

Location

M2 MCA

Posterior circulation

Low NIHSS

Pre-treatment with IV tPA

Technique

Balloon guide

Direct aspiration

Aspiration plus stent-retriever

Core infarct size

Time from symptom onset



	Inclusion Criteria NIHSS	Median NIHSS	NIHSS < 5
MR CLEAN	2 or more	18	2% (n=10)
ESCAPE	> 5	17	0
EXTEND-IA	“using standard criteria to receive IV tPA within 4.5 hours of stroke onset”	15	6% (n=4)
SWIFT PRIME	≥ 8 and < 30	17	0
REVASCAT	6 or more	17	0

ORIGINAL RESEARCH

Too good to intervene? Thrombectomy for large vessel occlusion strokes with minimal symptoms: an intention-to-treat analysis

Diogo C Haussen, Mehdi Bousslama, Jonathan A Grossberg, Aaron Anderson, Samir Belagage, Michael Frankel, Nicolas Bianchi, Leticia C Rebello, Raul G Nogueira

consecutive patients treated at comprehensive stroke center with an

NIHSS \leq 5 and an LVO on CTA from November 2014 to May 2016.

32 patients studied

22 (69%) were primarily treated with medical therapy and 10 (31%) intervention.

ORIGINAL RESEARCH

Too good to intervene? Thrombectomy for large vessel occlusion strokes with minimal symptoms: an intention-to-treat analysis

Diogo C Haussen, Mehdi Bousslama, Jonathan A Grossberg, Aaron Anderson, Samir Belagage, Michael Frankel, Nicolas Bianchi, Leticia C Rebello, Raul G Nogueira

consecutive patients treated at comprehensive stroke center with an **NIHSS \leq 5** and an LVO on CTA from November 2014 to May 2016.

A total of 9 (**41%**) of the 22 primary medical therapy patients showed clinical deterioration and were taken for thrombectomy

Baseline characteristics of the studied groups

	Thrombectomy(n=10)	Medical(n=22)	p Value*
Times (hours), median (IQR)			
Last-known-normal to arrival	6.25 (3.75–9.12)	10.5 (4.3–15)	0.19
Arrival to deterioration	–	5.2 (2.0–25.0)	
Deterioration to puncture	–	1.5 (0.6–2.1)	
Deterioration to reperfusion	–	2.7 (2.3–3.5)	

An orthostatic challenge was performed in 11 patients to evaluate collateral failure by elevating the patient in the stretcher and monitoring their examination.

Outcome data of the studied groups

Outcomes	Thrombectomy (n=10)	Medical (n=22)	p Value*
Parenchymal hemorrhages	0 (0)	0 (0)	1.00
NIHSS score			
NIHSS score at discharge, median (IQR)	1 (0–3)	2 (0.5–4.5)	0.31
NIHSS score worsening >4/death	1 (10)	5 (23)	0.63
NIHSS shift	–2.5	0	0.01
90-Day mRS†			0.19
0	4 (40)	5 (23)	
1	3 (30)	7 (32)	
2	3 (30)	5 (23)	
3	0 (0)	1 (5)	
4	0 (0)	0 (0)	
5–6	0 (0)	4 (18)	
90-Day mRS 0–2	10 (100)	17 (77)	0.15
90-Day mortality	0 (0)	3 (14)	0.53
Discharge home	9 (90)	16 (73)	0.38



ORIGINAL RESEARCH


Clinical outcomes of patients with acute minor stroke receiving rescue IA therapy following early neurological deterioration

Joon-Tae Kim,¹ Suk-Hee Heo,² Woong Yoon,³ Kang-Ho Choi,¹ Man-Seok Park,¹ Jeffrey L Saver,⁴ Ki-Hyun Cho¹

Retrospective study of consecutively registered patients with acute ischemic stroke in tertiary stroke center between November 2008 and May 2013.

Early neurologic deterioration in **23.6%** (n=232), rescue endovascular therapy performed in **13.4%** (n=28/209)

Factors associated with favourable outcomes at 3 months in patients with early deterioration by multivariate regression analysis

	Model 1, OR (95% CI)	p Value	Model 2, OR (95% CI)	p Value
 Rescue IAT	7.48 (2.32 to 24.11)	0.001	10.9 (3.1 to 38.8)	<0.001
Baseline NIHSS	0.63 (0.49 to 0.79)	<0.001	0.61 (0.48 to 0.79)	<0.001
FAT to visit time	NA		0.996 (0.992 to 1.000)	0.03
Diabetes mellitus	0.31 (0.15 to 0.64)	0.002	0.31 (0.15 to 0.66)	0.002
Symptomatic occlusion	0.40 (0.19 to 0.84)	0.02	0.42 (0.19 to 0.94)	0.03
Δ END–NIHSS	0.73 (0.63 to 0.84)	<0.001	0.71 (0.61 to 0.83)	<0.001

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Direct aspiration

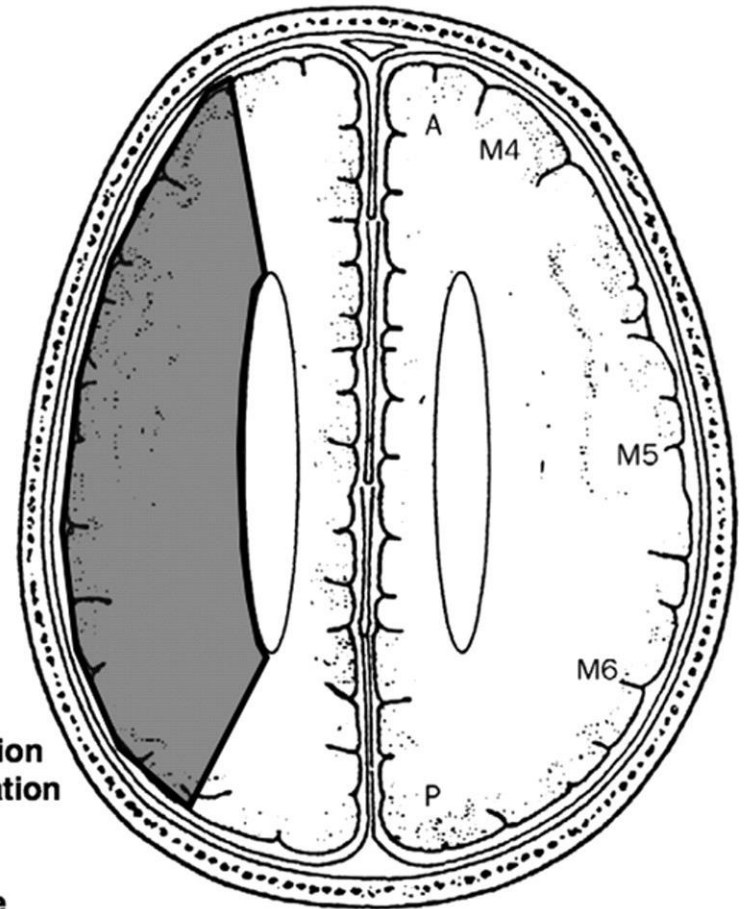
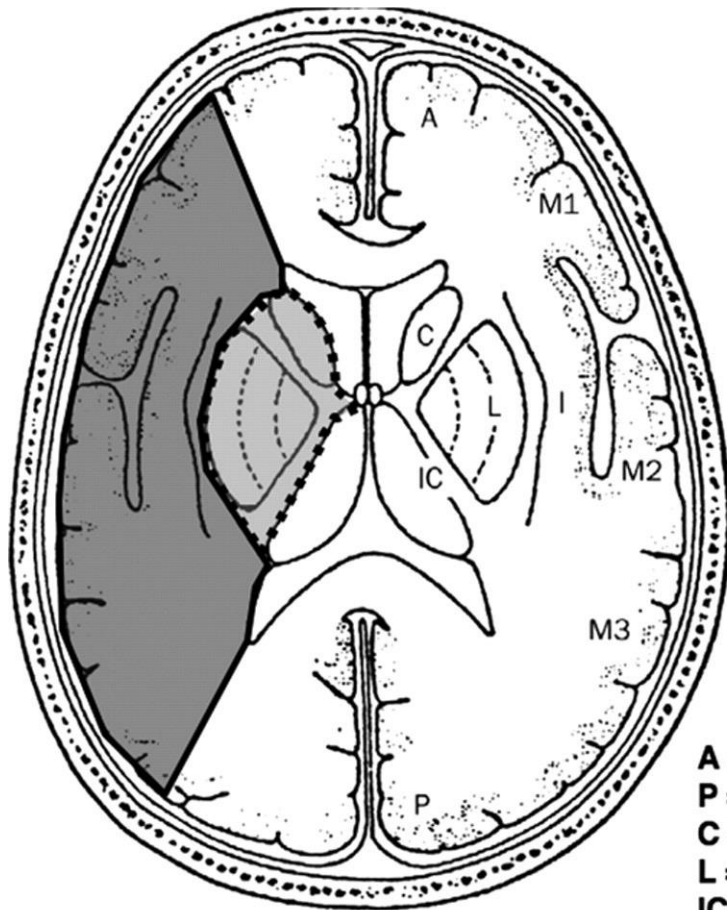
Aspiration plus stent-retriever

Core infarct size

Time from symptom onset



Adapted from Barber et al. Score allows deductions based on occupancy of lesion in each of 10 ASPECTS regions.



 **Subcortical Structures**
 **MCA cortex**

A = anterior circulation
P = posterior circulation
C = caudate
L = lentiform
IC = internal capsule
I = insular ribbon
MCA = middle cerebral artery
M1-M6 = Territories of MCA cortex



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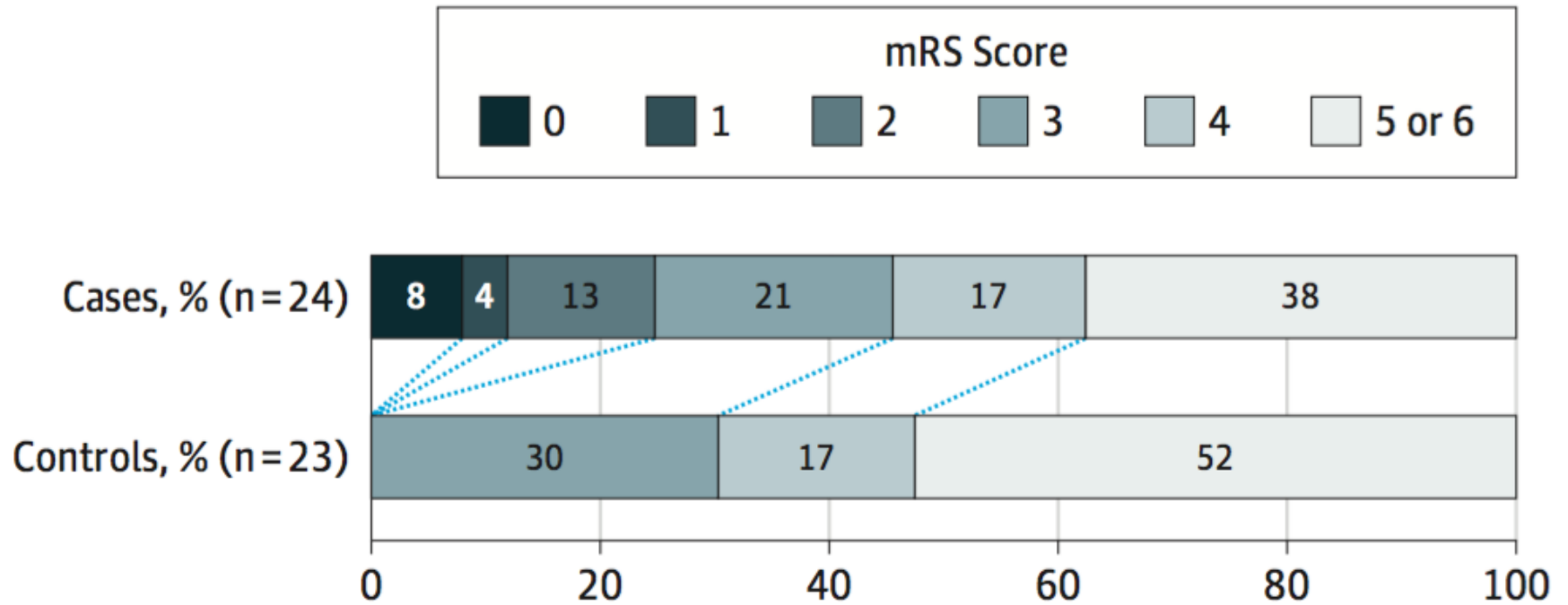
	Core infarct	
MR CLEAN	NA	70% underwent imaging eval for Penumbra
ESCAPE	ASPECTS 6-10	CTA collaterals
EXTEND-IA	< 70 mL	
SWIFT PRIME	≤ 100 mL, ASPECTS 6-10	CTP used in majority (80%)
REVASCAT	ASPECTS 6-10	Age adjusted ASPECTS threshold

JAMA Neurology | **Original Investigation**


Endovascular Treatment for Patients With Acute Stroke Who Have a Large Ischemic Core and Large Mismatch Imaging Profile

Leticia C. Rebello, MD; Mehdi Bousslama, MD; Diogo C. Haussen, MD; Seena Dehkharghani, MD; Jonathan A. Grossberg, MD; Samir Belagaje, MD; Michael R. Frankel, MD; Raul G. Nogueira, MD


Matched case-control study of patients with large vessel occlusion (ICA, M1/M2 MCA) and **baseline ischemic core > 50 mL** on CTP at a tertiary care center from May 1, 2011, through October 31, 2015.



Outcomes for baseline core > 50 mL

Outcome	Cases (n = 28)	Controls (n = 28)	P Value
Parenchymal hematoma type 2	2 (7)	1 (4)	>.99
Hemicraniectomy	2 (7)	6 (21)	.10
Final ischemic volume, mean (SD), mL	86.59 (76.94)	241.99 (120.35)	<.001
90-d mRS score			.04
0-2	 6 (25) ^b	0 ^c	.04
0-3	11 (46) ^b	7 (30) ^c	.77
4	4 (17) ^b	4 (17) ^c	>.99
5-6	9 (38) ^b	14 (52) ^c	.15
90-d Mortality	7 (29) ^b	11 (48) ^c	.75

Outcomes for baseline core > 70 mL

Outcome	Cases (n = 12)	Controls (n = 12)	P Value
Parenchymal hematoma type 2	0	1 (8)	>.99
Hemicraniectomy	2 (17)	4 (33)	.31
Final ischemic volume, mean (SD), mL	109.80 (64.64)	319.11 (146.96)	<.001
90-d mRS score			.18
0-2	 4 (40) ^b	0 ^c	.24
0-3	5 (50) ^b	2 (18) ^c	.31
4	1 (10) ^b	2 (18) ^c	>.99
5-6	4 (40) ^b	7 (64) ^c	.39
90-d Mortality	4 (40) ^b	6 (54) ^c	.65

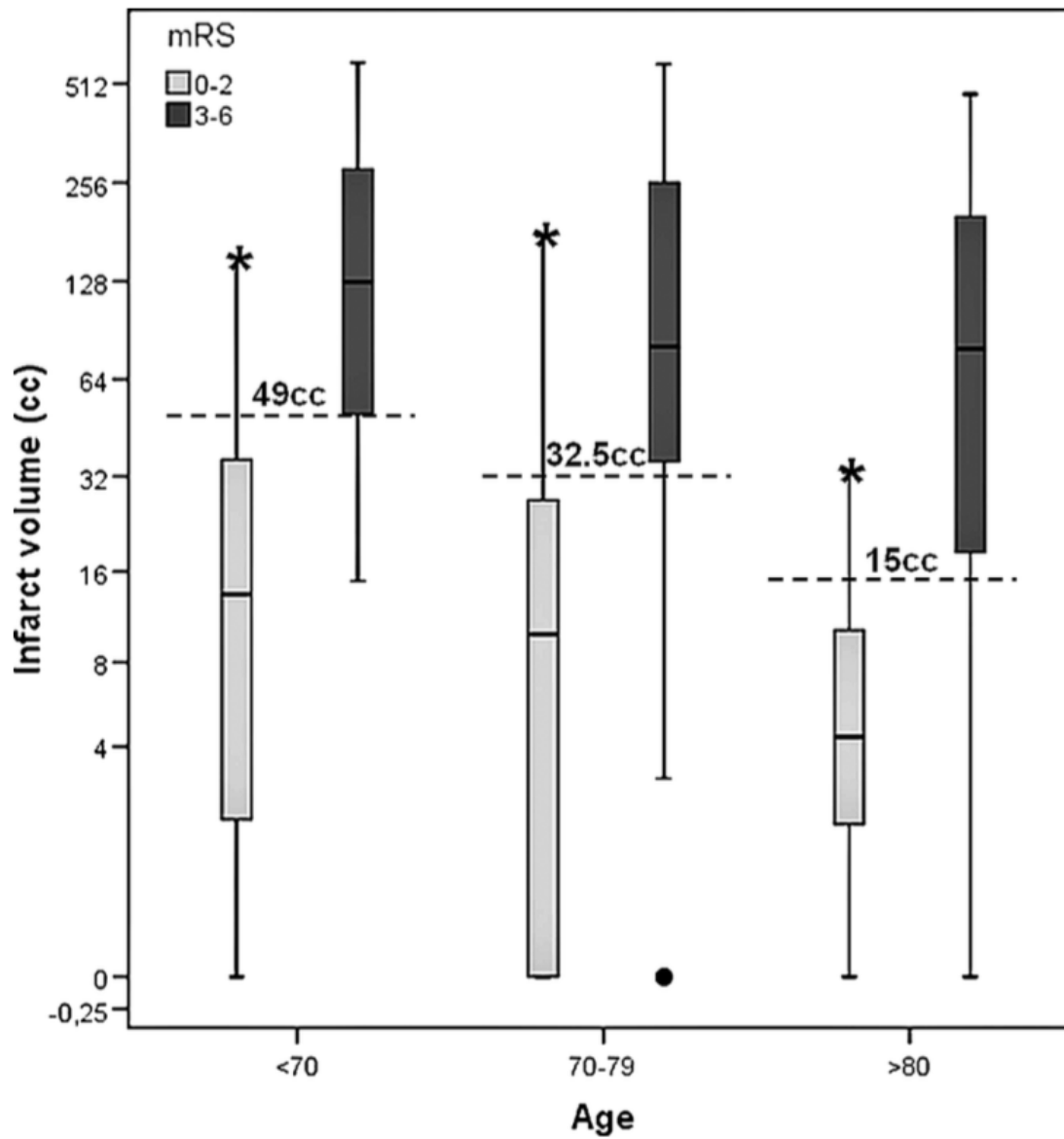
ORIGINAL RESEARCH

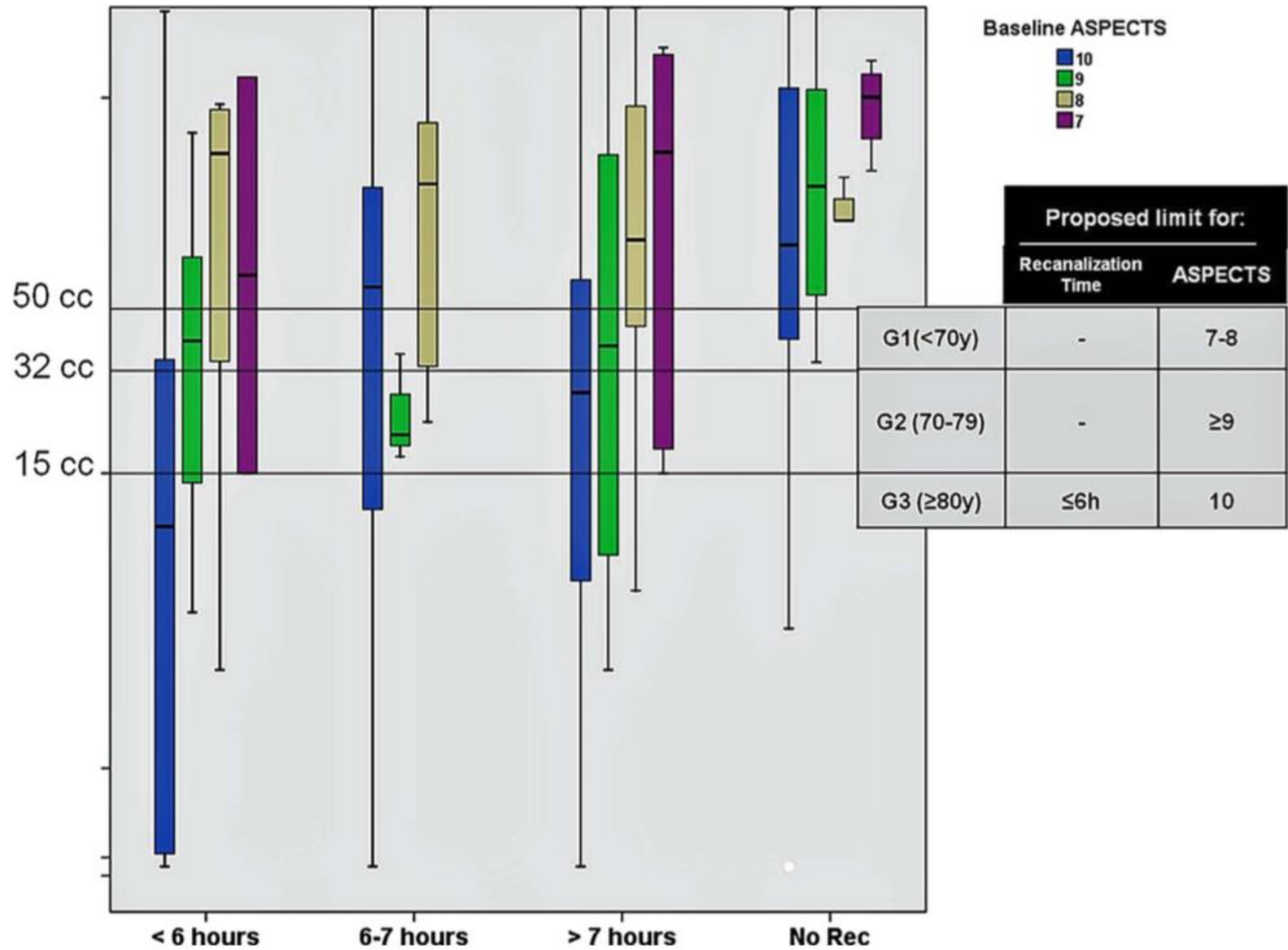
Age-adjusted infarct volume threshold for good outcome after endovascular treatment

Marc Ribo,¹ Alan Flores,¹ Eloy Mansilla,¹ Marta Rubiera,¹ Alejandro Tomasello,² Pilar Coscojuela,² Jorge Pagola,¹ David Rodriguez-Luna,¹ Marian Muchada,¹ José Alvarez-Sabín,¹ Carlos A Molina¹

Infarct volume calculated from 24-36 hour follow-up CT scan
Good clinical outcome at 90 days (mRS \leq 2)

For all patients the cut-off infarct volume that better predicted good





Pre-stroke disability, cognitive status and institutionalization (not living at home) are strong predictors of post-stroke death and dependence in the elderly stroke patient.

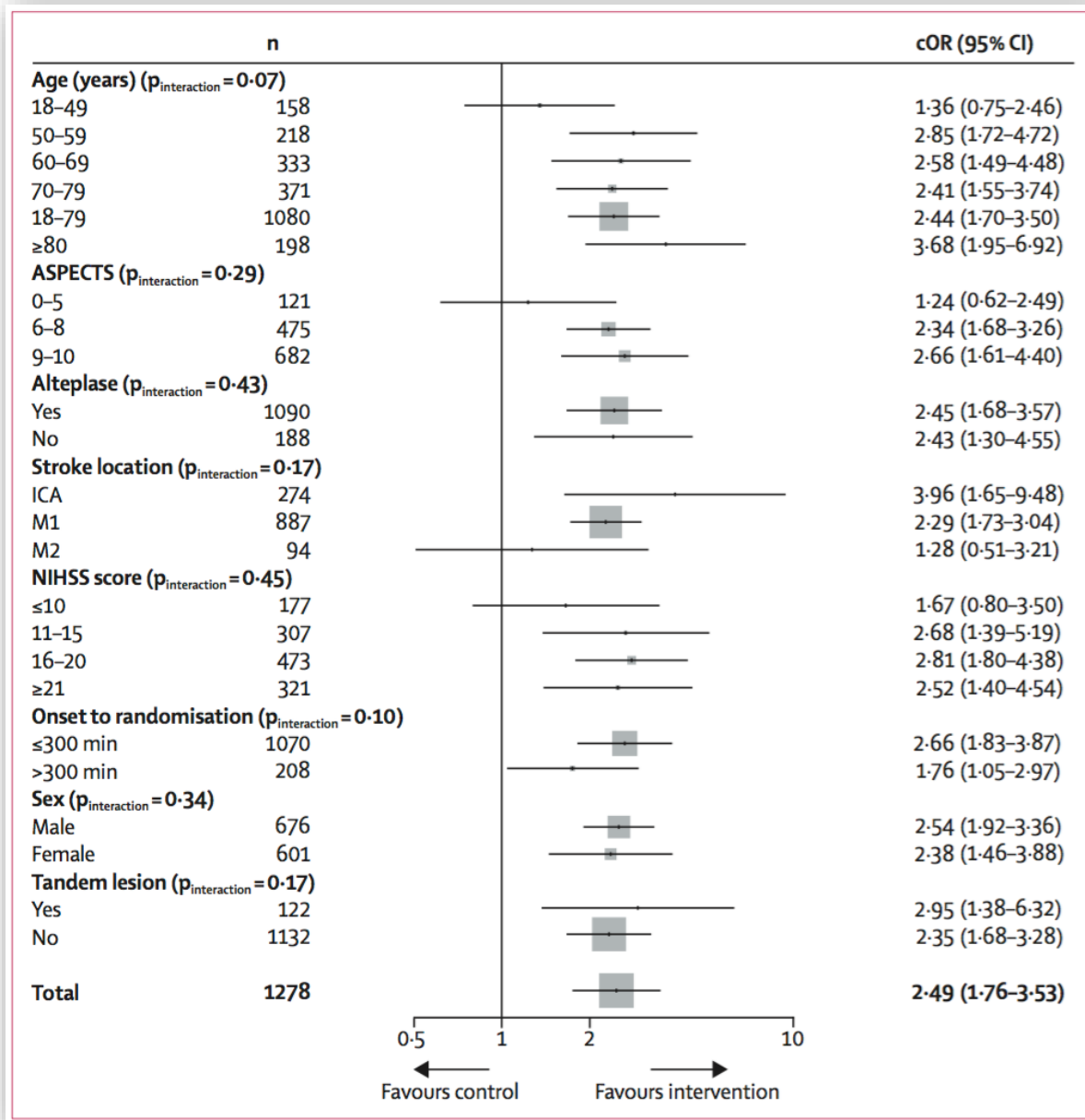
must **consider factors** such as **baseline** functional status, previous strokes and/or co-morbidities, eloquence of tissue at risk/infarcted area, and the **patient's and family's expectations.**

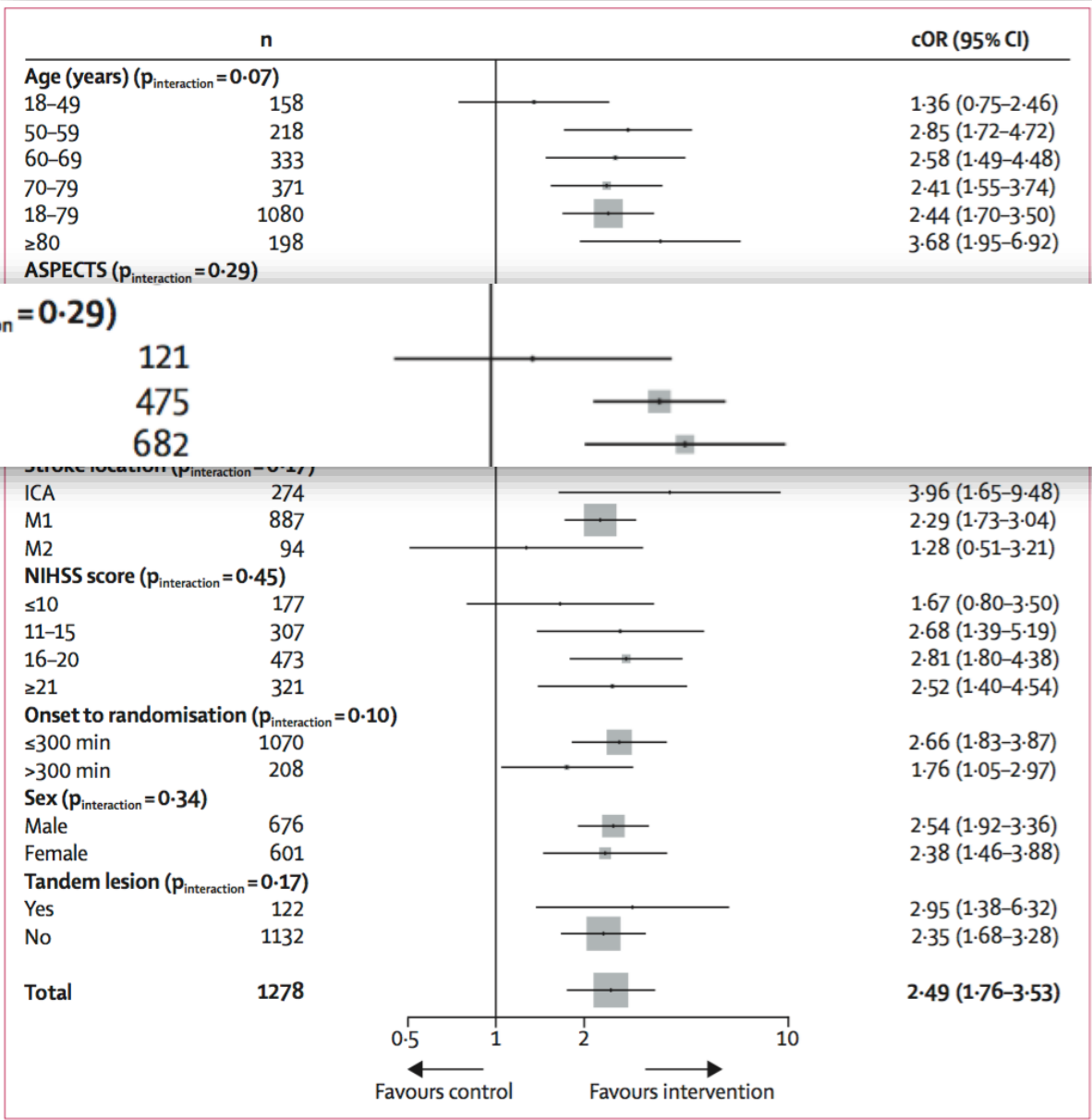
Endovascular thrombectomy after large-vessel ischaemic stroke: a meta-analysis of individual patient data from five randomised trials

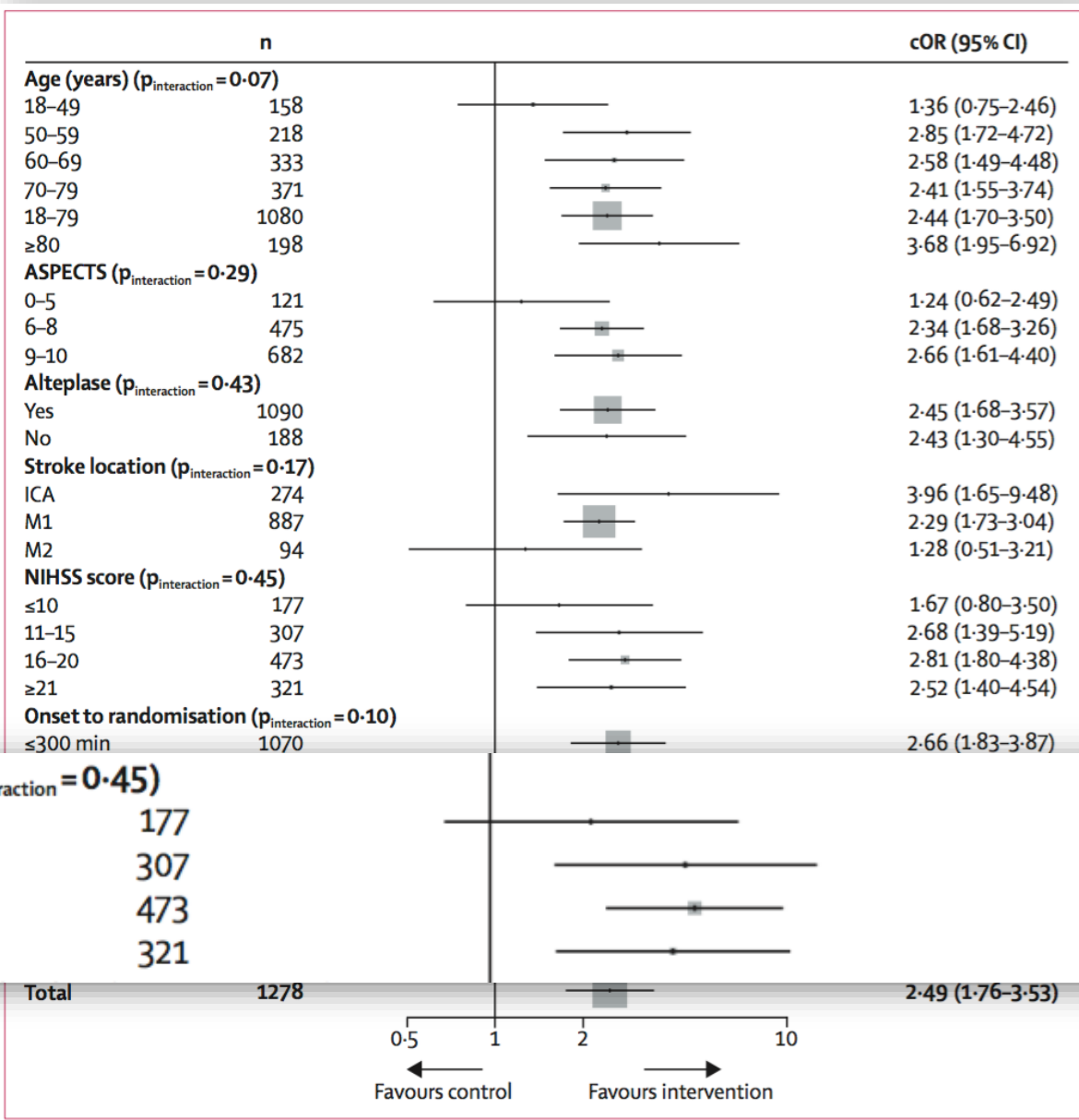


Mayank Goyal, Bijoy K Menon, Wim H van Zwam, Diederik W J Dippel, Peter J Mitchell, Andrew M Demchuk, Antoni Dávalos, Charles B L M Majoie, Aad van der Lugt, Maria A de Miquel, Geoffrey A Donnan, Yvo B W E M Roos, Alain Bonafe, Reza Jahan, Hans-Christoph Diener, Lucie A van den Berg, Elad I Levy, Olvert A Berkhemer, Vitor M Pereira, Jeremy Rempel, Mònica Millán, Stephen M Davis, Daniel Roy, John Thornton, Luis San Román, Marc Ribó, Debbie Beumer, Bruce Stouch, Scott Brown, Bruce C V Campbell, Robert J van Oostenbrugge, Jeffrey L Saver, Michael D Hill, Tudor G Jovin, for the HERMES collaborators

HERMES collaboration to pool patient-level data from five trials (MR CLEAN, ESCAPE, REVASCAT, SWIFT PRIME, and EXTEND IA) between Dec 2010, and Dec 2014.







NIHSS score ($p_{\text{interaction}} = 0.45$)

≤ 10	177	1.67 (0.80-3.50)
11-15	307	2.68 (1.39-5.19)
16-20	473	2.81 (1.80-4.38)
≥ 21	321	2.52 (1.40-4.54)

8. Although its benefits are uncertain, the use of endovascular therapy with stent retrievers may be reasonable for patients with acute ischemic stroke in whom treatment can be initiated (groin puncture) within 6 hours of symptom onset and who have prestroke mRS score >1 , ASPECTS <6 , or NIHSS score <6 and causative occlusion of the ICA or proximal MCA (M1) (*Class IIb; Level of Evidence B-R*). Additional randomized trial data are needed. (New recommendation)

Location

M2 MCA

Posterior circulation

Low NIHSS

Pre-treatment with IV tPA

Technique

Balloon guide

Direct aspiration

Aspiration plus stent-retriever

Core infarct size

Time from symptom onset



ORIGINAL RESEARCH

Intravenous thrombolysis before endovascular therapy for large vessel strokes can lead to significantly higher hospital costs without improving outcomes

Ansaar T Rai,¹ SoHyun Boo,¹ Chelsea Buseman,² Amelia K Adcock,³
Abdul R Tarabishy,⁴ Maurice M Miller,⁴ Thomas D Roberts,⁴ Jennifer R Domico,¹
Jeffrey S Carpenter¹

Single center retrospective analysis of **90** consecutive patients.

58% n=52 underwent endovascular therapy without IV tPA

42% n=38 underwent endovascular therapy pretreated with IV
tPA

Safety and Outcomes
for Subgroup
presenting within IV
tPA window

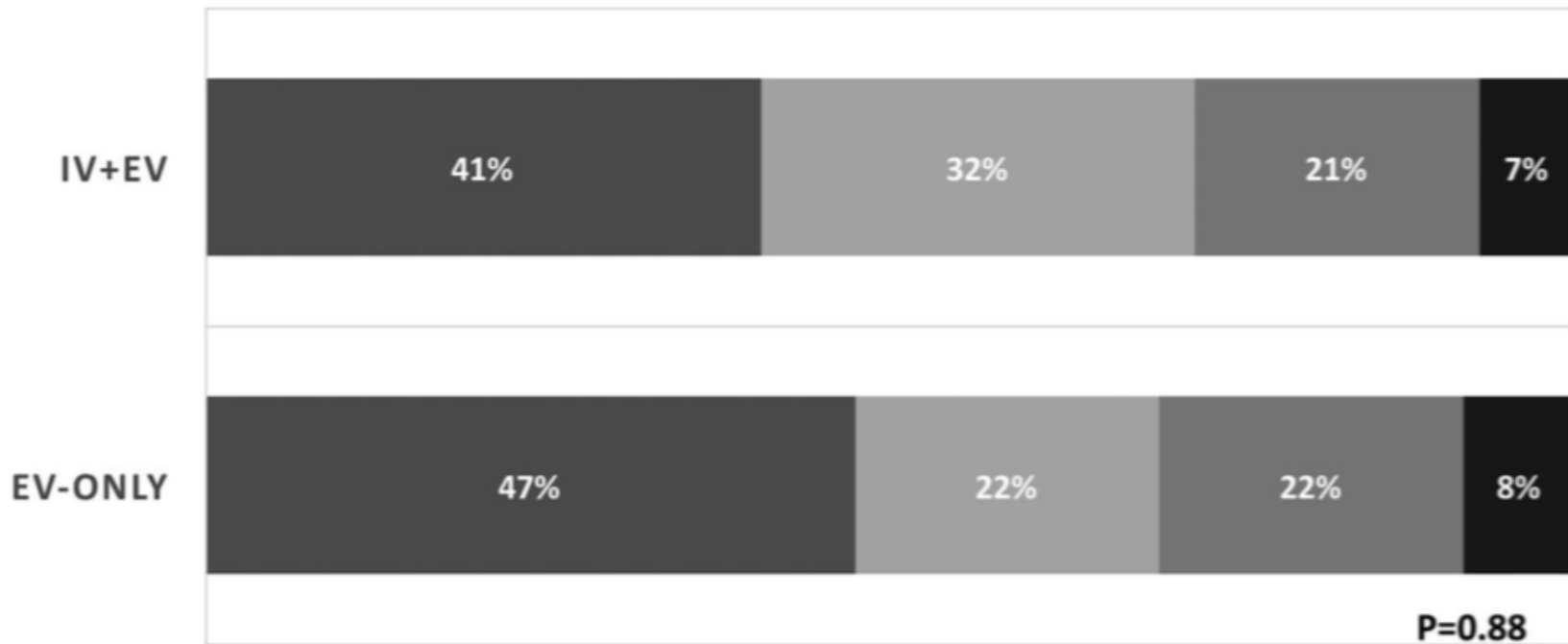
**EV-Only vs IV+EV
Onset to
presentation
≤4.5 hours (n=64)**

EV-Only (n=26)	IV+EV (n=38)	p Value
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Recanalization	21 (81)	31 (81.6)	0.93
Favorable outcome	14 (54)	22 (58)	0.75
Hemorrhage (PH1/PH2)	1 (3.8)	1 (2.6)	0.78
Mortality	5 (19.2)	4 (10.5)	0.33
Home discharge	11 (42)	11 (29)	0.27

STENT-RETRIEVER PASSES

■ 1 ■ 2 ■ 3 ■ >3



Cost and Length of
stay for Subgroup

presenting within IV
tPA window

EV-Only vs IV+EV

**Onset to presentation ≤ 4.5 hours
(n=64)**

EV-Only (n=26)

IV+EV (n=38)

p Value

Total cost, \$	31 621 (12 874)	40 743 (17 177)	0.027*
Direct cost, \$	22 087 (9228)	28 711 (11 406)	0.017*
Indirect cost, \$	9534 (3928)	12 032 (6311)	0.09
Length of stay, days	6 (4)	8 (6)	0.34
Length of ICU stay, days†	2 (2.2)	2.2 (1.5)	0.23

JAMA Neurology | **Original Investigation**

Combined Intravenous Thrombolysis and Thrombectomy vs Thrombectomy Alone for Acute Ischemic Stroke

A Pooled Analysis of the SWIFT and STAR Studies

Jonathan M. Coutinho, MD; David S. Liebeskind, MD; Lee-Anne Slater, MD; Raul G. Nogueira, MD;
Wayne Clark, MD; Antoni Dávalos, MD; Alain Bonafé, MD; Reza Jahan, MD; Urs Fischer, MD;
Jan Gralla, MD; Jeffrey L. Saver, MD; Vitor M. Pereira, MD

Analysis of two large multicenter, prospective clinical trials of Solitaire stent-retriever thrombectomy; Solitaire With the Intention for Thrombectomy (SWIFT; 2010-2011) and Solitaire Flow Restoration Thrombectomy for Acute Revascularization (STAR; 2010-2012).

291 patients

160 (55.0%) underwent IV tPA and endovascular therapy

131 (45.0%) underwent endovascular therapy alone

Procedural and Clinical

Outcomes

Variable	MT and IVT (n = 160)	MT Alone (n = 131)	P Value
No. of passes with stent retriever, mean (SD)	1.7 (0.9)	1.8 (1.0)	.28
No. of passes with stent retriever, median (range)	1 (1-5)	1 (1-7)	.30
mTICI 2b or 3 reperfusion	127/151 (84.1)	105/124 (84.7)	>.99
mTICI 3	86/151 (57.0)	66/124 (53.2)	.54
Outcome at 90 d			
mRS score of 0-1 ^b	65/156 (41.7)	46/128 (35.9)	.33
mRS score of 0-2 ^b	90/156 (57.7)	61/128 (47.7)	.10
Mortality	13/160 (8.1)	16/131 (12.2)	.32



Original Contribution

OPEN

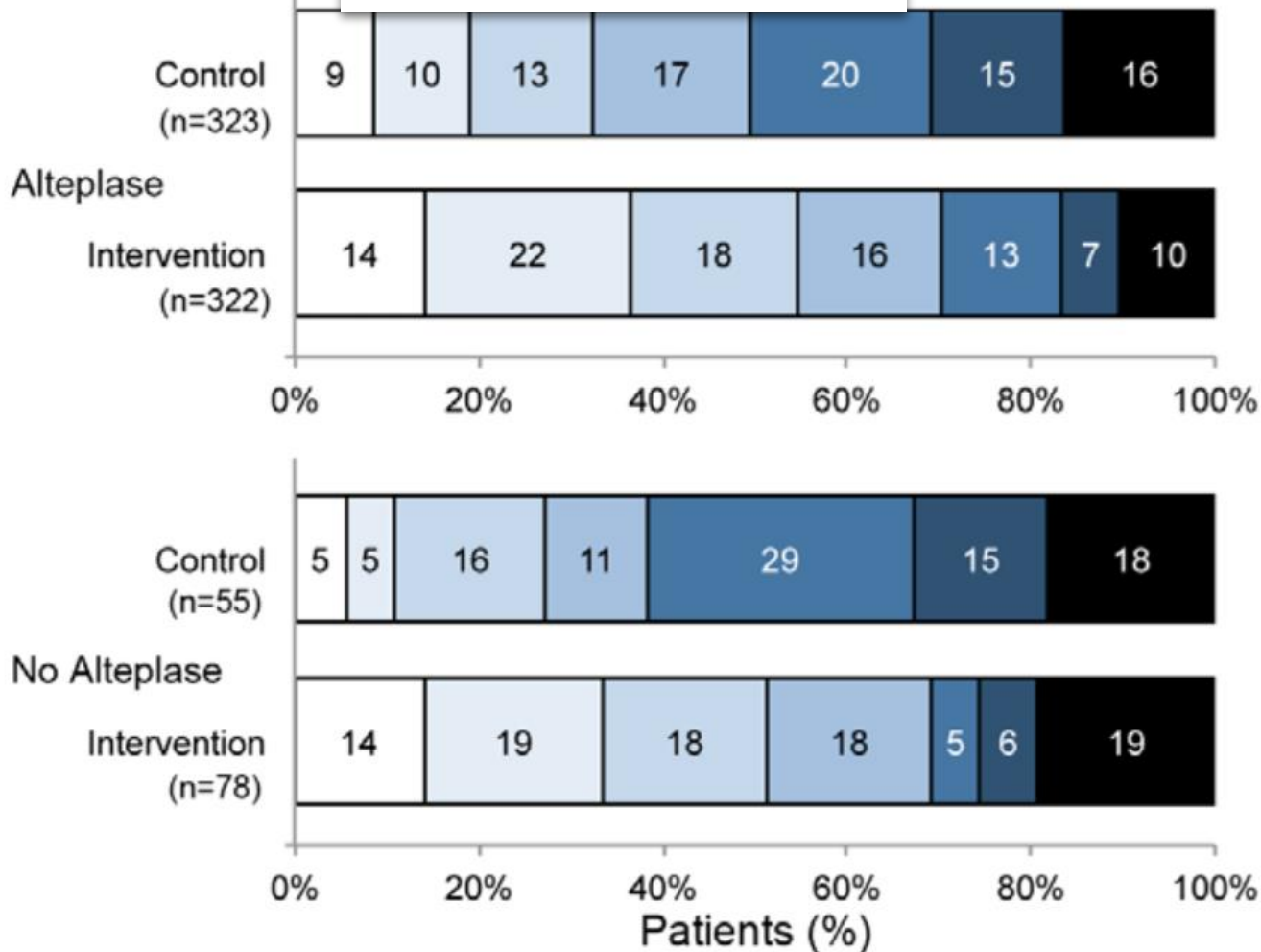
Safety and Efficacy of Solitaire Stent Thrombectomy Individual Patient Data Meta-Analysis of Randomized Trials

Bruce C.V. Campbell, MBBS, PhD*; Michael D. Hill, MD, MSc*; Marta Rubiera, MD*;
Bijoy K. Menon, MD, MSc*; Andrew Demchuk, MD; Geoffrey A. Donnan, MD;
Daniel Roy, MD; John Thornton, MD; Laura Dorado, MD, PhD; Alain Bonafe, MD;
Elad I. Levy, MD; Hans-Christoph Diener, MD, PhD; María Hernández-Pérez, MD;
Vitor Mendes Pereira, MD; Jordi Blasco, MD; Helena Quesada, MD; Jeremy Rempel, MD;
Reza Jahan, MD; Stephen M. Davis, MD; Bruce C. Stouch, PhD; Peter J. Mitchell, MBBS†;
Tudor G. Jovin, MD†; Jeffrey L. Saver, MD†; Mayank Goyal, MD†

Patient-level data pooled from trials in which the **Solitaire** was the only or the predominant device used in a prespecified meta-analysis (SEER Collaboration); SWIFT PRIME, ESCAPE, EXTEND-IA, REVASCAT

Modified Rankin Scale Score

□ 0 □ 1 □ 2 □ 3 □ 4 □ 5 ■ 6



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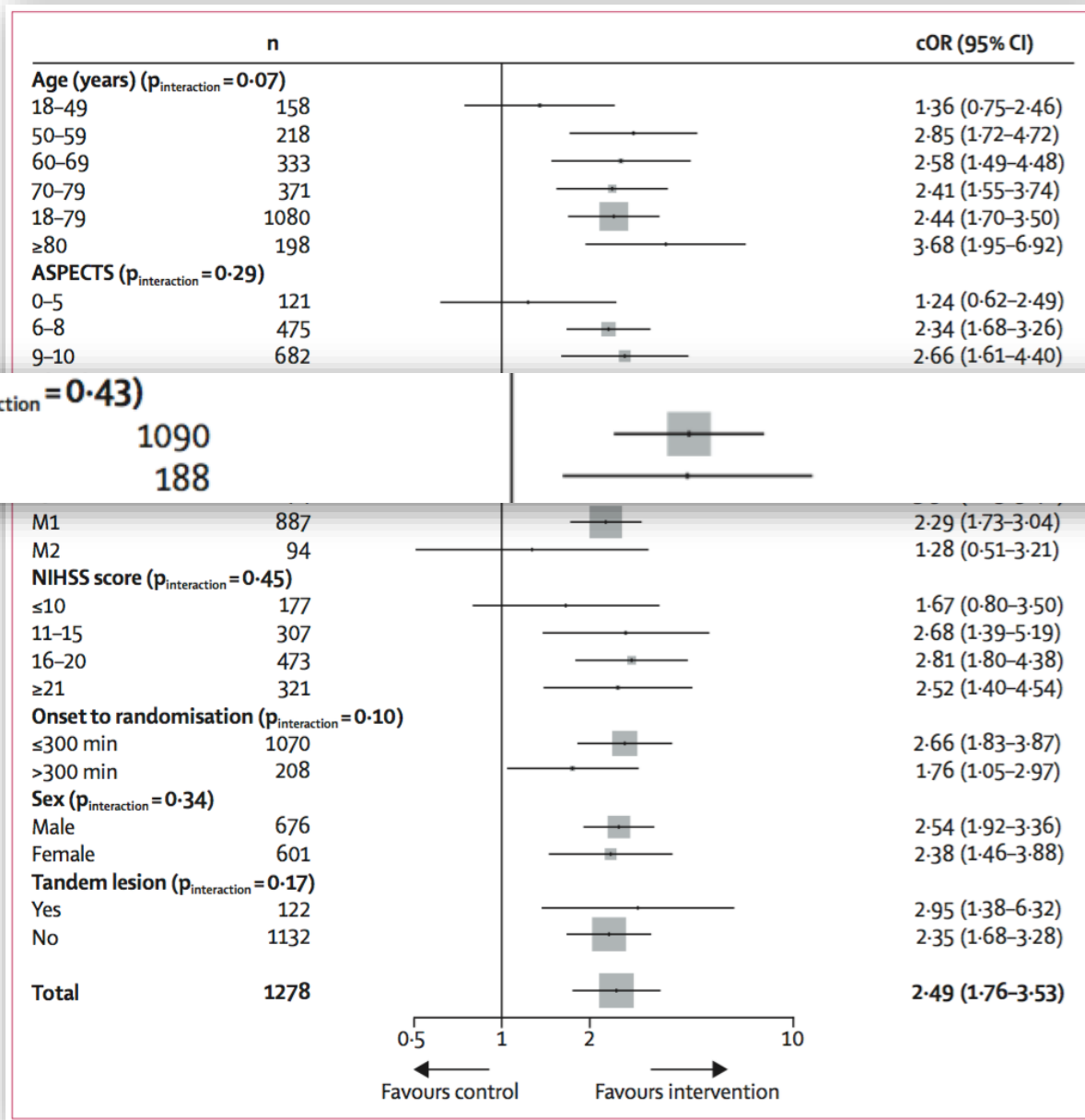
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Endovascular thrombectomy after large-vessel ischaemic stroke: a meta-analysis of individual patient data from five randomised trials



Mayank Goyal, Bijoy K Menon, Wim H van Zwam, Diederik W J Dippel, Peter J Mitchell, Andrew M Demchuk, Antoni Dávalos, Charles B L M Majoie, Aad van der Lugt, Maria A de Miquel, Geoffrey A Donnan, Yvo B W E M Roos, Alain Bonafe, Reza Jahan, Hans-Christoph Diener, Lucie A van den Berg, Elad I Levy, Olvert A Berkhemer, Vitor M Pereira, Jeremy Rempel, Mònica Millán, Stephen M Davis, Daniel Roy, John Thornton, Luis San Román, Marc Ribó, Debbie Beumer, Bruce Stouch, Scott Brown, Bruce C V Campbell, Robert J van Oostenbrugge, Jeffrey L Saver, Michael D Hill, Tudor G Jovin, for the HERMES collaborators

HERMES collaboration to pool patient-level data from five trials (MR CLEAN, ESCAPE, REVASCAT, SWIFT PRIME, and EXTEND IA) between Dec 2010, and Dec 2014.



Mechanical Thrombectomy Improves Functional Outcomes Independent of Pretreatment With Intravenous Thrombolysis

Georgios Tsivgoulis, MD; Aristeidis H. Katsanos, MD; Dimitris Mavridis, PhD;
Georgios Magoufis, MD; Adam Arthur, MD, MPH; Andrei V. Alexandrov, MD

Background and Purpose—Endovascular intervention for emergent large-vessel occlusion (ELVO) has evolved rapidly during the past decade. The question of whether pretreatment with intravenous thrombolysis (IVT) has a significant impact on the functional outcome of patients with ELVO still remains unanswered.

Methods—We conducted a systematic review and meta-analysis of all available randomized controlled trials evaluating the efficacy of endovascular therapy (ET) for acute ischemic stroke. We performed a mixed-effects subgroup analysis of the reported odds ratios on the association of ET (versus standard therapy) with 3-month functional outcome, stratified by pretreatment with IVT.

Results—Six randomized controlled trials were included, comprising 1916 total patients (49.1% receiving ET with IVT pretreatment and 5.6% receiving ET without IVT pretreatment). In the subgroup analysis, ET was associated with a higher likelihood of better 3-month functional outcome in both the subgroup of patients with (odds ratio=1.83; 95% confidence interval, 1.37–2.44; $P<0.001$) and without (odds ratio=2.47; 95% confidence interval, 1.32–4.63; $P=0.001$) pretreatment with IVT. We documented no significant effect of IVT pretreatment on the 3-month functional outcome of patients with ELVO undergoing ET, suggesting that ET is effective in all patients with ELVO. Heterogeneity was documented in the IVT pretreatment subgroup ($I^2=68.3\%$; P for Cochran $Q=0.014$), but not in the subgroup that did not receive IVT pretreatment ($I^2=0\%$, P for Cochran $Q=0.927$). The risk of bias was considered to be generally low in the qualitative assessment of the included trials.

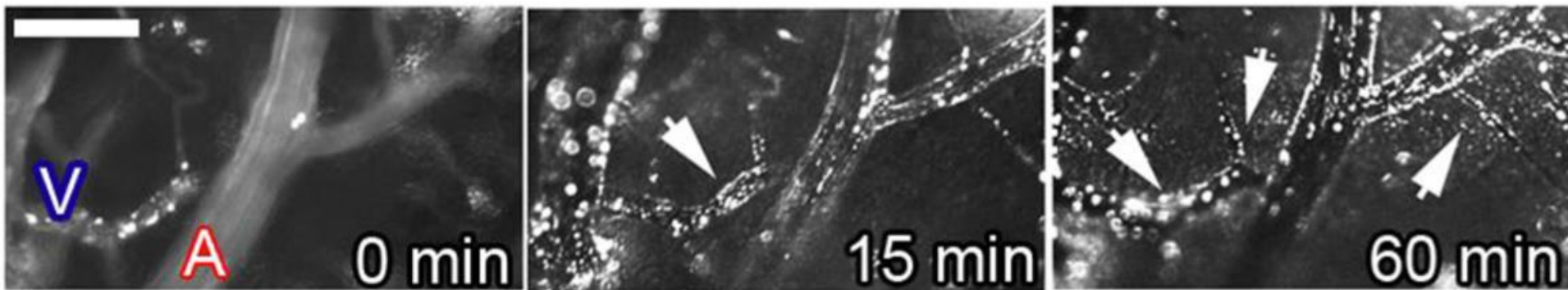
Conclusions—Our observation provides evidence and further reassurance to stroke clinicians regarding the efficacy of ET in ELVO independent of pretreatment with IVT. (*Stroke*. 2016;47:1661-1664. DOI: 10.1161/STROKEAHA.116.013097.)

Alteplase Reduces Downstream Microvascular Thrombosis and Improves the Benefit of Large Artery Recanalization in Stroke

Jean-Philippe Desilles, MD, MSc; Stephane Loyau, BSc; Varouna Syvannarath, MSc;
Jaime Gonzalez-Valcarcel, MD; Marie Cantier, MD; Liliane Louedec, BSc;
Bertrand Lapergue, MD, PhD; Pierre Amarenco, MD; Nadine Ajzenberg, MD, PhD;
Martine Jandrot-Perrus, MD, PhD; Jean-Baptiste Michel, MD, PhD; Benoit Ho-Tin-Noe, PhD;
Mikael Mazighi, MD, PhD

Study of transient MCA occlusion rat stroke model; 60-minute transient occlusion.

Cortical microcirculation downstream of MCA observed by intravital microscopy before, during, and after occlusion.



After MCA occlusion **platelets** and **leukocytes** adhere and accumulate (predominantly in the venous compartment), leading to secondary occlusions (*arrows*). Demonstrating **time-dependent increase in occluded microvessels during MCA occlusion**.

Alteplase treatment reduced infarct volume ($P=0.006$) and increased percentage of perfused vessels during occlusion ($P=0.02$) compared with saline.

reduced in vitro platelet aggregation ($P=0.0001$) and facilitated platelet disaggregation ($P=0.001$).

REVIEW

Does the use of IV tPA in the current era of rapid and predictable recanalization by mechanical embolectomy represent good value?

Ronil V Chandra,^{1,2} Thabele M Leslie-Mazwi,³ Brijesh P Mehta,⁴ Colin P Derdeyn,⁵ Andrew M Demchuk,^{6,7} Bijoy K Menon,^{6,7} Mayank Goyal,^{6,7} R Gilberto González,⁸ Joshua A Hirsch³

Recommendations

Endovascular Interventions

- 1. Patients eligible for intravenous r-tPA should receive intravenous r-tPA even if endovascular treatments are being considered (*Class I; Level of Evidence A*). (Unchanged from the 2013 guideline)**

Location

M2 MCA

Posterior circulation

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Pre-treatment with IV tPA

Technique

Balloon guide

Direct aspiration

Aspiration plus stent-retriever

Core infarct size

Time from symptom onset



	Protocol treatment window	Mean onset-to-groin access (time to endovascular treatment)
MR CLEAN	within 6 hours	4 hours 20 mins
ESCAPE	< 12 hours	3 hours 5 mins
EXTEND-IA	within 6 hours	3 hours 30 mins
SWIFT PRIME	within 6 hours	3 hours 4 mins
REVASCAT	within 8 hours	4 hours 29 mins

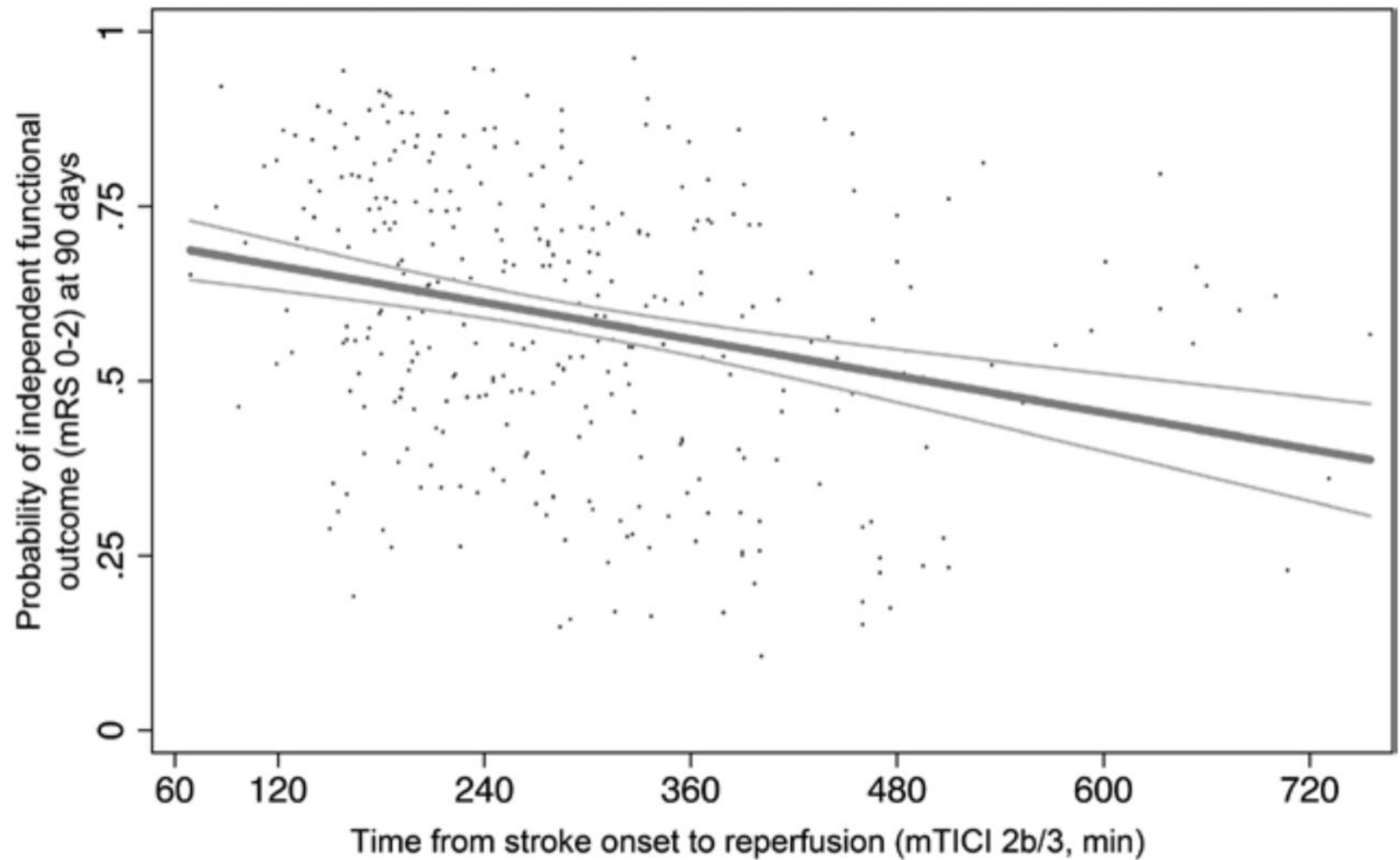
Original Contribution

OPEN

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Bruce C.V. Campbell, MBBS, PhD*; Michael D. Hill, MD, MSc*; Marta Rubiera, MD*;
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Patient-level data pooled from trials in which the **Solitaire** was the only or the predominant device used in a prespecified meta-analysis (**SEER** Collaboration); SWIFT PRIME, ESCAPE, EXTEND-IA, REVASCAT

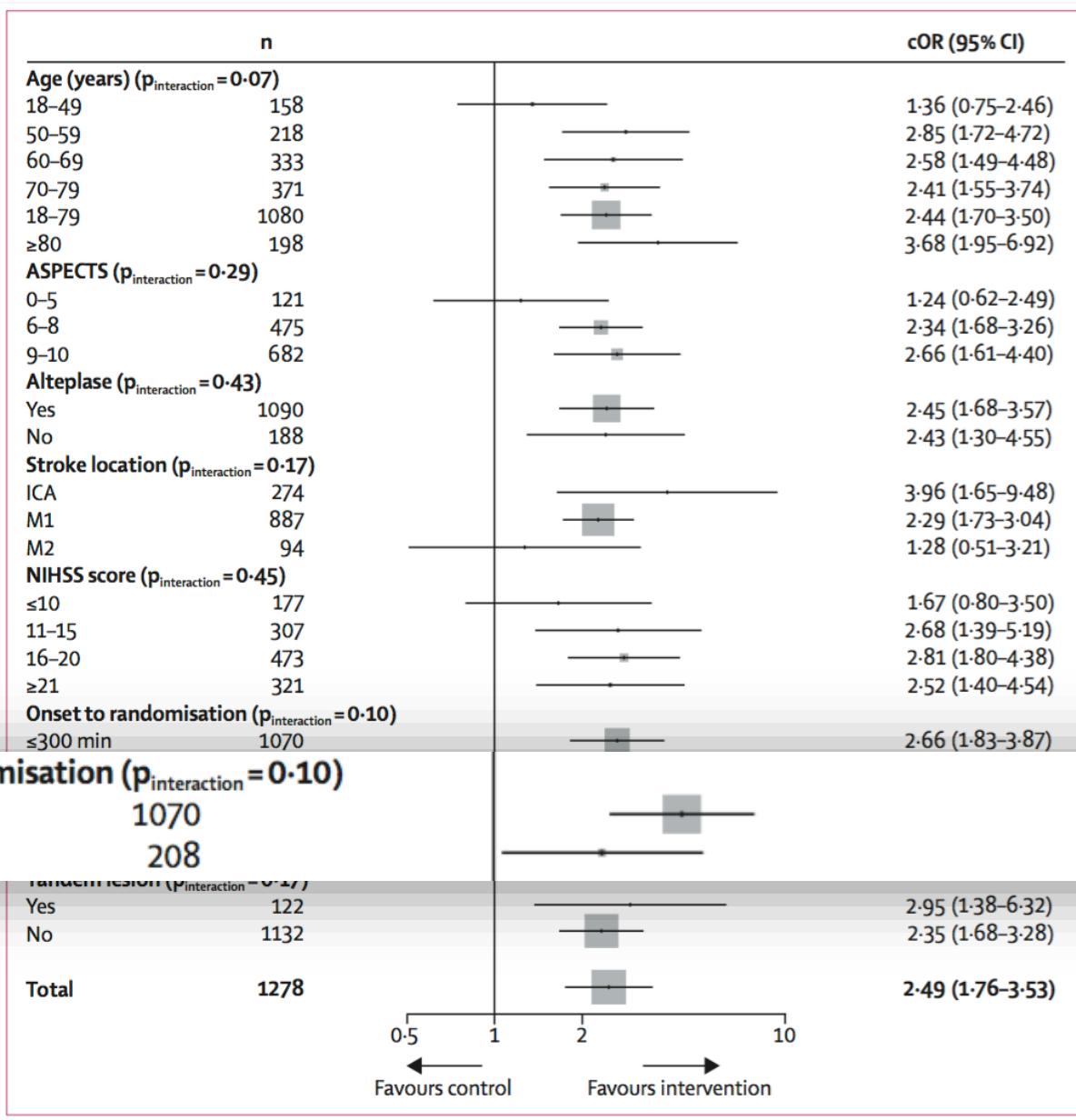


Endovascular thrombectomy after large-vessel ischaemic stroke: a meta-analysis of individual patient data from five randomised trials



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HERMES collaboration to pool patient-level data from five trials (MR CLEAN, ESCAPE, REVASCAT, SWIFT PRIME, and EXTEND IA) between Dec 2010, and Dec 2014.



- 4. When treatment is initiated beyond 6 hours from symptom onset, the effectiveness of endovascular therapy is uncertain for patients with acute ischemic stroke who have causative occlusion of the ICA or proximal MCA (M1) (*Class IIb; Level of Evidence C*). Additional randomized trial data are needed. (New recommendation)**

Collaterals

ECA-ICA

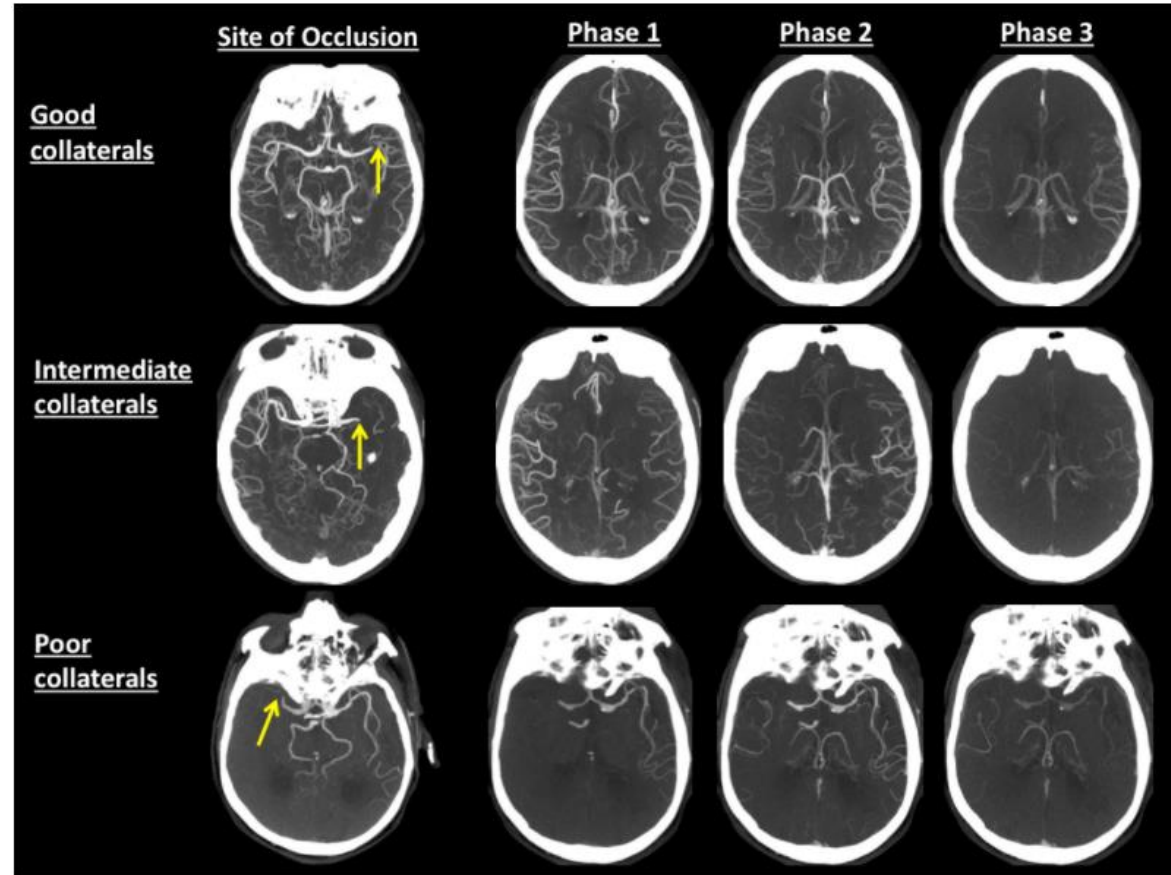
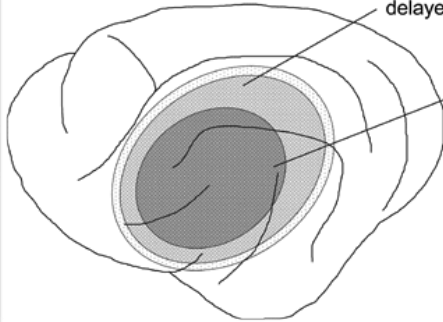
Circle of Willis

Leptomeningeal

Compartments of Infarct Development

Penumbra: moderate ischemia
delayed infarction

Core: dense ischemia
early infarction





Trevo and Medical Management Versus Medical Management Alone in Wake Up and Late Presenting Strokes

- Age ≥ 18
- Baseline NIHSS ≥ 10 (assessed within one hour of measuring core infarct volume)
- Randomised within 6 to 24 hours after time last known well
- pre-stroke mRS 0 - 1

Imaging Criteria

- $< 1/3$ MCA territory involved
- Occlusion of the intracranial ICA and/or MCA-M1
- Clinical Imaging Mismatch defined as one of the following;

MR-DWI or CTP-rCBF maps

0 to < 21 cc core infarct and NIHSS ≥ 10 (and age ≥ 80)

0 to < 31 cc core infarct and NIHSS ≥ 10 (and age < 80)

31 to < 51 cc core infarct and NIHSS ≥ 20 (and age < 80)



Stryker Announces an Early Stop to Enrollment in the DAWN™ Trial Due to the High Probability of Trial Success

Stryker announced an early end to patient enrollment in the DAWN Trial, a clinical study designed to compare mechanical thrombectomy with the Trevo® Retriever plus medical therapy against medical therapy alone when initiated within six to 24 hours after time last known well.

KALAMAZOO, MICHIGAN (PRWEB) MARCH 08, 2017

Stryker announced an early end to patient enrollment in the DAWN Trial, a clinical study designed to compare mechanical thrombectomy with the Trevo® Retriever plus medical therapy against medical therapy alone when initiated within six to 24 hours after time last known well. The independent Data Safety Monitoring Board (DSMB) recommended stopping study enrollment based on a pre-planned interim review of data from the first 200 patients, which concluded that multiple pre-specified stopping criteria were met. A final analysis of the data will be conducted upon completion of the remaining patient follow-up.



31 to < 51 cc core infarct and NIHSS ≥ 20 (and age < 80)



Trevo and Medical Management Versus Medical Management Alone in Wake Up and Late Presenting Strokes

May 16th



“**206** patients enrolled in the DAWN trial demonstrated that treatment with the Trevo Retriever significantly decreased poststroke disability and **improved functional independence at 90 days** when compared to medical management alone (48.6% vs 13.1%; $P > .9999$), a **relative reduction in disability of 73% percent**. The study showed that **1 in 2.8 patients treated** with the Trevo Retriever **within 24 hours of a stroke is saved from severe disability.**”



Endovascular Therapy Following Imaging Evaluation for Ischemic Stroke 3

- Age ≥ 18 - 90
- Baseline NIHSS ≥ 6
- Therapy initiated within **6 to 16 hours** of onset
- pre-stroke mRS 0 - 2

Imaging Criteria

- Occlusion of ICA and/or MCA-M1
- Target mismatch profile; (ischemic core volume is < 70 ml, mismatch ratio is ≥ 1.8 and mismatch volume* is ≥ 15 ml)

Perfusion Imaging Selection of Ischemic Stroke Patients for Endovascular

Therapy

- Age 18 - 80
- Baseline NIHSS ≥ 8
- Therapy initiated within **6 to 12 hours** of onset
- pre-stroke mRS 0 - 1

Imaging Criteria

- Occlusion of ICA and/or MCA-M1 bifurcation
- Exclude MRI or CT $> 1/3$ rd MCA territory; ASPECTS < 7

Location

M2 MCA

Posterior circulation

Low NIHSS

Pre-treatment with IV tPA

Technique

Balloon guide

Direct aspiration

Aspiration plus stent-retriever

Core infarct size

Time from symptom onset



Balloon Guide Catheter Improves Revascularization and Clinical Outcomes With the Solitaire Device

Analysis of the North American Solitaire Acute Stroke Registry

Thanh N. Nguyen, MD, FRCPC; Timothy Malisch, MD; Alicia C. Castonguay, PhD;
Rishi Gupta, MD; Chung-Huan J. Sun, MD; Coleman O. Martin, MD; William E. Holloway, MD;
Nils Mueller-Kronast, MD; Joey D. English, MD, PhD; Italo Linfante, MD;
Guilherme Dabus, MD; Franklin A. Marden, MD; Hormozd Bozorgchami, MD;
Andrew Xavier, MD; Ansaar T. Rai, MD; Michael T. Froehler, MD, PhD; Aamir Badruddin, MD;
Muhammad Taqi, MD; Michael G. Abraham, MD; Vallabh Janardhan, MD;
Hashem Shaltoni, MD; Roberta Novakovic, MD; Albert J. Yoo, MD; Alex Abou-Chebl, MD;
Peng R. Chen, MD; Gavin W. Britz, MD; Ritesh Kaushal, MD; Ashish Nanda, MD;
Mohammad A. Issa, MD; Hesham Masoud, MD; Raul G. Nogueira, MD;
Alexander M. Norbash, MD; Osama O. Zaidat, MD, MS

24 centres participating in North American Solitaire Acute Stroke
(NASA) registry.

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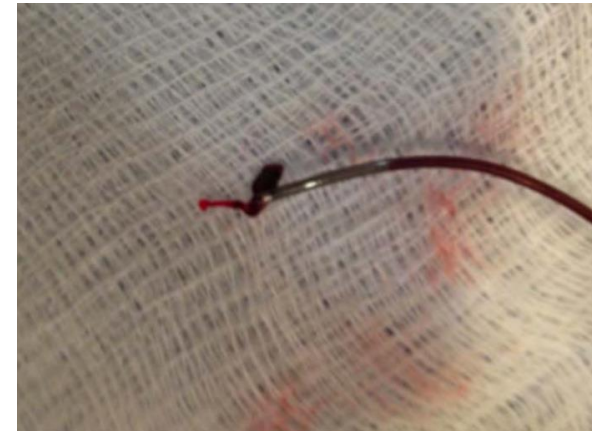
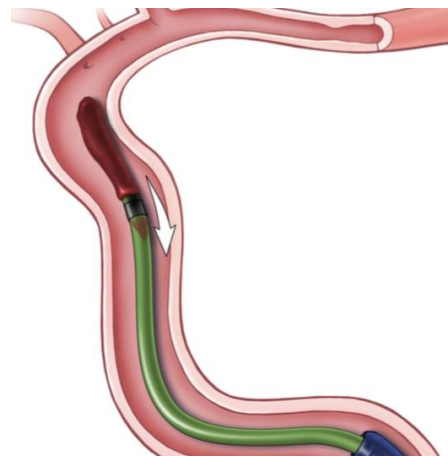
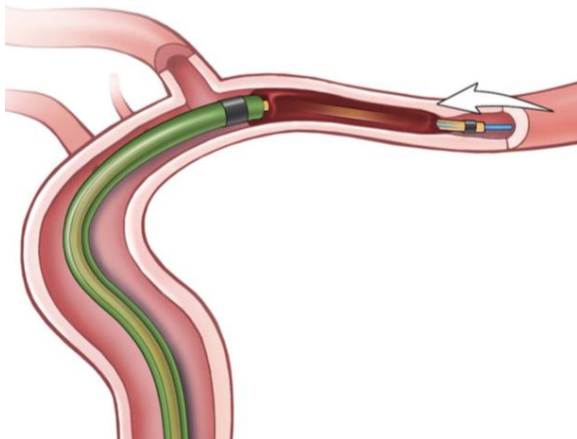
	BGC (n=149), n (%)	No BGC (n=189), n (%)	P Value
Imaging results			
Distal emboli	26 (18.2)	29 (16)	0.7
Emboli in new territory	8 (5)	10 (5.2)	0.9
Recanalization TICI 3	80 (53.7)	61 (32.5)	<0.0001
Recanalization TICI 2b–3	113 (76)	133 (71)	0.3
Recanalization TIMI 2/3	128 (86)	158 (84)	0.6
Recanalization TICI 2a–3	131 (87.9)	166 (87.8)	1
Clinical outcome			
Discharge NIHSS score			
Mean (SD)	12 (14.5)	17.5 (16)	0.002
Median (IQR)	6 (1–18)	11 (4–42)	
Good clinical outcome (1 mo)	55 (49.1)	32 (24.2)	0.002
Good clinical outcome (3 mo)	65 (51.6)	62 (35.8)	0.02
Symptomatic hemorrhage	18 (12.2)	17 (9)	0.4
Mortality	33 (26.2)	55 (31.8)	0.3

- 10. Use of stent retrievers is indicated in preference to the MERCI device. (*Class I; Level of Evidence A*). The use of mechanical thrombectomy devices other than stent retrievers may be reasonable in some circumstances (*Class IIb, Level B-NR*). (New recommendation)**
- 11. The use of a proximal balloon guide catheter or a large-bore distal-access catheter rather than a cervical guide catheter alone in conjunction with stent retrievers may be beneficial (*Class IIa; Level of Evidence C*). Future studies should examine which systems provide the highest recanalization rates with the lowest risk for nontarget embolization. (New recommendation)**

ORIGINAL RESEARCH

Initial clinical experience with the ADAPT technique: A direct aspiration first pass technique for stroke thrombectomy

Aquilla S Turk,¹ Alex Spiotta,² Don Frei,³ J Mocco,⁴ Blaise Baxter,⁵ David Fiorella,⁶
Adnan Siddiqui,⁷ Maxim Mokin,⁷ Michael Dewan,⁴ Henry Woo,⁶ Raymond Turner,²
Harris Hawk,¹ Amrendra Miranpuri,¹ Imran Chaudry¹



A Direct Aspiration, First Pass Technique (ADAPT) versus Stent Retrievers for Acute Stroke Therapy: An Observational Comparative Study

B. Lapergue, R. Blanc, P. Guedin, J.-P. Decroix, J. Labreuche, C. Preda, B. Bartolini, O. Coskun, H. Redjem, M. Mazighi, F. Bourdain, G. Rodesch, and M. Piotin



Outcomes ^a	Solitaire Group (n = 119)	ADAPT Group (n= 124)	Relative Risk	P Value
Successful revascularization at final angiogram	82 (68.9)	102 (82.3)	1.19 (1.03–1.38)	.015
Early neurologic improvement	61 (55.5)	56 (57.1)	1.03 (0.81–1.31)	.81
90-day excellent outcome	44 (38.3)	45 (39.1)	1.02 (0.73–1.42)	.89
90-day favorable outcome	63 (54.8)	61 (53.0)	0.97 (0.76–1.23)	.79
90-day mortality	20 (17.4)	26 (22.6)	1.30 (0.77–2.19)	.32
ENT	8 (6.8)	7 (5.7)	–	.70
sICH	7 (5.9)	3 (2.4)	–	.21



Fondation Ophtalmologique
Adolphe de Rothschild

ASTER trial: Interest of Direct Aspiration First Pass Technique (ADAPT) for Thrombectomy Revascularisation of Large Vessel Occlusion in Acute Ischaemic Stroke

Prospective, multicenter (8 centres in France) randomised trial comparing ADAPT to stent-retriever thrombectomy within \leq 6hrs.

Successful reperfusion at end of procedure

Endpoint	Aspiration first n=192	Stent-retriever first n=189	p value
TICI 2b/3	164 (85.4)	157 (83.1)	0.53
TICI 3	72 (37.5)	73 (38.6)	0.82
Adjunctive tx	63 (32.8)	63 (32.8)	0.053



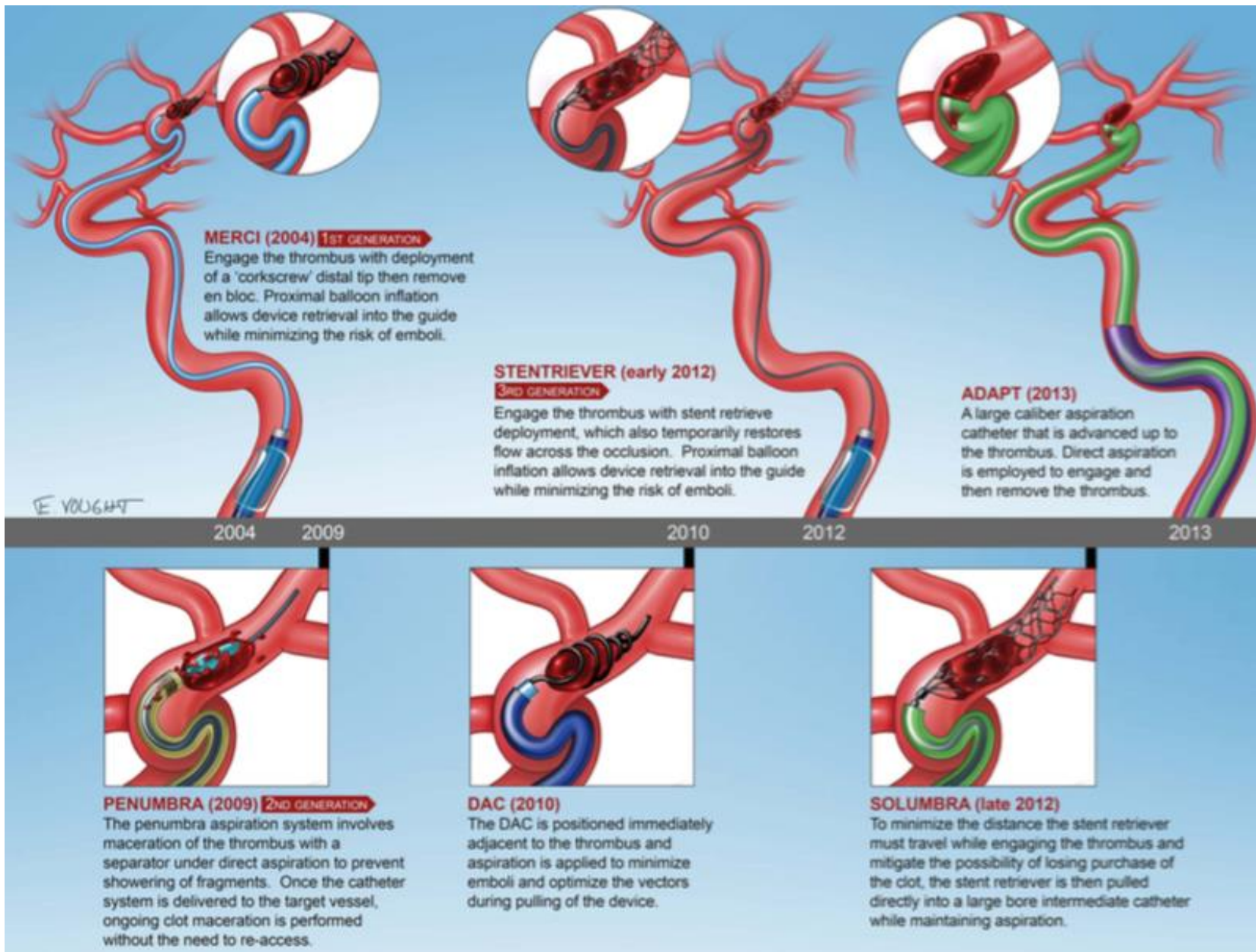
Fondation Ophtalmologique
Adolphe de Rothschild

ASTER trial: Interest of Direct Aspiration First Pass Technique (ADAPT) for Thrombectomy Revascularisation of Large Vessel Occlusion in Acute Ischaemic Stroke

Prospective, multicenter (8 centres in France) randomised trial comparing ADAPT to stent-retriever thrombectomy within \leq 6hrs.

Successful frontline strategy alone

Endpoint	Aspiration first n=192	Stent-retriever first n=189	p value
TICI 2b/3	121 (63)	128 (67.7)	0.33
TICI 3	55 (28.6)	67 (35.4)	0.15





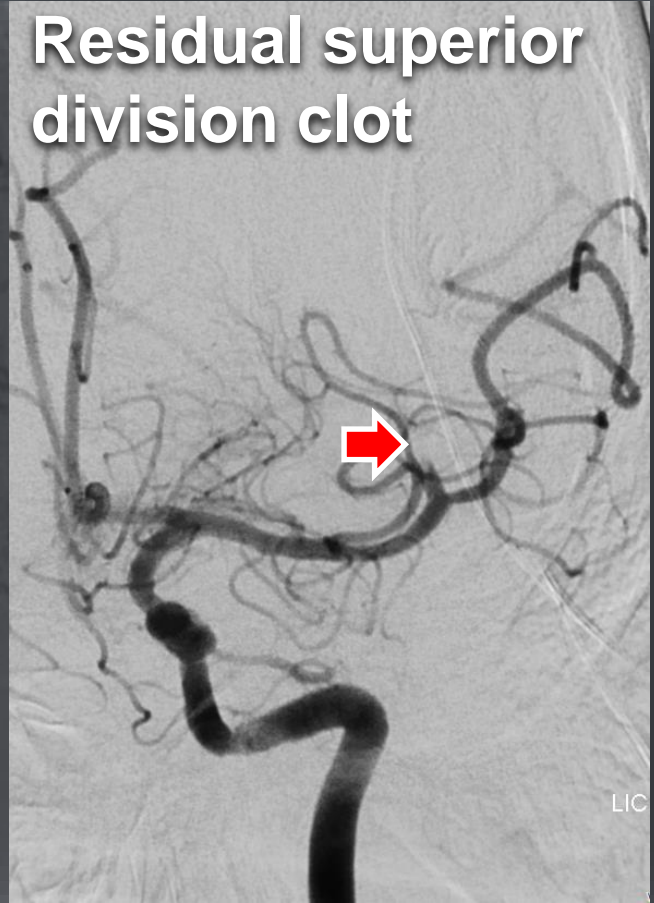
Accessing L-
MCA clot



**Accessing L-
MCA clot**

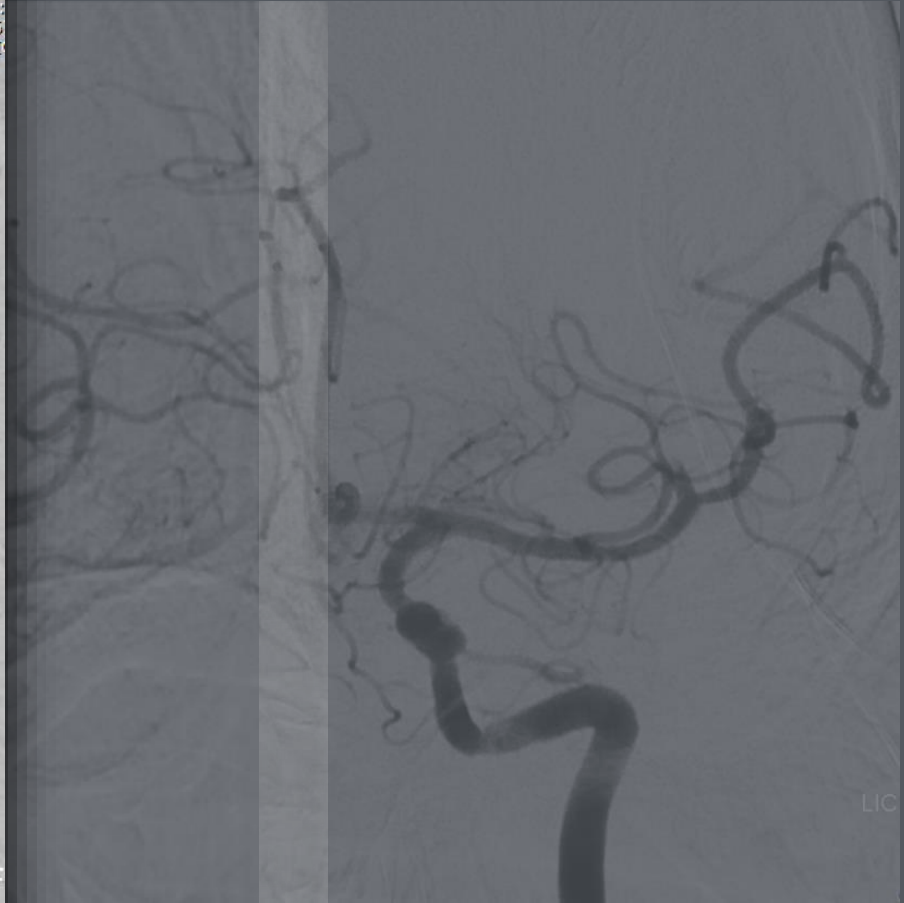
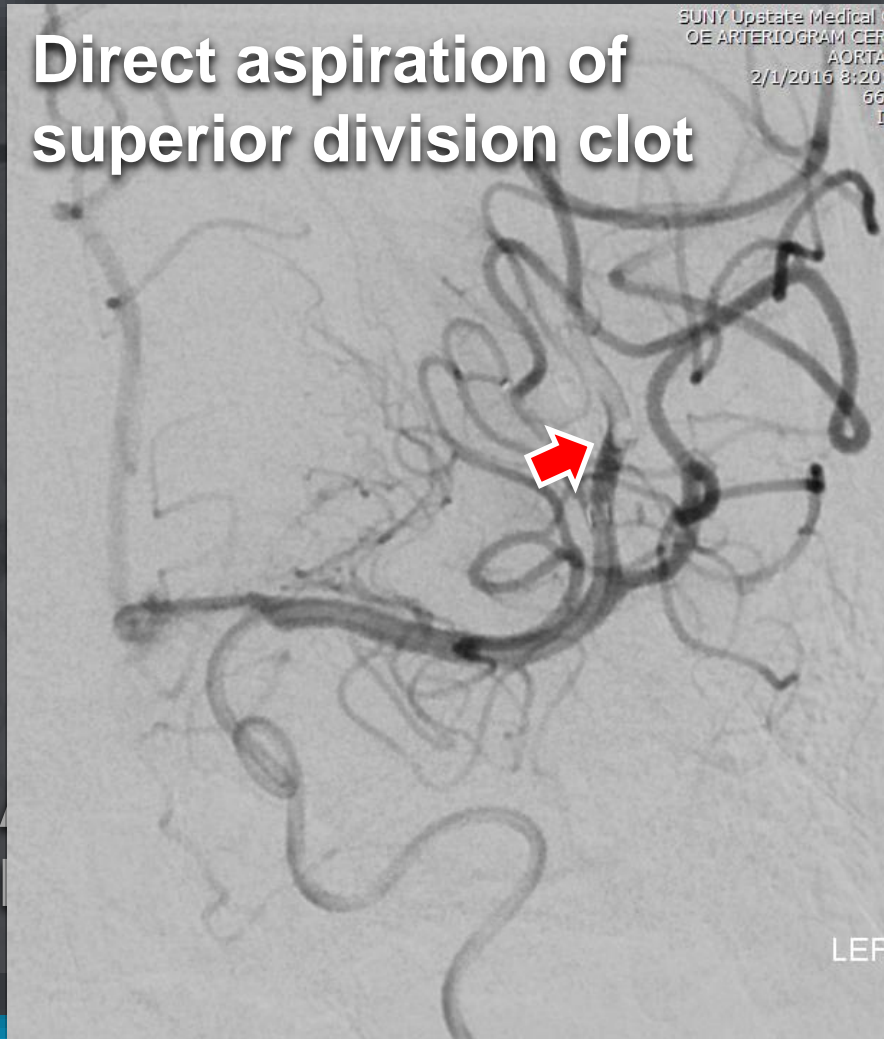


**Trevo device
4x20 deployment**



Direct aspiration of superior division clot

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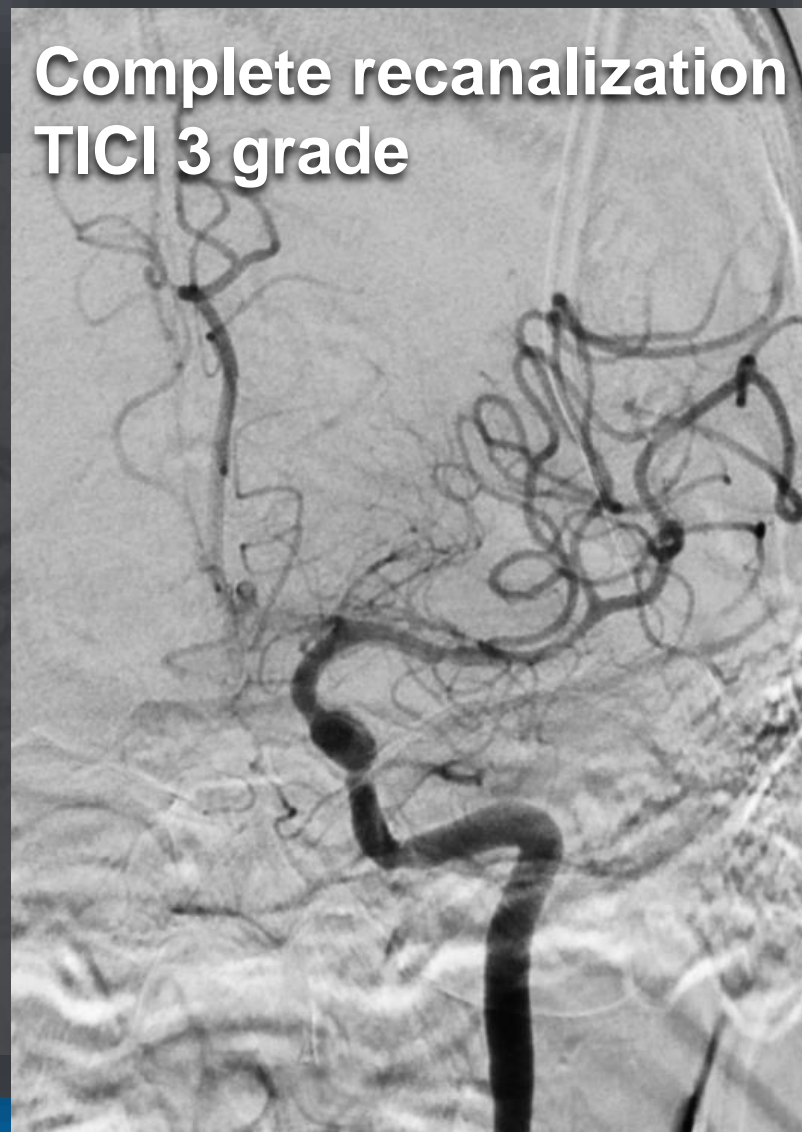


SUNY Upstate Medical
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2/1/2016 3:20:
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Accessing L-
MCA clot

Complete recanalization
TICI 3 grade



ORIGINAL RESEARCH

Comparison of clinical outcomes in patients with acute ischemic strokes treated with mechanical thrombectomy using either Solumbra or ADAPT techniques

Josser E Delgado Almandoz,¹ Yasha Kayan,¹ Mark L Young,² Jennifer L Fease,¹ Jill M Scholz,¹ Anna M Milner,¹ Timothy H Hehr,² Pezhman Roohani,² Maximilian Mulder,³ Ronald M Tarrel²

Comparison of consecutive patients who underwent mechanical thrombectomy using either the Solumbra or ADAPT techniques at a comprehensive stroke center.

55 Solumbra

45 ADAPT

Outcomes

	All patients N=100	Solumbra group N=55 (%)	ADAPT group N=45 (%)	p Value*
Any post-thrombectomy ICH	36	26 (47)	10 (22)	0.01
Any post-thrombectomy SAH	16	13 (24)	3 (7)	0.03
Post-thrombectomy SICH	8	7 (13)	1 (2)	0.07
Intraparenchymal	3	2 (4)	1 (2)	1
Subarachnoid	5	5 (9)	0	0.06
Mean Neuro-ICU LOS, days	3.1	3.7	2.4	0.04
Mean hospital LOS, days	6.5	6.8	6.2	0.5
Discharge disposition				
Home	19	8 (15)	11 (24)	0.3
Rehabilitation	43	22 (40)	21 (47)	0.5
SNF	16	9 (16)	7 (16)	1
Expired/hospice	22	16 (29)	6 (13)	0.09
90-day mortality	24	16 (29)	8 (18)	0.24
Good clinical outcome at 90 days (mRS 0–2)	42	17 (31)	25 (56)	0.015



STRATIS Registry

Prospective multicenter registry of Solitaire stent-retriever thrombectomy within ≤ 8 hrs using

- Proximal flow arrest with balloon guide catheter (BGC)
- Large bore conventional guide catheter (CGC)
- Distal large bore catheter (DLBC)

Main angiographic and technical outcomes

- First pass effect defined as successful recanalization of \geq TICI2b
- TICI 3 after first pass with Solitaire
- Number of passes among the cohorts

STRATIS Registry

413 patients included in interim analysis.

Initial technical approach

60% BGC, 30% DLBC, and 10% CGC.

Rates of FPE

62%, 51%, and 45% ($P = 0.0336$), while the true FPE rates were: 44% vs. 37% vs. 28% ($P = 0.0996$) with BGC, DLBC, and CGC, respectively.

Mean number of passes

1.7 ± 1.09 , 2.1 ± 1.42 , and 2.2 ± 1.76 ($P = 0.0085$), with BGC, DLBC, and CGC, respectively.

The rates of successful recanalization of \geq TICI2b after all passes

91.9% BGC, 88.8% DLBC, and 87.5% CGC ($P = 0.4945$).



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ASTER Trial

Subgroup analysis, clinical outcomes, and a cost-effectiveness analysis will be presented at the European Stroke Organisation Conference 2017 in May (ESOC; 16–18 May, Prague, Czech Republic).



COMPASS Trial:

a Direct Aspiration First Pass Technique

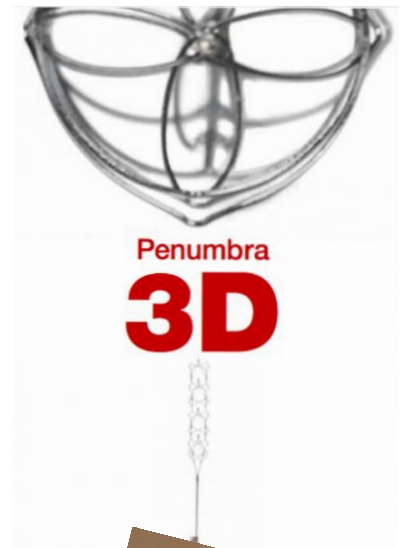
Prospective, randomised trial comparing ADAPT to stent-retriever thrombectomy within ≤ 6 hrs.

ClinicalTrials.gov Identifier(s):

NCT02523261

NCT02466893

Amnis Therapeutics **Golden Retriever** Karolinska Institute clinical trial to enrol 60 patients

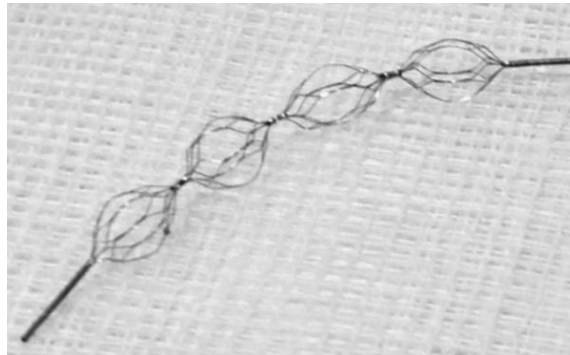


Neuravi
EmboTrap II
Initial data presented at
ESMINT 2015; Karolinska
ARISE II clinical trial
enrolment completed 2/2017



Medtronic

Embolus Retriever with
Interlinked Cages
(ERIC)



Lazarus Effect

WITH A STROKE, TIME LOST IS BRAIN LOST.



Estimated Pace of Neural Circuitry Loss in Typical Large Vessel, Supratentorial Acute Ischemic Stroke

	Neurons Lost	Synapses Lost	Myelinated Fibers Lost	Accelerated Aging
Per Stroke	1.2 billion	8.3 trillion	7140 km/4470 miles	36 y
Per Hour	120 million	830 billion	714 km/447 miles	3.6 y
Per Minute	1.9 million	14 billion	12 km/7.5 miles	3.1 wk
Per Second	32 000	230 million	200 meters/218 yards	8.7 h



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