



Health

Hunter New England
Local Health District

RUSH IN

Rural Update for Stroke:

Hyper-acute Interventions

Endovascular Clot Retrieval

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John Hunter Hospital



Conflict of interest



- None





- ✓ Introduction to the Endovascular Clot Retrieval (ECR) of Ischemic Stroke.
- ✓ ECR revascularization techniques.
- ✓ Scientific evidence.
- ✓ Selection of candidates for ECR.
- ✓ Clinical case.

Global burden of Stroke

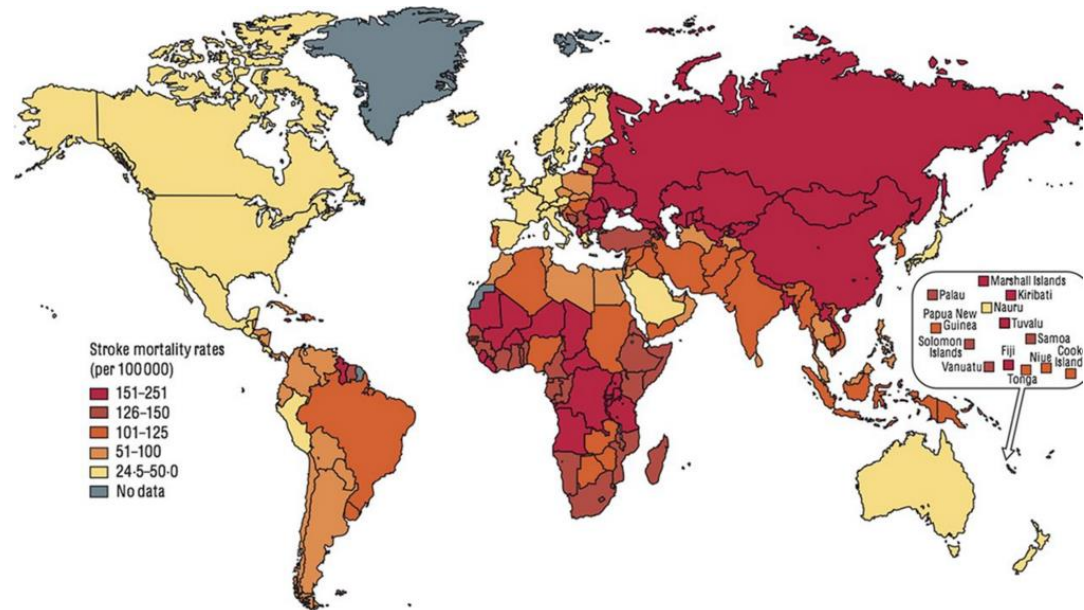


Stroke is a leading cause of **death and disability** worldwide.

Near 17 million strokes/year worldwide:
5 million die, 5 million remain disabled.

90% of strokes attributable to a modifiable risk factor.

Exhaustive control of risk factors could avoid $\frac{3}{4}$ of all strokes.

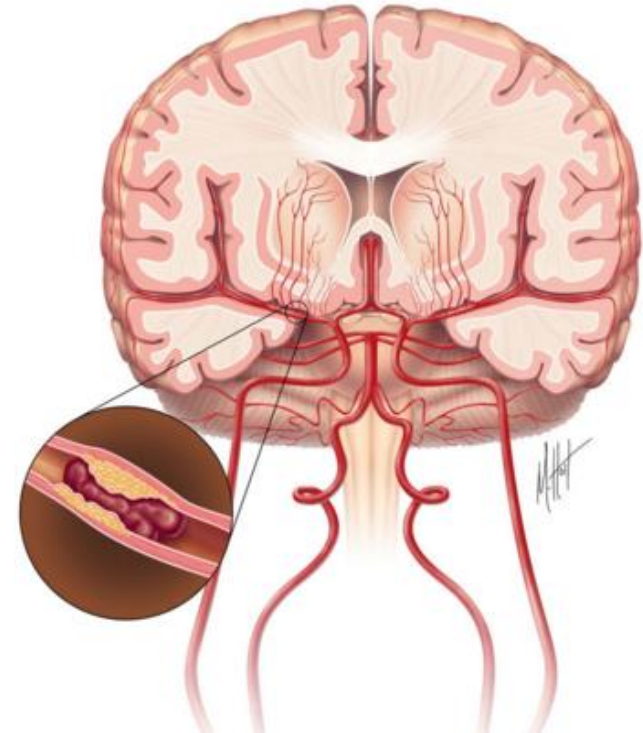


Lancet Neurol. 2016 Aug;15(9):913-24

Large vessel occlusions (LVOs)



- **Large vessel occlusion (LVO)** (35 – 40%).
 - Internal Carotid Artery (ICA).
 - Middle Cerebral Artery (MCA) M1.
 - Basilar Artery (BA).
- **Poor prognosis:**
 - ✓ 60-80% will die or remain disabled at 90 days after the stroke.
 - ✓ Iv rt-PA recanalizes less than 30%.
- ✓ **Target of Endovascular Clot Retrieval (ECR).**



N Engl J Med 2013;368:1265

Acute Stroke Management

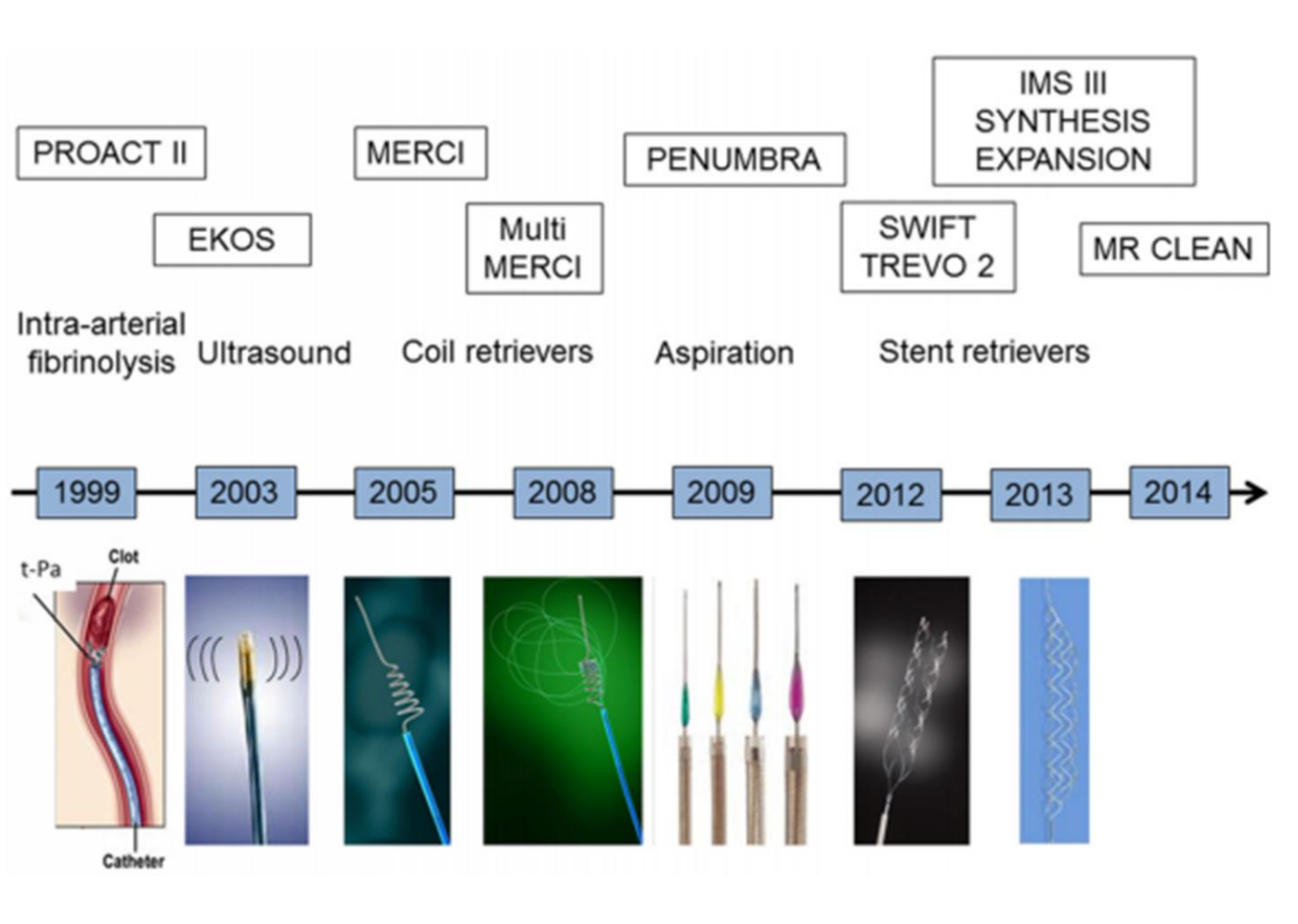


Acute Ischemic Stroke management:

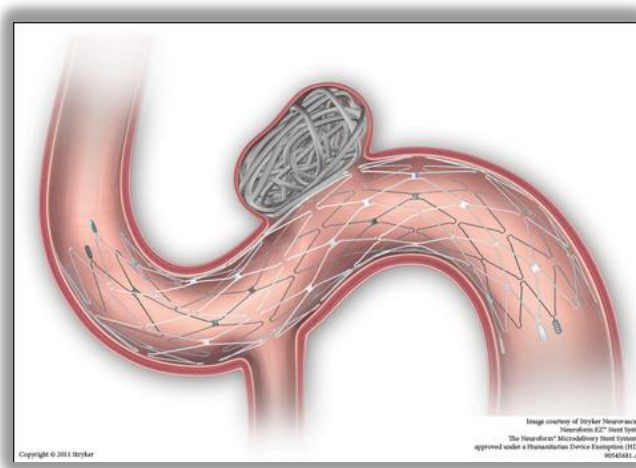
1. Stroke Units.
2. Intravenous thrombolysis – limitations:
 - 2.1. Narrow time window < 4.5h.
 - 2.2. Contraindications.
 - 2.3. Limited efficacy in LVOs.
3. *Endovascular therapy (ECR)*



History of Stroke ECR



Stent retrievers



Stent retrievers



Figure 1 Diagnostic cerebral angiography revealed a complete occlusion of the left MCA (distal part of M1 and proximal part of M2).

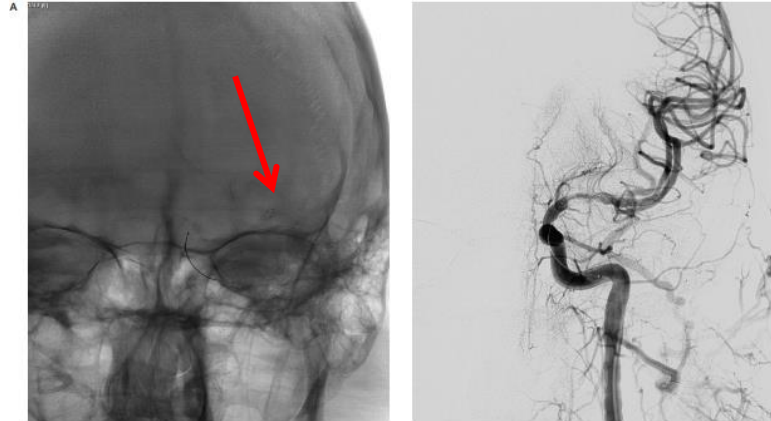


Figure 4 A,B) The Solitaire™ AB device was deployed (A), and angiography demonstrated flow through the device (B).

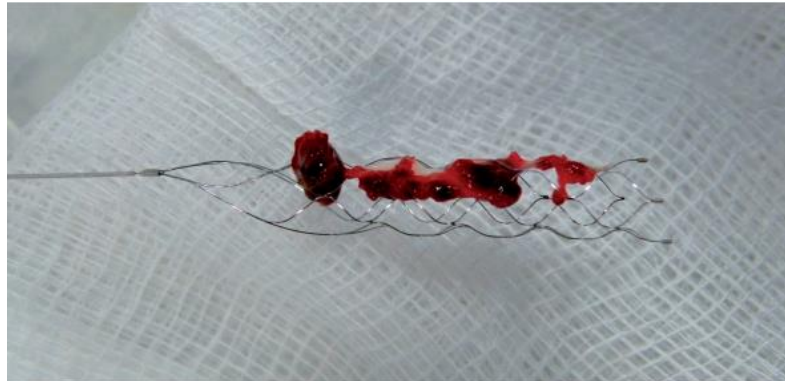


Figure 6 A thrombus was retrieved with a single pass of the Solitaire™ AB device.

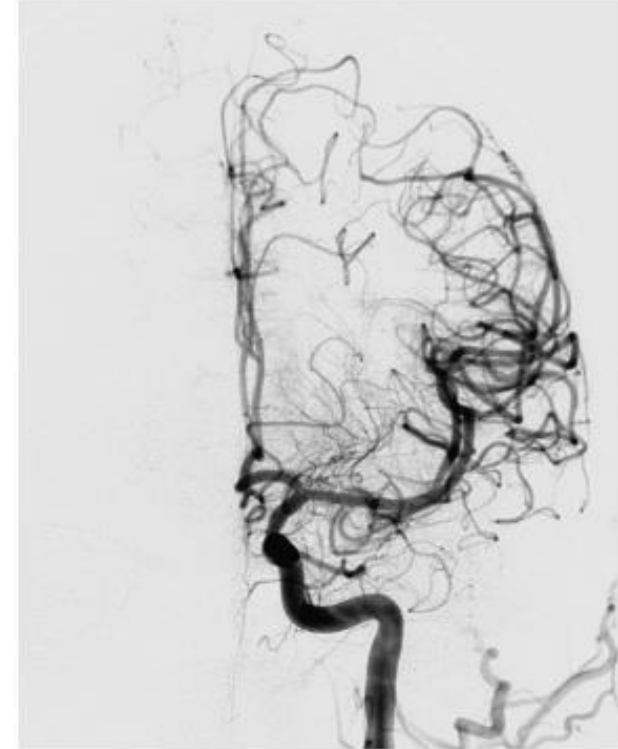
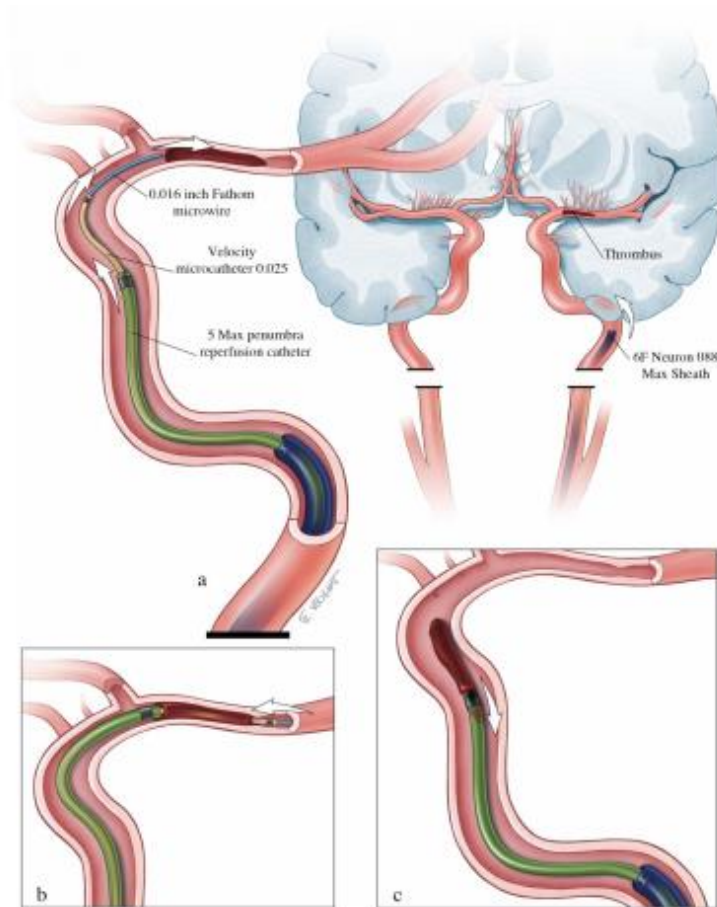


Figure 5 Postprocedure angiography demonstrated successful recanalization of the entire left ICA, ACA and MCA, and reperfusion with normal antegrade flow into the distal MCA branches, after Solitaire™ AB was used.

ADAPT TECHNIQUE

direct aspiration first pass technique



**Complete
revascularization
n 78%**

**Average time from
groin puncture to
recanalization
37 min**

J Neurointerv Surg. 2014;6:260-4



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Positive Clinical Trials



MR CLEAN

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 JANUARY 1, 2015 VOL. 372 NO. 1

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. 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. Aerc 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. Dipp for the MR CLEAN Investigators*

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

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. 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. Faul B.S. Steinfurt, M. Priglinger, T. Ang, R. Scroop, P.A. Barber, B. McGuin T. Wijeratne, T.G. Phan, W. Chong, R.V. Chandra, C.F. Bladin, M. Badve, L. de Villiers, H. Ma, P.M. Desmond, G.A. Donnan, and S.M. Davis for the EXTEND-IA Investigators*

EXTEND IA

ESCAPE

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Randomized Assessment of Rapid Endovascular Treatment of Ischemic Stroke

M. G
T. C
W. J
C
S

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 JUNE 11, 2015 VOL. 372 NO. 24

Stent-Retriever Thrombectomy after Intravenous t-PA vs. t-PA Alone

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

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*

SWIFT PRIME

REVASCAT

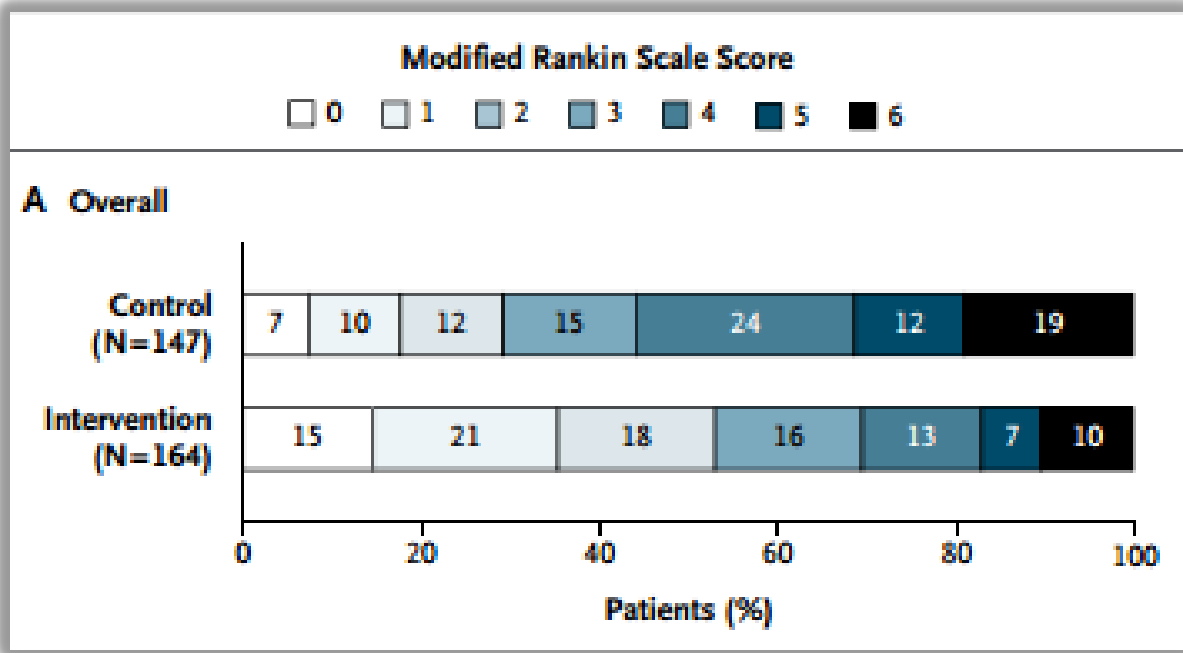


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Positive RCT

ESCAPE Trial:

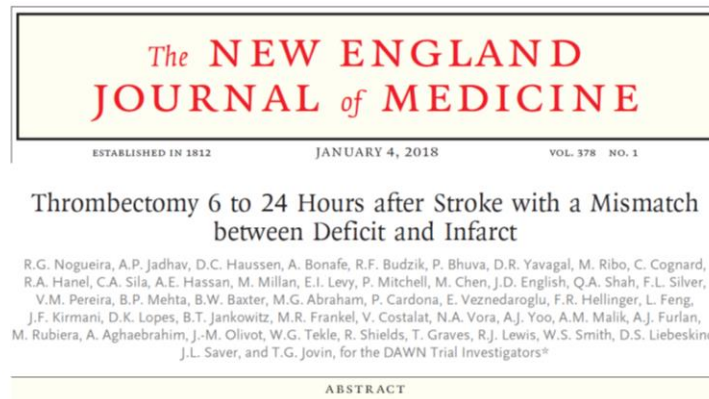


N Engl J Med 2015;372:1019-30

Time window expansion



Mechanical thrombectomy up to 24 hours from onset. Careful selection with CTP



The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

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

G.W. Albers, M.P. Marks, S. Kemp, S. Christensen, J.P. Tsai, S. Ortega-Gutierrez, R.A. McTaggart, M.T. Torbey, M. Kim-Tenser, T. Leslie-Mazwi, A. Sarraj, S.E. Kasner, S.A. Ansari, S.D. Yeatts, S. Hamilton, M. Mlynash, J.J. Heit, G. Zaharchuk, S. Kim, J. Carrozzella, Y.Y. Palesch, A.M. Demchuk, R. Bammer, P.W. Lavori, J.P. Broderick, and M.G. Lansberg, for the DEFUSE 3 Investigators*



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Multimodal Neuroimaging:

“Proximal occlusion + small core ”

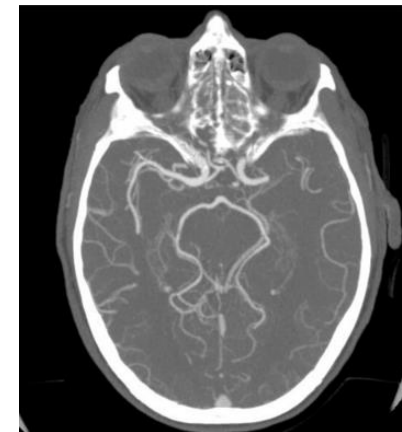
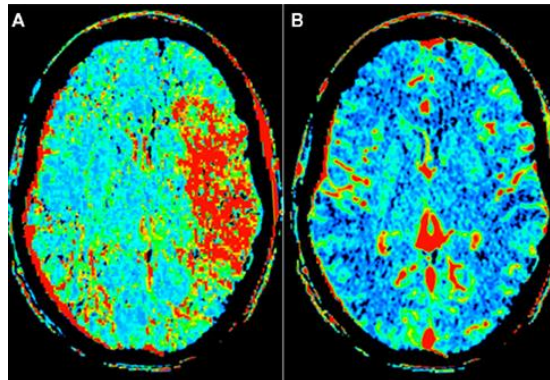
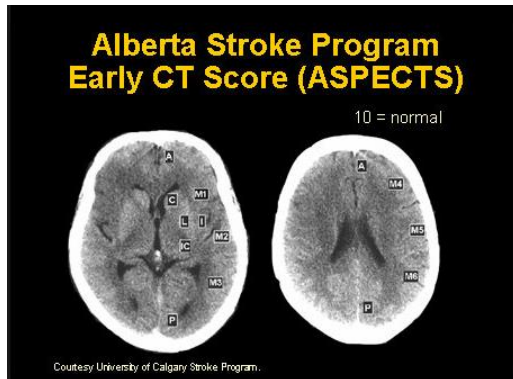
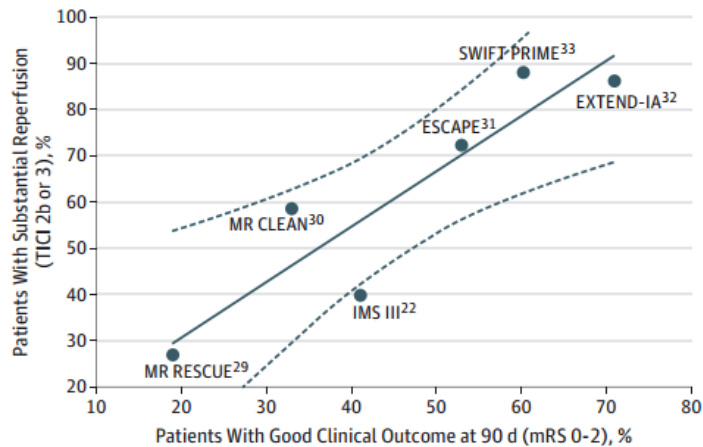


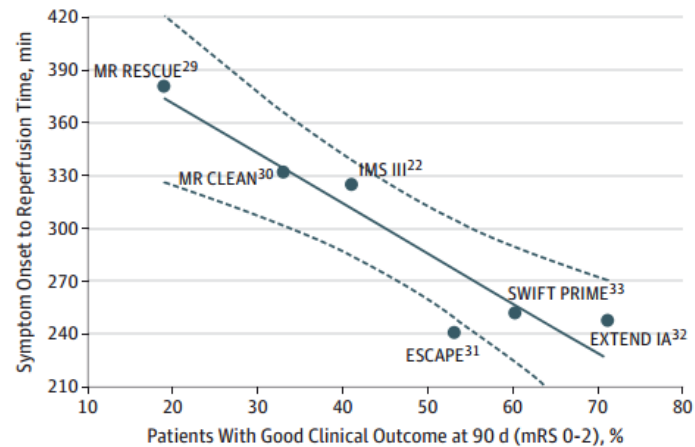


Figure 3. Rate of Reperfusion and Time to Reperfusion Compared With Percentage of Good Outcomes in the 6 Trials Comparing Endovascular Treatment to Medical Treatment Alone

A Substantial reperfusion rates



B Time to reperfusion



mRS indicates modified Rankin Scale; TICI, thrombolysis in cerebral infarction. The dotted lines indicate 95% CIs.

“Recanalize fast!!”

JAMA. 2015;313(14):1451-1462

Clinical case

79 year old from Taree (March 2019).

PMH: HTN, DM, DI, IHD.

Social: IADL, mRS 0.

On ASA.

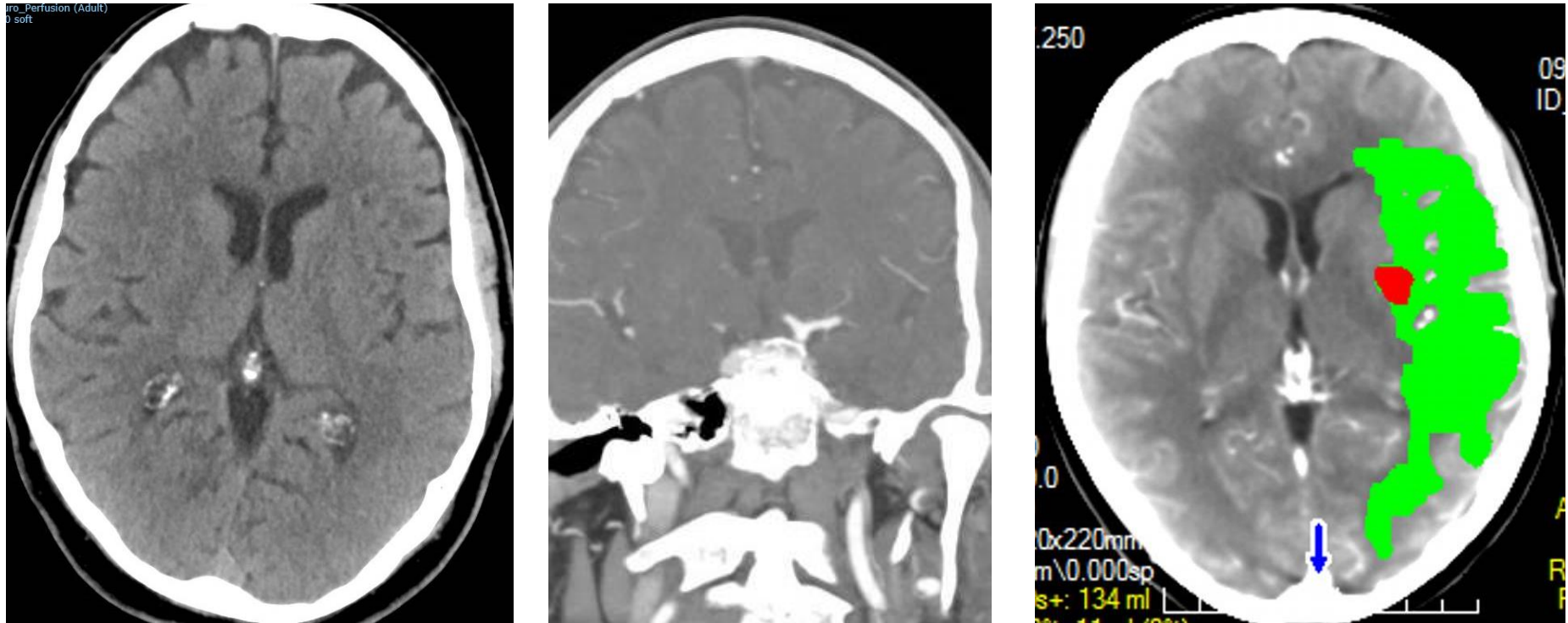
Wake up onset global aphasia, Rt
Sided weakness, sensory and visual
loss. NIHSS 19.

Key metrics:

- Last seen well 22:30 h.
- Symptoms found 08:00 h.
- ED admission 08:53 h.
- Telestroke neurologist contacted 08:56 h.
- Imaging started 09:10 h.



Clinical case



Not candidate for iv thrombolysis (rt-PA) as wake up stroke (>4.5 h).
Transferred to JHH directly to Angio-suite 13:15 h.

Clinical case

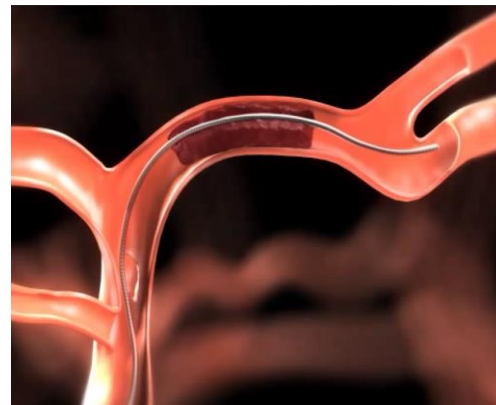
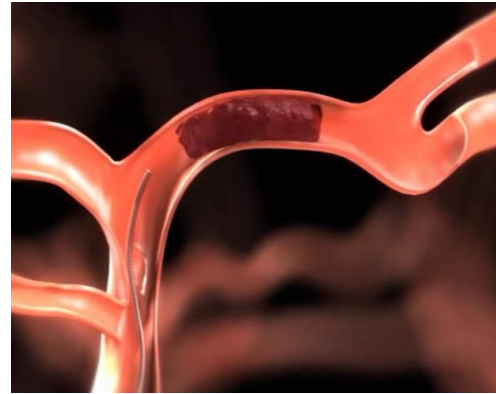


Groin puncture time 13:30h

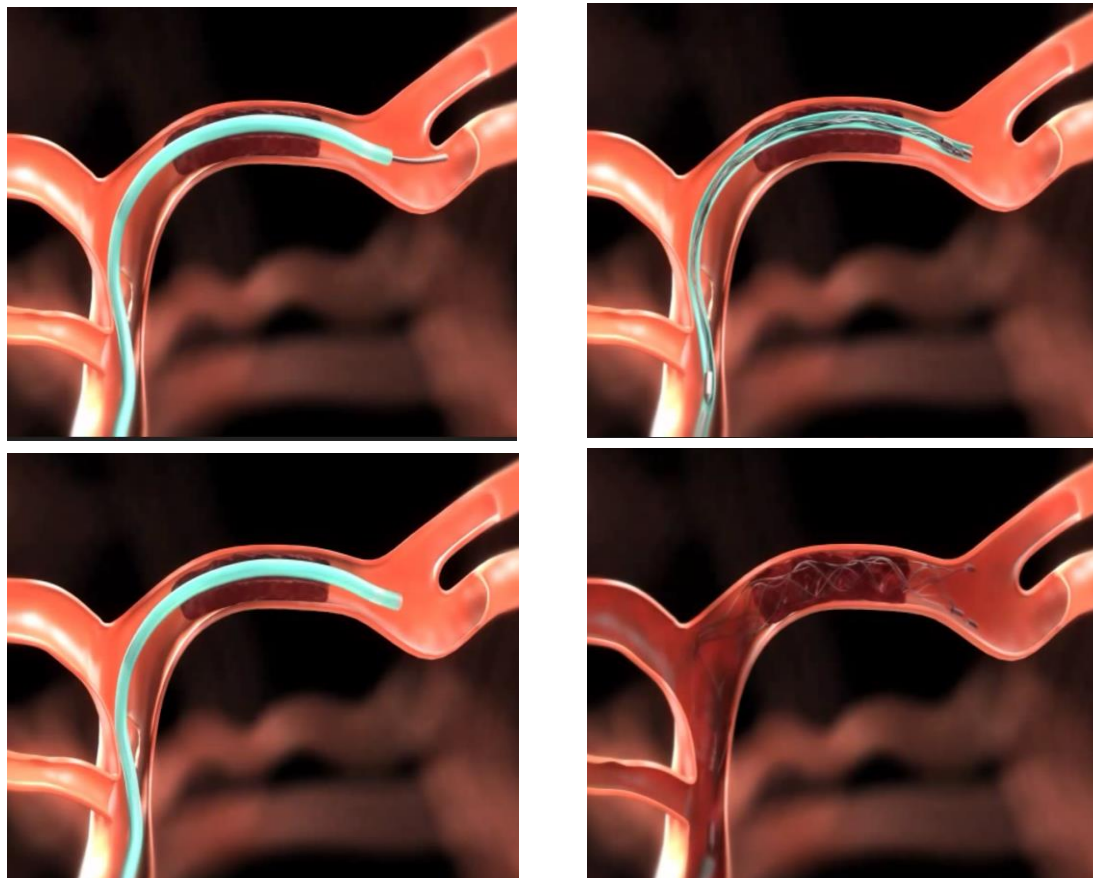
Distal left M1 occlusion.

Technique: Balloon guiding catheter + Stent-retriever.

Clinical case



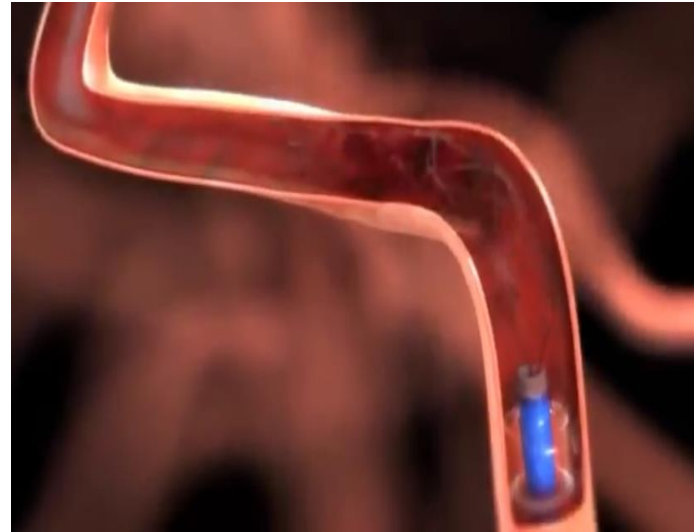
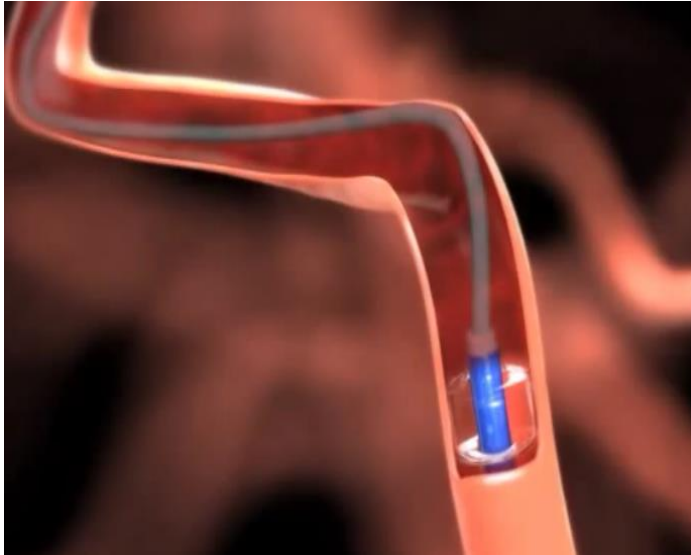
Clinical case



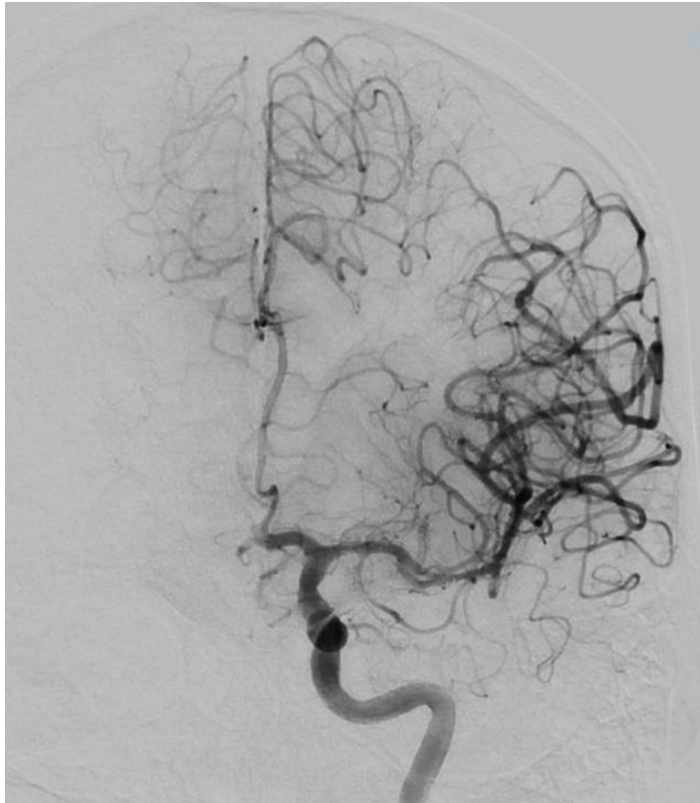
Clinical case



Clinical case



Clinical case

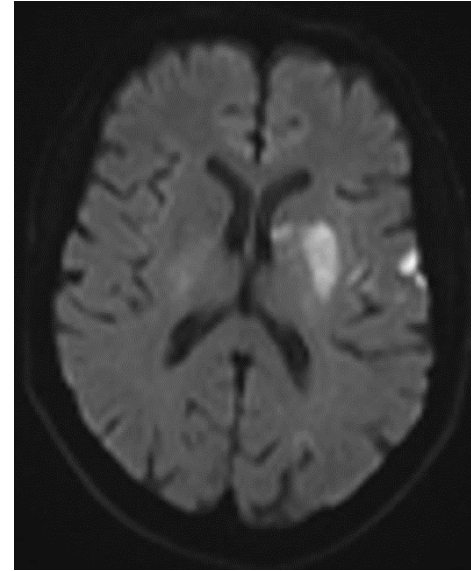


**Complete
recanalization**



**Clot retrieved at 13:48
18 mins procedural time**

Clinical case



- Excellent clinical recovery at 24 hours: mild facial weakness + difficulty finding words.
- Small left MCA territory infarcts.
- Transferred to MBH on D4.



- **Endovascular treatment of ischemic stroke is safe and highly effective.**
- **ECR has been successfully implemented in John Hunter Hospital.**
- **Awareness for early detection of candidates is crucial in ED.**
- **Reducing workflow times increases chances of good outcomes.**

