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at Jefferson

Stroke a treatable disease!

Pascal Jabbour MD , FAANS, FAHA

The Angela and Richard T. Clark Distinguished

Professor of Neurological Surgery

Director Division of Neurovascular Surgery and Endovascular Neurosurgery

Thomas Jefferson University Hospital

Stroke director Chestnut Hill Hospital

Disclosure

- Consultant: Medtronic, Microvention, Cerus Endovascular, Balt, Q'Apel Medical
- Research Grant: Medtronic, Cerenovus
- Proctor: Pipeline, WEB
- PI: ADVANCE, CREST II, RAGE, Excellent, Vantage, Citadel, Evolve
- National PI: ADVANCE
- Investor: Q'Apel Medical

May is National Stroke Awareness Month

National Stroke Association encourages everyone to spread awareness about stroke in May about how to:

- **STOP** primary and secondary stroke through risk factor management.
- **Act F.A.S.T.** to increase recognition of and response to stroke symptoms.
- **Spread HOPE** about recovery from stroke.

Visit www.stroke.org/SAM for free educational resources.

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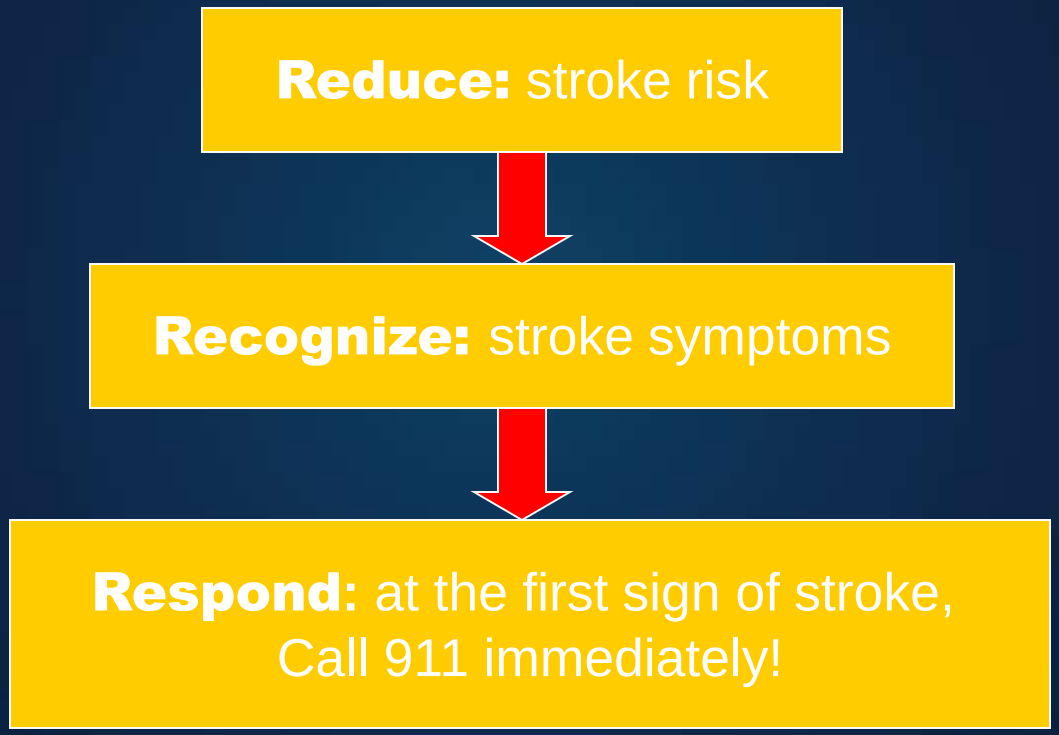
Be Stroke Smart



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Stroke Facts

- A leading cause of death in the United States
- 795,000 Americans suffer strokes each year
- 134,000 deaths each year
  - From 1996 to 2006, the stroke death rate fell 33.5% and number of deaths fell by 18.4%
- 6,400,000 stroke survivors

Diagnosis	Yearly Incidence in the US
Acute stroke	750,000
Traumatic brain injury	600,000
Alzheimer's Disease	360,000
Parkinson's Disease	60,000
Aneurysm Rupture	30,000
Primary brain tumor	18,000

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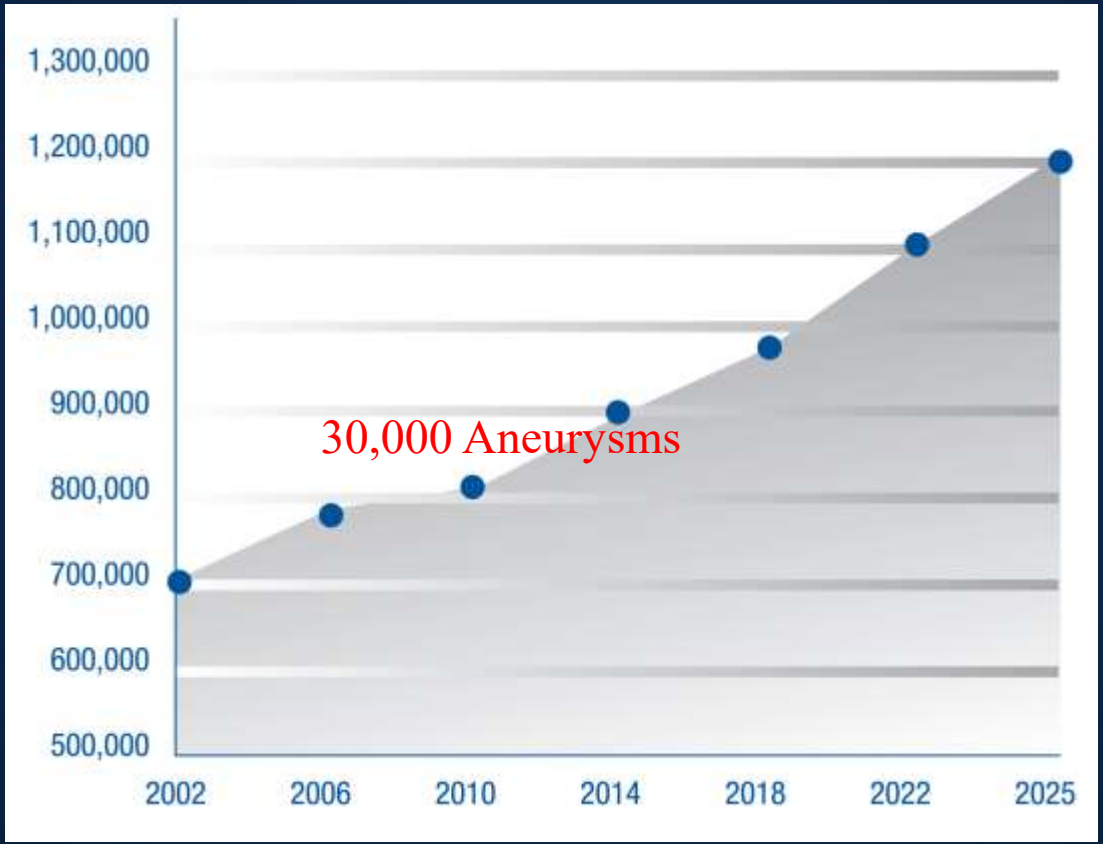
Projected number of strokes in US: 2002 - 2025



Source: Stroke, January 2004; J. P. Broderick, MD

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Stroke Facts

- A leading cause of adult disability
- Up to 80% of all strokes are preventable through risk factor management
- On average, someone suffers a stroke every 40 seconds in America

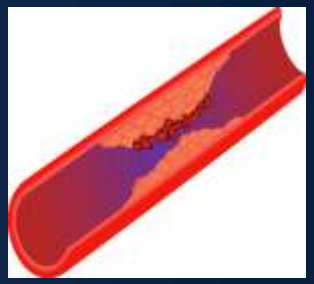
Definition of Stroke

- Sudden brain damage
- Lack of blood flow to the brain caused by a clot or rupture of a blood vessel

Ischemic = Clot

(makes up approximately 87% of all strokes)

Embolic



Thrombotic

Hemorrhagic = Bleed

- Bleeding around brain
- Bleeding into brain

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Stroke Strikes F.A.S.T.
You Should, Too. Call 9-1-1

- **F =** Face: ask the person to smile
- **A =** Arm: ask the person to raise both arms
- **S =** Speech: ask the person to speak a simple sentence
- **T =** Time: to call 911

Every minute matters!

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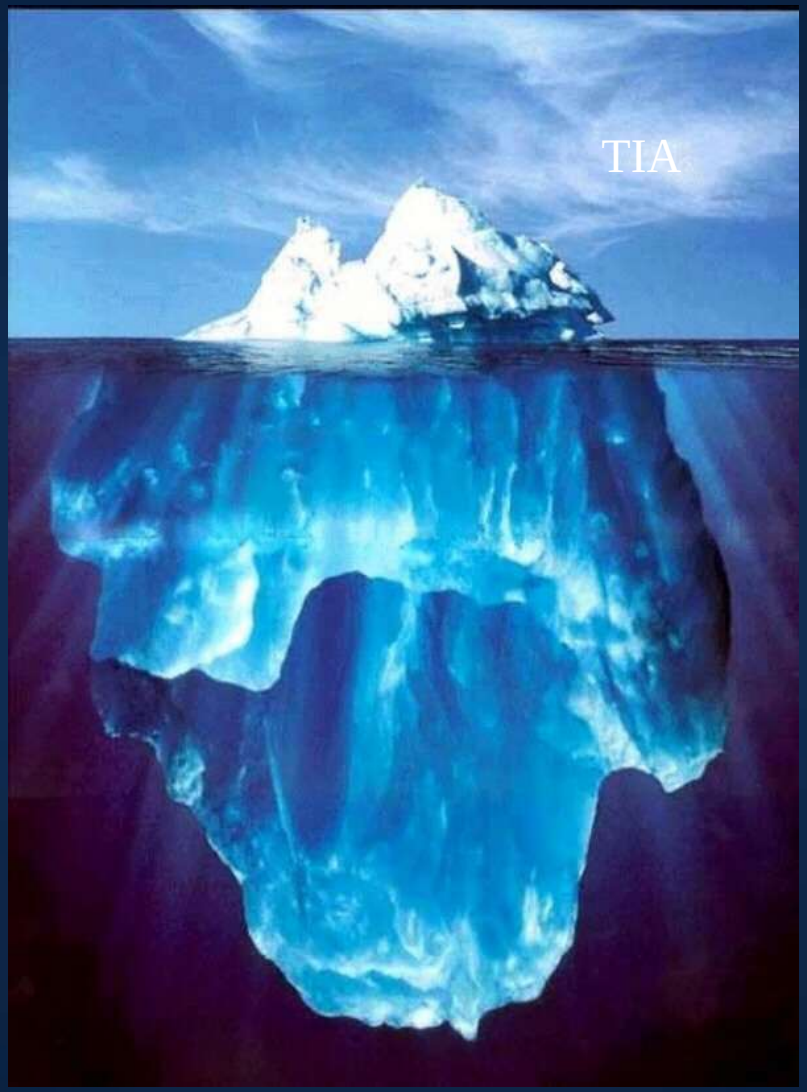
TIA

- Transient ischemic attack (TIA) is a warning sign of a future stroke – up to 40% of TIA patients will have a future stroke
- Symptoms of TIAs are the same as stroke
- TIA symptoms can resolve within minutes or hours
- It is important to seek immediate medical attention if you suspect that you are having or have had a TIA



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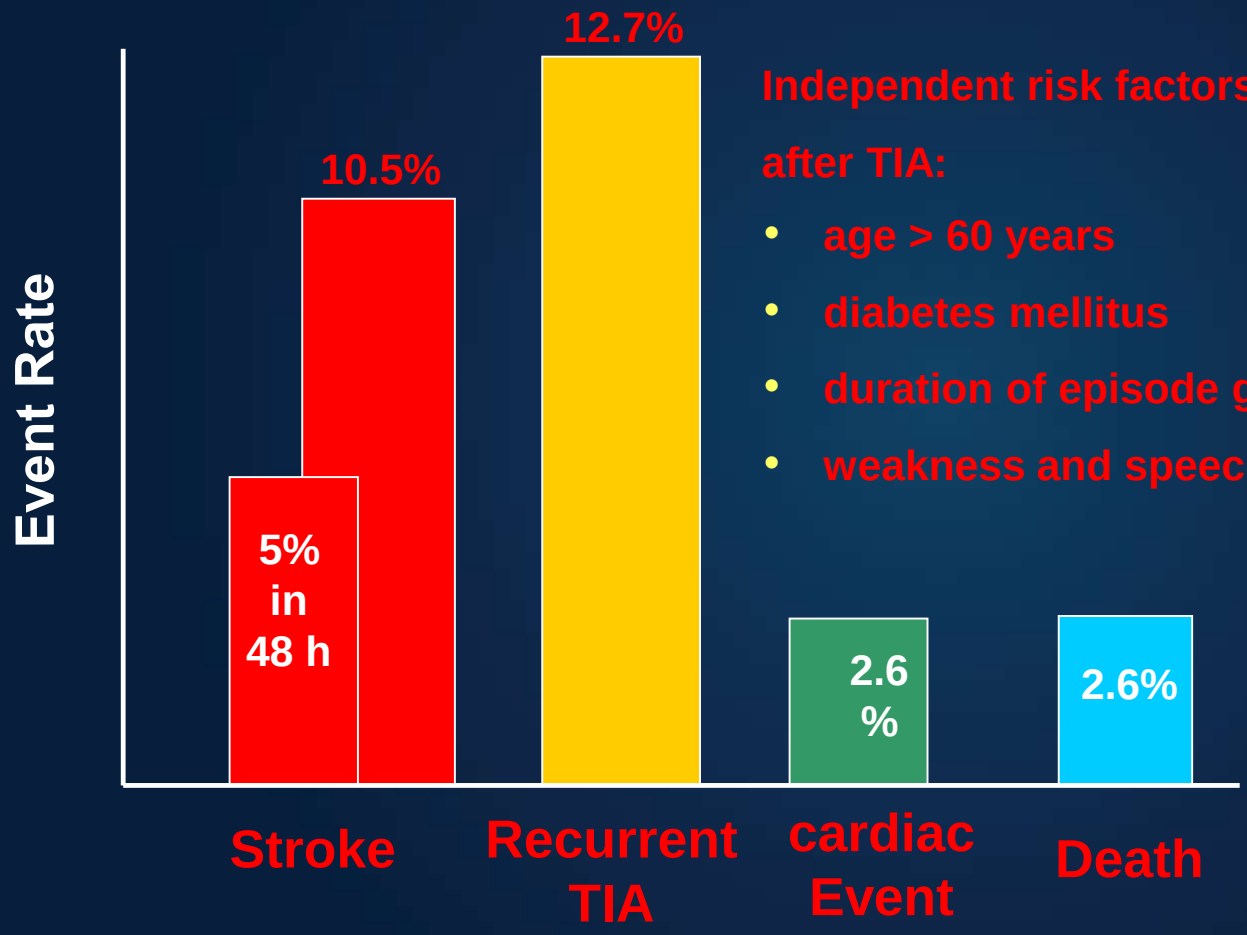
Event Risk Within 3 Months After TIA



Independent risk factors for stroke within 90 days after TIA:

- age > 60 years
- diabetes mellitus
- duration of episode greater than 10 min
- weakness and speech impairment with the episode

Johnston SC, et al. *JAMA*. 2000;284:29012906.

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The Perceptions of Stroke

Myth	Reality
• Stroke is not preventable	• Up to 80% percent of strokes are preventable
• Stroke cannot be treated	• Stroke requires emergency treatment
• Stroke only strikes the elderly	• Anyone can have a stroke
• Stroke happens in the heart	• Stroke is a “Brain Attack”
• Stroke recovery ends after 6 months	• Stroke recovery can last a lifetime

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Acute Stroke Treatments

Ischemic stroke (Brain Clot)

- Clot busting medication: t-PA (Tissue Plasminogen Activator)
- Clot-removing devices: Mechanical thrombectomy

Hemorrhagic Stroke (Brain Bleed)

- Clipping
- Coiling

Stroke Recovery

- 10% of stroke survivors recover almost completely
- 25% recover with minor impairments
- 40% experience moderate to severe impairments requiring special care
- 10% require care within either a skilled-care or other long-term care facility
- 15% die shortly after the stroke

Stroke Survivors

- NIH study of survivors of ischemic stroke:
  - 50% had partial paralysis
  - 30% were unable to walk without assistance
  - 19% had cognitive impairment
  - 35% had depressive symptoms
  - 26% were institutionalized in a nursing home

Types of Stroke Rehabilitation

Physical Therapy (PT)

- Walking, range of movement

Occupational Therapy (OT)

- Taking care of one's self

Speech Language Therapy

- Communication skills, swallowing, cognition

Recreational Therapy

- Cooking, gardening

Stroke Ignorance

Gallup Survey

- 97% can't name stroke symptoms
- 44% had suffered stroke or had family with stroke
- Less than 50% identified brain as organ of insult
- Most fear stroke more than MI

Acute Stroke Patients

- 25% correctly identified symptoms
- 24% seek medical help within 3 hours
- Patients with previous stroke **not** more inclined to seek medical help

80% think their symptoms are not serious!!

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Stroke Awareness!

- At-risk patients unaware
- Acute symptoms ignored

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TIME IS BRAIN

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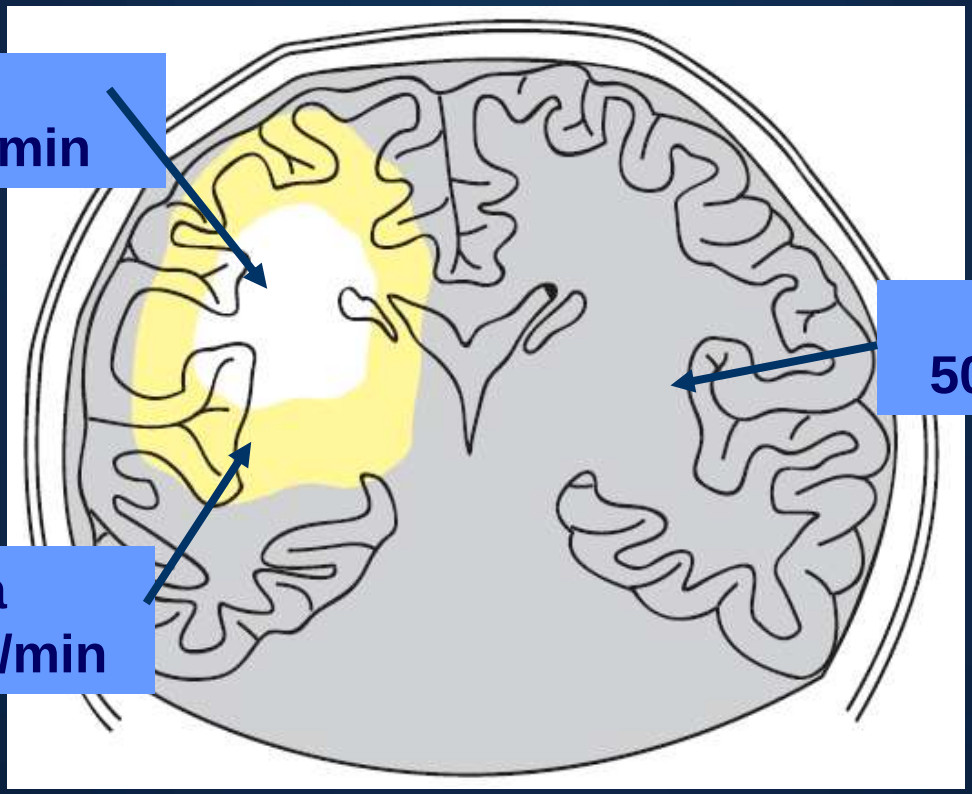
Ischemic Penumbra

Hypoperfused Area of Focal Ischemia Can Be Salvaged by Timely Intervention



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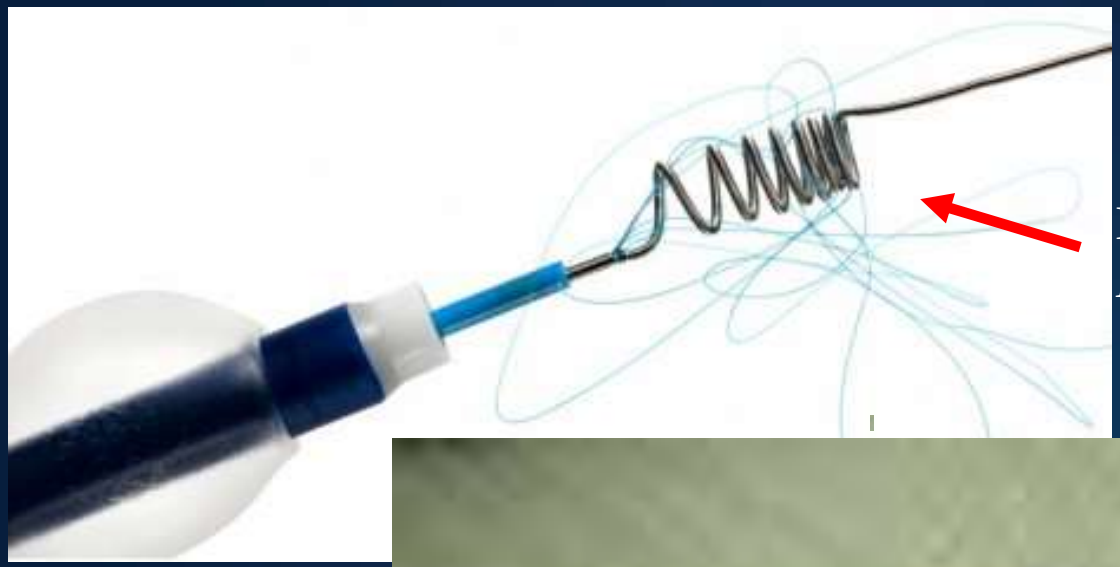
Merci Retriever

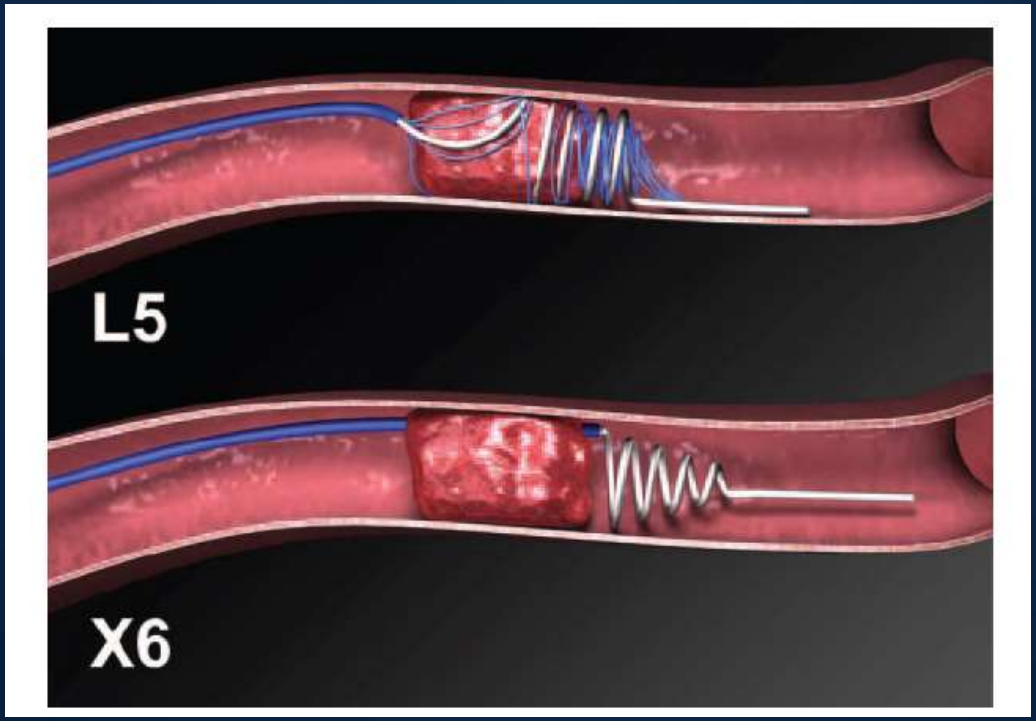


Nitinol Wire Loops with Arcading Filaments

Mechanical Thrombectomy for Acute Ischemic Stroke

Final Results of the Multi MERCI Trial

Wade S. Smith, MD, PhD; Gene Sung, MD, MPH; Jeffrey Saver, MD; Ronald Budzik, MD; Gary Duckwiler, MD; David S. Liebeskind, MD; Helmi L. Lutsep, MD; Marilyn M. Rymer, MD; Randall T. Higashida, MD; Sidney Starkman, MD; Y. Pierre Gobin, MD; for the Multi MERCI Investigators



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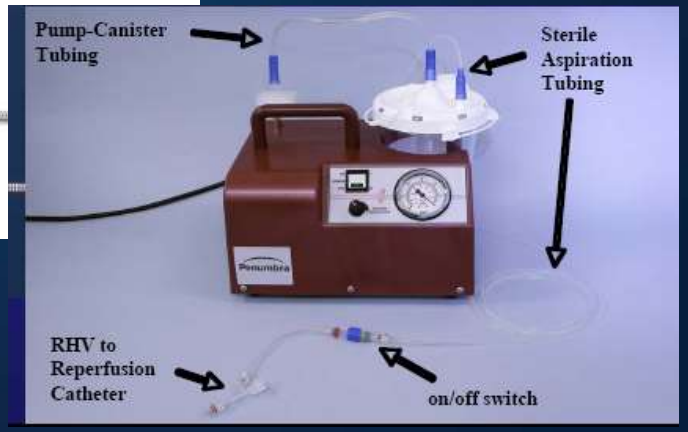
Penumbra System

Separator



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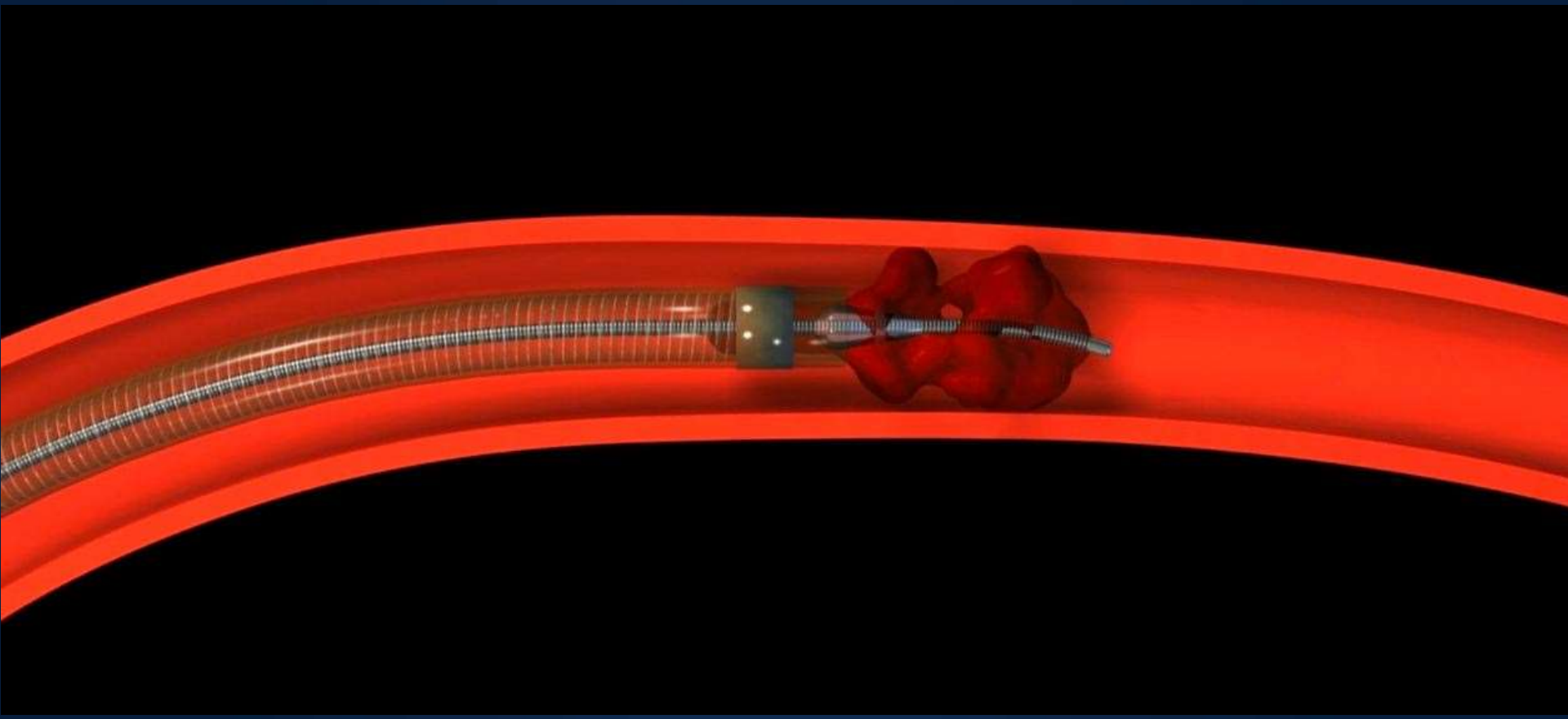
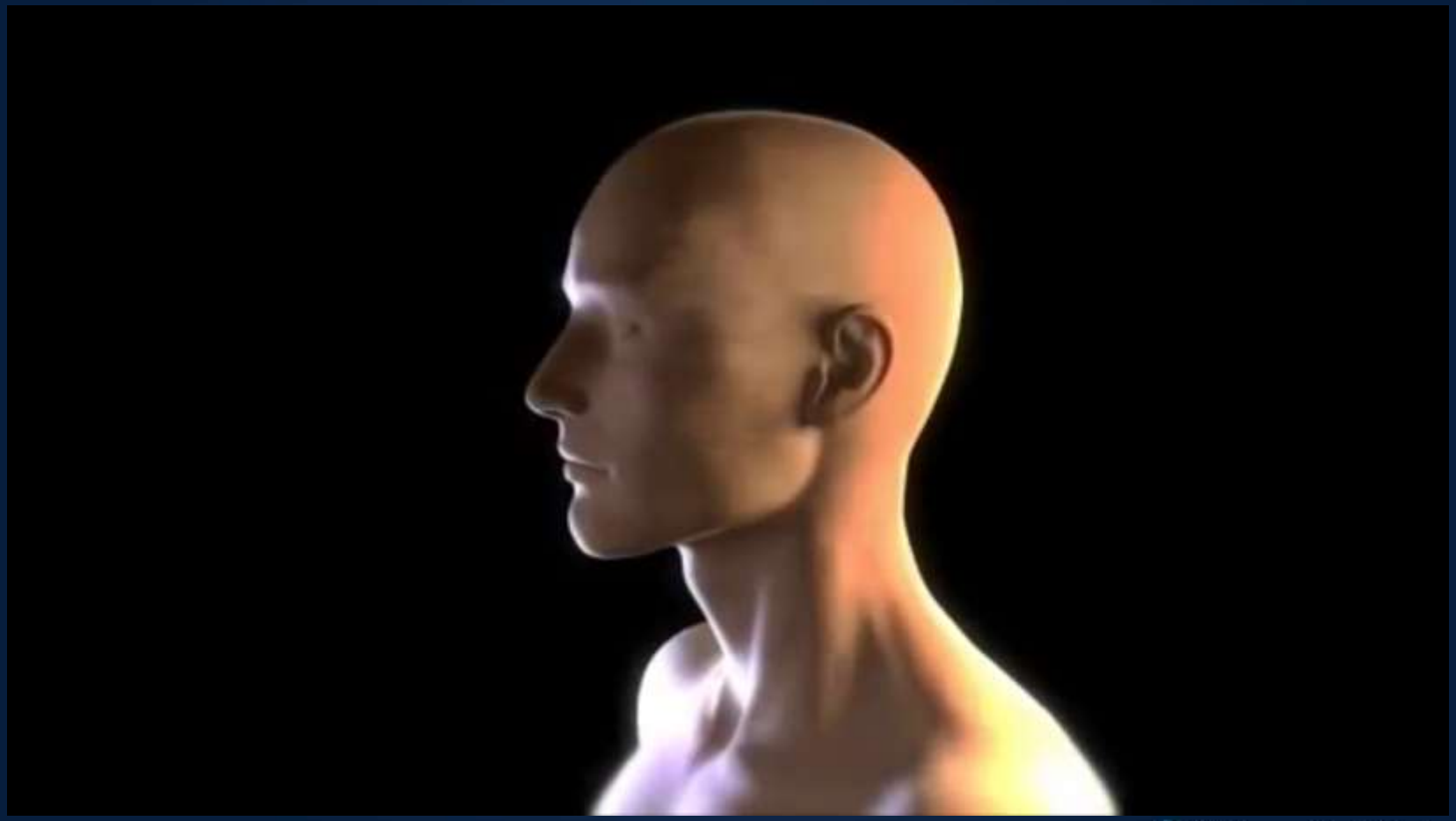


Stentreivers



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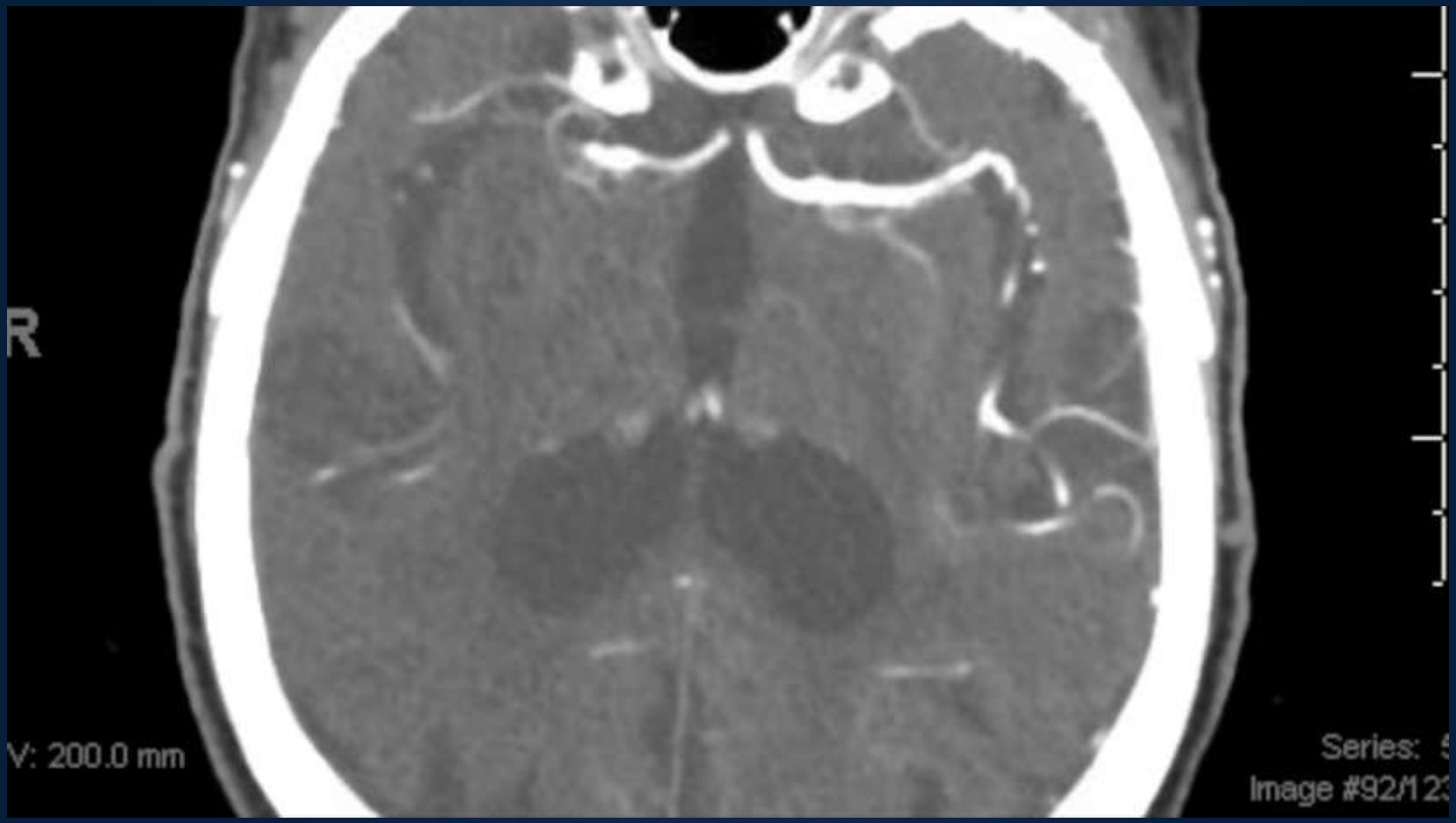
Stroke



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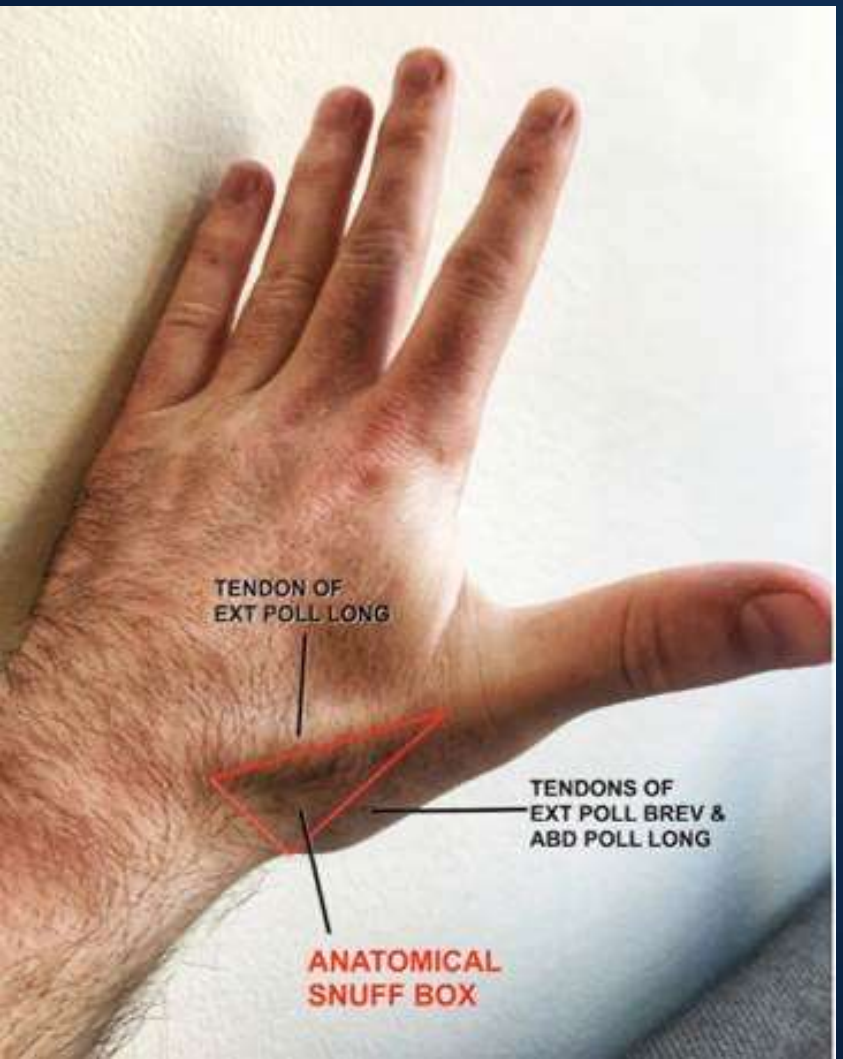
Snuff box


TENDON OF
EXT POLL LONG
TENDONS OF
EXT POLL BREV &
ABD POLL LONG
ANATOMICAL
SNUFF BOX

JNS

CLINICAL ARTICLE

A comparison of radial versus femoral artery access for acute stroke interventions

Omaditya Khanna, MD, Lohit Velagapudi, BS, Somnath Das, BS, Ahmad Sweid, MD, Nikolaos Mouchtouris, MD, Fadi Al Saiegh, MD, Michael B. Avery, MD, MSc, Nohra Chalouhi, MD, Richard F. Schmidt, MD, Kalyan Sajja, MD, M. Reid Gooch, MD, Stavropoula Tjoumakaris, MD, Robert H. Rosenwasser, MD, and Pascal M. Jabbour, MD

Department of Neurological Surgery, Thomas Jefferson University Hospital, Philadelphia, Pennsylvania

OBJECTIVE In this study, the authors aimed to investigate procedural and clinical outcomes between radial and femoral artery access in patients undergoing thrombectomy for acute stroke.

METHODS The authors conducted a single-institution retrospective analysis of 104 patients who underwent mechanical thrombectomy, 52 via transradial access and 52 via traditional transfemoral access. They analyzed various procedural

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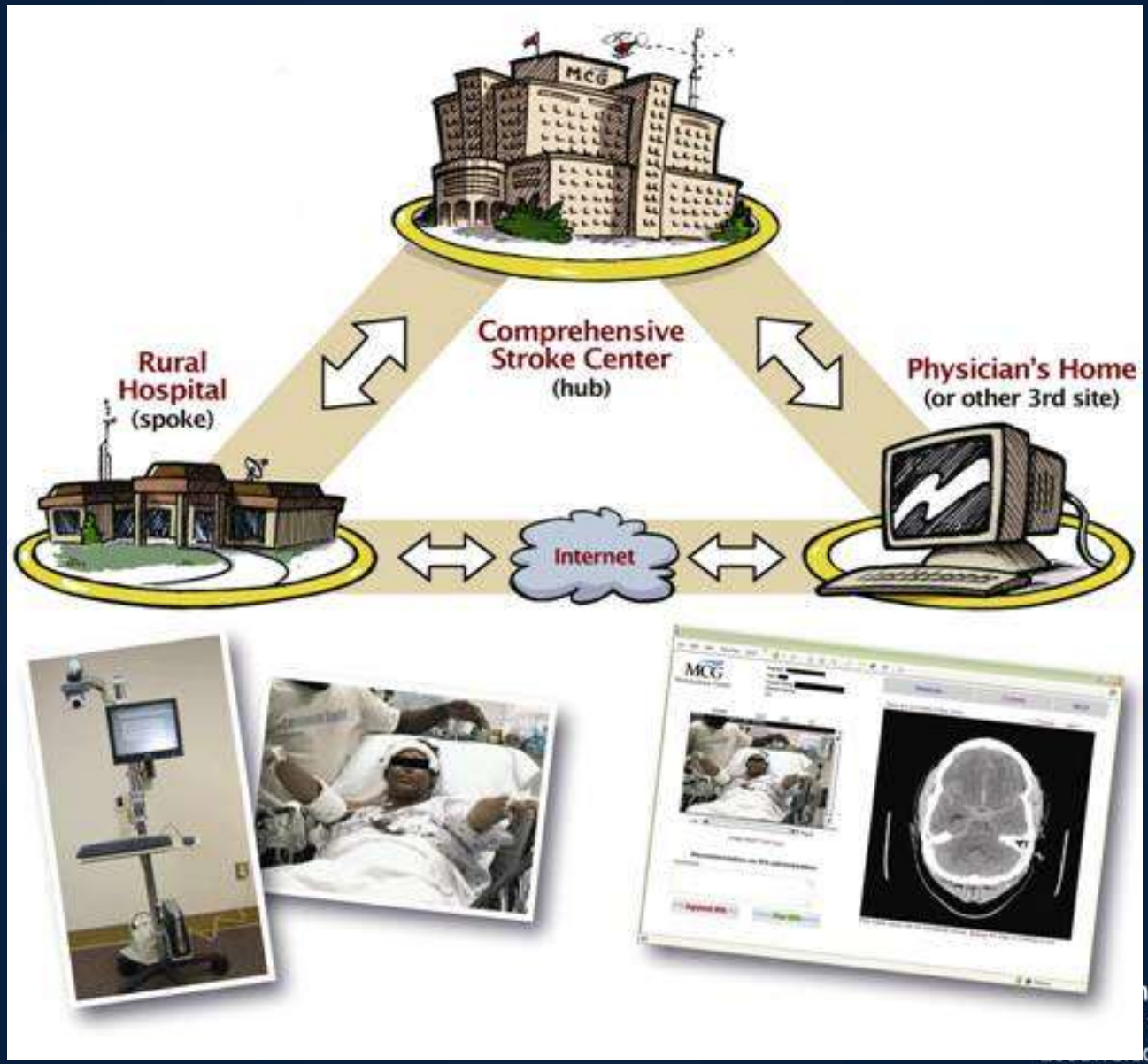
TELEMEDICINE MODEL



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on

Telemedicine and continuity of care

Research & Outcomes

RESEARCH—HUMAN—CLINICAL STUDIES

Intravenous Tissue Plasminogen Activator Administration in Community Hospitals Facilitated by Telestroke Service

Nohra Chalouhi, MD
Jeremy A. Dressler, BS
Emily S.I. Kunkel
Richard Dalyai, MD
Pascal Jabbour, MD
L. Fernando Gonzalez, MD
Robert M. Starke, MD
Aaron S. Dumont, MD
Robert Rosenwasser, MD
Stavropoula Tjoumakaris, MD

Department of Neurosurgery, Thomas Jefferson University and Jefferson Hospital for Neuroscience, Philadelphia, Pennsylvania

Correspondence:
Stavropoula I. Tjoumakaris, MD,
Assistant Professor,
Department of Neurological Surgery,
Division of Neurovascular Surgery and Endovascular Neurosurgery,
Thomas Jefferson University Hospital,
901 Walnut St, 3rd Floor,
Philadelphia, PA 19107.
E-mail: stavropoula.tjoumakaris@jefferson.edu

Received, February 9, 2013.
Accepted, June 24, 2013.
Published Online, July 9, 2013.

BACKGROUND: Stroke is a leading cause of death and disability in the United States. Despite the proven benefits of intravenous tissue plasminogen activator (IV-tPA), only a small percentage of patients who have had a stroke (3.4%–5.2%) receive this US Food and Drug Administration-approved therapy.

OBJECTIVE: To prospectively assess the impact of a telestroke network on the rate of IV-tPA administration in patients with acute ischemic stroke in community hospitals.

METHODS: Thomas Jefferson University Hospital has developed a telestroke system providing acute stroke care in 28 community hospitals within the region (Pennsylvania, New Jersey, and Delaware). Telemedicine consultations are delivered through Remote Presence robotic technology.

RESULTS: A total of 1643 telemedicine stroke consultations were provided between January 2011 and June 2012. The mean interval from consultation request to telemedicine

NEUROSURGERY

Contents lists available at ScienceDirect

Clinical Neurology and Neurosurgery

journal homepage: www.elsevier.com/locate/clineuro

Epidemiology of a large telestroke cohort in the Delaware valley

Mario Zanaty[a], Nohra Chalouhi[a], Robert M. Starke[b], Stavropoula I. Tjoumakaris[a], L. Fernando Gonzalez[a], Maureen Deprince[a], Saurabh J. Singhal[a], Robert H. Rosenwasser[a], Pamela Kolb[a], Pascal M. Jabbour[a,*]

[a] Department of Neurological Surgery, Thomas Jefferson University, Philadelphia, USA
[b] Department of Neurological Surgery, University of Virginia, Charlottesville, USA

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ABSTRACT

Background: The American Heart Association/American Stroke Association has recently endorsed tele-stroke. Telestroke has enhanced stroke diagnosis, increased tPA administration and improved long-term outcomes. However, many of the publication on telemedicine so far have been review articles.

Objectives: We investigated the epidemiological features of telestroke patients and evaluated the difference between the transferred and non-transferred cohorts.

Methods: We collected data on telestroke consultation, between January 2012 and June 2013, regarding patient's age, gender, diagnosis, NIHSS, onset-to-spoke time (OTS), tPA administration and transfer status. Further data was obtained on transferred patients regarding discharge and endovascular interventions.

Results: The means of age, NIHSS and OTS time were the following: 67.59 years, 7.65 and 11.28 h respec-

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Intravenous thrombolysis in the elderly is facilitated by a tele-stroke network: A cross-sectional study

Sebastian Sanchez[a,1], Yesica Campos[b,1], Angel Cadena[a], Sara Habib[a], Maureen Deprince[c], Nohra Chalouhi[a], Matthew Vibbert[a], Jacqueline Urtecho[a], M. Kamran Athar[a], Diana Tzeng[d], Lori Sheehan[d], Rodney Bell[d], Stravoupoula Tjoumakaris[a], Pascal Jabbour[a], Robert Rosenwasser[a], Fred Rincon[a,d,*]

[a] Department of Neurosurgery, Thomas Jefferson University, United States
[b] Department of Neurology, University of Alabama, United States
[c] Jefferson Hospital for Neuroscience, United States
[d] Department of Neurology, Thomas Jefferson University, United States

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Don’t leave any LVO behind !
Carotid cutdown

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journal homepage: www.elsevier.com/locate/jocn

Tools and techniques

Carotid cutdown for mechanical thrombectomy in the setting of intravenous tissue plasminogen activator: A technical report

Ritam Ghosh, Nohra Chalouhi, Ahmad Sweid, Fadi Al Saiegh, Omaditya Khanna, Nikolaos Mouchtouris, Stavropoula Tjoumakaris, Michael Reid Gooch, Robert H. Rosenwasser, Pascal M. Jabbour *

Department of Neurological Surgery, Thomas Jefferson University Hospital, Philadelphia, PA, United States

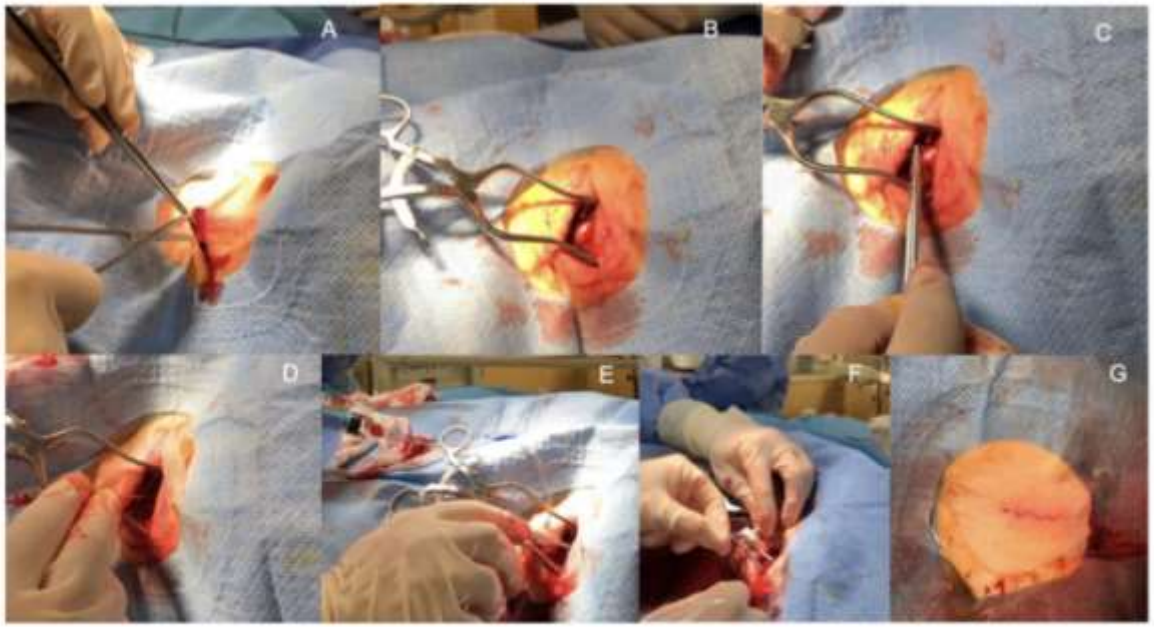
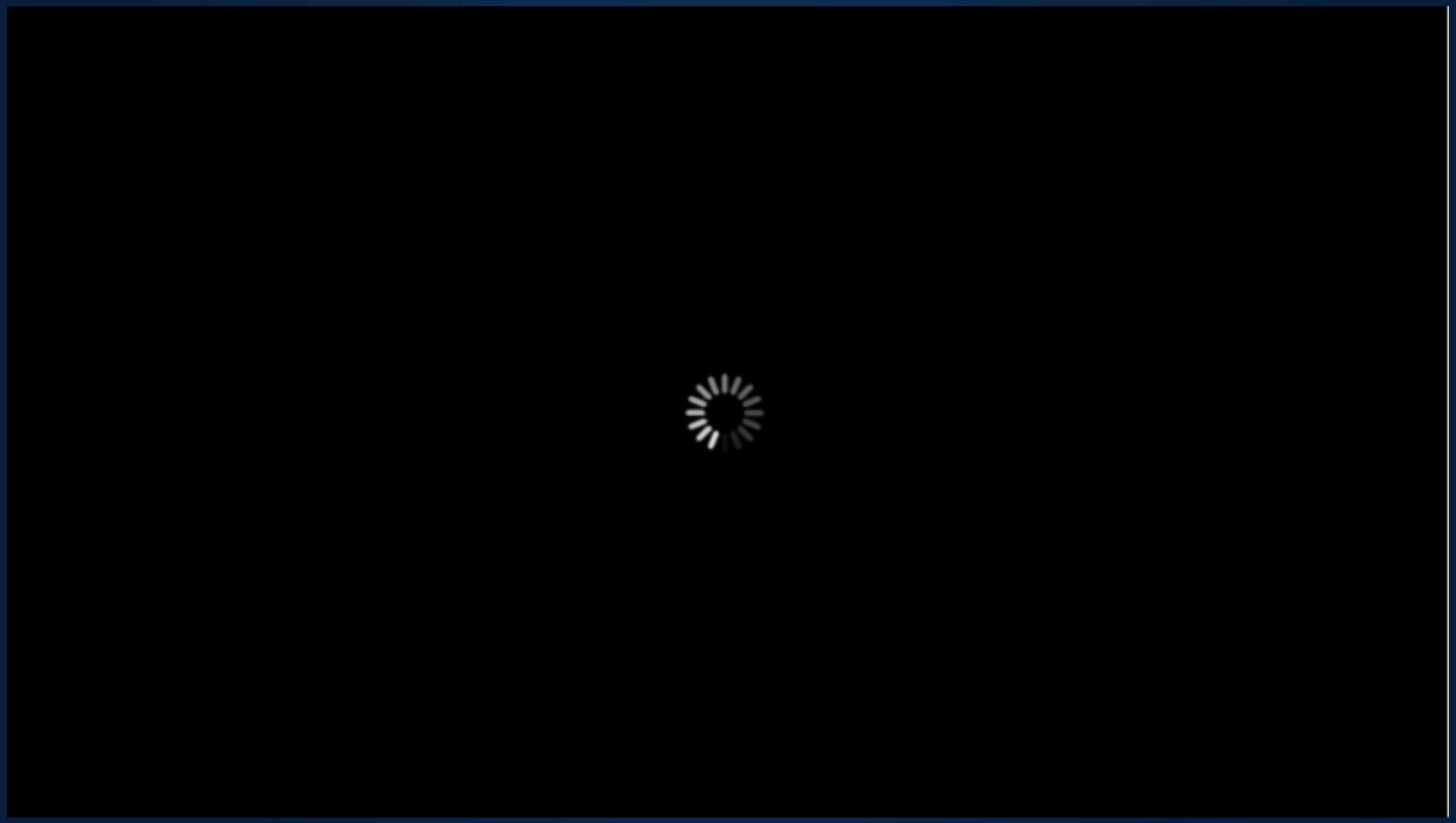


Fig. 6. Detailed figure showing step by step process of operative technique. In image A, a 1–2 cm incision is made along the anterior border of the sternocleidomastoid muscle. Image B showcases the left common carotid artery, with image C highlighting the purse string suture being placed in the artery using a 6/0 prolene stitch. Puncture needle is inserted in image D, with sheath being placed in image E. After the stroke intervention is completed, the sheath is removed while the purse string is tied down (Image F) to avoid bleeding from the carotid artery. Multi-layer closure is performed with the finished product being seen in image G.

Not all strokes are arterial !



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The Future is now !

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MSU Impact

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journal homepage: www.elsevier.com/locate/clineuro

The impact of the implementation of a mobile stroke unit on a stroke cohort

Joshua H. Weinberg [a], Ahmad Sweid [a], Mauren DePrince [b], John Roussis [b], Nabeel Herial [a], Michael Reid Gooch [a], Hekmat Zarzour [a], Stavropoula Tjoumakaris [a], Thomas Topley [c], Alvin Wang [c], Gerald Wydro [c], Lawrence Durland [c], Robert Elliot [c], James Fox [c], Robert H. Rosenwasser [a], Pascal Jabbour [a,*]

[a] Department of Neurological Surgery, Thomas Jefferson University Hospital, Philadelphia, PA, USA
[b] Department of Neuroscience, Thomas Jefferson University Hospital, Philadelphia, PA, USA
[c] Department of Emergency Medicine, Thomas Jefferson University Hospital, Philadelphia, PA, USA

Research

International Journal of Stroke WSO

Cerebral ischemic and hemorrhagic complications of coronavirus disease 2019

International Journal of Stroke
0(0) 1–10

DOI: 10.1177/1747493020937189
journals.sagepub.com/home/wso
SAGE

Ahmad Sweid[1], Batoul Hammoud[2], Kimon Bekelis[3], Symeon Missios[3], Stavropoula I Tjoumakaris[1], Michael R Gooch[1], Nabeel A Herial[1], Hekmat Zarzour[1], Victor Romo[4], Maureen DePrince[1], Robert H Rosenwasser[1] and Pascal Jabbour[1]

- 22 patients , mean age 59.5
- 17 cases of acute ischemic stroke, 3 cases of aneurysm rupture, and 2 cases of sinus thrombosis
- 54.4% no past significant medical history
- 45.5% Stroke was the first symptom of Covid
- 50% poor outcome mRS 3-6
- Mortality 36.4%

Letter: Thrombotic Neurovascular Disease in COVID-19 Patients FREE

Ahmad Sweid, MD, Batoul Hammoud, MD, Joshua H Weinberg, BS, Mazen Oneissi, MD, Eytan Raz, MD, Maksim Shapiro, MD, Maureen DePrince, BA, Stavropoula Tjoumakaris, MD, Michael R Gooch, MD, Nabeel A Herial, MD, MPH, Hekmat Zarzour, MD, Victor Romo, MD, Robert H Rosenwasser, MD, Pascal Jabbour, MD

Neurosurgery, nyaa254, https://doi-org.proxy1.lib.tju.edu/10.1093/neuros/nyaa254

Published: 04 June 2020

Letter: Thrombotic Neurovascular Disease in COVID-19 Patients

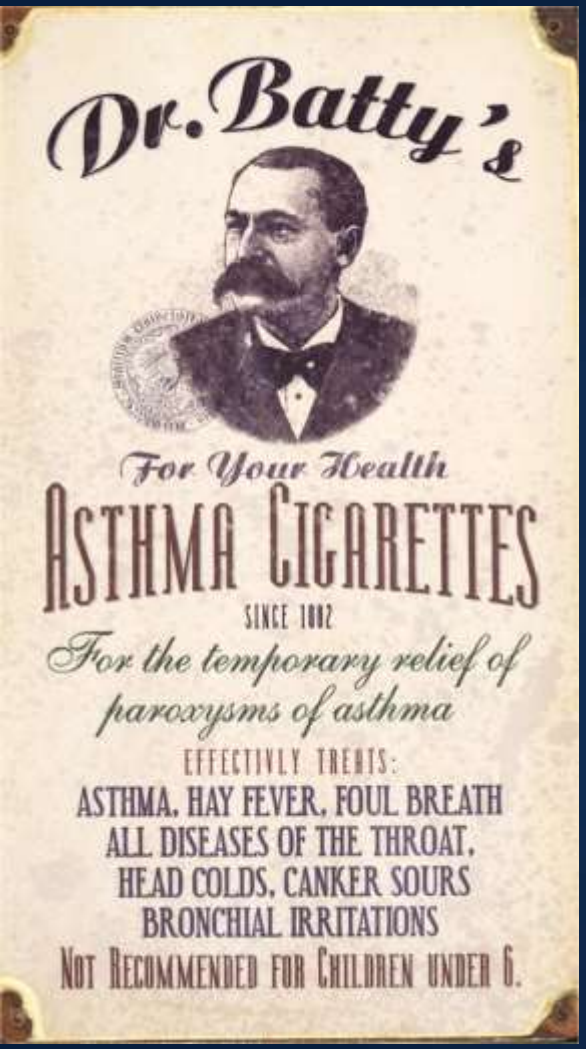
To the Editor:

Although the respiratory system is the primary target of the coronavirus, studies have demonstrated a strong tropism to the central nervous system (CNS).[1,2] The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infects cells by binding to the angiotensin-converting enzyme 2 (ACE2) receptor. This receptor is also found in the CNS and plays a crucial role in autoregulating cerebral perfusion pressure.[3,4] Additionally, epidemiological data demonstrated increased mortality due to cardiovascular and cerebrovascular diseases during flu pandemics due to a hypercoagulable state.[5,6] The triad of neuroinvasion of SARS-CoV-2, induction of hypercoagulable state,[3-9] and the inhibition of ACE2 blocking the formation of Angiotensin (1-7) serve as the pathophysiology for neurovascular insults.[3,4] We present a case series of coronavirus disease 2019 (COVID-19) patients from 2 health systems developing cerebrovascular insult.

METHODS

RESULTS

The total sample size was 14 patients. The mean age was 60.1 ± 11.1 yr, and 9 patients were males (64.3%). Six patients (42.8%) had no significant prior medical history. Seven patients (50.3%) had neurological insult as the initial manifestation of COVID-19. The average duration between the onset of COVID-19 symptoms and the cerebrovascular insult was 3.5 d (range: 0-17). The cerebrovascular pathologies were 12 cases of acute ischemic stroke (AIS) and 2 cases of sinus thrombosis. The mean NIHSS was 15.8 (range: 1-30), and all patients were treated within 6 h of symptoms onset. A total of 4 patients had carotid T occlusions, 2 had tandem occlusion (internal carotid artery [ICA] and middle cerebral artery [MCA] M1 occlusion), 1 patient had M1 and A2 occlusion, 2 patients had M1 occlusion, 2 patients had M2 occlusion, 2 patients had sinus thrombosis, and 1 patient had central retinal artery occlusion. Two patients developed hemorrhagic conversion requiring decompressive surgery. The mean duration of the mechanical thrombectomy (MT) procedures was 95.5 min (range: 17-428), and a favorable thrombolysis in cerebral infarction (TICI) score (>2b) was achieved



Conclusion

- Stroke is a preventable disease
- In case it happens FAST
- IV Tpa up to 4.5 hours
- Mechanical thrombectomy more extended window
- Stroke work up
- Secondary stroke prevention
- Rehabilitation is crucial

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Thank you !

@PascalJabbourMD

Pascal Jabbour MD

Jabbour.pascal

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