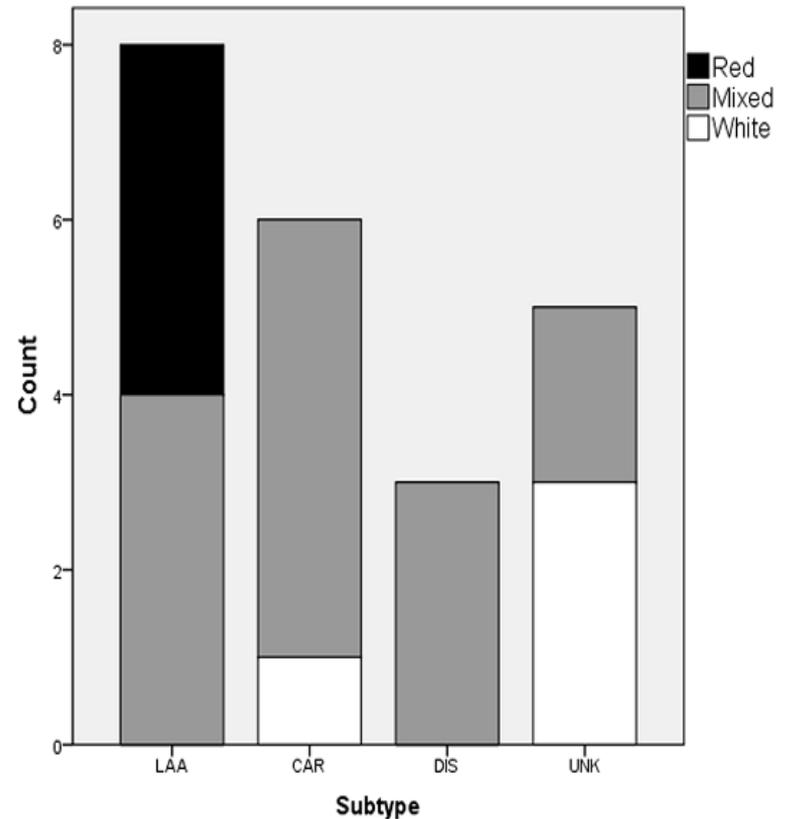
# Potential sources of embolism:

- Cardiac mural thrombus
- Vegetations on heart valve
- Emboli from carotid plaque.

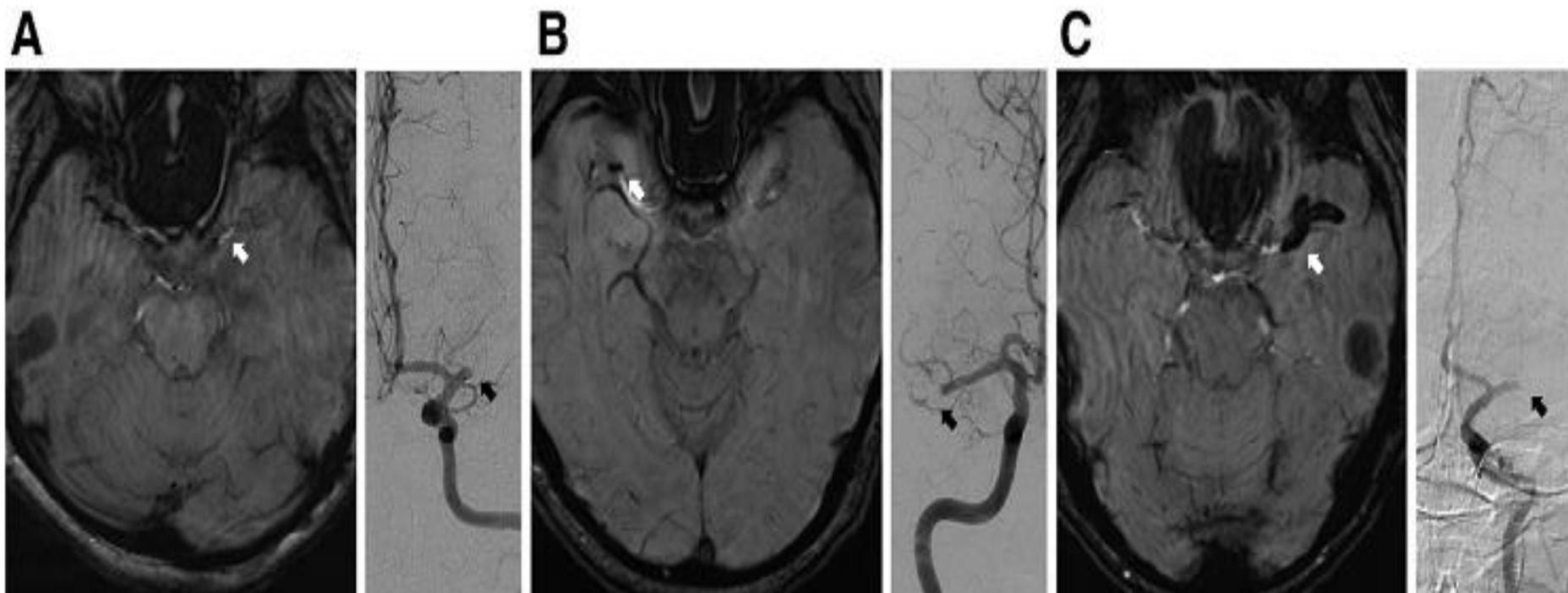


# Types of Trombüs

- The first histopathologic studies showed that the architecture of cerebral thrombi is variable with different main components such as fibrin, red blood cells (RBC) and platelets
- Thrombi originating from **large artery atherosclerosis** have the highest percentages of red blood cells (**RED THROMBI**)
- **Cardioembolic stroke** subtype thrombi have the least red blood cells. (**WHITE THROMBI**)



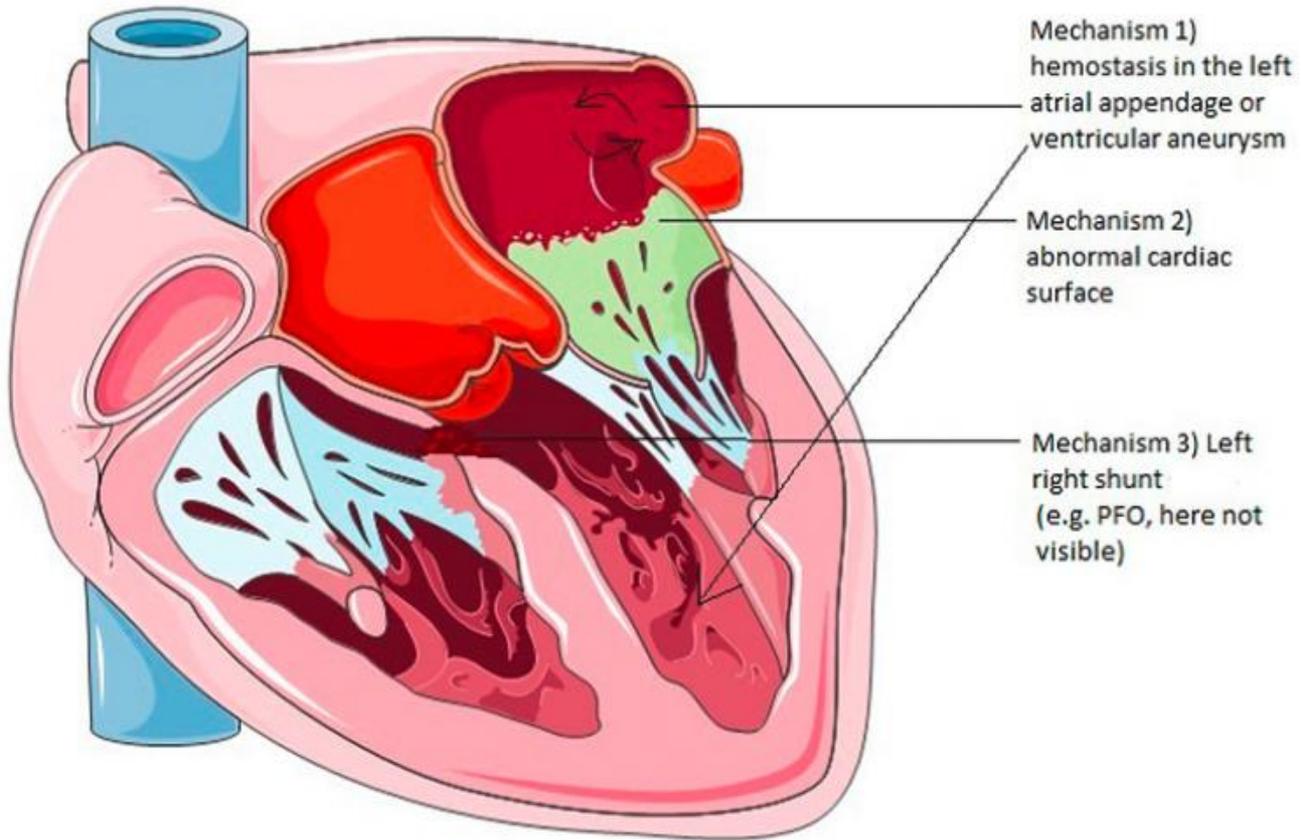
# Susceptibility Vessel Signs



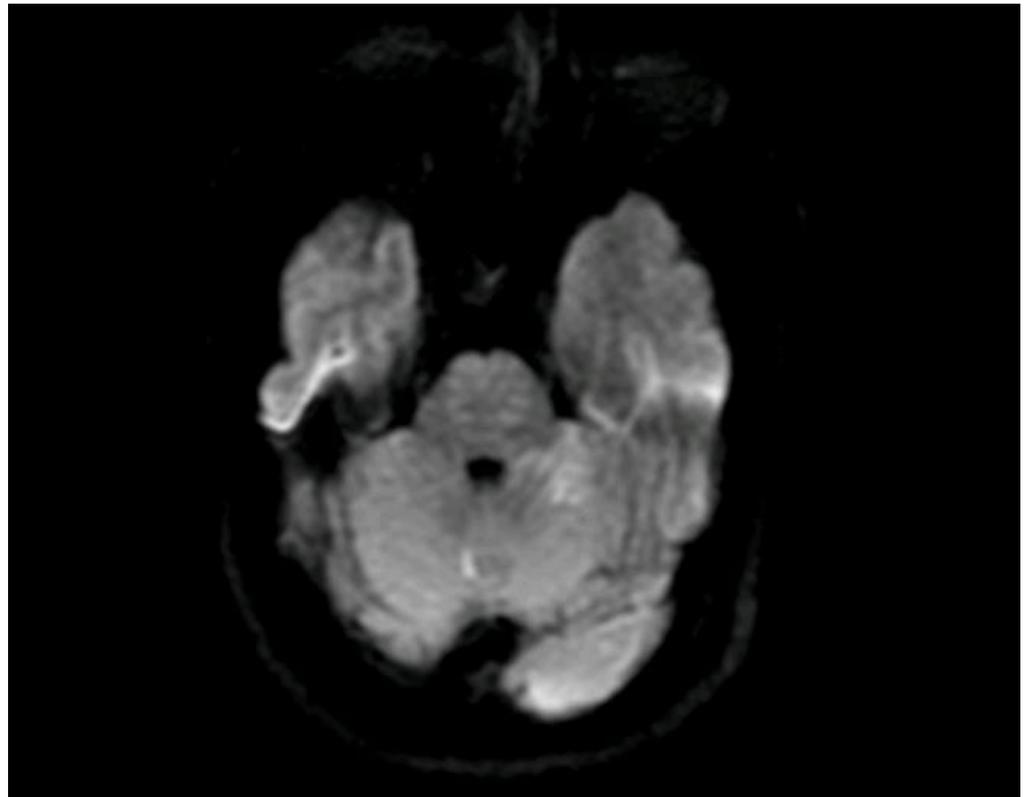
The SVS was defined as a hypointense signal on SWMRI in the corresponding symptomatic occlusive vessels

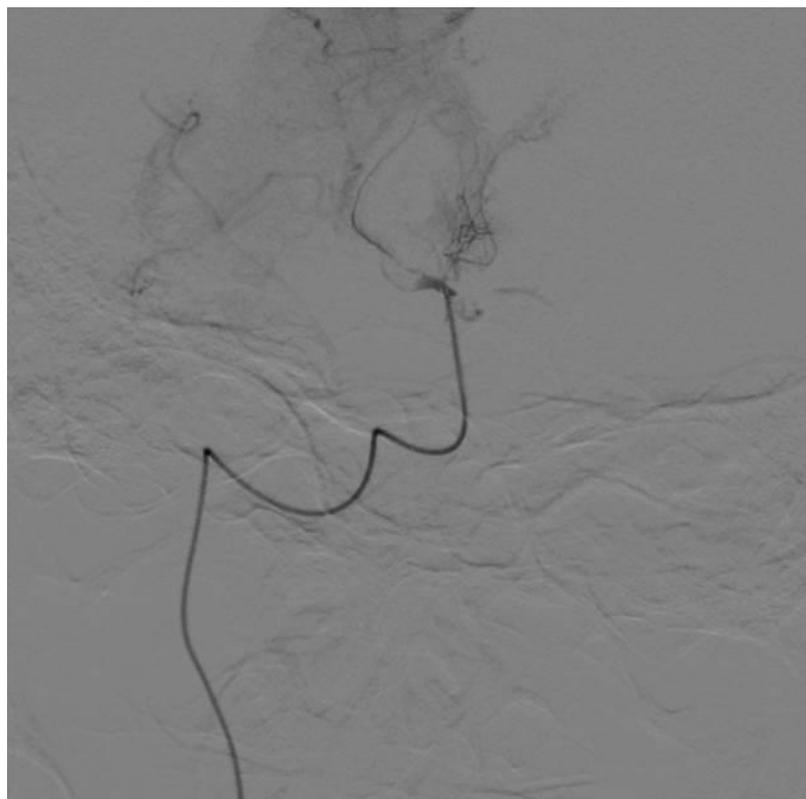
*Kang et al. Stroke 2017*

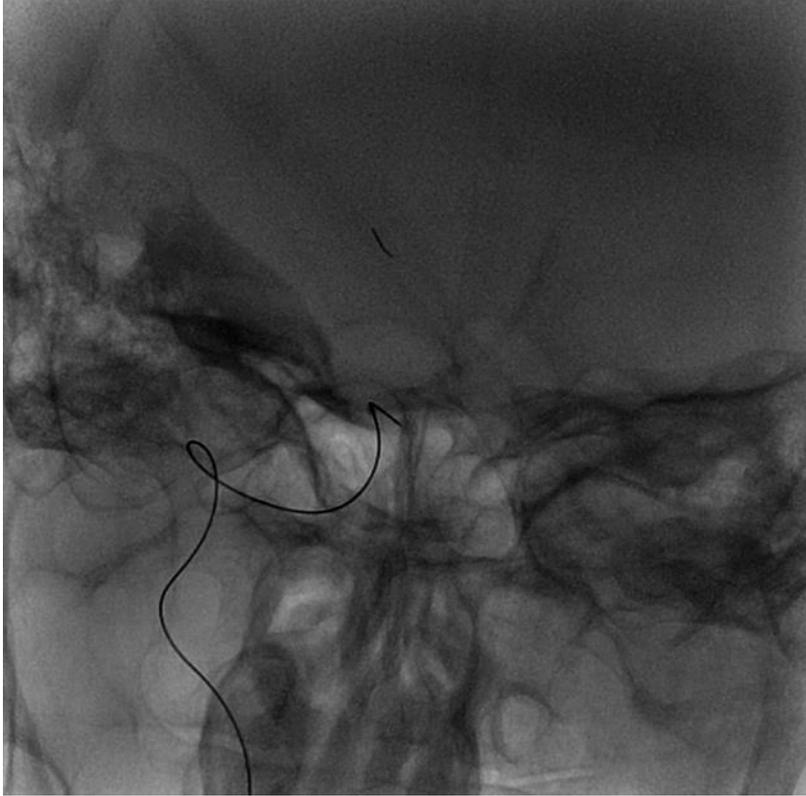
# Cardioembolic Stroke



- 62 yo female
- HTN, Afib on warfarin  
INR 1.6
- Presented with  
confused and  
quadriparesis
- NIH scores 24

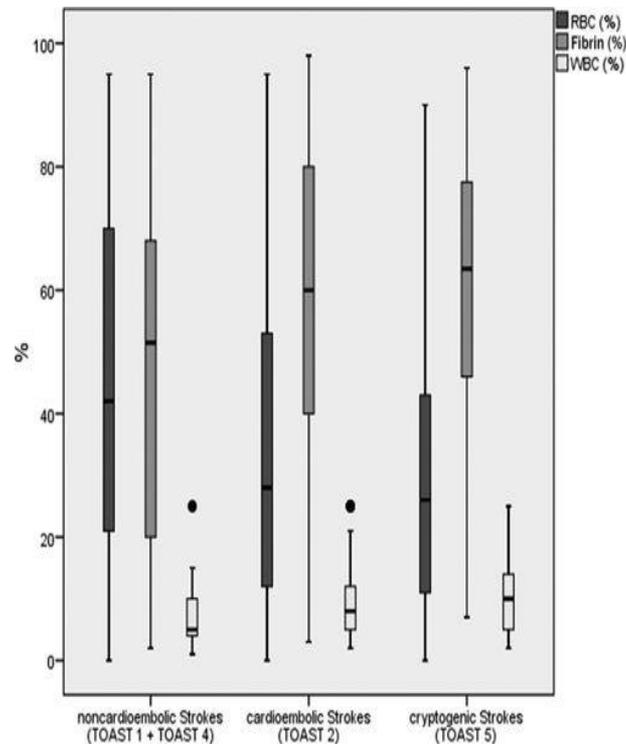




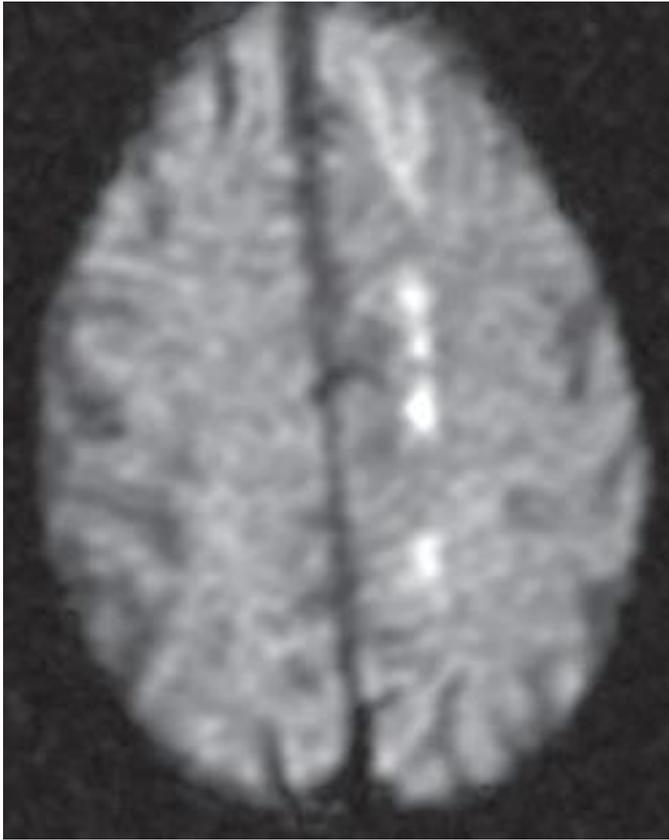


# Cardioembolic Stroke, Acute Endovascular Treatment

- The higher number of retraction maneuvers required for the extraction of cardioembolic thrombi may be because of a higher organizational degree of these thrombi
- Worse outcome values, reflected by higher mRS and NIHSS scores in CE patients

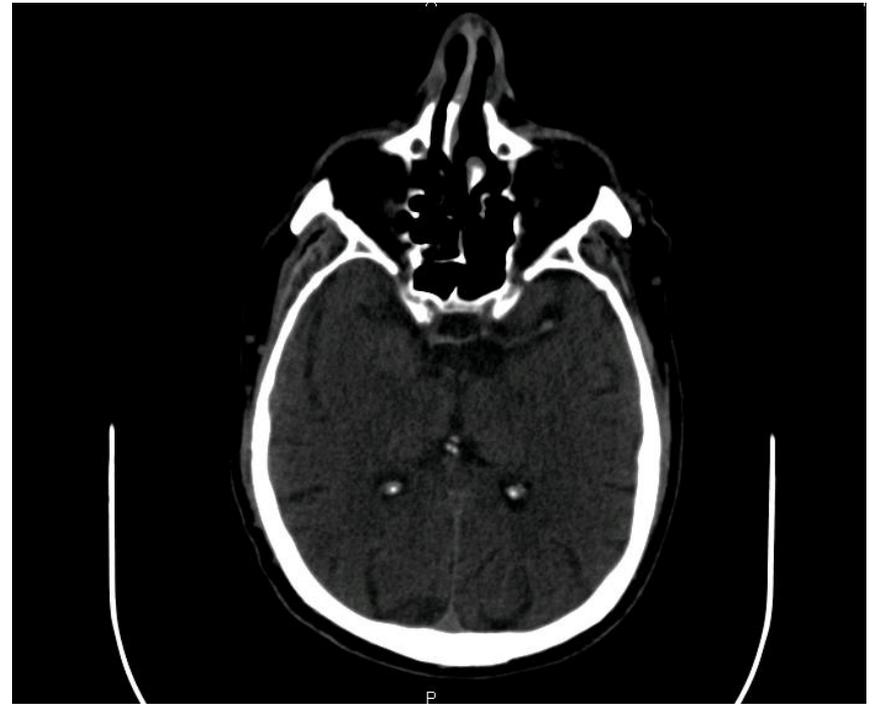


# Large Artery Stenosis



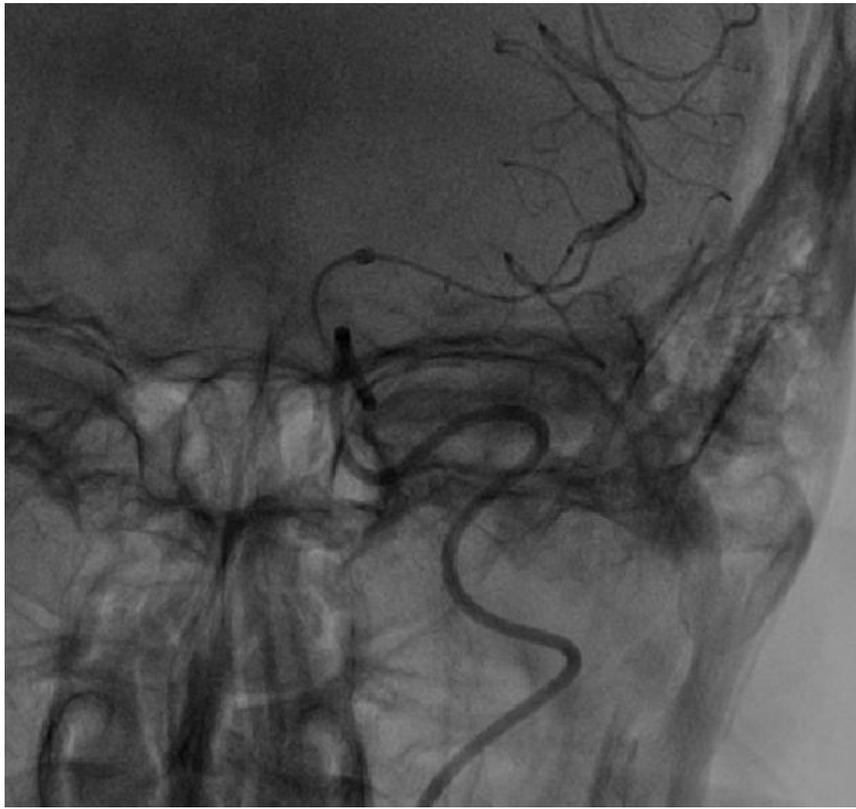
Carotid Artery Steno/occlusive disease

- 73 YO Male
- HTN, DM, Smoker
- Known carotid artery stenosis %80
- 3 hours after the operation of bladder cancer, weakness developed on the right side
- Exam: Right hemiparesis and aphasia NIH scores 18



ASPECT 8







# Tandem Occlusion

- Although the course of tandem occlusions is poor, endovascular intervention is absolutely superior than medical treatment

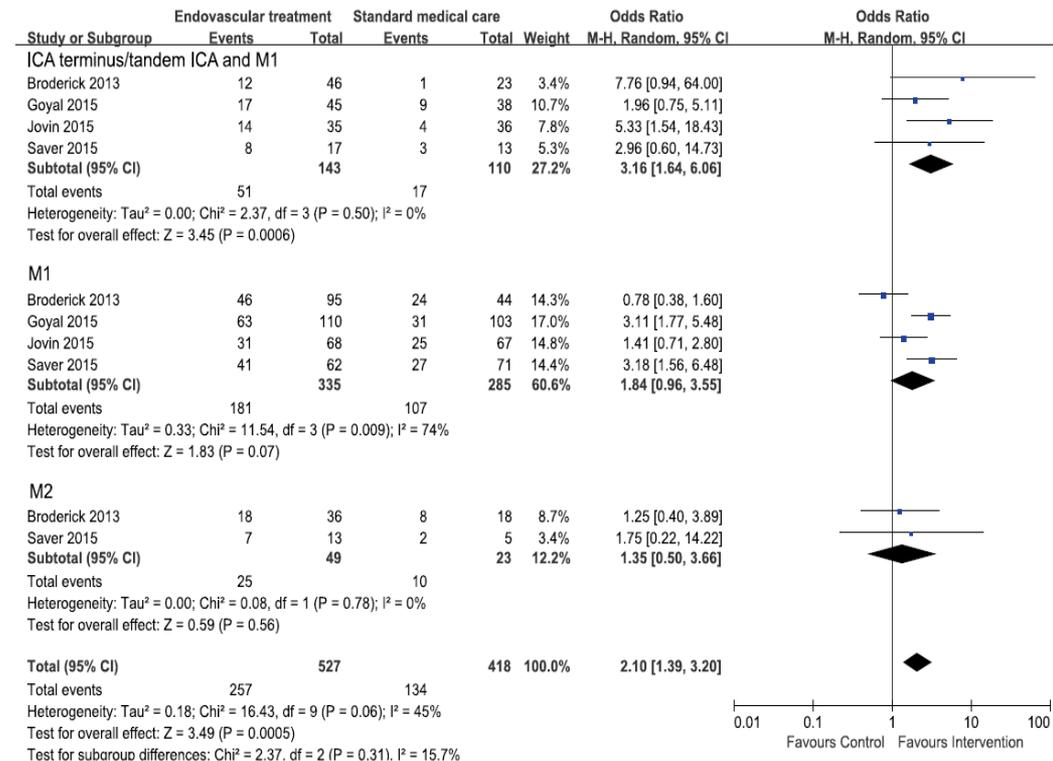


Fig 4. Forest plots of 90-day functional independence between endovascular treatment and standard medical care in patients stratified by occlusion site. ICA = intracranial carotid artery, M1 = the first segment of middle cerebral artery, M2 = the second segments of middle cerebral artery.

# Tandem Occlusion-Questions

- IV tPA (IA tPA) ?

If stent is needed, given antiagregan can be a problem

- Distal or Proximal ?

Should priority intracranial arteries or carotid artery ?

- CAS?

When the carotid artery should be stented ?

- Technique ?

Aspiration or thrombectomy

# First Proximal intervention (stent or angioplasty)

- Advantages

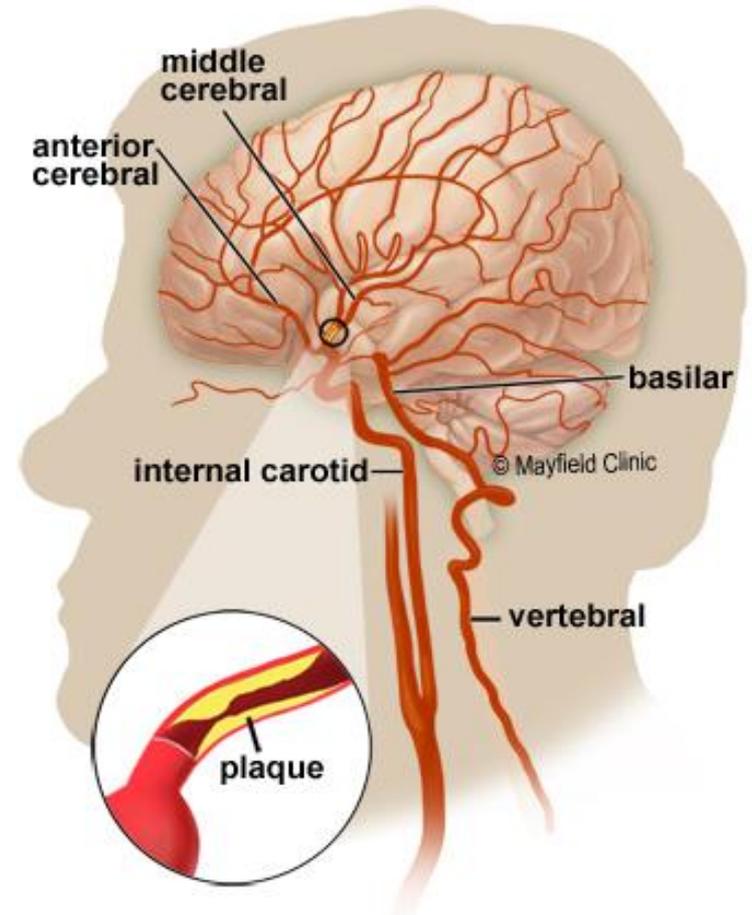
- Large aspiration catheters can be delivered to the intracranial region in the real lumen
- Low Risk for distal embolus
- Correcting proximal flow protects intracranial collateral arteries

- Disadvantages

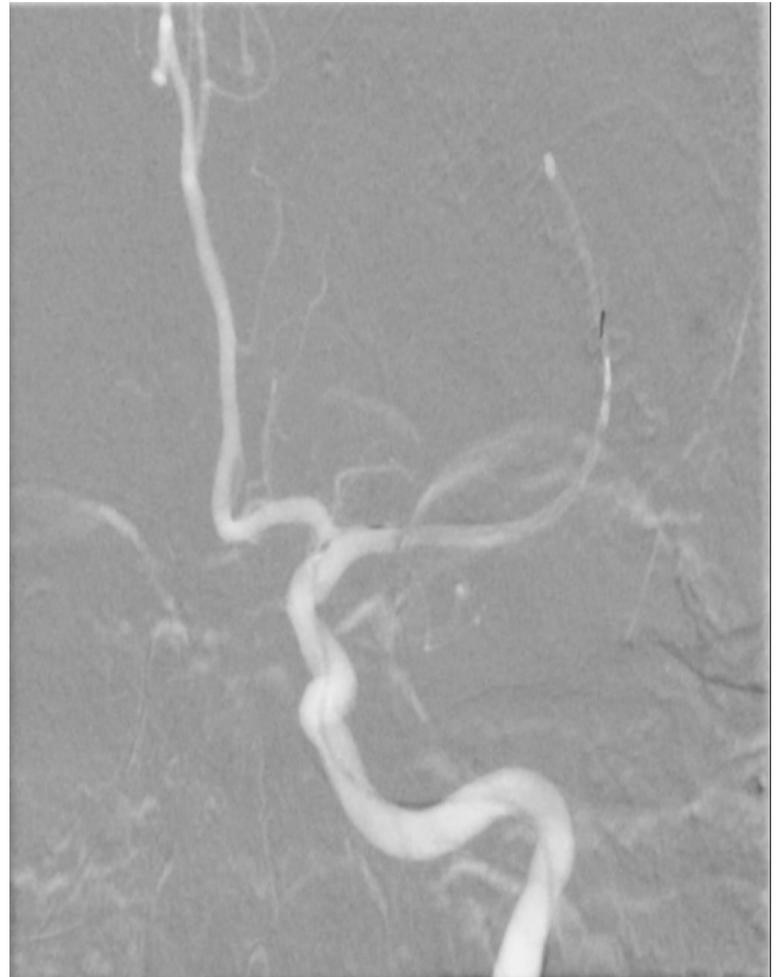
- Delays cerebral reperfusion
- It may cause technical problems especially open cell stents

# Intracranial Stenosis

- Mechanism of stroke
  - Perfusion failure
  - Artery-to-artery thromboembolism
  - Occlusion at the origin of perforators or occlusion at the site of the stenosis due to plaque rupture, intraplaque haemorrhage or plaque growth



- 60 years old male
- Presented with right sided hemiparesis and aphasia from 3 hours of symptom onset
- ASPECT:9
- NIHSS:20
- previous MI, DM



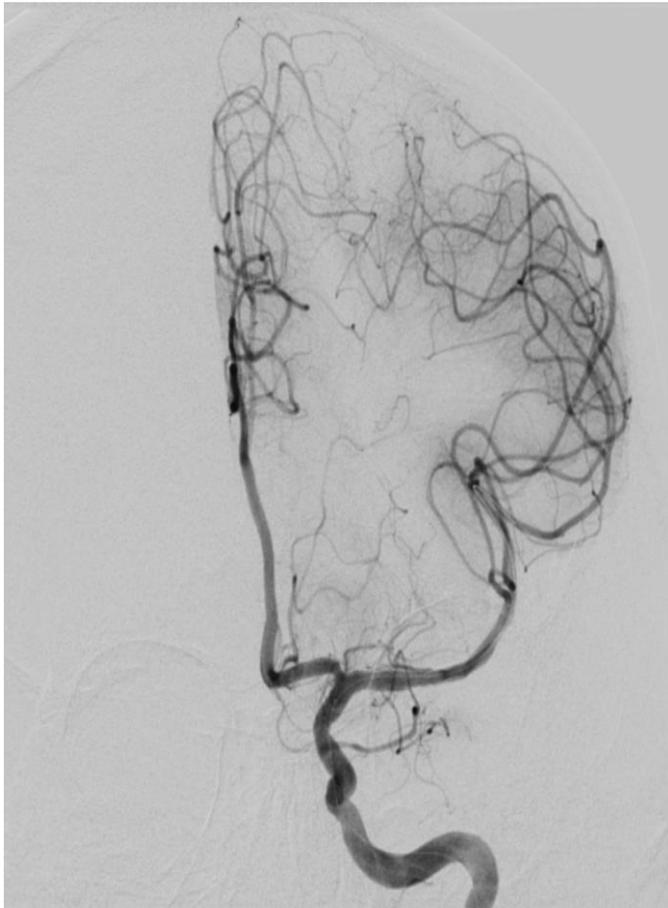
3 passes of thrombectomy



TREVO



2.5-22 coronary stent after clopidogrel loading



## Intracranial Stenting after Failure of Thrombectomy with the emboTrap® Device

Sandra A. Cornelissen<sup>1</sup> · Tommy Andersson<sup>2,3</sup> · Ake Holmberg<sup>2</sup> · Patrick A. Brouwer<sup>2</sup> · Michael Söderman<sup>2</sup> · Pervinder Bhogal<sup>4</sup> · Leonard L. L. Yeo<sup>2,5</sup> 

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### CASE SERIES

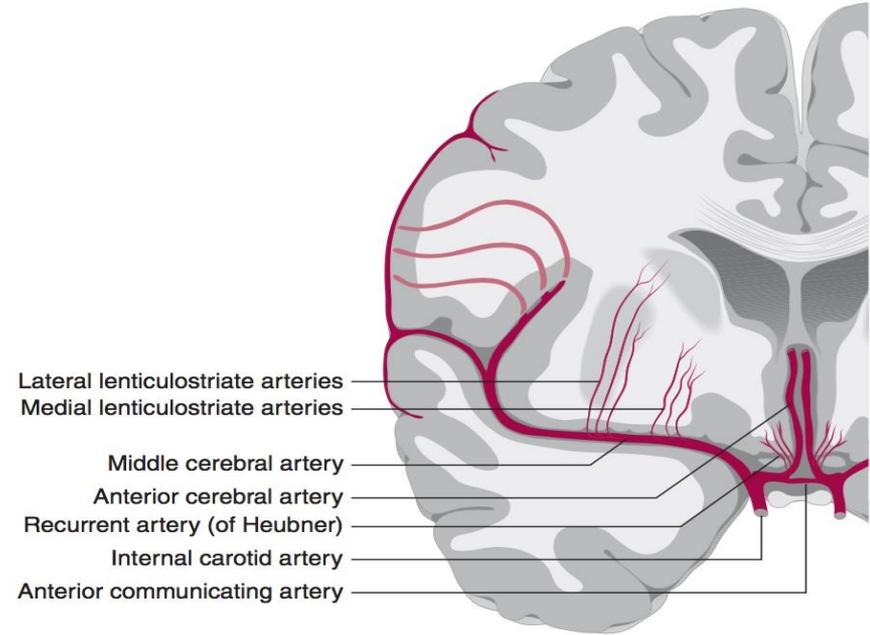
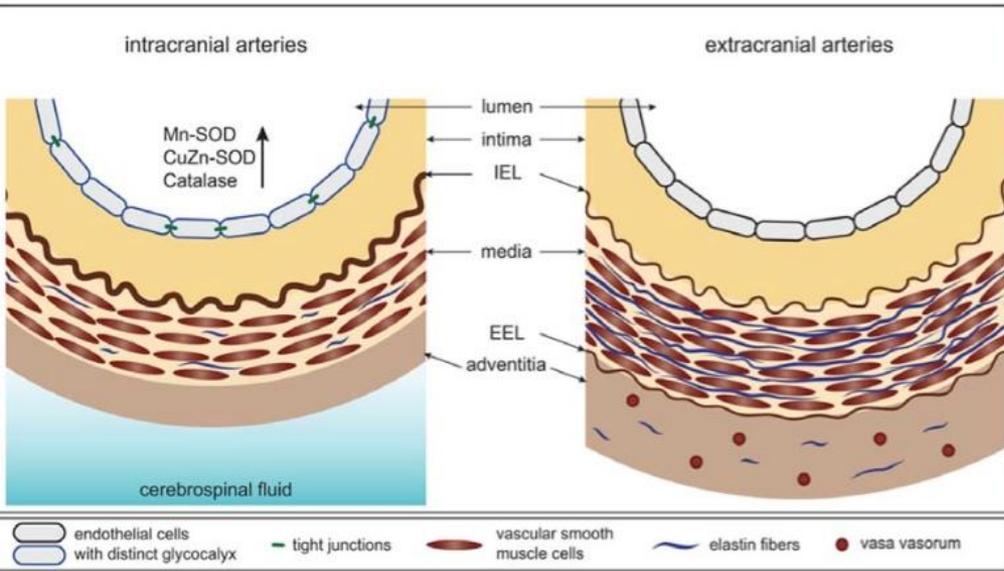
## Permanent implantation of the Solitaire device as a bailout technique for large vessel intracranial occlusions

Syed Uzair Ahmed, Jenna Mann, Jeremie Houde, Evan Barber, Michael E Kelly, Lissa Peeling **JNIS 2018**

## Stenting as a Rescue Treatment After Failure of Mechanical Thrombectomy for Anterior Circulation Large Artery Occlusion

Jang-Hyun Baek, MD; Byung Moon Kim, MD; Dong Joon Kim, MD; Ji Hoe Heo, MD; Hyo Suk Nam, MD; Joonsang Yoo, MD  
**Stroke 2016**

# ICAS Permanent Stenting



Antiagregant  
Penetran Arteries  
Tortious arteries

- Stroke etiology is important to determine the technique and strategy in the endovascular treatment of acute ischemic stroke
- Localization, size and intensity of clot type affect the success of the procedure

