What's Next for Acute Ischemic Stroke

Adnan H. Siddiqui, MD PhD
Chief Executive Officer & Chief Medical Officer,
Jacobs Institute
UB Distinguished Professor &
Vice Chair, Department of Neurosurgery
Director, Canon Stroke & Vascular Research Center
SUNY University at Buffalo
Director, Neurosurgical Stroke Service
Kaleida Health
JACOBSINSTITUTE.ORG

UBNS Neurosurgery UNIVERSITY AT BUFFALO
CANON STROKE & VASCULAR RESEARCH CENTER UNIVERSITY AT BUFFALO
Gates Vascular Institute
Buffalo General Medical Center
A Kaleida Health Facility
University at Buffalo
The State University of New York
JACOBS INSTITUTE

Disclosures

Current Research Grants; Co-investigator for NIH - 1R01EB030092-01, Project Title: High Speed Angiography at 1000 frames per second; Mentor for Brain Aneurysm Foundation Carol W. Harvey Chair of Research, Sharon Epperson Chair of Research, Project Title: A Whole Blood RNA Diagnostic for Unruptured Brain Aneurysm: Risk Assessment Prototype Development and Testing

Financial Interest/Investor/Stock Options/Ownership: Adona Medical, Inc., Bend IT Technologies, Ltd., BlinkTBI, Inc, Cerebrotech Medical Systems, Inc., Cognition Medical, CVAID Ltd., E8, Inc., Endostream Medical, Ltd, Galaxy Therapeutics, Inc., Imperative Care, Inc., InspireMD, Ltd., InspireMD, Ltd., Instylla, Inc., IRRAS AB, Launch NY, Inc., NeuroRadial Technologies, Inc., NeuroTechnology Investors, Neurovascular Diagnostics, Inc., Pelija Medical, PerFlow Medical, Ltd., Q'Apel Medical, Inc., QAS.ai, Inc., Radical Catheter Technologies, Inc., Rebound Therapeutics Corp. (Purchased 2019 by Integra Lifesciences, Corp), Rist Neurovascular, Inc. (Purchased 2020 by Medtronic), Sense Diagnostics, Inc., Serenity Medical, Inc., Silk Road Medical, Sim & Cure, Songbird Therapy, Spinnaker Medical, Inc., StimMed, LLC, Synchron, Inc., Three Rivers Medical, Inc., Truvic Medical, Inc., Tulavi Therapeutics, Inc., Vastrax, LLC, Viseon, Inc.

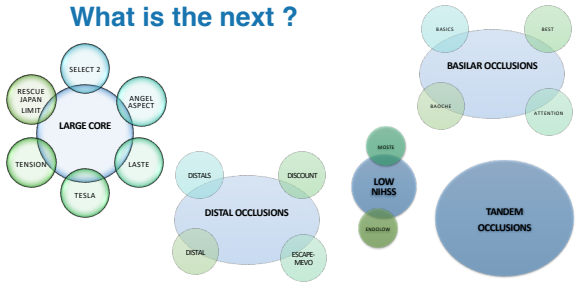
Consultant/Advisory Board: Apellis Pharmaceuticals, Inc., Boston Scientific, Canon Medical Systems USA, Inc., Cardinal Health 200, LLC, Cerebrotech Medical Systems, Inc., Cerenovus, Cordis, Corindus, Inc., Endostream Medical, Ltd, Imperative Care, InspireMD, Ltd., Integra, IRRAS AB, Medtronic, MicroVention, Minnetronix Neuro, Inc., Pelija Medical, Penumbra, Q'Apel Medical, Inc., Rapid Medical, Serenity Medical, Inc., Silk Road Medical, StimMed, LLC, Stryker Neurovascular, Three Rivers Medical, Inc., VasSol, Viz.ai, Inc.

National PI/Steering Committees; Cerenovus EXCELLENT and ARISE II Trial; Medtronic SWIFT PRIME, VANTAGE, EMBOLISE and SWIFT DIRECT Trials; MicroVention FRED Trial & CONFIDENCE Study; MUSC POSITIVE Trial; Penumbra 3D Separator Trial, COMPASS Trial, INVEST Trial, MIVI neuroscience EVAQ Trial; Rapid Medical SUCCESS Trial; InspireMD C-GUARDIANS IDE Pivotal Trial

What is not in the Guidelines ?

- Age < 18 years
- Mild Strokes: NIHSS 0-5
- Large Strokes: ASPECTS 0-6
- Time > 24 hours
- Posterior Circulation
- Distal & Medium Vessel Occlusions
- Tandem Occlusions
- Adjunctive thrombolytics

What is the next ?



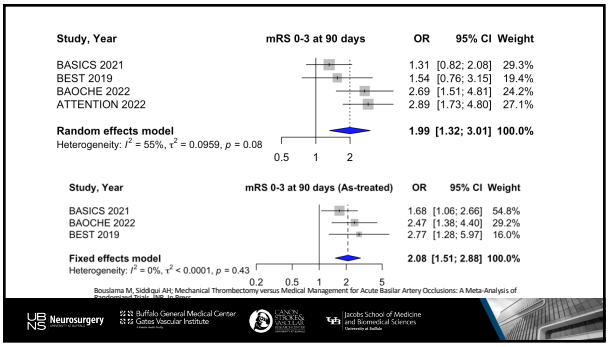
Basilar Artery Occlusion Strokes

2019
Endovascular treatment versus standard medical treatment for vertebrobasilar artery occlusion (BEST): an open-label, randomised controlled trial

2021 ORIGINAL ARTICLE
Endovascular Therapy for Stroke Due to Basilar-Artery Occlusion

2022 ORIGINAL ARTICLE
Trial of Thrombectomy 6 to 24 Hours after Stroke Due to Basilar-Artery Occlusion

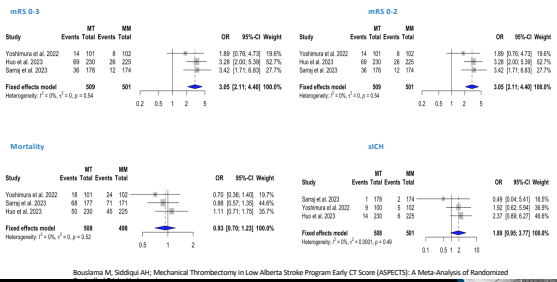
2022 ORIGINAL ARTICLE
Trial of Endovascular Treatment of Acute Basilar-Artery Occlusion



Large Core Strokes (ASPECTS <6)

Low ASPECTS / Large Core Thrombectomy Trials

Trial	ClinicalTrials.gov Identifier	Imaging Criteria
RESCUE-JAPAN LIMIT	NCT03702413	NCCT or DWI ASPECTS 3-5
TESLA	NCT03805308	NCCT ASPECTS 2-5
TENSION	NCT03094715	NCCT or DWI ASPECTS 3-5
ANGEL-ASPECT	NCT04551664	NCCT ASPECTS: 3-5 or CTP [rCBF<30%] MRI (ADC<620) 70-100cc or both
IN EXTREMIS Large Stroke Therapy Evaluation (LASTE)	NCT03811769	NCCT or DWI ASPECTS 0-5 and in patients >80 years NCCT or DWI ASPECTS 4-5
SELECT-2	NCT03876457	NCCT (ASPECTS: 3-5) or advanced perfusion imaging ([rCBF<30%] on CTP or [ADC<620] on MRI: ≥50cc) or both



Considerations in Large Core Thrombectomy

Table 1 Agreement between Alberta Stroke Program Early CT Score (ASPECTS) and CT perfusion core volume categories

n=1248	Ischemic core ≤70 cc (n=1203)	Ischemic core >70cc (n=45)
ASPECTS 6–10 (n=1123)	1094 (97.4%, 90.9%)	29 (2.6%, 64.4%)
ASPECTS 0–5 (n=125)	109 (87.2%, 9.1%)	16 (12.8%, 35.6%)

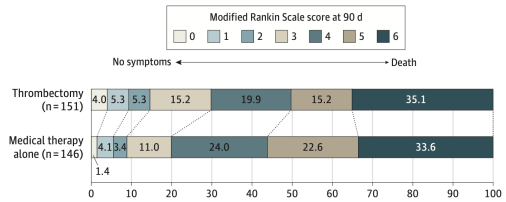
McNemar Test for discordant pairs p<0.0001.

Table 3 Outcome measures

	ASPECTS 0–5 (n=125)		
	Core≤70 cc (n=108)	Core>70 cc (n=16)	P value
mTICI 2b/3	104 (95.4)	15 (93.8)	0.57
mTICI 3	47 (43.1)	7 (43.8)	0.96
Any PH	14 (12.8)	5 (31.3)	0.07
Hemicraniectomy	4 (3.7)	6 (37.5)	<0.001
FIV (mL)	86.3 (43.9–147)	164.2 (127–238.2)	0.004
90-day mRS score 0–2	42 (38.9)	3 (18.8)	0.12
90-Day mortality	19 (17.6)	4 (25.0)	0.5

Bouslama M, Siddiqui AH; Endovascular perfusion outcomes in low Alberta stroke program early CT score patients dependent on baseline infarct volumes. JNIS 2021

TESLA 90-Day mRS



Favorable mRS Shift mRS 0-3

Mild Strokes (NIHSS <6)

CLINICAL SCIENCES

Mechanical Thrombectomy in Patients With Milder Strokes and Large Vessel Occlusions

A Multicenter Matched Analysis

Simon Nagel, MD, Mehdi Bouslama, MD, Lars U. Krause, MD, Clemens Küpper, MD, Mirko Messer, MD, Martina Petersen, MD, Stephan Lowens, MD, Moritz Herzberg, MD, Peter A. Ringleb, MD, Markus A. Möhlenbruch, MD, Steffen Tiedt, MD, Fabricio O. Lima, MD, Diogo C. Haussen, MD, Wade S. Smith, MD, Michael H. Lev, MD, and Raul G. Nogueira, MD

Patient Characteristics	IMT (n=77)	BMM-MT (n=77)	P Value
Age, y* (median [IQR])	68.5 [58–75]	69.5 [63–77]	0.68†
Baseline NIHSS* (median [IQR])	3.5 [3–5]	4 [4–5]	0.74†
Gender (male), n (%)	42 (54.5)	45 (58.4)	0.63‡
Hypertension, n (%)	54 (70.1)	55 (71.4)	0.86‡
Dyslipidemia, n (%)	28 (36.4)	30 (39.0)	0.74‡
Diabetes mellitus, n (%)	12 (15.6)	13 (16.9)	0.83‡
Atrial fibrillation, n (%)	35 (45.5)	22 (28.6)	0.03‡§
Smoking, n (%)	14 (18.2)	23 (20.8)	0.69‡
Baseline mRS			0.77†
0	65 (84.4)	58 (84.1)	
1	7 (9.1)	9 (13)	
2	5 (6.5)	2 (2.9)	
Occlusion site*			1.00‡
ICA-T	7 (9.1)	7 (9.1)	
Tandem	9 (11.7)	9 (11.7)	
M1	32 (41.6)	32 (41.6)	
M2	23 (29.9)	23 (29.9)	
Basilar	6 (7.8)	6 (7.8)	
ASPECTS, median[IQR]	10 [9–10]	9 [8.5–10]	0.002†§
MAP, mm Hg median [IQR]	115[108–128]	118[104–146]	0.35†
IV t-PA, n (%)	36 (46.8)	42 (54.5)	0.33‡
sICH, n (%)	4 (5.2)	2 (2.6)	0.41ǁ
Excellent outcome (mRS, 0–1), n (%)	47 (61.0)	41 (53.2)	0.33‡
Good outcome (mRS, 0–2), n (%)	65 (84.4)	54 (70.1)	0.03‡§
Mortality, n (%)	3 (3.9)	4 (5.2)	0.73‡

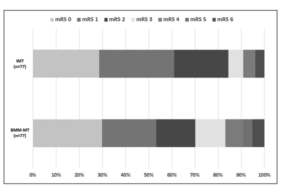
UBNS Neurosurgery University at Buffalo | Buffalo General Medical Center Gates Vascular Institute | Canon Stroke & Vascular Research Center | Jacobs School of Medicine and Biomedical Sciences University at Buffalo

CLINICAL SCIENCES

Mechanical Thrombectomy in Patients With Milder Strokes and Large Vessel Occlusions

A Multicenter Matched Analysis

Simon Nagel, MD, Mehdi Bouslama, MD, Lars U. Krause, MD, Clemens Küpper, MD, Mirko Messer, MD, Martina Petersen, MD, Stephan Lowens, MD, Moritz Herzberg, MD, Peter A. Ringleb, MD, Markus A. Möhlenbruch, MD, Steffen Tiedt, MD, Fabricio O. Lima, MD, Diogo C. Haussen, MD, Wade S. Smith, MD, Michael H. Lev, MD, and Raul G. Nogueira, MD



	IMT (n=77)	BMM-MT (n=77)	P Value	OR	95% CI
90-d mRS (A)*			0.32	1.34	0.76–2.35
0	22 (28.6)	23 (29.9)			
1	25 (32.5)	18 (23.4)			
2	18 (23.4)	13 (16.9)			
3	5 (6.5)	10 (13.0)			
4	4 (5.2)	6 (7.8)			
5	0 (0)	3 (3.9)			
6	3 (3.9)	4 (5.2)			
90-d mRS (B)*			0.03†	2.29	1.05–4.98
0, 1, and 2	65 (84.4)	54 (70.1)			
3	5 (6.5)	10 (13.0)			
4	4 (5.2)	6 (7.8)			
5 and 6	3 (3.9)	7 (9.1)			

UBNS Neurosurgery University at Buffalo | Buffalo General Medical Center Gates Vascular Institute | Canon Stroke & Vascular Research Center | Jacobs School of Medicine and Biomedical Sciences University at Buffalo

JAMA Neurology | Original Investigation

Medical Management vs Mechanical Thrombectomy for Mild Strokes
An International Multicenter Study and Systematic Review and Meta-analysis

Nitin Goyal, MD; Georgios Tsivgoulis, MD; Konark Malhotra, MD; Muhammad F. Ishfaq, MD; Abhi Pandhi, MD; Michael T. Frohler, MD; Alejandro M. Spiotta, MD; Mohammad Anadani, MD; Marios Psychogios, MD; Volker Maus, MD; Adnan Siddiqui, MD; Muhammad Waqas, MD; Peter D. Schellinger, MD; Marcel Groen, MD; Christos Krogias, MD; Daniel Richter, MD; Maher Saqqur, MD; Pablo Garcia-Bermejo, MD; Maxim Mokin, MD; Ronen Leker, MD; Jose E. Cohen, MD; Aristeidis H. Katsanos, MD; Georgios Magoufis, MD; Klearchos Psychogios, MD; Vasileios Lioutas, MD; Meg VanNostrand, MD; Vijay K. Sharma, MD; Maurizio Paciaroni, MD; Alexandros Rentzos, MD; Hazem Shoirah, MD; J. Mocco, MD; Christopher Nickele, MD; Violiza Inoa, MD; Daniel Hoit, MD, MPH; Lucas Elijovich, MD; Andrei V. Alexandrov, MD; Adam S. Arthur, MD, MPH

Outcome	Median (IQR) Mechanical Thrombectomy (n = 138)	Median (IQR) Best Medical Management (n = 113)	P Value
Length of stay, d			
Hospital	5 (4-9)	4 (3-7)	.002
ICU	2 (1-4)	3 (1-4)	.38
Successful reperfusion, No./total No. (%)	117/138 (84.5)	NA	NA
ICH, No./total No. (%)			
Asymptomatic	31/137 (22.3)	4/109 (3.2)	.002
Symptomatic	6/137 (4.4)	1/107 (0.9)	.11
Discharge NIHSS	2 (0-4)	1 (0-2)	.02
Neurological improvement during hospitalization[a]	2 (1-3)	1 (0-3)	.69
Discharge mRS	1 (1-3)	1 (0-2)	.002
3-mo Follow-up			
mRS	1 (0-2)	1 (0-2)	.09
FFO, No./total No. (%)	84/133 (63.1)	62/88 (70.4)	.26
FI, No./total No. (%)	102/133 (76.7)	75/88 (85.2)	.12
Mortality, No./total No. (%)	13/133 (9.7)	5/88 (5.7)	.28
With LOCF			
mRS	1 (0-2)	1 (0-2)	.06
FFO, No./total No. (%)	88/138 (63.7)	81/113 (71.6)	.17
FI, No./total No. (%)	106/138 (76.8)	100/113 (88.4)	.02
Mortality, No./total No. (%)	13/138 (9.4)	4/113 (3.5)	.12

Outcome	Type of Analysis	Unadjusted Analyses OR (95% CI)	Unadjusted Analyses P Value	Adjusted Analyses[a,b] aOR (95% CI)	Adjusted Analyses[a,b] P Value
3-mo FFO	Without LOCF	0.72 (0.40-1.28)	.26	0.60 (0.22-1.64)	.32
	With LOCF	0.69 (0.40-1.18)	.17	0.72 (0.31-1.72)	.47
3-mo FI	Without LOCF	0.57 (0.28-1.16)	.12	0.73 (0.19-2.75)	.64
	With LOCF	0.44 (0.22-0.90)	.02	0.47 (0.14-1.64)	.24
3-mo Mortality	Without LOCF	1.62 (0.20-12.93)	.65	1.79 (0.62-5.23)	.28
	With LOCF	2.26 (0.78-6.56)	.13	1.73 (0.21-13.87)	.61
Functional improvement	Without LOCF	0.68 (0.42-1.12)	.13	0.72 (0.32-1.64)	.43
	With LOCF	0.79 (0.50-1.25)	.31	0.81 (0.39-1.67)	.56
Symptomatic ICH	NA	4.85 (0.57-40.95)	.15	2.09 (0.16-27.85)	.58
Asymptomatic ICH	NA	4.42 (1.62-12.00)	.004	11.07 (1.31-93.53)	.03

Meta-analysis

Source	Study Type	No. of Patients	MT, No./Total No. (%)	Age, Mean (SD)	Male, No./Total No. (%)	Occlusion Site (%)	IVT, No./Total No. (%)	Rescue MT, No./Total No. (%)	Confounder Adjustment
Goyal et al,[19] 2019	Multicenter	251	138/251 (55.0)	65 (15)	133/251 (52.9)	ICA: 17.8; M1-MCA: 48.0; M2-MCA: 31.7	121/249 (48.6)	NA	Multivariable regression
Nagel et al,[25] 2018	Multicenter	300	81/300 (27)	68 (14)	162/300 (54)	ICA: 9; tandem: 12; M1-MCA: 27.1; M2-MCA: 43.8; ACA: 3; BA: 21	152/300 (50.7)	34/300 (11.3)	PSM
Sarraj et al,[16] 2018	Multicenter	214	124/214 (57.9)	65 (16)	124/214 (57.9)	ICA: 15.4; MCA-M1: 41.6; MCA-M2: 36; MCA-M3/M4 & ACA: 6.9	69/214 (32.2)	NA	Multivariable regression
Urra et al,[14] 2014	Multicenter	78	34/78 (43.6)	67.9	39/78 (50.0)	ICA: 1.3; MCA-M1: 33.3; MCA-M2: 29.5; tandem: 5.1; posterior: 30.8	45/78 (57.7)	16/78 (20.5)	NA

Outcome	Type of Analysis	Unadjusted No. of Studies	Unadjusted OR (95% CI)	Unadjusted P Value	Unadjusted Heterogeneity I^2, %	Unadjusted Heterogeneity P Value for Cochran Q	Adjusted No. of Studies	Adjusted OR (95% CI)	Adjusted P Value	Adjusted Heterogeneity I^2, %	Adjusted Heterogeneity P Value for Cochran Q
3-mo FFO	Without LOCF	4	0.96 (0.71-1.30)	.78	0	.48	3	1.13 (0.78-1.65)	.51	0	.51
	With LOCF	4	0.93 (0.69-1.26)	.65	0	.40	3	1.09 (0.76-1.57)	.65	0	.39
3-mo FI	Without LOCF	4	0.94 (0.48-1.86)	.86	71	.02	3	1.11 (0.55-2.27)	.77	62	.07
	With LOCF	4	0.88 (0.41-1.87)	.74	76	.005	3	0.96 (0.38-2.46)	.94	77	.01
3-mo Mortality	Without LOCF	4	1.71 (0.52-5.61)	.38	62	.05	2	1.28 (0.51-3.23)	.60	0	.38
	With LOCF	4	1.85 (0.54-6.28)	.32	64	.04	2	1.45 (0.52-4.07)	.48	20	.26
sICH	NA	4	5.52 (1.91-15.94)	.002	0	.83	2	2.89 (0.75-11.20)	.12	0	.53
Asymptomatic ICH	NA	2	1.85 (0.34-10.13)	.48	84	.01	1	NA	NA	NA	NA

CONCLUSIONS AND RELEVANCE Our multicenter study coupled with the meta-analysis suggests similar outcomes of MT and bMM in patients with stroke with mELVO, but no conclusions about treatment effect can be made. The clinical equipoise can further be resolved by a randomized clinical trial.

UBNS Neurosurgery University at Buffalo | Buffalo Gates V

Ongoing Trials

IN EXTREMIS

MOSTE][LASTE

Minor Stroke Therapy Evaluation (MOSTE)

ENDOLOW

Endovascular Therapy for Low NIHSS Ischemic Strokes (ENDOLOW)

UBNS Neurosurgery University at Buffalo | Buffalo General Medical Center Gates Vascular Institute | Canon Stroke & Vascular Research Center | Jacobs School of Medicine and Biomedical Sciences University at Buffalo

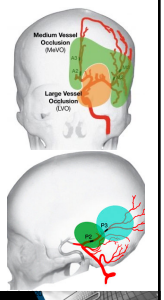
Distal & Medium Vessel Occlusion (DMVO) Strokes

UBNS Neurosurgery University at Buffalo | Buffalo General Medical Center Gates Vascular Institute | Canon Stroke & Vascular Research Center | Jacobs School of Medicine and Biomedical Sciences University at Buffalo

Distal & Medium Vessel Occlusion (DMVO) Strokes Prevalence

- Proximal LVOs account for 35%-40% of strokes
- Small vessel occlusions (deep and long pial penetrators) 20%-25%
- Hemodynamic watershed ischemia 2%-5%
- Unusual and disseminated conditions (RCVS, hyperviscocity, moyamoya, etc) 1% -5%

25%- 40% are DMVOs = DMVOs ARE COMMON



Distal & Medium Vessel Occlusion (DMVO) Strokes

DMVOs distinguish themselves from proximal LVOs by 2 key features:

- **Vessel Distance and Tortuosity**
- **Vessel Size** (lumen diameters between 0.75 and 2.0 mm)
  For reference ICA (3.8 mm), MCA-M1 (2.7 mm), BA (3.2 mm), and VA (2.8 mm) while LS (0.5 mm)
  MCA-M2 from 1.1 to 2.1 mm
  MCA-M3: 1.1–1.5 mm

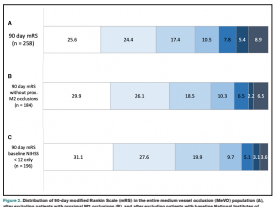
Distal & Medium Vessel Occlusion (DMVO) Strokes

TWO TYPES

- Primary (de novo)
- Secondary (Clot migration of fragmentation occurring spontaneously or after IV thrombolysis of mechanical thrombectomy)
  - Embolism to a new territory (ENT) affecting fields not previously compromised by ischemia 2/2 fragmentation and loss of control of thrombus during pullback.
  - Embolism to a distal territory (EDTs) within the initial ischemic field 2/2 fragmentation and loss of control of thrombus during the initial engagement with the retrieval device.

CLINICAL AND POPULATION SCIENCES

Clinical Course of Acute Ischemic Stroke Due to Medium Vessel Occlusion With and Without Intravenous Alteplase Treatment

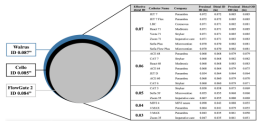


50% of patients do not achieve recanalization with intravenous alteplase alone

Expanding The Thrombectomy Armamentarium

Walrus large bore guide catheter impact on recanalization first pass effect and outcomes: the WICKED study

Impact of Balloon Guide Catheter Use on Clinical and Angiographic Outcomes in the STRATIS Stroke Thrombectomy Registry



- Modern BGCs are more versatile and flexible than older ones
- BGC use expands the armamentarium for each thrombectomy case

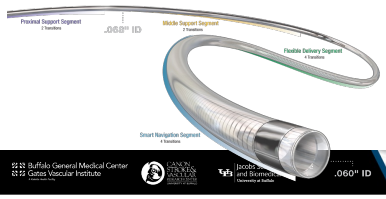
Use of balloon-guide catheters during thrombectomy is an independent predictor of first pass effect and functional independence at 90-days

BGC clinical data shows powerful benefits.

Shorter Procedure Times	Better Predictor of Good Clinical Outcome	Superior Recanalization Results	Higher Rate of First-Pass Success
Procedure time was 50% shorter in the BGC group than in the non-BGC group. Median 20.5 min vs 41.0 min, respectively.	After adjustment for potentially associated factors (N=429; 90d mRS 0-2), BGC utilization remained independently associated with recanalization and good functional outcome.	The successful recanalization rate (TICI 2b-3) was *significantly higher* in the BGC group compared with the non-BGC group (86.8% versus 74.7%) respectively; n=955.	The overall rate of *first-pass recanalization* was 63.1% (497/788) for the BGC group compared with 45.2% (280/619) for the non-BGC group.
(p<0.0001) Velasco, 2016	(p<0.0001) Kang, 2019	(p<0.001) Baek, 2019	(p<0.01) Brinjikji, 2018
20.5 mins BGC Group n=102	60.3% BGC Group n=117	86.8% BGC Group n=516	63.1% BGC Group n=1083
41.0 mins Non-BGC Group n=81	45.1% Non-BGC Group n=106	74.7% Non-BGC Group n=439	45.2% Non-BGC Group N=939

WHEN IT COMES TO ASPIRATION

SIZE MATTERS

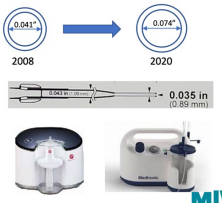


The Evolution of Aspiration Technology

- Larger diameter systems (catheters and aspiration tubing)
- Tapered catheters (ie: 3MAX, ARC) with larger proximal diameter to increase average radius of system
- More powerful pumps

MIVI Goal: Maximize system radius (r) and length (L) while maintaining vessel access and safety

$$Q = \frac{\pi r^4 \Delta P}{8\eta L}$$



Novel Aspiration Tubing

Penumbra **THUNDERBOLT™**

- Modulated aspiration - switches between ambient pressure (iv bag) and engine pump vacuum. (-29.2 inches of mercury) 12 times per second.
- Keeps a constant column of fluid at the aspiration tip, reducing friction, increasing how much of the clot is engulfed/aspirated

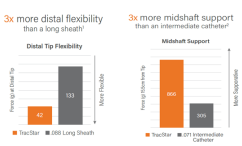
SET-UP

1. Attach Suction Connector to canister
2. Plug in adapter to power port
3. Turn on Penumbra ENGINE'
4. Spike a non-pressurized saline bag
5. Press PRIME

Ongoing Trial-THUNDER: Acute Ischemic Stroke Study With the Penumbra System® Including Thunderbolt™ Aspiration Tubing,

New Category of Intracranial Access

The TracStar Large Distal Platform (LDP) is an .088 catheter that combines the stability of a long sheath with the flexibility of an intermediate catheter.

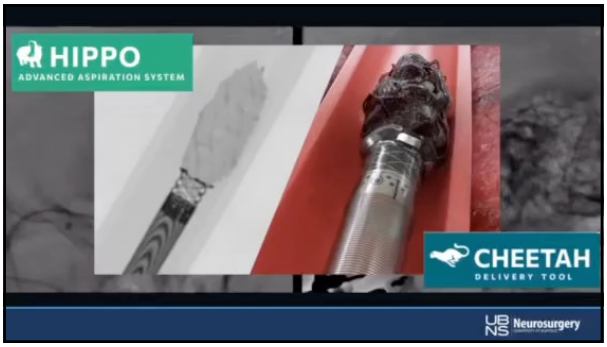


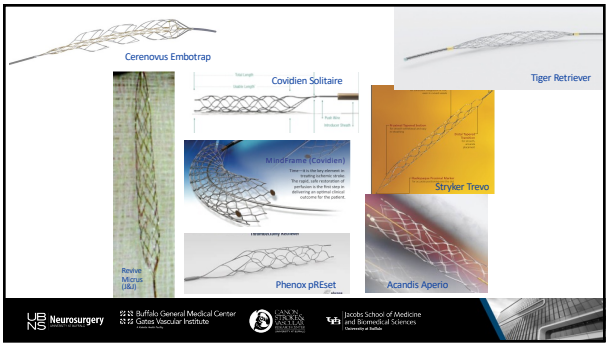
Large Distal Platform (LDP)

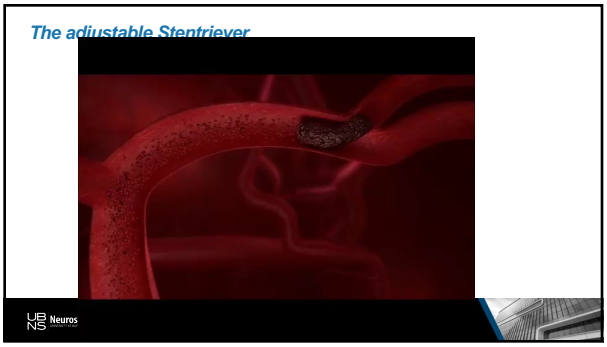
Zoom(ing) Through Aspiration Thrombectomy

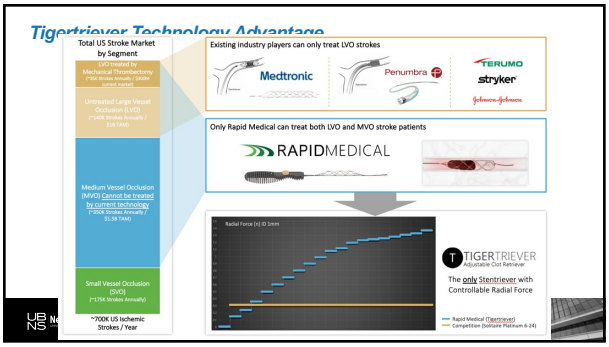
Adnan H. Siddiqui, MD., Ph.D
Steven B. Housley, MD., MS.
Justin M. Cappuzzo, MD
Muhammad Waqas, MBBS.

UB NS Neurosurgery UNIVERSITY AT BUFFALO









Distal & Medium Vessel Occlusion (DMVO) Strokes

Ongoing Trials

- EnDovascular therapy plus best medical treatment (BMT) versus BMT alone for MedIum VeSsel Occlusion sTroke - a prAgmatic, international, multicentre, randomized triaL (DISTAL)
  - MT/ mRS shift
- EndovaSCular TreAtment to imProve outcomEs for Medium Vessel Occlusions (ESCAPE-MeVO)
  - MT/ mRS shift
- Evaluation of Mechanical Thrombectomy in Acute Ischemic Stroke Related to a Distal Arterial Occlusion (DISCOUNT)
  - Stent retriever/ mRS 0-2
- Distal Ischemic Stroke Treatment With Adjustable Low-profile Stentriever (DISTALS)
  - Tiger retriever/Successful reperfusion (CTP or MR PWI) without sICH

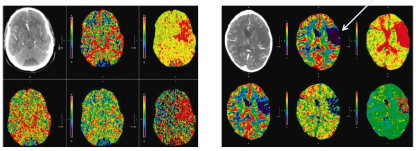
Heterogeneity of Stroke Pathophysiology

- The rate of neuronal loss is **NOT ABSOLUTE**.
- Two stroke phenotypes: "**fast progressors**" vs "**slow progressors**"
- Approximately **55% LVO strokes are slow progressors**
- A minority (approximately **25%) are fast progressors**.[24]
- However, the **infarct growth rate is dynamic, and a continuous** spectrum and **intermediate progressors** may also exist.
- Although reasons for and predictors of variable infarct growth rate are under investigation, it is well recognized that the robustness of collateral blood flow is a major factor, along with innate tissue resistance to ischemia.

Faster workflow and triage

CT perfusion-based patient selection

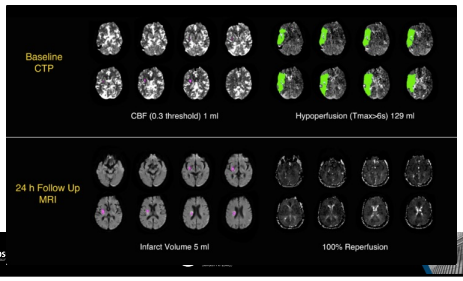
- Clinical examples – two patients with same duration of stroke symptoms



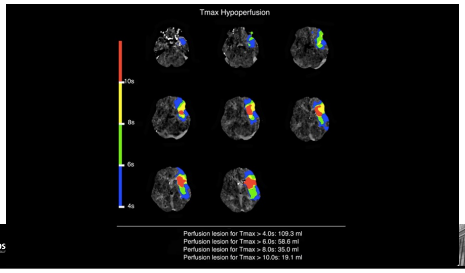
Patient 1: has "penumbra" and

Patient 2: has volume loss

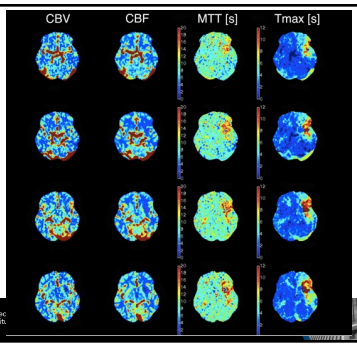
Automated Platforms > 90%



Automated Platforms Tmax hypoperfusion



Automated Platforms



OMCR

Oxford Medical Case Reports, 2019;00, 1–4
doi: 10.1093/omcr/omz042
Case Report

CASE REPORT

Reperfusion therapy of acute ischemic stroke in an all-in-one resuscitation room called a hybrid emergency room

Masahiro Kashiura[1,*], Shunsuke Amagasa[1], Hiroyuki Tamura[1], Hidenori Sanayama[2], Motoshige Yamashina[3,4], Masashi Ikota[3,4], Yoshio Sakiyama[2], Yoshikazu Yoshino[3,4] and Takashi Moriya[1]

[1]Department of Emergency and Critical Care Medicine, Saitama Medical Center, Jichi Medical University, Saitama, Japan, [2]Department of Neurology, Saitama Medical Center, Jichi Medical University, Saitama, Japan, [3]Department of Neurosurgery, Saitama Medical Center, Jichi Medical University, Saitama, Japan, [4]Department of Endovascular Surgery, Saitama Medical Center, Jichi Medical University, Saitama, Japan

*Correspondence address. Department of Emergency and Critical Care Medicine, Saitama Medical Center, Jichi Medical University, 1-847 Amanuma-cho, Omiya-ku, Saitama-shi, Saitama, 330-8503, Japan. Tel: +81-48-647-2111; Fax: +81-48-648-9070; E-mail: kashiura@me.com

Conclusions

- Thrombectomy is the gold standard for the treatment of of large vessel occlusion Strokes presenting up to 24 hours from symptom onset.
- Indications keep expending with several positive trials published in the last year (i.e large core strokes and basilar occlusions)
- Ongoing trials addressing different stroke populations will help determine who best benefits from treatment
- Selection for thrombectomy is key. Simplifying the paradigm (NCCT vs CTP) would increase the target population.