DIRECT TO ANGIO – DOES IT MAKE SENSE (AND CENTS) ?

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DISCLOSURES

Member steering committee/DSMB): Cerenovus-modest

Member screening committee: Contego Medical - modest

Principal Investigator DAWN, AURORA: Stryker Neurovascular

Consultant/Advisory Board: Ownership Interest: Galaxy– modest

Consultant/Advisory Board: Ownership Interest: Blockade Medical-modest

Consultant/Advisory Board: Ownership Interest: FreeOx Biomedical-modest

Consultant/Advisory Board: Ownership Interest: Route 92-modest

Consultant/Advisory Board: Ownership Interest: Viz.ai-modest

Consultant/Advisory Board: Ownership Interest: Kandu

Consultant/Advisory Board: Anaconda- modest

Grant support : Medtronic

Research

JAMA. 2019;322(3):252-263. doi:10.1001/jama.2019.8286

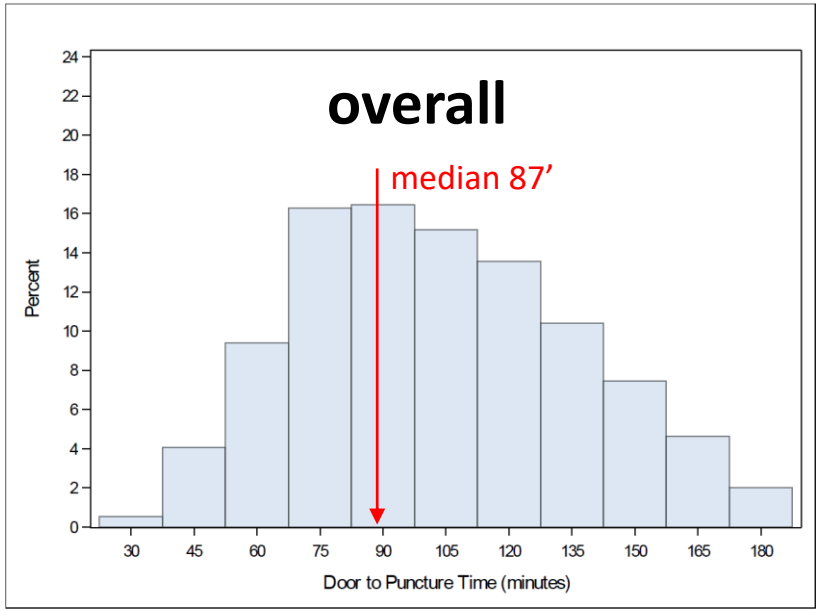
JAMA | Original Investigation

Association Between Time to Treatment With Endovascular Reperfusion Therapy and Outcomes in Patients With Acute Ischemic Stroke Treated in Clinical Practice

Reza Jahan, MD; Jeffrey L. Saver, MD; Lee H. Schwamm, MD; Gregg C. Fonarow, MD; Li Liang, PhD; Roland A. Matsouaka, PhD; Ying Xian, MD; DaJuanicia N. Holmes, MS; Eric D. Peterson, MD; Dileep Yavagal, MD; Eric E. Smith, MD, MPH

6756 patients

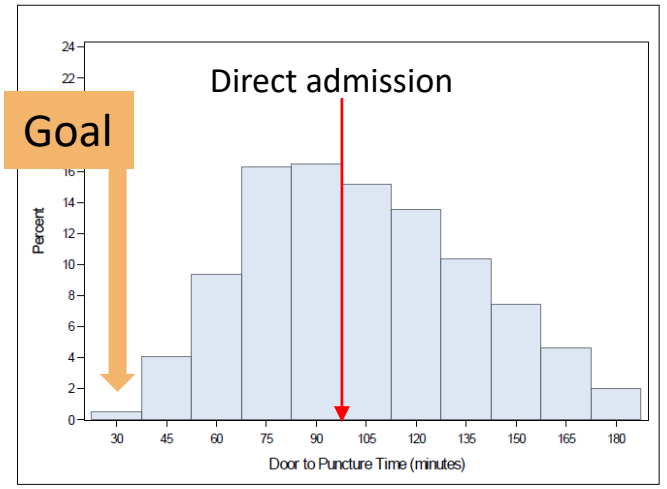
B



Median **onset-to-puncture time was 230 minutes** (IQR, 170-305)
Median **door-to-puncture time was 87 minutes** (IQR, 62-116)

In hospital workflow: 38% of total onset-to puncture

A



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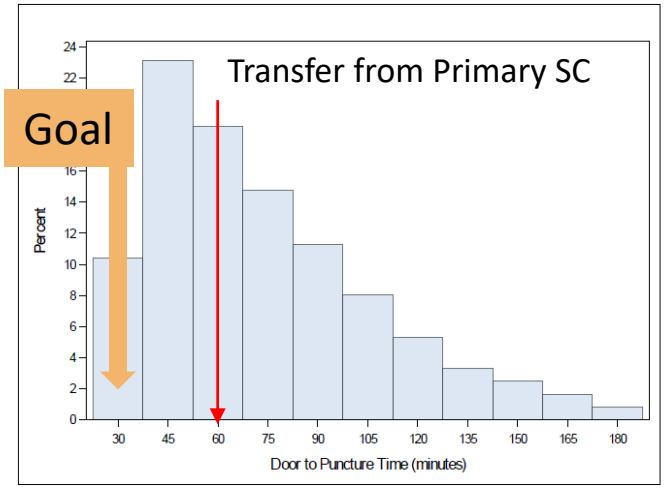


Stroke

CLINICAL AND POPULATION SCIENCES

Influence of the COVID-19 Pandemic on Treatment Times for Acute Ischemic Stroke

The Society of Vascular and Interventional Neurology Multicenter Collaboration

James E. Siegler, MD; Alicia M. Zha, MD; Alexandra L. Czap, MD; Santiago Ortega-Gutierrez, MD, MSc; Mudassir Farooqui, MD; David S. Liebeskind, MD; Shashvat M. Desai, MD; Ameer E. Hassan, DO; Amy K. Starosciak, PhD; Italo Linfante, MD; Vivek Rai, MD; Jesse M. Thon, MD; Ryna Then, MD; Mark E. Heslin, BS; Lauren Thau, BS; Priyank Khandelwal, MD; Mahmoud H. Mohammaden, MD, MSc; Diogo C. Haussen, MD; Raul G. Nogueira, MD; Dinesh V. Jillella, MD; Fadi Nahab, MD; Artem Kaliaev, MD; Thanh N. Nguyen, MD; Osama Zaidat, MD; Tudor G. Jovin, MD; Ashutosh P. Jadhav, MD, PhD

	All patients (n=2955)	Pre–COVID-19 March to July 2019 (n=1491)	COVID-19 March to July 2020 (n=1464)	*P* value
Door-to-needle ≤60 min, n (%)	295/386 (77%)	164/203 (81%)	131/183 (72%)	0.03
Door-to-needle, min; median (IQR)	42 (27–59)	42 (27–55)	46 (31–64)	0.03
Door-to-CT time, min; median (IQR)	30 (13–90)	37 (15–101)	29 (14–77)	<0.01
CT-to-needle time, min; median (IQR)	23 (13–36)	22 (13–37)	29 (18–41)	0.02
Door-to-skin puncture,* min; median (IQR)	97 (77–134)	100 (80–151)	102 (87–127)	0.82
CT-to-skin puncture,* min; median (IQR)	87 (65–121)	90 (73–129)	83 (63–133)	0.30
Length of hospital stay, d; median (IQR)	4 (3–8)	4 (2–7)	4 (2–8)	0.46
Discharge disposition, n (%)				<0.01
Home/against medical advice	1707/2920 (58%)	872/1491 (58%)	835/1429 (58%)	
Acute rehabilitation facility	310/2920 (11%)	213/1491 (14%)	97/1429 (7%)	
Skilled nursing facility	185/2920 (6%)	150/1491 (10%)	35/1429 (2%)	
Long-term acute-care facility	11/2920 (<1%)	5/1491 (<1%)	6/1429 (<1%)	
Other/unspecified health care facility	401/2920 (14%)	95/1491 (6%)	306/1429 (21%)	
Hospice	117/2920 (4%)	59/1491 (4%)	58/1429 (4%)	
Expired	131/2920 (4%)	51/1491 (3%)	80/1429 (6%)	
Modified Rankin Scale at discharge, median (IQR)	3 (1–4)	3 (1–4)	4 (2–5)	<0.01

COVID-19 indicates coronavirus disease 2019; CT, computed tomography; and IQR interquartile range.

*Analysis limited to patients with internal carotid, proximal middle cerebral (M1), or basilar artery occlusions who were evaluated in the emergency department and not transferred from an outside hospital.

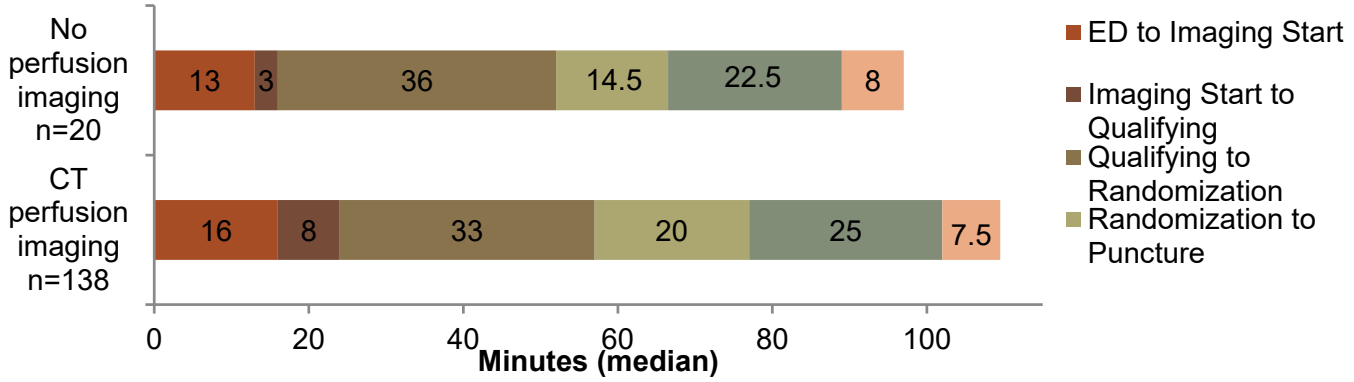
Siegler et al., Stroke 2021

Cooper University Hospital

Cooper Medical School of Rowan University

SELECTION FOR THROMBECTOMY IN THE EARLY TIME WINDOW: NO IMAGING SAVES BRAIN !!!!!

SWIFT PRIME CT Perfusion Imaging and Workflow



- Time from plain CT head to successful post-processing of CT perfusion images was 24 minutes (IQR 14-36).

- Pts with vs without RAPID for randomization:
  - With RAPID: Solitaire 57.7% (30/52), tPA 36.2% (17/47); absolute difference 21.5%.
  - Without RAPID: Solitaire 57.7% (15/26), tPA 26.7% (8/30), absolute difference 31.0%

- CT vs MR at mothership: median time of 84 minutes for MR vs. 76 for CT; p=0.17 (16 min longer for MRI)

Goyal et al., Radiology 2016

4 out of 100 have less disability for every 15 minutes faster we reperfuse after hospital arrival

eTable 12. Number Needed to Treat, Benefit Per Thousand, and Minutes Needed to Treat for Faster Reperfusion Times

	Onset to Reperfusion		ED Arrival to Reperfusion	
	Less Disability	Functional Independence	Less Disability	Functional Independence
Benefit per thousand per 15 min faster*	16	9	39	25

Saver J et al., JAMA 2016

ROLE OF IMAGING (CT/MRI/CTP/CTA) IN SELECTION FOR ACUTE STROKE REPERFUSION THERAPIES IN THE HYPERACUTE TIME WINDOW

- Rule out hemorrhage
- Rule out absence of occlusion
- Rule out large core
- Rule out absence or small of “at risk” tissue

MAIN ROLE OF IMAGING IS TO EXCLUDE PATIENTS FROM TREATMENT !!!

MAIN ADVANTAGE OF ADVANCED IMAGING IS PRECISE DELINEATION OF CORE

- How accurately can we measure it ?
- How important is it for efficacy and safety ?
- How frequent are patients with large core ?

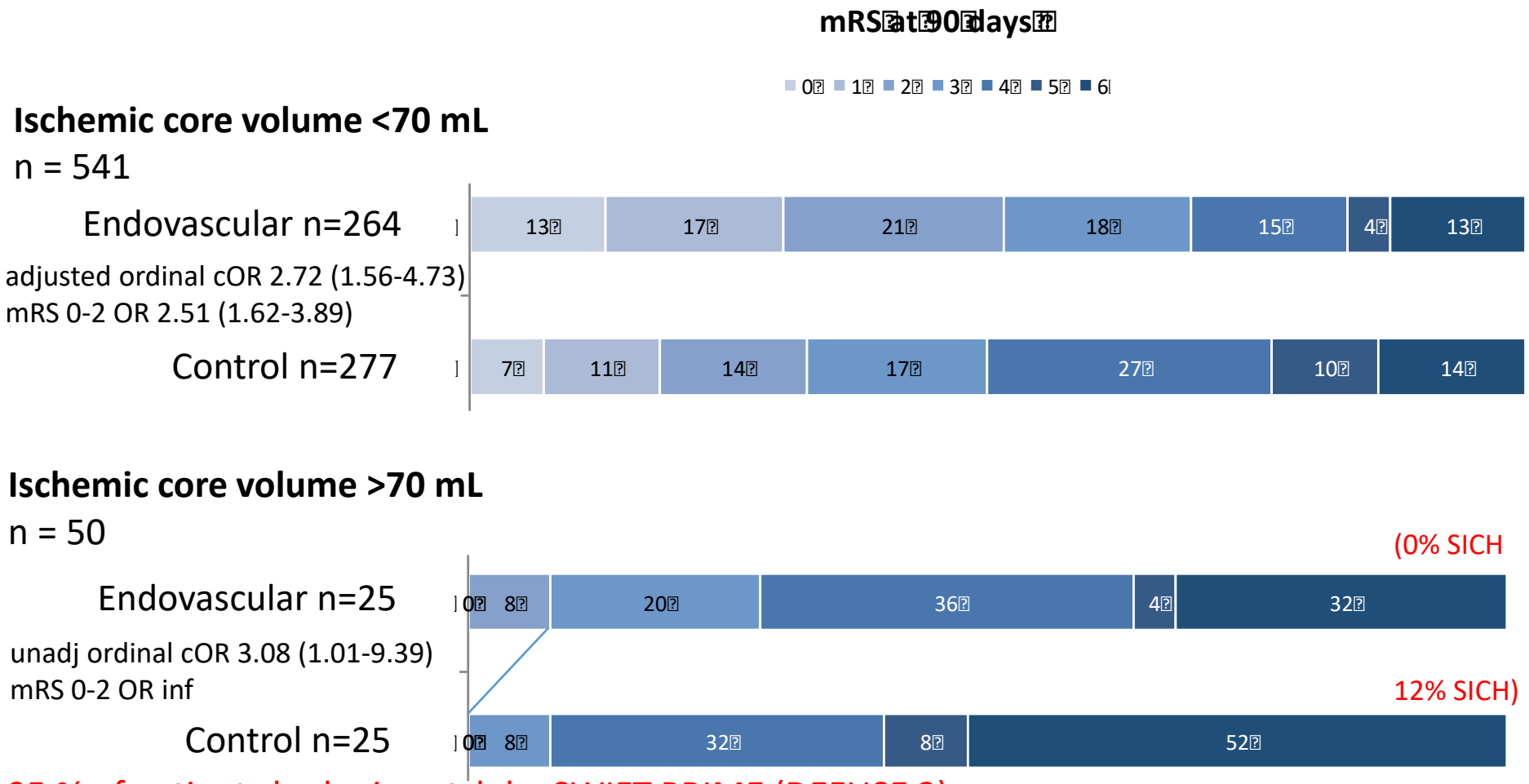
FREQUENCY OF LARGE CORE (ASPECTS 0-5) IN LVO PATIENTS PRESENTING AT 0-6 HOURS

TABLE 2. Characteristics of Patients With M1 and ICA Occlusion Strokes

	All patients, n = 147	0-6 h arrival, n = 97	6-12 h arrival, n = 28	12-24 h arrival, n = 22	*P* value
Age, mean ± SD	69.9 ± 15.2	70.6 ± 15.9	66.7 ± 14.7	70.7 ± 12.5	.47
NIHSS, median (IQR)	15 (10)	15 (10)	13.5 (9.5)	14.5 (9.75)	.86
Sex, female, n (%)	65 (44%)	44 (45%)	12 (43%)	9 (41%)	.92
Atrial fibrillation, n (%)	53 (36%)	38 (39%)	7 (25%)	8 (36%)	.39
CAD, n (%)	33 (22%)	27 (28%)	4 (14%)	2 (9%)	.085
Diabetes, n (%)	37 (25%)	28 (29%)	4 (14%)	5 (23%)	.28
Dyslipidemia, n (%)	60 (41%)	41 (42%)	11 (39%)	8 (36%)	.86
Hypertension, n (%)	105 (71%)	73 (75%)	19 (68%)	13 (59%)	.28
Smoking, n (%)	41 (28%)	23 (24%)	12 (43%)	6 (27%)	.14
Previous stroke, n (%)	32 (22%)	17 (18%)	7 (25%)	8 (36%)	.14
Previous TIA, n (%)	12 (8%)	7 (7%)	2 (7%)	3 (14%)	.60
Transfer from outside hospital, n (%)	26 (18%)	16 (16%)	7 (25%)	3 (14%)	.50
IV tPA given at outside hospital (for transferred patients only), n (%)	11 (7%)	9 (9%)	2 (7%)	0 (0%)	.33
Occlusion site					
ICA, n (%)	48 (33%)	26 (27%)	12 (43%)	10 (45%)	.11
M1, n (%)	99 (67%)	71 (73%)	16 (57%)	12 (55%)	
ASPECTS, median (IQR)	8 (3)	8 (2)	7 (2.25)	7 (2.75)	.13
ASPECTS 9-10, n (%)	57 (39%)	45 (46%)	6 (21%)	6 (27%)	.12
ASPECTS 6-8, n (%)	63 (43%)	37 (38%)	15 (54%)	11 (50%)	
ASPECTS 0-5, n (%)	27 (18%)	15 (16%)	7 (25%)	5 (23%)	

Mokin et., Neurosurgery 2017

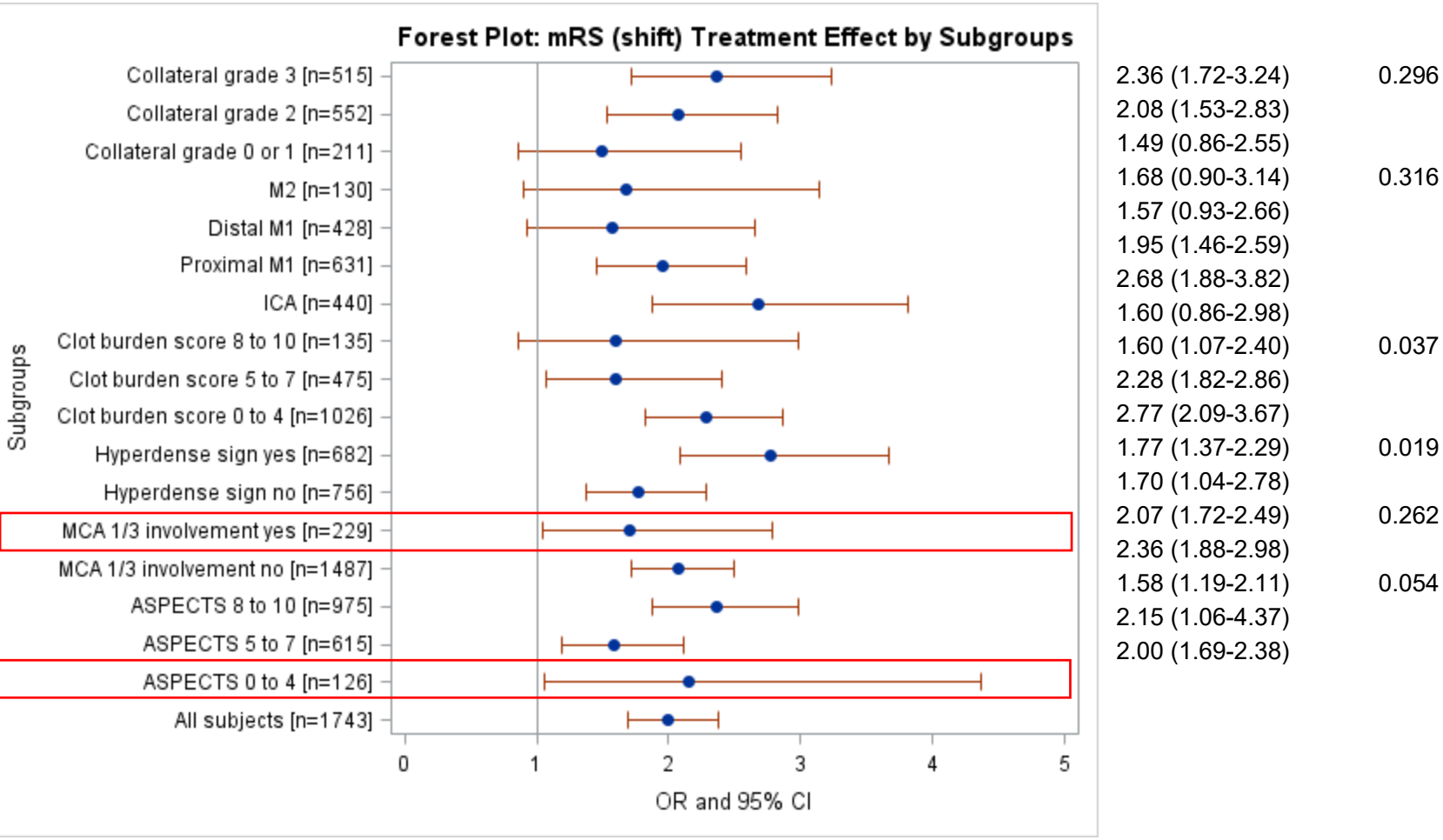
Ischemic Core Volume versus Functional Outcome



95 % of patients had mismatch by SWIFT PRIME (DEFUSE 3) criteria and 78% of patients had large penumbral volumes (>60 mls) !!!!

Campbell et. al., Lancet Neurol 2018

IMAGING PREDICTORS OF CLINICAL OUTCOME AND ENDOVASCULAR TREATMENT RESPONSE: FINAL RESULTS FROM THE HIGHLY EFFECTIVE REPERFUSION EVALUATED IN MULTIPLE ENDOVASCULAR STROKE TRIALS (HERMES)



Post hoc Forest Plot mRS analysis (shift) by subgroups according to neuroimaging at baseline

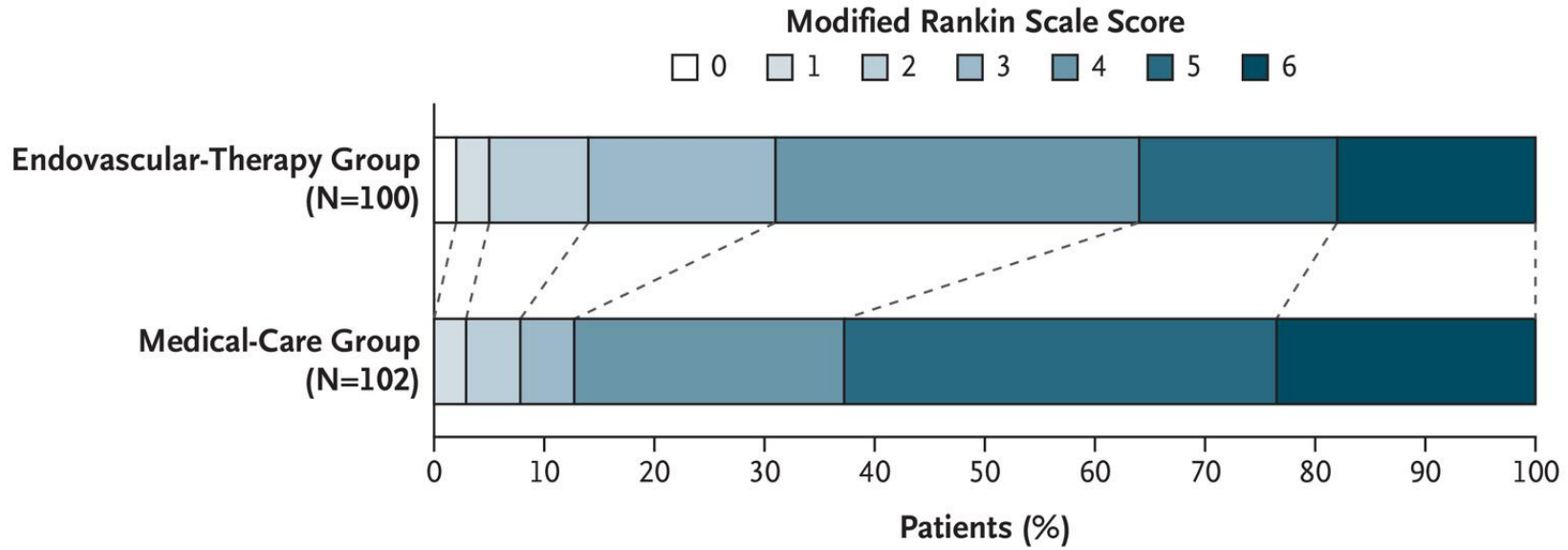
San Roman, L et al. Lancet Neurol, 2018

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Endovascular Therapy for Acute Stroke with a Large Ischemic Region

S. Yoshimura, N. Sakai, H. Yamagami, K. Uchida, M. Beppu, K. Toyoda, Y. Matsumaru, Y. Matsumoto, K. Kimura, M. Takeuchi, Y. Yazawa, N. Kimura, K. Shigeta, H. Imamura, I. Suzuki, Y. Enomoto, S. Tokunaga, K. Morita, F. Sakakibara, N. Kinjo, T. Saito, R. Ishikura, M. Inoue, and T. Morimoto



Modified Rankin Scale Score at 90 Days	0	1	2	3	4	5	6
Endovascular-therapy group — no. (%)	2 (2.0)	3 (3.0)	9 (9.0)	17 (17.0)	33 (33.0)	18 (18.0)	18 (18.0)
Medical-care group — no. (%)	0	3 (2.9)	5 (4.9)	5 (4.9)	25 (24.5)	40 (39.2)	24 (23.5)

National Institutes of Health Stroke Scale Score and Vessel Occlusion in 2152 Patients With Acute Ischemic Stroke

Mirjam R. Heldner, MD; Christoph Zubler, MD; Heinrich P. Mattle, MD; Gerhard Schroth, MD; Anja Weck, MD; Marie-Luise Mono, MD; Jan Gralla, MD, MSc; Simon Jung, MD; Marwan El-Koussy, MD; Rudolf Lüdi, MD; Xin Yan, MD; Marcel Arnold, MD; Christoph Ozdoba, MD; Pasquale Mordasini, MD, MSc; Urs Fischer, MD, MSc

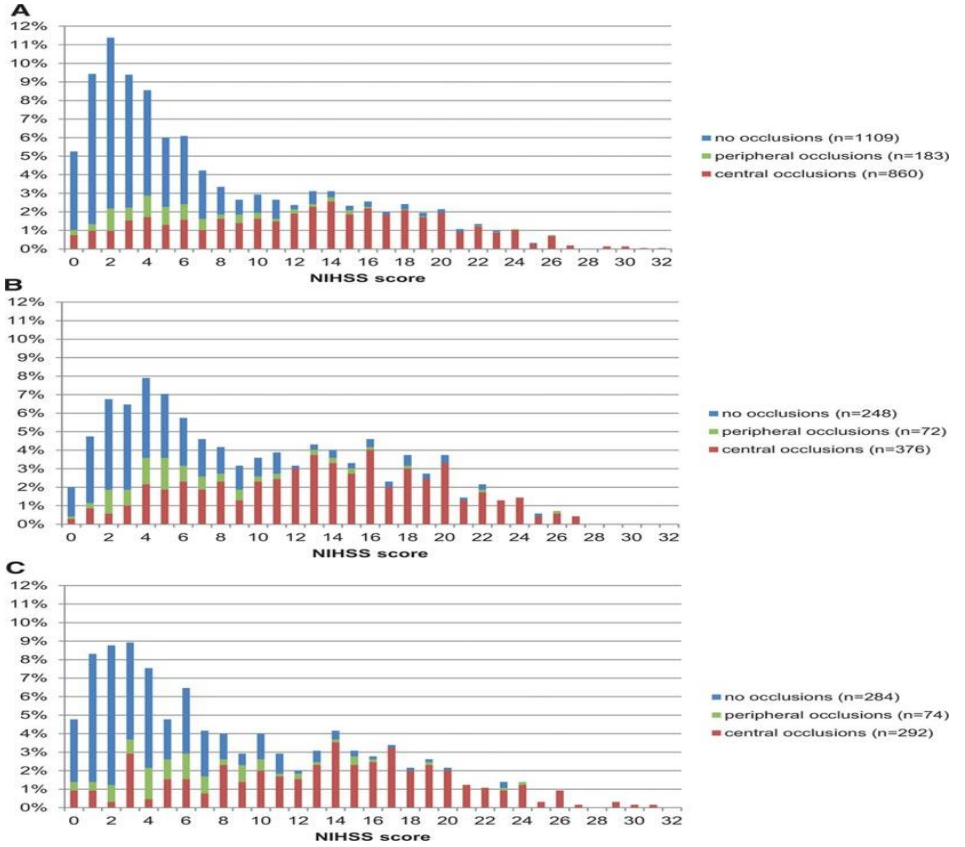
Background and Purpose—There is some controversy on the association of the National Institutes of Health Stroke Scale (NIHSS) score to predict arterial occlusion on MR arteriography and CT arteriography in acute stroke.

Methods—We analyzed NIHSS scores and arteriographic findings in 2152 patients (35.4% women, mean age 66±14 years) with acute anterior or posterior circulation strokes.

Results—The study included 1603 patients examined with MR arteriography and 549 with CT arteriography. Of those, 1043 patients (48.5%; median NIHSS score 5, median time to clinical assessment 179 minutes) showed an occlusion, 887 in the anterior (median NIHSS score 7/0–31), and 156 in the posterior circulation (median NIHSS score 3/0–32). Eight hundred sixty visualized occlusions (82.5%) were located centrally (ie, in the basilar, intracranial vertebral, internal carotid artery, or M1/M2 segment of the middle cerebral artery). NIHSS scores turned out to be predictive for any vessel occlusions in the anterior circulation. Best cut-off values within 3 hours after symptom onset were NIHSS scores ≥9 (positive predictive value 86.4%) and NIHSS scores ≥7 within >3 to 6 hours (positive predictive value 84.4%). Patients with central occlusions presenting within 3 hours had NIHSS scores <4 in only 5%. In the posterior circulation and in patients presenting after 6 hours, the predictive value of the NIHSS score for vessel occlusion was poor.

Conclusions—There is a significant association of NIHSS scores and vessel occlusions in patients with anterior circulation strokes. This association is best within the first hours after symptom onset. Thereafter and in the posterior circulation the association is poor. (*Stroke*. 2013;44:1153-1157.)

Key Words: angiography ■ emergencies ■ imaging, diagnostic ■ stroke



- Patient population: 2152 patients with stroke (93.2%) or TIA (6.8%)
- Imaging modality: MRA 74.5%, CTA 25.5%
- Imaging timing: 32.4% 0-3 hours, 30% 3-6 hours

THE BEST NIHSS SCORE CUT-OFF TO SHOW A CENTRAL VO WITHIN 3 HOURS WAS 9 (PPV 80.7%) AND WITHIN >3 TO 6 HOURS 7 (PPV 77%).

Cooper University Hospital

Mirjam R. Heldner et al. Stroke. 2013;44:1153-1157

CARDIOLOGY WAY-DIRECT TO ANGIO WITHOUT NON-INVASIVE VESSEL IMAGING

European Heart Journal
Acute Cardiovascular Care
ESC European Society of Cardiology

Review Article

Pathophysiology, diagnosis and management of MINOCA: an update

European Heart Journal: Acute Cardiovascular Care
1–9

DOI: 10.1177/2048872618782414
journals.sagepub.com/home/acc
SAGE

Giancarla Scalone, Giampaolo Niccoli and Filippo Crea

Abstract

Myocardial infarction with non-obstructive coronary arteries (MINOCA) is a syndrome with different causes, characterised by clinical evidence of myocardial infarction with normal or near-normal coronary arteries on angiography. Its prevalence ranges between 5% and 25% of all myocardial infarction. The prognosis is extremely variable, depending on the cause of

GIVEN A PATIENT POPULATION OF ACUTE STROKE WITHIN 6 HOURS WITH NIHSS > 9 IN ORDER TO EXCLUDE 15% OF PATIENTS WHO MAY NOT BENEFIT AND ARE VERY UNLIKELY TO BE HARMED, WE HARM THE REST OF THE 85 % WITH THE > 30 MIN DELAYS CAUSED BY IMAGING !!!!!

TIME IS BRAIN REVISITED

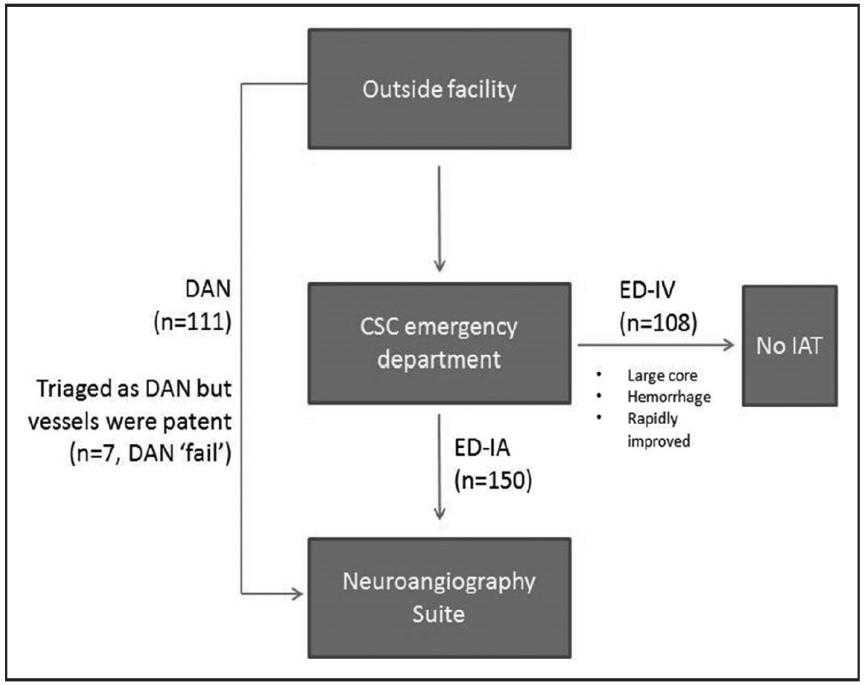
Time = Brain
Imaging = Time

→ IMAGING = BRAIN !!!

Interfacility Transfer Directly to the Neuroangiography Suite in Acute Ischemic Stroke Patients Undergoing Thrombectomy

Ashutosh P. Jadhav, MD, PhD; Cynthia L. Kenmuir, MD, PhD; Amin Aghaebrahim, MD; Kaustubh Limaye, MD; Lawrence R. Wechsler, MD; Maxim D. Hammer, MD; Matthew T. Starr, MD; Bradley J. Molyneaux, MD, PhD; Marcelo Rocha, MD, PhD; Francis X. Guyette, MD; Christian Martin-Gill, MD; Andrew F. Ducruet, MD; Bradley A. Gross, MD; Brian T. Jankowitz, MD; Tudor G. Jovin, MD

- Retrospective review of cases Jan 2013-Oct 2016 at UPMC
  - 660 IAT
  - 261 (39%) transferred from OSH for IAT
- Direct Admit to Neuroangiosuite (DAN) vs transfer through Emergency Department (ED)
- DAN patients treated without additional imaging
- Door to groin puncture: 82 min ED vs 24 min DAN (58 min, P= 0.001)
- Door to reperfusion: 126 min ED vs 63 min min DAN (63 min, P= 0.001)



Jadhav et al, Stroke 2017

JAMA Neurology | Original Investigation

Direct to Angiography Suite Without Stopping for Computed Tomography Imaging for Patients With Acute Stroke

A Randomized Clinical Trial

Manuel Requena, PhD; Marta Olivé-Gadea, MD; Marian Muchada, PhD; David Hernández, MD; Marta Rubiera, PhD; Sandra Boned, PhD; Carlos Piñana, MD; Matías Deck, MD; Álvaro García-Tornel, MD; Humberto Díaz-Silva, MD; Noelia Rodriguez-Villatoro, PhD; Jesús Juega, MD; David Rodriguez-Luna, PhD; Jorge Pagola, PhD; Carlos Molina, PhD; Alejandro Tomasello, MD; Marc Ribo, MD, PhD

Cooper University Hospital
Cooper Medical School of Rowan University

Table 3. Workflow and Procedural Characteristics of the Modified Intention-to-Treat Population[a]

Characteristic	Patients, No. (%) DTAS (n = 74)	DTCT (n = 73)	*P* value
Patients receiving EVT			
Door-to-puncture time, median (IQR), min	18 (15-24)	42 (35-51)	<.001
No. of passes, median (IQR)	2 (1-3)	2 (1-3)	.22
Onset-to-reperfusion time, mean (SD), min	290.5 (141.7)	326.9 (122.2)	.32
Door-to-reperfusion time, median (IQR), min	57 (43-77)	84 (63-117)	<.001

JAMA Neurology

RCT: Direct to Angiography Suite Without Stopping for Computed Tomography Imaging in Acute Stroke

POPULATION

96 Men, 78 Women

Adults with suspected large vessel occlusion (LVO) stroke within 6 h of symptom onset

Mean age, 73.4 y (range, 19-95 y)

INTERVENTION

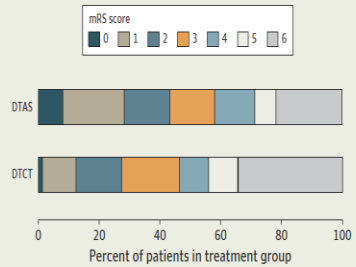
147 Patients randomized and analyzed

74 Direct transfer to angiography suite (DTAS)
Direct transfer to angiography suite for diagnosis of LVO using flat-panel computed tomography (CT) and angiogram

73 Direct transfer to CT scan (DTCT)
Direct transfer to CT scan for usual imaging protocols, including CT and CT angiography

FINDINGS

DTAS significantly improved functional independence for adults with acute ischemic stroke compared with DTCT for usual imaging protocols



Adjusted odds ratio for 1-point improvement of mRS score:
2.2 (95% CI, 1.22-4.08)

SETTINGS / LOCATIONS

1 Stroke center in Barcelona, Spain

PRIMARY OUTCOME

Functional independence, as measured by distribution of the 7-category modified Rankin Scale (mRS) score (range, 0 [no symptoms] to 6 [death]) at 90 d after stroke in patients with confirmed LVO

Requena M, Olivé-Gadea M, Muchada M, et al. Direct to angiography suite without stopping for computed tomography imaging for patients with acute stroke: a randomized clinical trial. *JAMA Neurol*. Published online August 2, 2021. doi:10.1001/jamaneurol.2021.2385

	DTAS (89)	DTCT (85)	p value
Procedure complication (EVT patients)	6 (8.1%)	2 (2.7%)	0.6
Symptomatic hemorrhage	1 (1.4%)	3 (4.1%)	0.28
Hemicraniectomy	2 (2.7%)	4 (5.5%)	0.39
In-hospital mortality	8 (9.0%)	10 (11.8%)	0.55
90 days mortality	18 (20.2%)	28 (32.9%)	0.07
Vascular access complication	2 (2.7%)	0	0.16

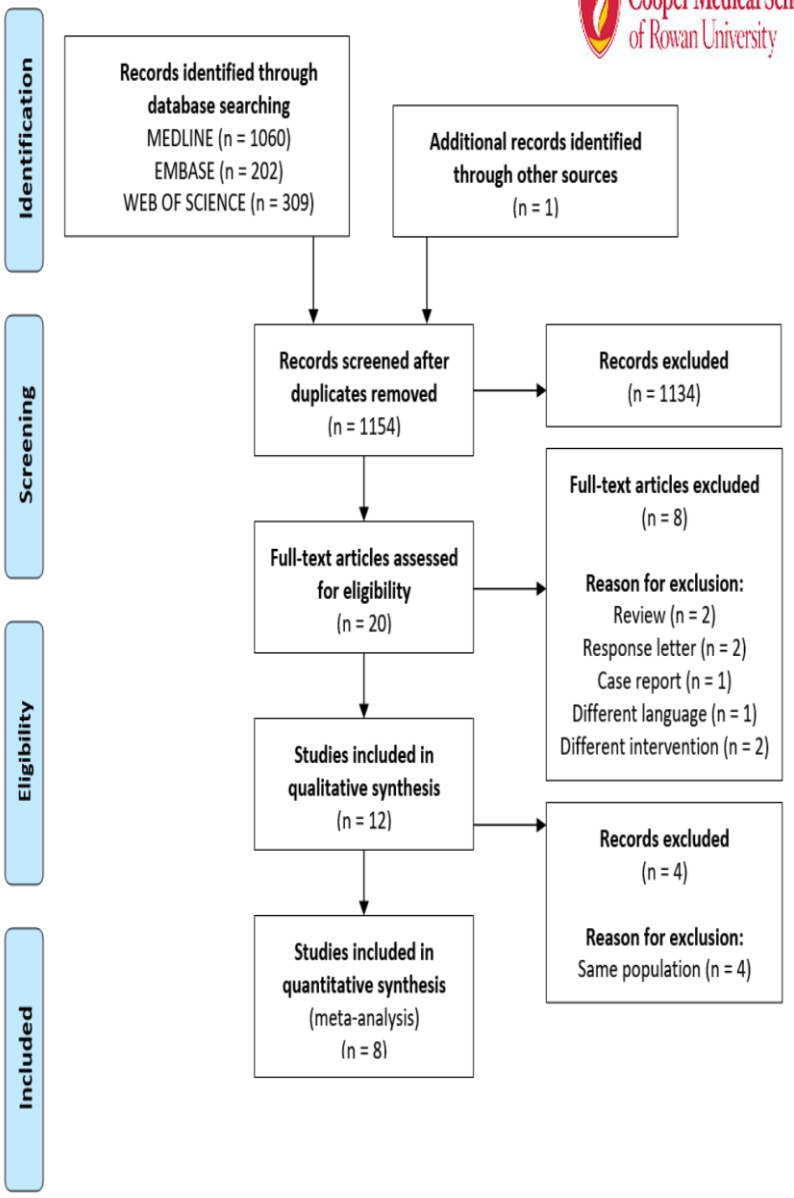
REQUENA ET AL., JAMA 2021

Ischemic stroke

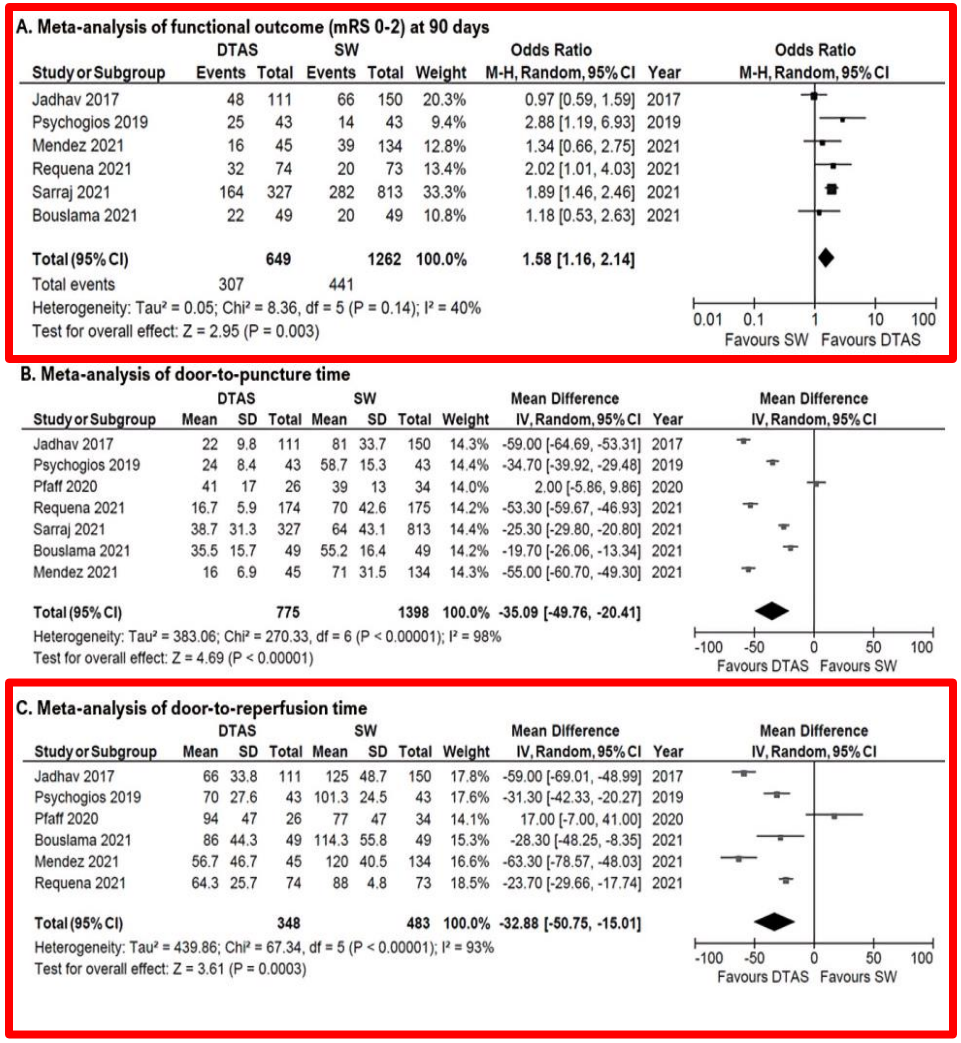
Original research

Direct to angiosuite strategy versus standard workflow triage for endovascular therapy: systematic review and meta-analysis

Milagros Galecio-Castillo ,[1] Juan Vivanco-Suarez ,[1] Cynthia B Zevallos ,[1] Andres Dajles,[1] Julie Weng,[1] Mudassir Farooqui ,[1] Marc Ribo ,[2,3] Tudor G Jovin,[4] Santiago Ortega-Gutierrez [5]



Galecio-Castillo et al., 2022



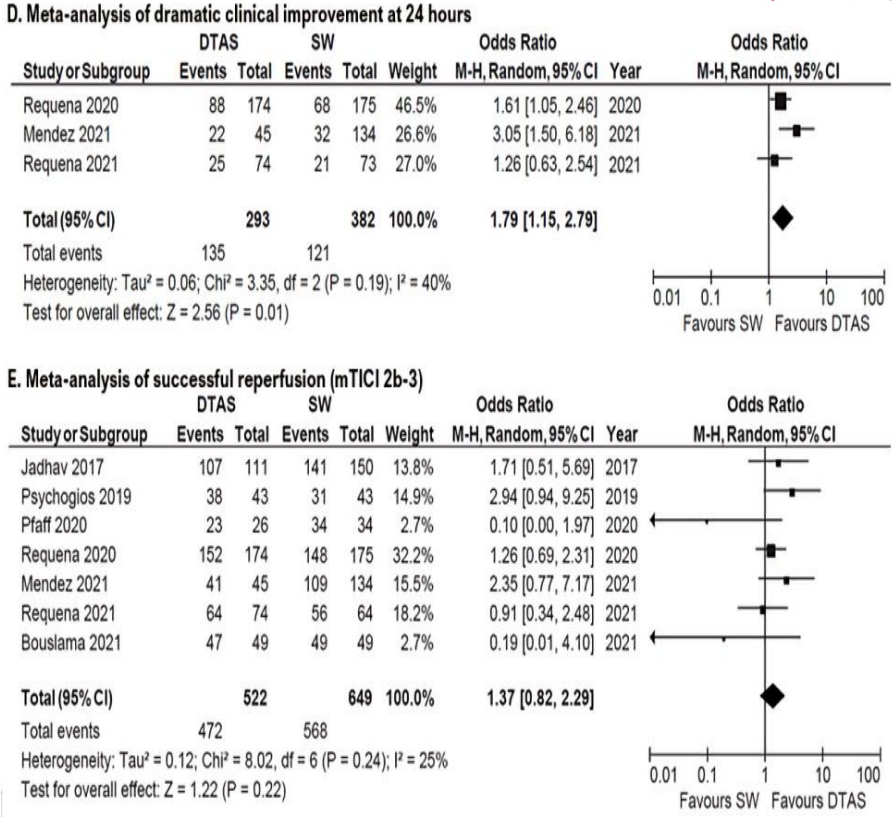


Figure 2 Forest plots for meta-analysis of (A) functional outcome (mRS 0–2) at 90 days, (B) door-to-puncture time, (C) door-to-reperfusion time, (D) dramatic clinical improvement at 24 hours, and (E) successful reperfusion (mTICI 2b-3). DTAS, direct to angiosuite; M-H, Mantel-Haenszel; mRS, modified Rankin Scale; mTICI, modified Thrombolysis In Cerebral Infarction; SW, standard workflow

Galecio-Castillo et al., 2022

Stroke

SPECIAL REPORT

Thrombectomy for Distal, Medium Vessel Occlusions

A Consensus Statement on Present Knowledge and Promising Directions

Jeffrey L. Saver, MD; Rene Chapot, MD; Ronit Agid, MD; Ameer E. Hassan, DO; Ashutosh P. Jadhav, MD; David S. Liebeskind, MD; Kyriakos Lobotesis, MD; Dan Meila, MD; Lukas Meyer, MD; Guy Raphaeli, MD; Rishi Gupta, MD; for the Distal Thrombectomy Summit Group*†

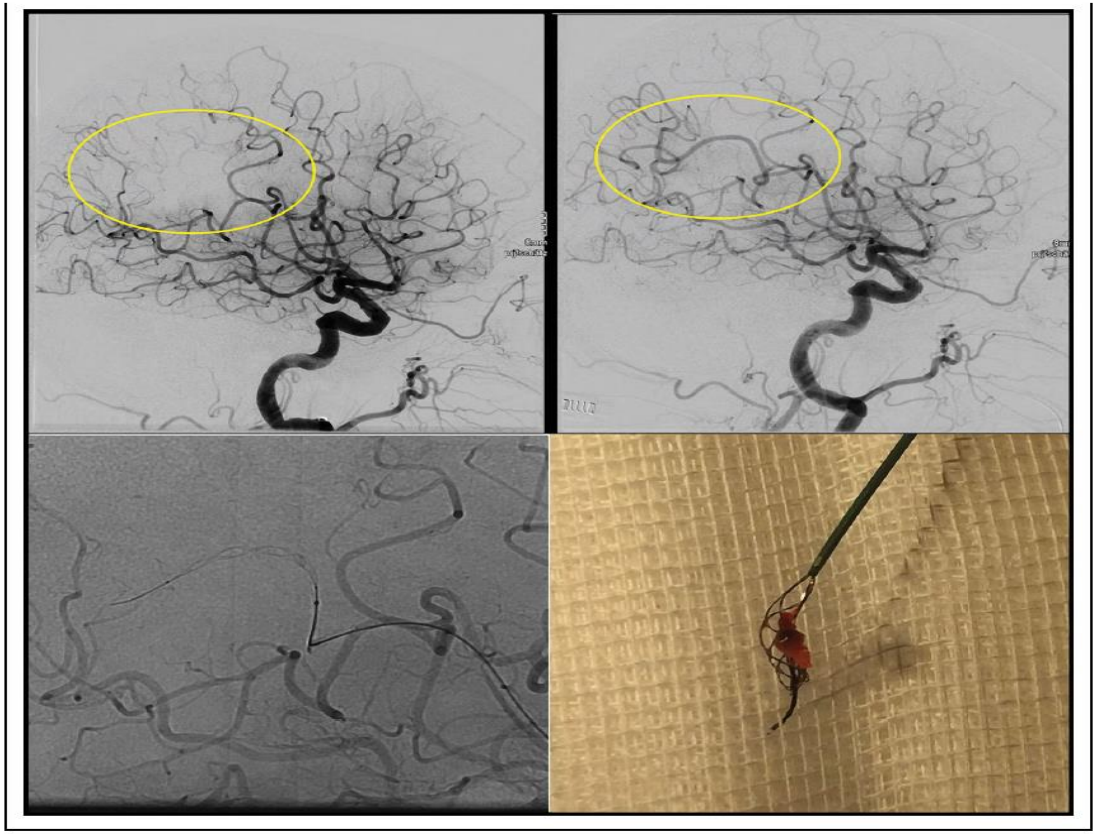


Figure 2. Distal medium vessel occlusion reperfusion by stent retriever.
Upper left, Following endovascular thrombectomy for an M1 middle cerebral artery (MCA) occlusion, angiography showed a residual or new distal M4 MCA branch occlusion (yellow circle). **Upper right**, Reperfusion of M4 after distal thrombectomy procedure (yellow circle). **Lower left**, Tiger 13 stentriever advanced through Headway27 microcatheter into target branch artery. **Lower right**, Retrieved thrombus. Image courtesy of Rene Chapot, MD.

Stroke, 2021

LET'S TALK ABOUT COST !!!!!

Case scenario: 100 patients with NIHSS> 9, 0-6 hours from TLSW
(assumes 85 patients with LVO and favorable imaging)

DIRECT TO ANGIO= fastest reperfusion

Additional cost: -15 unnecessary angiograms
Savings: -100 CTA/CTP
-Health care savings from 30 min earlier reperfusion X 85 patients

CTA + CTP then (if eligible) angio = 30 min delay

Additional cost: -85 CTA/CTP
-Health care costs incurred by 30 min delay in reperfusion X 85 patients
Savings: -15 angiograms

WHICH APPROACH SAVES MORE MONEY ???

Evaluating the cost-utility of a direct transfer to angiosuite protocol within 6 h of symptom onset in suspected large vessel occlusion patients

Manuel Requena[a,b], Valeska Seguel-Ravest[c], Andreu Vilaseca-Jolonch[a], Jacklyn Woods[d], Pablo Guijarro[e], Marc Ribo[a,b], Alejandro Tomasello[f] and Carlos A. Molina[a,b]

[a]Stroke Unit, Neurology Department, Vall d'Hebron University Hospital, Barcelona, Spain; [b]Stroke Research Group, Vall d'Hebron Research Institute, Barcelona, Spain; [c]Medtronic Ltd, Watford, UK; [d]Medtronic Inc., Minneapolis, MN, USA; [e]Medtronic Ibérica SAU, Madrid, Spain; [f]Department of Interventional Neuroradiology, Vall d'Hebron University Hospital, Barcelona, Spain

Table 3. Cost-utility analysis results.

Analysis	DTCT per patient	DTAS per patient	Incremental per patient	ICURs	NMB
Life-time analysis (base case)					
Total acute costs	€20,333	€18,615	−€1718		
Long term care costs (Nursing home & Residential care)	€162,389	€112,408	−€49,981		
Recurrent stroke costs	€2197	€2390	€193		
Total costs	€184,919	€133,413	−€51,505		
Total QALY per patient	4.37	5.19	0.82	Dominant	€72,056
Total life years per patient	7.32	7.55	0.23		
Stepped economic analysis					
One year					
Total acute costs	€20,333	€18,615	−€1718		
Long-term care costs (Nursing home & Residential care)	€12,982	€8541	−€4441		
Recurrent stroke costs	€459	€488	€29		
Total costs	€33,774	€27,644	−€6130		
Total QALY per patient	0.4203	0.4834	0.0631	Dominant	€7,706
Total life years per patient	0.7251	0.7132	−0.0118		
Two-year analysis					
Total acute costs	€20,333	€18,615	−€1718		
Long-term care costs (Nursing home & Residential care)	€29,907	€19,763	−€10,144		
Recurrent stroke costs	€635	€676	€41		
Total costs	€50,875	€39,055	−€11,820		
Total QALY per patient	0.8142	0.9384	0.1242	Dominant	€14,926
Total life years per patient	1.4081	1.3882	−0.0199		
Five-year analysis					
Total acute costs	€20,333	€18,615	−€1718		
Long-term care costs (Nursing home & Residential care)	€73,833	€49,225	−€24,608		
Recurrent stroke costs	€1,097	€1174	€77		
Total costs	€95,263	€69,014	−€26,249		
Total QALY per patient	1.8539	2.1473	0.2934	Dominant	€33,585
Total life years per patient	3.2017	3.1774	−0.0243		
Ten-year analysis					
Total acute costs	€20,333	€18,615	−€1,718		
Long-term care costs (Nursing home & Residential care)	€125,277	€84,682	−€40,594		
Recurrent stroke costs	€1,671	€1,799	€128		
Total costs	€147,281	€105,097	−€42,184		
Total QALY per patient	3.1461	3.6737	0.5276	Dominant	€55,374
Total LIFE years per patient	5.3915	5.4155	0.0240		

Abbreviations. NMB, net monetary benefit; QALY, quality adjusted life year; ICUR, incremental cost-utility ratio.

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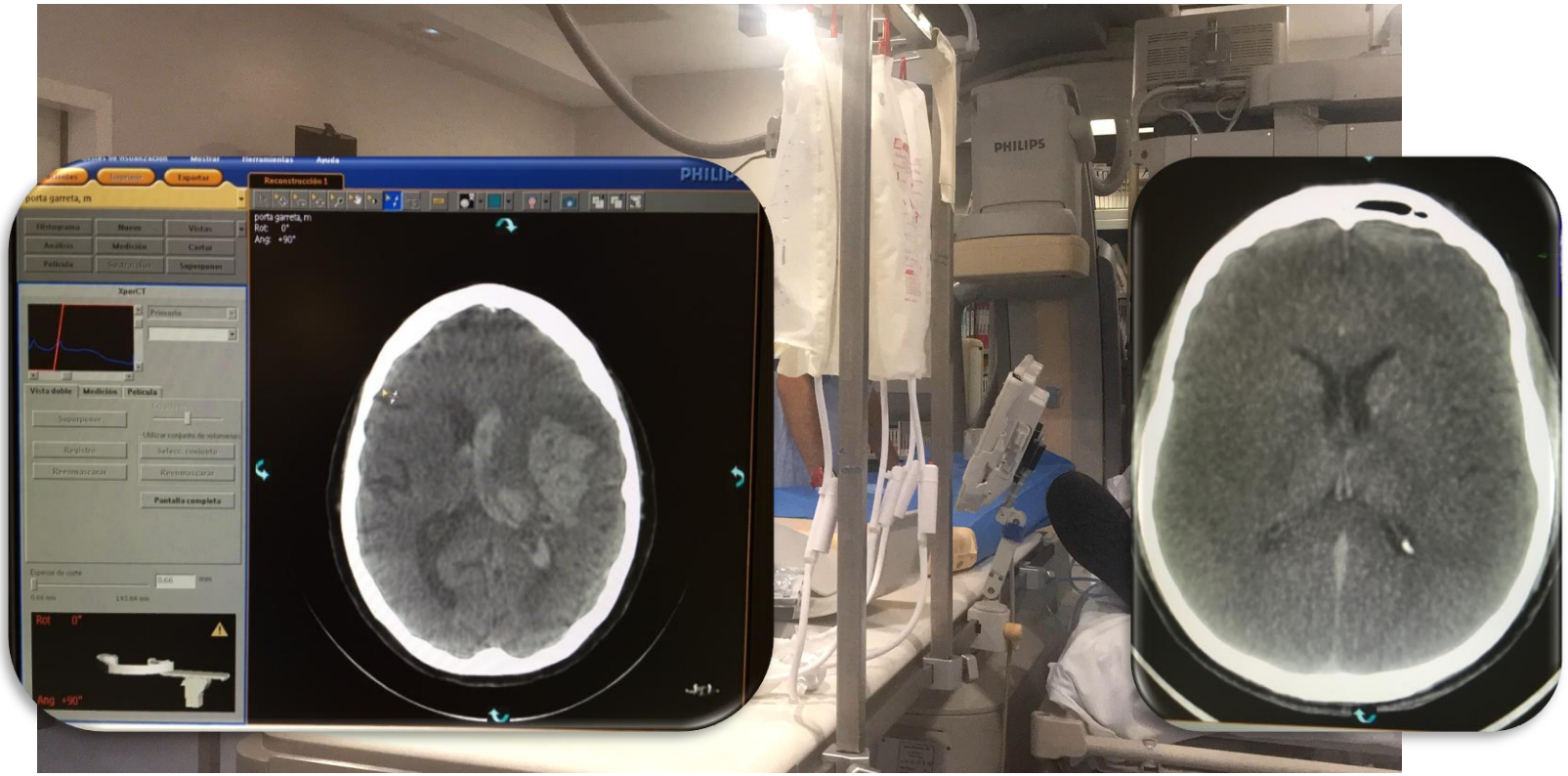
DIRECT TRANSFER TO ANGIO-SUITE



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BRIEF REPORT

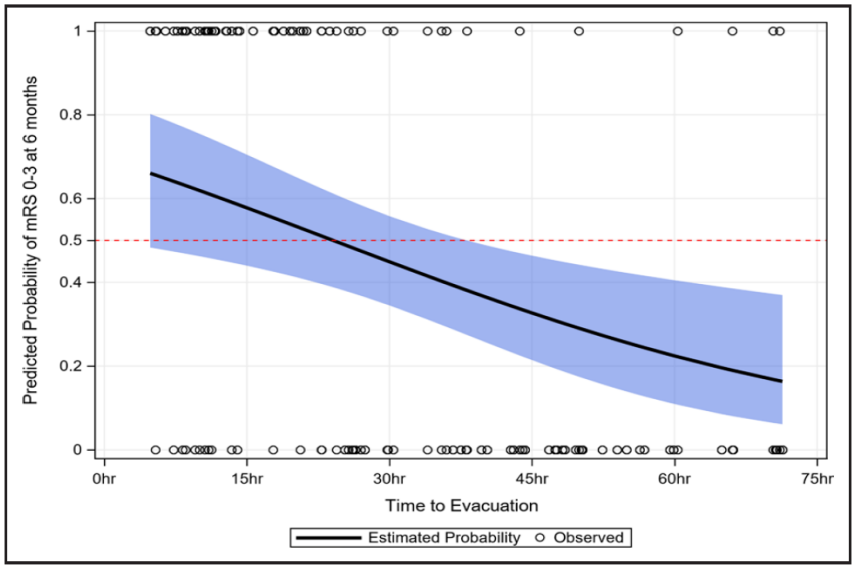
Time to Evacuation and Functional Outcome After Minimally Invasive Endoscopic Intracerebral Hemorrhage Evacuation

Christopher P. Kellner, MD*; Rui Song, MD*; Muhammad Ali, BA; Dominic A. Nistal, MD; Milan Samarage, MD; Neha S. Dangayach, MD; John Liang, MD; Ian McNeill, MD; Xiangnan Zhang, MS; Joshua B. Bederson, MD; J Mocco, MD, MS

Table 2. Multivariate Analysis of 6-Month Functional Outcome With Modeled Probability as mRS Score, 0–3 (Reference mRS Score, 4–6) and Age by Decade

Independent Variable	OR	95% CI	*P* value
Age (decade)	0.49	0.28–0.77	0.005
IVH	0.15	0.04–0.47	0.002
Location (lobar)	18.5	4.5–103	0.0002
Time to evacuation	0.95	0.92–0.98	0.004

IVH indicates intraventricular hemorrhage; mRS, modified Rankin Scale; and OR, odds ratio.



CONCLUSION:

- **EARLY (6 HOURS) – MINDFUL OF FAST PROGRESSORS**
- **IMAGING CANNOT DIFFERRENTIATE BETWEEN RESPONDERS/NON-RESPONDERS**
  - TIME TO TREAT - NO TIME/NEED FOR ADVANCED IMAGING !!!
  - GO DIRECTLY TO ANGIO

Questions ?????