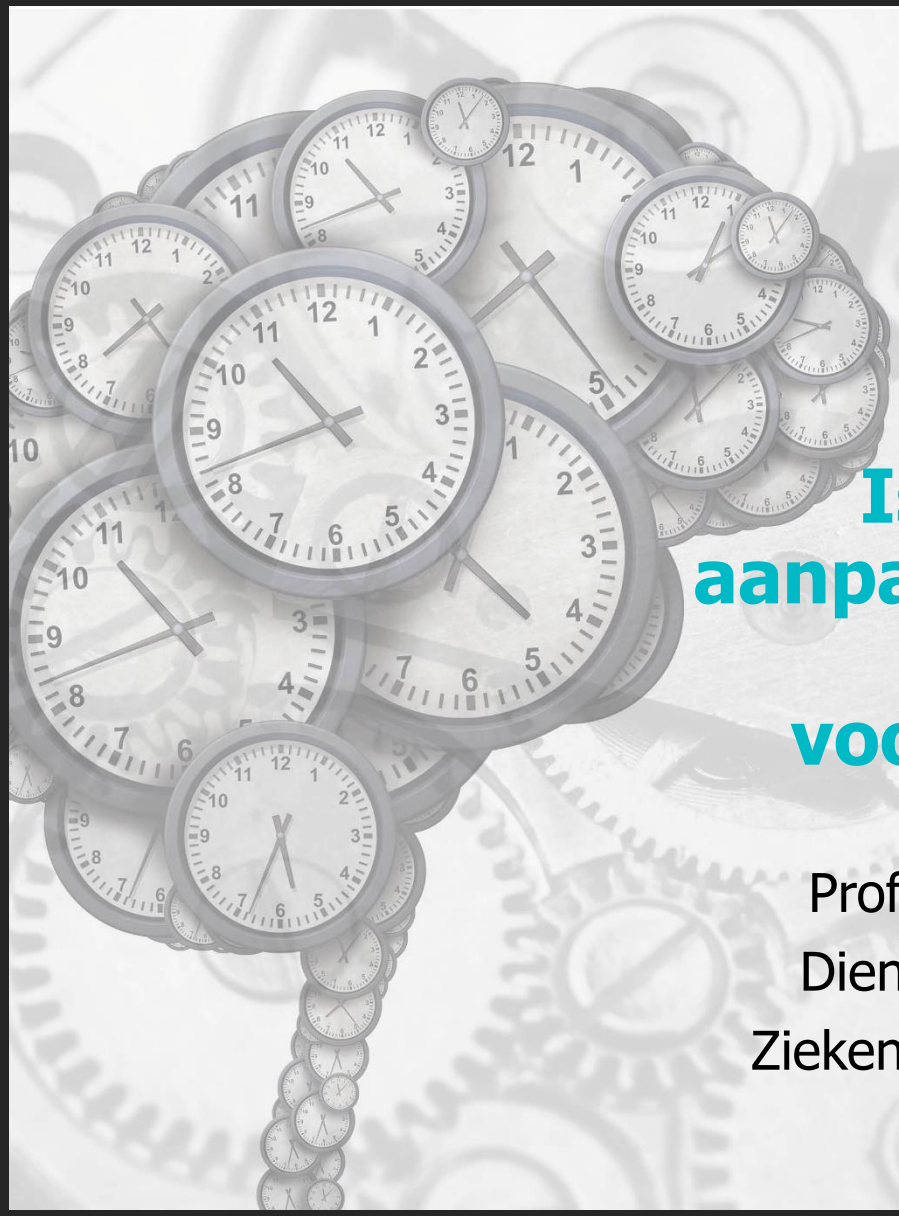

Ischemic stroke: aanpak op Spoedgevallen en Anesthesie voor thrombectomie

Prof. dr. Pascal Vanelderen
Diensthoofd Spoedgevallen
Ziekenhuis Oost-Limburg, Genk

Ziekenhuis Oost-Limburg


FAST & FURIOUS


FAST & FURIOUS

FAST INLEIDING
Modified Rankin Score

- 0 - No symptoms.
- 1 - No significant disability. Able to carry out all usual activities, despite some symptoms.
- 2 - Slight disability. Able to look after own affairs without assistance, but unable to carry out all previous activities.
- 3 - Moderate disability. Requires some help, but able to walk unassisted.
- 4 - Moderately severe disability. Unable to attend to own bodily needs without assistance, and unable to walk unassisted.
- 5 - Severe disability. Requires constant nursing care and attention, bedridden, incontinent.
- 6 - Dead.

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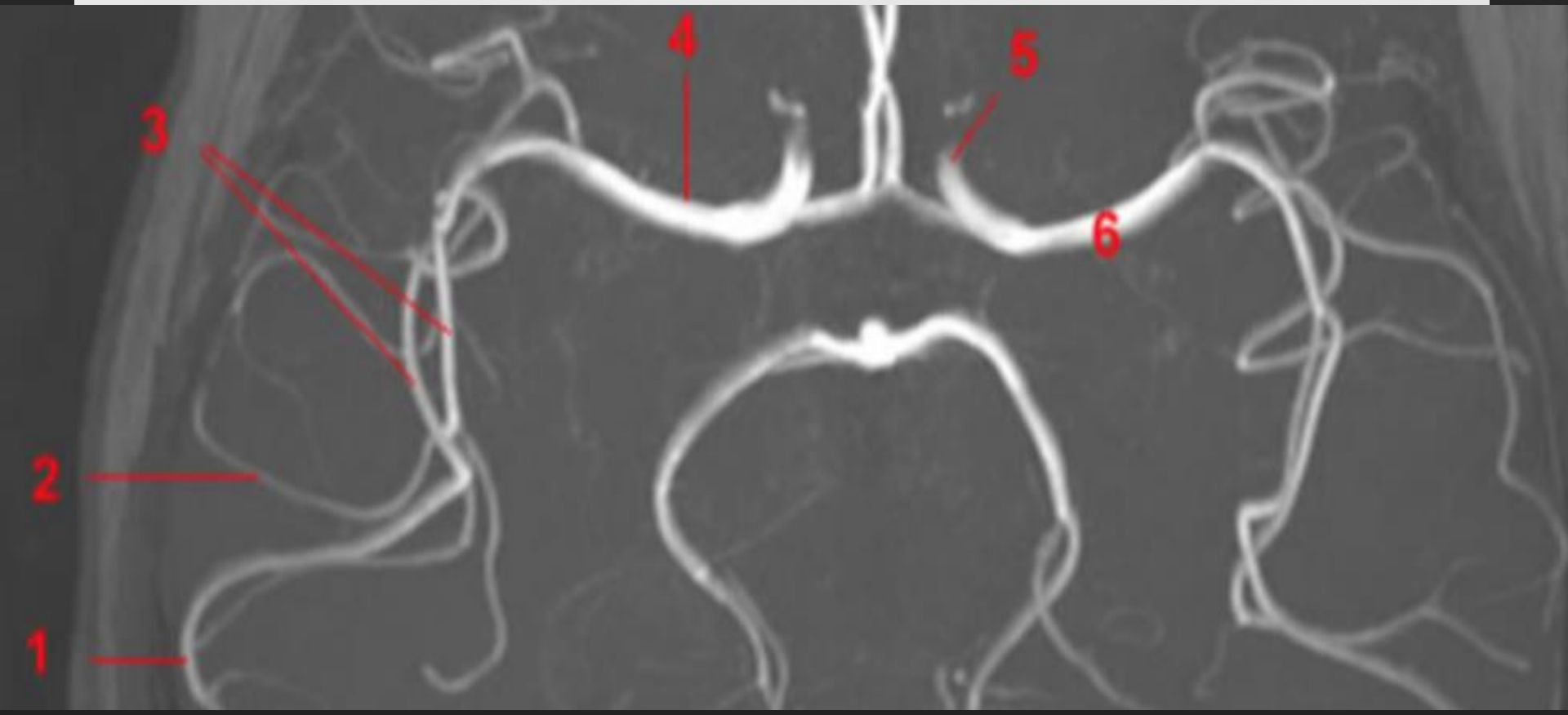
FAST INLEIDING



MRI of the brain, Time-of-Flight, axial MIP, circle of Willis (magnification). Image 2. 1, Middle cerebral artery (M4). 2, Middle cerebral artery (M3). 3, Middle cerebral artery (M2). 4, Middle cerebral artery (M1). 5, Internal carotid artery (left side). 6, Middle cerebral artery (left side).

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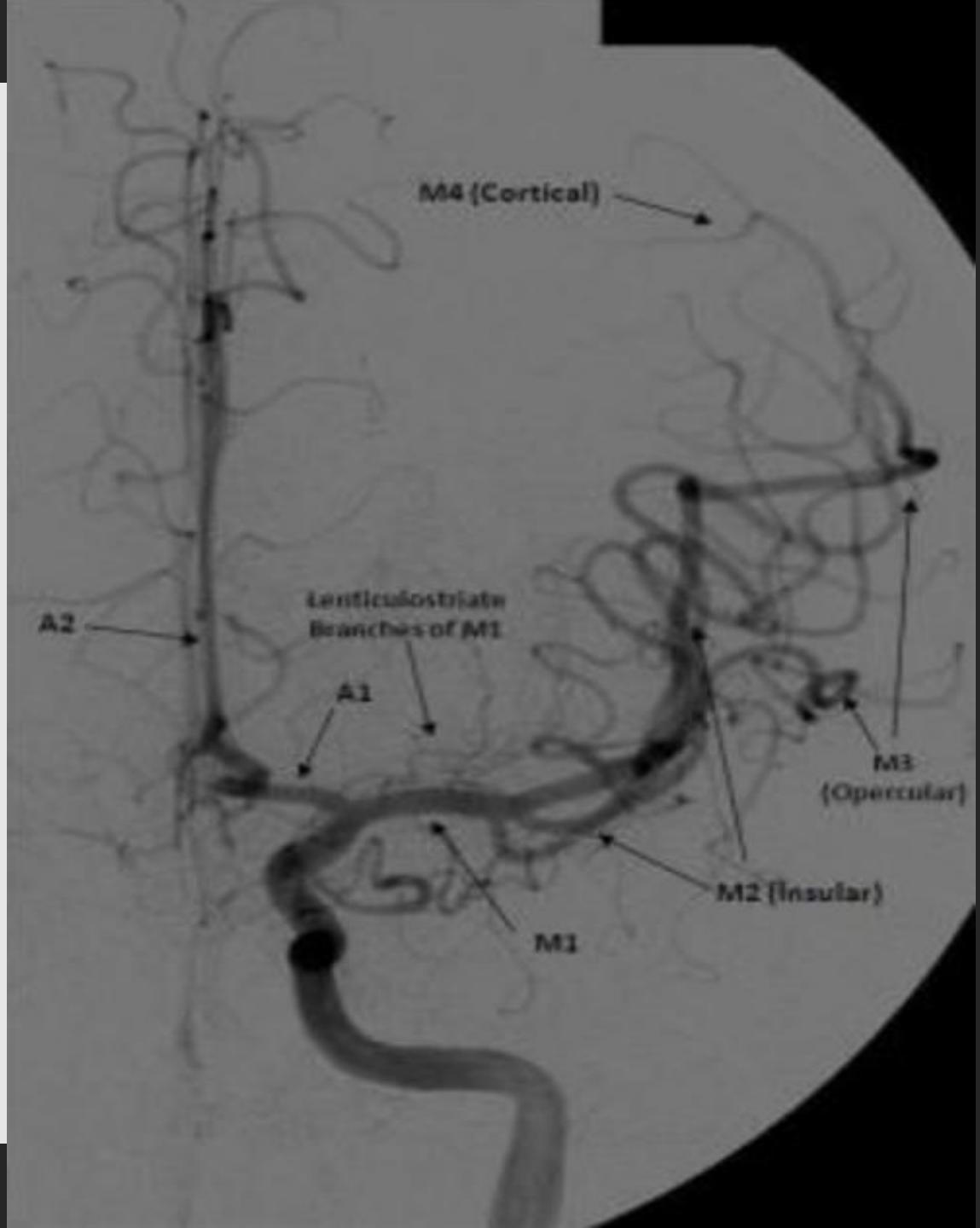
FAST INLEIDING



DIAGNOSE: Ischemisch CVA met hemibeeld rechts op basis van thrombus M1 ACM links

MUG-interventienr.: 1182
Oproep datum: dinsdag, 04/10/2016
Oproep uur: 16u24
Behandelend arts: Dr. A. Wibail
MUG arts: Dr. S. Sainte
Supervisie urgentiegeneeskunde: Dr. S. Van Poucke

- 64j man, Maasmechelen
- In de keuken onwel geworden
- Hemibeeld rechts en blikdwang naar links bij aankomst MUG
- Alarmering neuroloog en diagnostisch radioloog vanuit MUG

Ziekenhuis Oost-Limburg

Ziekenhuis Oost-Limburg

0587544
Man
15-02-1952

Opnamegegevens

Contactnummer	11347429
Opnametijdstip	04-10-2016 16:55
Arts	WIBAIL ALAIN

Triage gegevens

Triage verpleegkundige	chiara.corecig
Aangemaakt op	04-10-2016 17:03
Stroomschema	Collaps
Discriminatoren	
Triagekleur	Rood
Verduidelijking klacht	CVA/TIA

Opgesteld door : ZG/MBV/70122 WILLEMS ENDRY
Onderzoekdatum : 4/10/2016 17:11
Rapportdatum : 4/10/2016 17:37
Extra info : CT ACUTE STROKE ANGIO

CT SCHEDEL: ACUTE STROKE ZONDER CONTRAST, CT ACUTE STROKE ANGIO

Klinische inlichtingen en diagnostische vraagstelling
- recente ischemie:
- neurologische uitval rechter hemibeeld

Bevindingen
-Geen intracraniale bloeding aangetoond.
-Aspect-score: 9 à 10/10.
-Spontaan dense thrombus in het M1-segment van de linker ACM. TEvens vermoeden van een kleine wandstandige thrombus in het supraclinoïdale segment van de linker ACI.
-Collateral-score: 4/5.

Geen significant stenoserende letsels op de halsvaten aangetoond.

NB:;
Anatomische variante waarbij de linker a. vertebralis rechtstreeks aftakt van de aortaboog.
Fetale ACP links. Hypoplasie van het P1 segment van de rechter ACP.

Conclusie

Ideal candidate Fair candidate Poor candidate
Ischemic core volume ASPECTS 6-10 ASPECTS 5-7 ASPECTS 0-4
Clot (thrombus) Proximal / large Distal / small No visible intercranial occlusion
Collaterals (pial backfilling) Good Fair None / poor

Ziekenhuis Oost-Limburg

Ziekenhuis Oost-Limburg

Tijdslijn

- 16u24 Oproep MUG
- 16u55 Aankomst ziekenhuis
- 17u03 Triage en assessment urgentiearts
- 17u11 CT-schedel en CT-angio
- 17u12 Neurologisch consult,
- 17u43 Thrombolyse, arteriële en DLP-Catheter, operatiekwartier start-up
- 18u22 Start thrombectomie
- 18u50 Einde thrombectomie
- 19u00 Extubatie patiënt

31 min

8 min

8 min

32 min

39 min

Totaal:

87 min 'in hospital'

Ziekenhuis Oost-Limburg

FAST

Treatment Time-Specific Number Needed to Treat Estimates for Tissue Plasminogen Activator Therapy in Acute Stroke Based on Shifts Over the Entire Range of the Modified Rankin Scale

Maarten G. Lansberg, MD, PhD; Maarten Schrooten, MD; Erich Bluhmki, PhD; Vincent N. Thijs, MD, PhD; Jeffrey L. Saver, MD

With every 10-minute delay in the start of thrombolytic infusion within the 1-to-3-hour-treatment time period, there was 1 fewer patient of 100 patients having improved disability outcome

Methods—The pooled data set of the first 6 major randomized acute stroke trials of intravenous tissue plasminogen activator was used for this study. The data were stratified by 90-minute treatment time windows. NNT for benefit and NNT for harm estimates were determined based on expert generation of joint outcome distribution tables. NNT for benefit estimates were also calculated based on joint outcome distribution tables generated by a computer model.

Results—NNT for benefit estimates based on the expert panel were 3.6 for patients treated between 0 and 90 minutes, 4.3 with treatment between 91 and 180 minutes, 5.9 with treatment between 181 and 270 minutes, and 19.3 with treatment between 271 and 360 minutes. The computer simulation yielded very similar results. The NNT for harm estimates for the corresponding time intervals are 65, 38, 30, and 14.

Conclusions—Up to 4½ hours after symptom onset, tissue plasminogen activator therapy is associated with more benefit than harm, whereas there is no evidence of a net benefit in the 4½- to 6-hour time window. The NNT estimates for each 90-minute epoch provide useful and intuitive information based on which patients may be able to make better informed treatment decisions. (*Stroke*. 2009;40:2079-2084.)

Ziekenhuis Oost-Limburg

FAST

Timeliness of Tissue-Type Plasminogen Activator Therapy in Acute Ischemic Stroke

Patient Characteristics, Hospital Factors, and Outcomes Associated With Door-to-Needle Times Within 60 Minutes

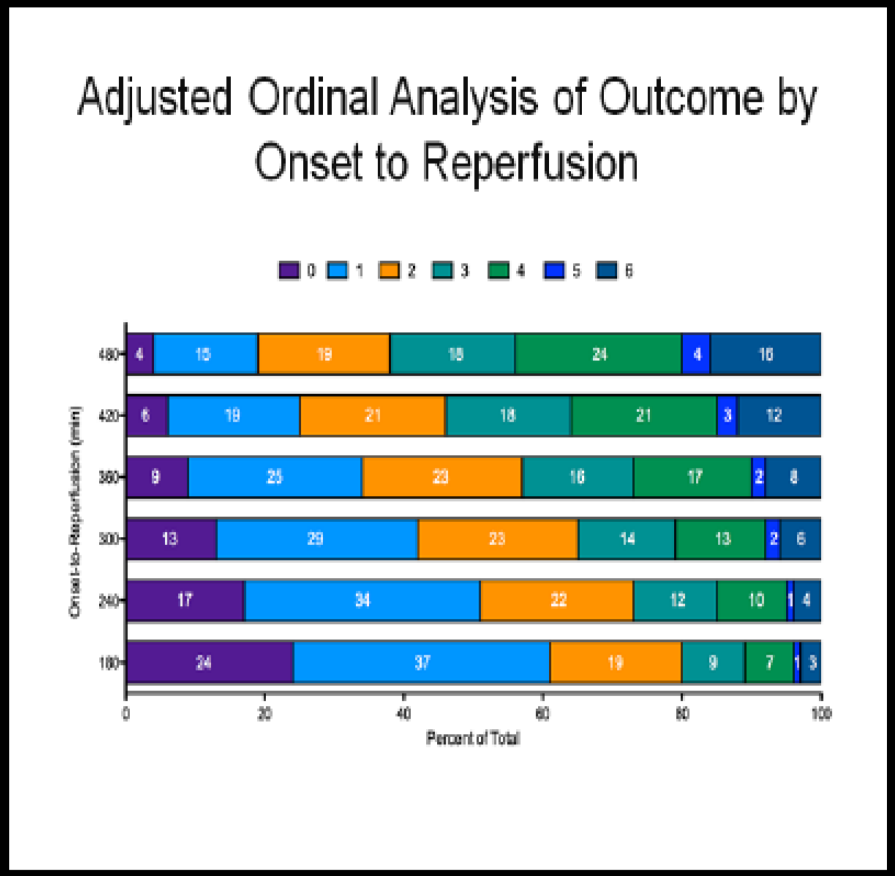
Gregg C. Fonarow, MD; Eric E. Smith, MD, MPH; Jeffrey L. Saver, MD; Mathew J. Reeves, PhD; Deepak L. Bhatt, MD, MPH; Maria V. Grau-Sepulveda, MD, MPH; DaiWai M. Olson, PhD, RN; Adrian F. Hernandez, MD, MHS; Eric D. Peterson, MD, MPH; Lee H. Schwamm, MD

Lower in-hospital mortality and less frequent symptomatic intracranial hemorrhage for patients with door-to-needle (tPA) times <60 minutes compared with door-to-needle times >60 minutes.
For every 15-minute reduction there was 5% lower odds of risk-adjusted in-hospital mortality.

≤60 minutes in only 6790 (28.6%). Patient factors most strongly associated with door-to-needle time ≤60 minutes were younger age, male gender, white race, or no prior stroke. Hospital factors associated with ≤60 minute door-to-needle time included greater annual volumes of tPA-treated stroke patients. The proportion of patients with door-to-needle times ≤60 minutes varied widely by hospital (0% to 79.2%) and increased from 19.5% in 2003 to 29.1% in 2009 ($P<0.0001$). Despite similar stroke severity, in-hospital mortality was lower (adjusted odds ratio, 0.78; 95% confidence interval, 0.69 to 0.90; $P<0.0003$) and symptomatic intracranial hemorrhage was less frequent (4.7% versus 5.6%; $P<0.0017$) for patients with door-to-needle times ≤60 minutes compared with patients with door-to-needle times >60 minutes.

Conclusions—Fewer than one-third of patients treated with intravenous tPA had door-to-needle times ≤60 minutes, with only modest improvement over the past 6.5 years. These findings support the need for a targeted initiative to improve the timeliness of reperfusion in acute ischemic stroke. (*Circulation*. 2011;123:750-758.)

Steep Time Benefit Curve Over Entire Disability Range for Neurothrombectomy



- Every 5 minute delay, 1 of every 100 patients has a worse disability outcome

--Sheth et al, Stroke ISC Abstracts 2015

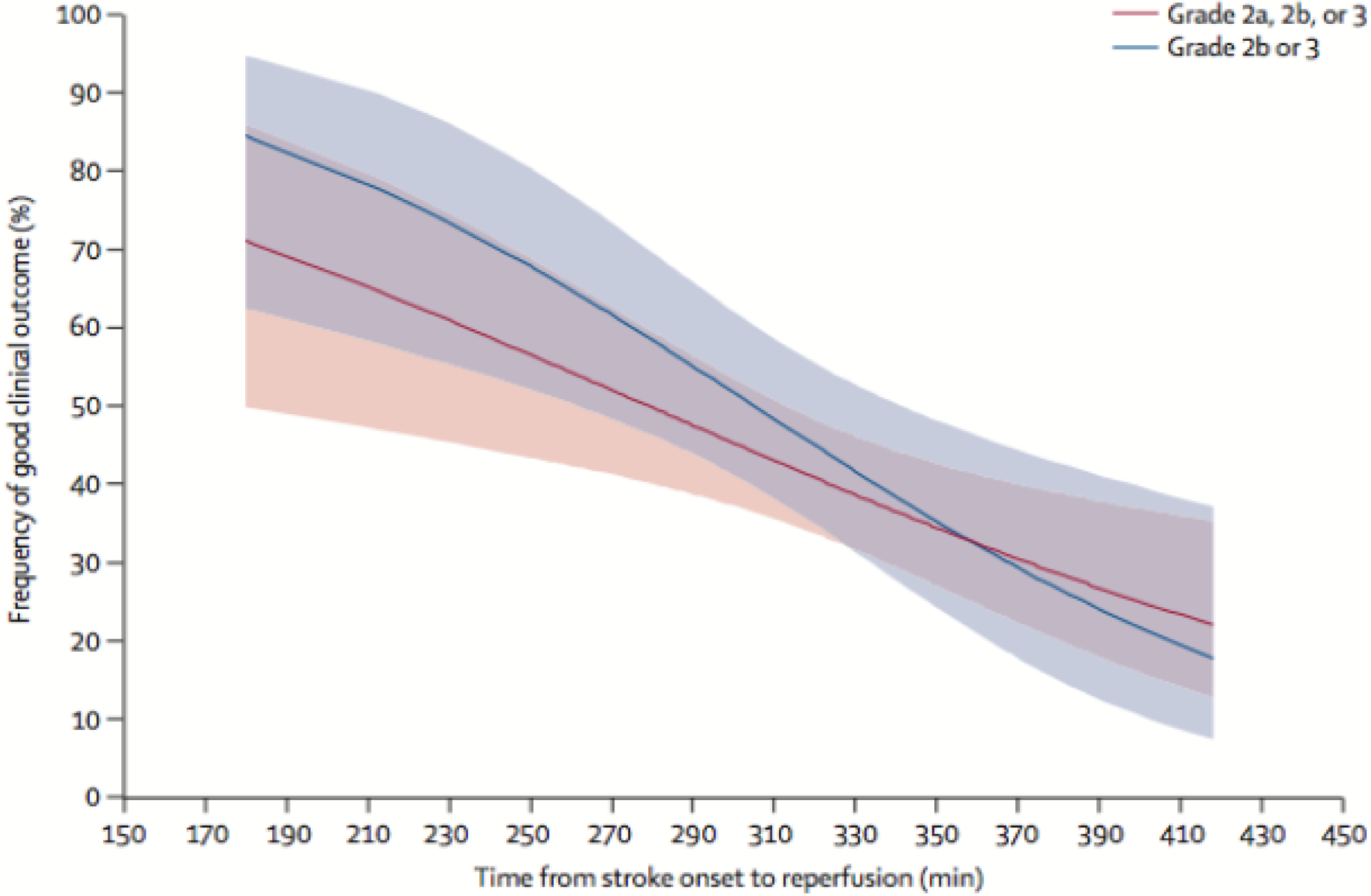
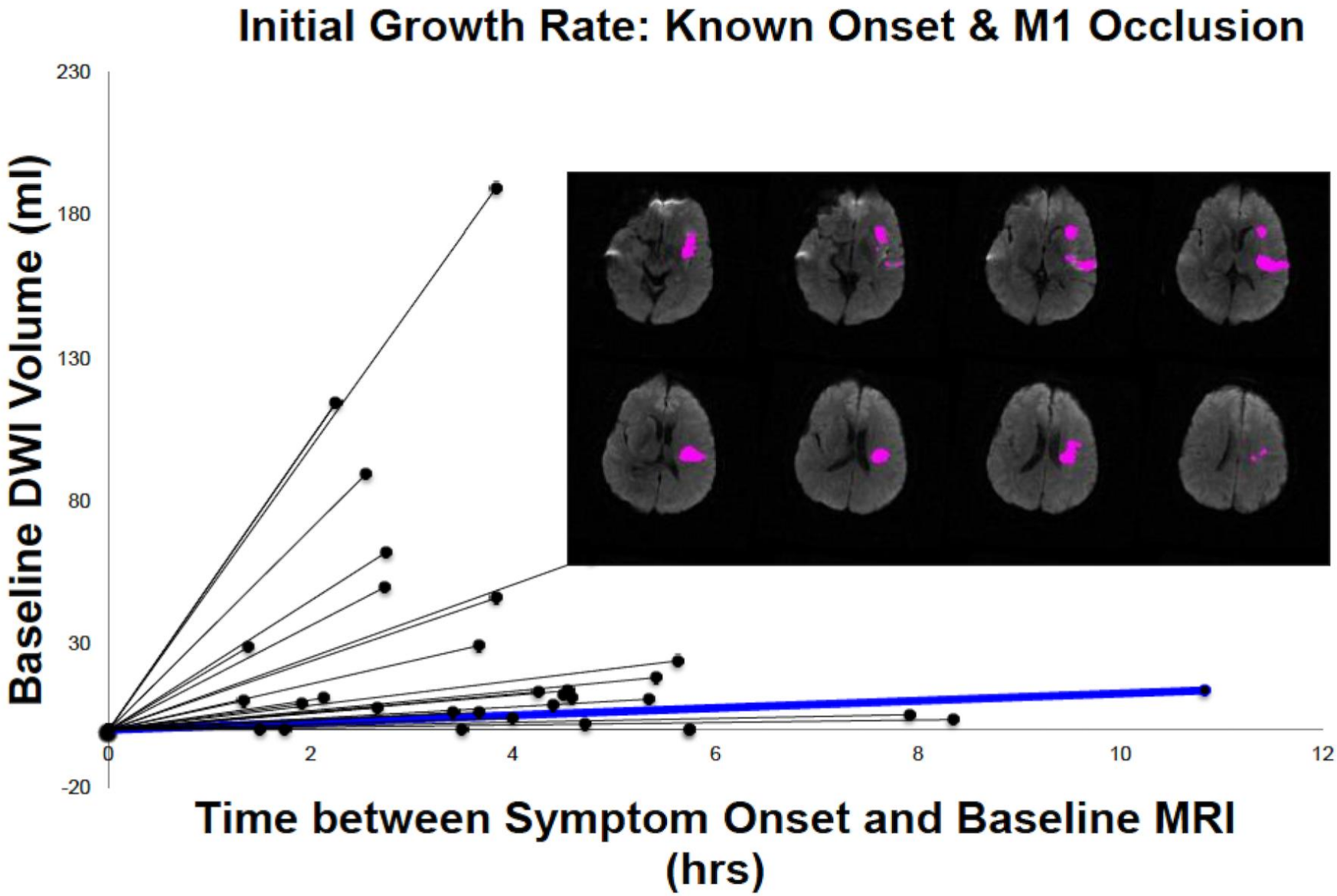


Figure 5: **Probability of good clinical outcome by time as predicted by unadjusted analysis, by reperfusion status**
Shaded areas show 95% CIs. Good clinical outcome was defined as a modified Rankin Scale score of ≤2.

FAST voor iedereen?

Ziekenhuis Oost-Limburg

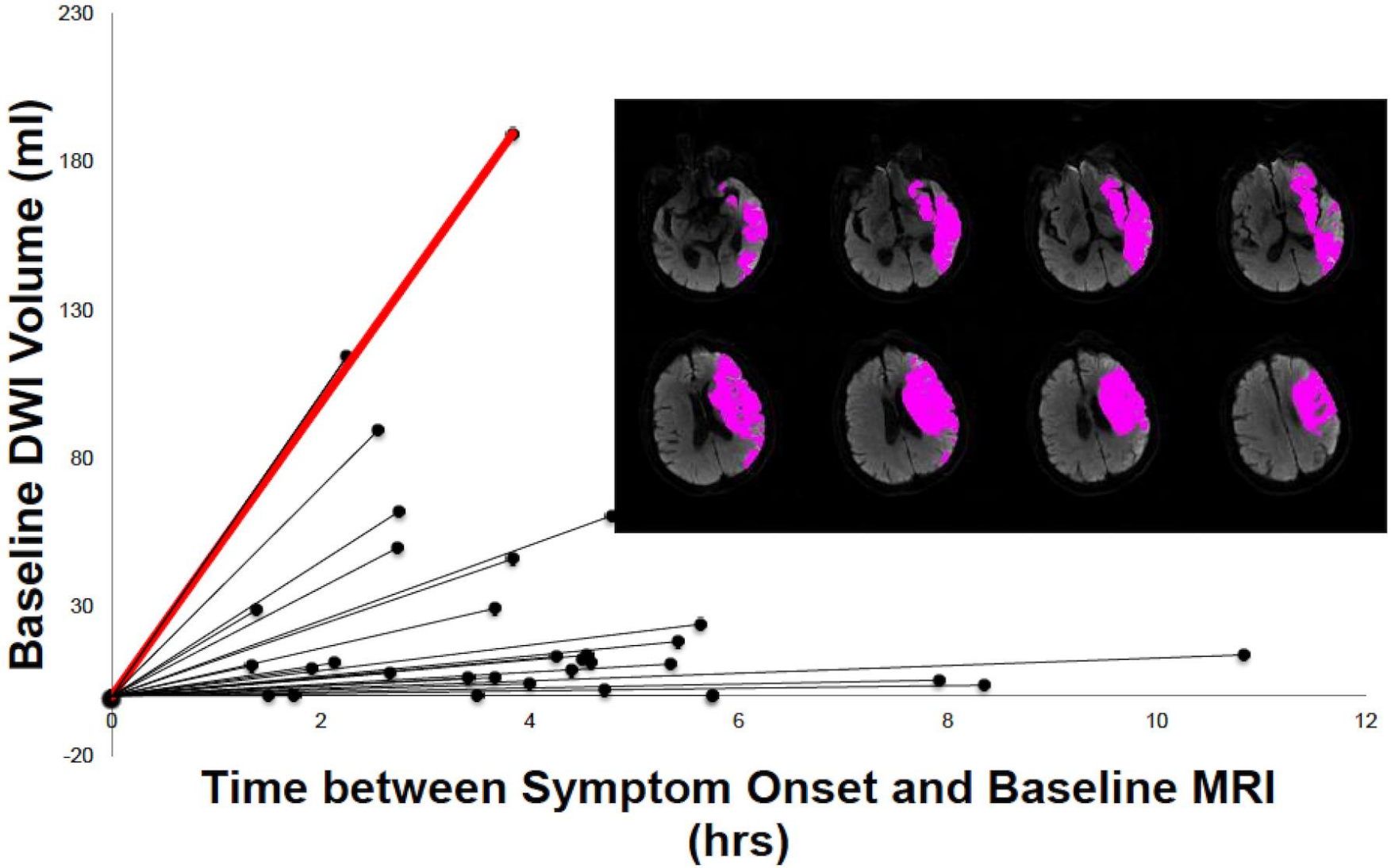
DEFUSE 2



Wheeler HM, et al. Int J Stroke. 2015

DEFUSE 2

Initial Growth Rate: Known Onset & M1 Occlusion



Wheeler HM, et al. Int J Stroke. 2015

FAST

Special Report

Improving Door-to-Needle Times in Acute Ischemic Stroke

The Design and Rationale for the American Heart Association/American Stroke Association's Target: Stroke Initiative

Gregg C. Fonarow, MD; Eric E. Smith, MD, MPH; Jeffrey L. Saver, MD;
Mathew J. Reeves, PhD; Adrian F. Hernandez, MD, MHS; Eric D. Peterson, MD, MPH;
Ralph L. Sacco, MD; Lee H. Schwamm, MD

Background and Purpose—The benefits of intravenous tissue-type plasminogen activator (tPA) in acute ischemic stroke are time-dependent, and guidelines recommend a door-to-needle time of ≤60 minutes. However, fewer than one third of acute ischemic stroke patients who receive tPA are treated within guideline-recommended door-to-needle times. This article describes the design and rationale of Target: Stroke, a national initiative organized by the American Heart Association/American Stroke Association in partnership with other organizations to assist hospitals in increasing the proportion of tPA-treated patients who achieve guideline-recommended door-to-needle times.

Methods—The initial program goal is to achieve a door-to-needle time ≤60 minutes for at least 50% of acute ischemic stroke patients. Key best practice strategies previously associated with achieving faster door-to-needle times in acute ischemic stroke were identified.

Results—The 10 key strategies chosen by Target: Stroke include emergency medical service prenotification, activating the stroke team with a single call, rapid acquisition and interpretation of brain imaging, use of specific protocols and tools, premixing tPA, a team-based approach, and rapid data feedback. The program includes many approaches intended to promote hospital participation, implement effective strategies, share best practices, foster collaboration, and achieve stated goals. A detailed program evaluation is also included. In the first year, Target: Stroke has enrolled over 1200 United States hospitals.

Conclusions—Target: Stroke, a multidimensional initiative to improve the timeliness of tPA administration, aims to elevate clinical performance in the care of acute ischemic stroke, facilitate the more rapid integration of evidence into clinical practice, and improve outcomes. (***Stroke*. 2011;42:2983-2989.**)

FAST

However, despite the evidence, national guideline recommendations, and previous quality improvement efforts, hospital initiation of tPA treatment is frequently longer than the recommended national target of a door-to-needle time ≤60 minutes. In a recent analysis of GWTG–Stroke, only one quarter of patients with acute ischemic stroke treated with tPA within 3 hours of symptom onset had door-to-needle times within 60 minutes, and overall median door-to-needle time for the entire cohort of patients was 78 minutes.[11] The length of time participating in the GWTG–Stroke program and the Joint Commission Primary Stroke Center Certification were not independently associated with an increase in the proportion of patients with door-to-needle time ≤60 minutes; this demonstrates the need to expand the focus of GWTG–Stroke beyond efforts to increase tPA use among eligible patients.[11] Other studies have also shown relatively prolonged door-to-needle times in patients treated with tPA for acute ischemic stroke. The Standard Treatment with Alteplase to Reverse Stroke (STARS) multicenter tPA study of 57 academic and community centers in the U.S. found a median door-to-needle time of 96 minutes.[12] In the Safe Implementation of Thrombolysis in Stroke-Monitoring Study (SITS-MOST) observational study conducted in 285 centers and 6483 patients in the European Union, there was a mean door-to-needle time of 68 minutes.[30]

Ziekenhuis Oost-Limburg

FAST

Coördinatie tussen verschillende diensten:

- Spoedgevallen:
  - Inschrijvingen
  - Triage
  - Verpleegkundigen - Artsen
- Neurologie
- Diagnostische radiologie
- Interventionele radiologie
- Anesthesie
- Intensieve Zorgen

Ziekenhuis Oost-Limburg

Strategy	Best Practice	Explanation
01	Advance hospital notification by EMS	EMS providers should, if feasible, provide early notification to the receiving hospital when stroke is recognized in the field. Advance notification of patient arrival by EMS can shorten time to CT and improve the timeliness of treatment with thrombolysis.
02	Rapid triage protocol and stroke team notification	Acute triage protocols facilitate the timely recognition of stroke and reduce time to treatment. Acute stroke teams enhance stroke care and should be activated as soon as the stroke patient is identified in the emergency department or after notification from pre-hospital personnel.
03	Single-call activation system	A single-call should activate the entire stroke team. A single-call activation system for the stroke team is defined here as a system in which the emergency department calls a central page operator, who then simultaneously pages the entire stroke team, including notification for stroke protocol imaging.
04	Stroke tools	A stroke toolkit containing clinical decision support, stroke-specific order sets, guidelines, hospital-specific algorithms, critical pathways, NIH Stroke Scale, and other stroke tools should be available and used for each patient.
05	Rapid acquisition and interpretation of brain imaging	It is essential to initiate a CT scan (or MRI) within 25 min of arrival and complete interpretation of the CT scan within 45 min of arrival to exclude intracranial hemorrhage prior to administration of intravenous tPA.
06	Rapid laboratory testing (including point-of-care testing if indicated)	When indicated, laboratories such as platelet count and—for patients in whom coagulation parameters should be assessed due to suspicion of coagulopathy—INR(PT)/PTT results should be available as quickly as possible and no later than 45 min after ED arrival. If standard stat laboratory turnaround times cannot meet this target, point-of care testing in the emergency department can provide the data in the needed timeframe.
07	Mix tPA medication ahead of time	Mix drug and set up the bolus dose and 1-hour infusion pump as soon as a patient is recognized as a possible rtPA candidate, even before brain imaging. Early preparation allows tPA infusion to begin as soon as the medical decision to treat is made. It is the policy of some drug manufacturers to replace, free of charge, medications that are mixed but not used in time-critical emergency situations such as these. Check with your hospital pharmacy for the proper procedures that will allow you to use this strategy to shorten time to treatment without financial risk.
08	Rapid access to intravenous tPA:	Once eligibility has been determined and intracranial hemorrhage has been excluded, intravenous tPA should be promptly administered. tPA should be readily available in the emergency department or CT scanner area (if CT scanner is not located in the ED). Dosing charts and standardized order sets can also facilitate timely administration and minimize dosing errors.
09	Team-based approach	The team approach based on standardized stroke pathways and protocols has proven to be effective in increasing the number of eligible patients treated and reducing time to treatment in stroke. An interdisciplinary collaborative team is also essential for successful stroke performance improvement efforts. The team should meet frequently to review your hospital's processes, care quality, patient safety parameters and clinical outcomes, as well as to make recommendations for improvement.
10	Prompt data feedback	Accurately measuring and tracking your hospital's door-to-needle times, IV tPA treatment rates in eligible patients and performance on other stroke performance/quality measures equip the stroke team to identify areas for improvement and take appropriate action. A data-monitoring and feedback system includes using the Get With The Guidelines-Stroke Patient Management Tool (PMT) and creating a process for providing timely feedback on a case-by-case basis and in hospital aggregate. This system helps identify specific delays, set targets and monitor progress on a case-by-case basis.

EMS indicates emergency medical system; CT, computed tomography; NIH, National Institutes of Health; MRI, magnetic resonance imaging; INR, International Normalized Ratio; PT, Prothrombin Time; PTT, Partial Thromboplastin Time; ED, emergency department; tPA, tissue-type plasminogen activator; IV, intravenous; PMT, patient management tool.

FAST

PATIENT TIME TRACKER

TARGET: STROKE™

ACUTE ISCHEMIC STROKE TREATMENT GOAL: DTN TIME WITHIN 60 MINUTES

Last Known Well: Date: _____ Time: _____

Weight: _____ (kg) Total Dose: _____(mg) Bolus: _____(mg)

		Clock Time	Time Intervals
Pre-Arrival notification:	Date: _____	Time: _____	- _____ (min)
Arrival (ED Registration):	Date: _____	Time: _____	0 (min)
Acute Stroke Team Notification:		Time: _____	_____ (min)
Acute Stroke Team Bedside:		Time: _____	_____ (min)
CT/MRI Time (Scout Film Acquired):		Time: _____	_____ (min)
IV rt-PA Order* Time:		Time: _____	_____ (min)
IV rt-PA Time Given:		Time: _____	_____ (min)

Door to TPA time (goal ≤ 60 minutes): _____ minutes

Door to CT/MRI time (goal ≤ 25 minutes): _____ minutes

Door to Stroke Team Notification (goal ≤ 15 minutes): _____ minutes

* If IV rt-PA not given, select reason(s) for non-treatment. (See Get With The Guidelines coding instructions for definitions.)

TIME LOST IS BRAIN LOST.™

American Heart Association. | American Stroke Association.

Learn and Live.

Ziekenhuis Oost-Limburg

Identificatieklever

FOLLOW-UP igv STROKE

☐ Verwijzing vanuit een ander ziekenhuis (**ZOZ**)

TIMING:

Onset CVA Time: ...:...h
to ER: Time: ...:...h
to Triage: Time: ...:...h
to Imaging: Time: ...:...h
to neurology contact: Time: ...:...h
to neurologic exam: Time: ...:...h
to rTPA: dose rTPA: …… Time: ...:...h
to induction anesthesia: Time: ...:...h
to endovascular therapy: Time: ...:...h
End of endovascular therapy: Time: ...:...h
Duration endovascular therapy: ΔT:
Extubation of patient: Date: ... /... /... Time: ...:...h

SEVERITY/OUTCOME:

NIHSS:
ER: Extubation: D3: D7: D90:
Modified Rankin Scale:
D3: D90:
ASPECT-score: % Collateral score:
Controle CT/MRI 24h:

ENDOVASCULAR PROCEDURE:

Site of Occlusion:
Aspiration: Y/N number of aspirations:
Stent-retriever: Y/N number of passages:
TICI:

HEMODYNAMIC/RESPIRATORY PARAMETERS (via computer):

Mean Hartrate :
Mean Systolic BP :
Mean Diastolic BP :
Mean Mean BP :
Mean Saturation :
Mean ETCO2 : PaCO2:

ANESTHETIC AGENTS:

Induction Dose Etomidate :
Induction Dose Fentanyl : Total Dose Fentanyl:
Intubation Dose Esmeron : Total Dose Esmeron:
Mean % Sevorane :
Other products:

TERUG BEZORGEN AAN SECRETARIAAT SPOEDGEVALLEN

Igv verwijzing vanuit een ander ziekenhuis:

Datum en uur opname in ander ziekenhuis: ..... / ..... / ....., ... u .....

Naam ander ziekenhuis: ……

Eventuele problemen:

……
……
……
……
……

Redenen voor het niet toedienen van thrombolyse:

O NIH minder dan 5

O Snelle klinische recuperatie

O Buiten therapeutisch tijdsvenster

O Behandeling met coumarine/noac

Redenen voor het niet uitvoeren van een endovasculaire behandeling

O Geen klinische indicatie

O Normale CT-angiografie

INTERNE STROKE PATIENT

Triage verpleegkundige / Urgentiearts

Locatie: **Triage**

1. Tel urgentiearts (4444)
(Urgentiearts: Assessment. Tel radioloog (4605).
Controle nierfunctie in VG: eGFR<50ml/min = NaHCO3 1.4% 500ml+300mg lysomucil IV)
2. Tel neuroloog
3. Parameters, bloedname en infuus (Plasmalyte A): CVA-kits (labobuizen, veneus bloedgas, laboaanvraag, CT-angio aanvraag, NIHSS, Follow-up blad)

Urgentiearts / Radioloog

Locatie: **CT-spoed**
Assessment urgentiearts: bloeding?
Assessment radioloog: Ischemie: stand-by plaatsen interventioneel radioloog

Neuroloog

Locatie: **BOX spoed**
Assessment neuroloog:
- Geen endovasculaire therapie +/- opstart thrombolyse
- tel interventioneel radioloog: afmelden stand-by

Locatie: Stroke Unit

Neuroloog

Locatie: **BOX spoed**
Assessment neuroloog:
- endovasculaire therapie +/- opstart thrombolyse
- tel interventioneel radioloog: timing procedure? (interventioneel radioloog verwittigt verpleging Rx)
- tel urgentiearts (4444)

Urgentiearts

Locatie: **BOX spoed**
- Tel coordinator OK: 5099/6666 (N-WE), tel Ward Eertmans (1514)
- 2-lumen perifere IV catheter
- Arteriele lijn door staflid

Rx verpleging

Locatie: **Interventionele Rx-zaal**
- Tel spoed (5180) transport patient
- Tel anesthesie (5099/6666 N-WE)

Anesthesist

Locatie: **IZ**
- Patiënt beademd naar IZ

Na extubatie en HD-stabilisatie

EXTERNE VERWIJZING STROKE THROMBECTOMIE

Tel Urgentiearts 089/324444

1. Onset CVA? Anticoagulantia? Thrombolyse gestart/ geindiceerd? ETA?
2. NIHSS ter plaatse? CT(-angio) beelden meegeven!
3. 5180 verwittigen.

Triage verpleegkundige / Urgentiearts

Locatie: **Triage**
1. Tel urgentiearts (4444). Urgentiearts: NIHSS, Follow-up blad. Tel radioloog (4605).
2. Parameters, bloedname en infuus (NaHCO3 1.4% 500ml+300mg lysomucil IV standaard voor externe verwijzingen), CVA-kits

Urgentiearts / Radioloog

Locatie: **CT-spoed**
Altijd controle CT-angio tenzij:
-NIHSS stabiel in vergelijking met vertrek **EN**
-Geen thrombolyse gestart in verwijzend ziekenhuis **EN**
-CT-angio gekregen in verwijzend ziekenhuis

NIHSS beter dan bij verwijzing:
Assessment neuroloog:
- Endovasculaire therapie?
- Tel interventioneel radioloog: afmelden stand-by?

Neuroloog+Urgentiearts

Locatie: Stroke Unit

Neuroloog

NIHSS slechter dan bij verwijzing:
Bloeding te zien op controle CT-angio?

JA

NEEN

Assessment neuroloog:
Beslissing al of niet protocol ICH onder thrombolyse

Neuroloog

NIHSS gelijk als bij verwijzing:
- Assessment neuroloog
- Dringende thrombectomie
- Tel interventioneel radioloog: timing procedure? (interventioneel radioloog verwittigt verpleging Rx)
- Tel coordinator OK: 5099/6666 (N-WE)
- Tel Ward Eertmans (1514)
- 2-lumen perifere IV catheter
- Arteriele lijn door staflid

Neuroloog+Urgentiearts

Rx verpleging

Locatie: **Interventionele Rx-zaal**
- Tel spoed (5180) transport patient
- Tel anesthesie (5099/6666 N-WE)

Anesthesist

Locatie: **IZ**
- Patiënt beademd naar IZ

Na extubatie en HD-stabilisatie

Ziekenhuis Oost-Limburg

FAST: Stroke kits

- Labo:
  - Aanvraag
  - Vacutainers
  - Veneus bloedgas
- CT-angio aanvraag:
- NIHSS
- Follow-up blad

Ziekenhuis Oost-Limburg

Campus St. Jan
Secr. + afspraken RX, CT, Echo, mammo : 089 32 45 57
Afspraken NMR : 089 32 45 77
Campus A. Dumont
Secretariaat + afspraken : 089 32 45 89
Campus St. Barbara
Secretariaat + afspraken : 089 32 45 58

AANVRAAGFORMULIER CT ACUTE STROKE

IDENTIFICATIE VAN DE PATIËNT: (*)

Naam:

Voornaam:

KLEEF HIER EEN ETIKET

Geboortedatum:

Geslacht: M ◻ V ◻

AANVRAGENDE GENEESHEER: (*)
(naam, voornaam, adres en RIZIV-nummer zijn verplicht)

Handtekening:
Datum:

ÉÉN APART AANVRAAGFORMULIER PER KLINISCHE VRAAGSTELLING IS VEREIST!

RELEVANTE KLINISCHE INLICHTINGEN: (*)

HEMIPARESE ◻ ARM ◻ R ◻ L
◻ BEEN ◻ R ◻ L
◻ GELAAT ◻ R ◻ L

FATISCHE STOORNISSEN ◻ JA ◻ NEEN

VISUSSTOORNISSEN ◻ JA ◻ NEEN

NIHSS: .....

UUR ONSET CVA: ..... WAKE UP STROKE ◻ JA ◻ NEEN

DIAGNOSTISCHE VRAAGSTELLING: (*)

DD ISCHEMIE/BLOEDING

ASPECT SCORE?

COLLATERAAL SCORE?

VORIGE RELEVANTE ONDERZOEKEN I.V.M. DE DIAGNOSTISCHE VRAAGSTELLING: (*)

◻ RX ◻ ECHO ◻ CT ◻ NMR
◻ Andere:..... ◻ Onbekend

RELEVANTE BIJKOMENDE INLICHTINGEN: (*)

◻ *Nierinsufficiëntie*
eGFR: ..... ml/min/1.73 m²
◻ Diabetes
◻ Hartinsufficiëntie
◻ Allergie
◻ Zwangerschap

VOORGESTELD(E) ONDERZOEK(EN):(*)

NEURO

◻ Hersenen
◻ Andere:.....

CT-ANGIO

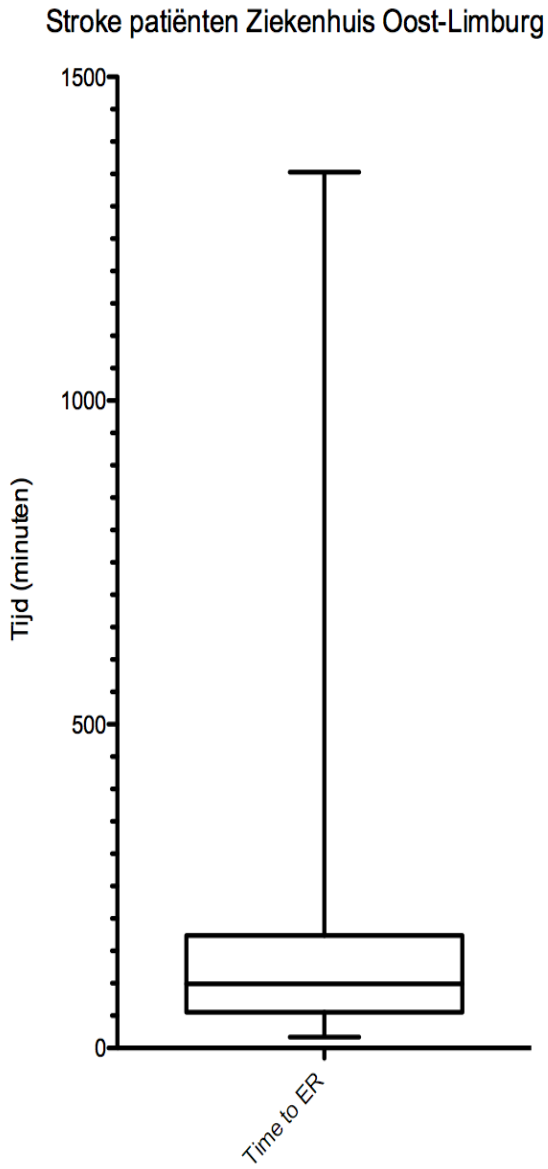
◻ Circulus van Willis + halsvaten

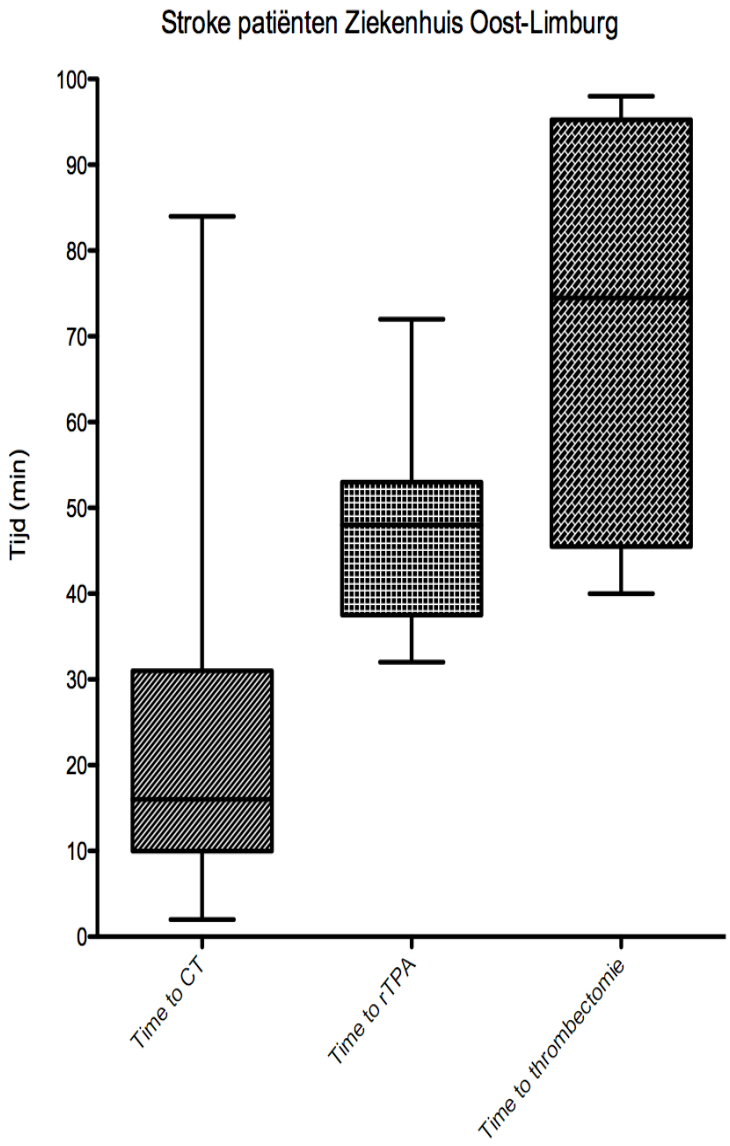
Scanprotocol : ◻ CT acute stroke à blanc
(voorbehouden MBV) ◻ CT acute stroke angio

Dit aanvraagformulier kan pas voor terugbetaling door het RIZIV in aanmerking komen, indien de gemarkeerde rubrieken (*) correct ingevuld zijn door de aanvragende geneesheer (cfr. RIZIV-bepalingen per 01.03.2013).

03-2016 DRFO1042

FAST: preliminaire data





Furious: algemene anesthesie of sedatie voor thrombectomie?

	AA	Sedatie
Voordelen	• Immobiele patiënt • Luchtwegprotectie • Pijncontrole • Complexe procedures	• Eenvoudiger • Sneller?
Nadelen	• Verlies van tijd? • Slechtere outcome?	• Agitatie • Aspiratie risico • Betere outcome?

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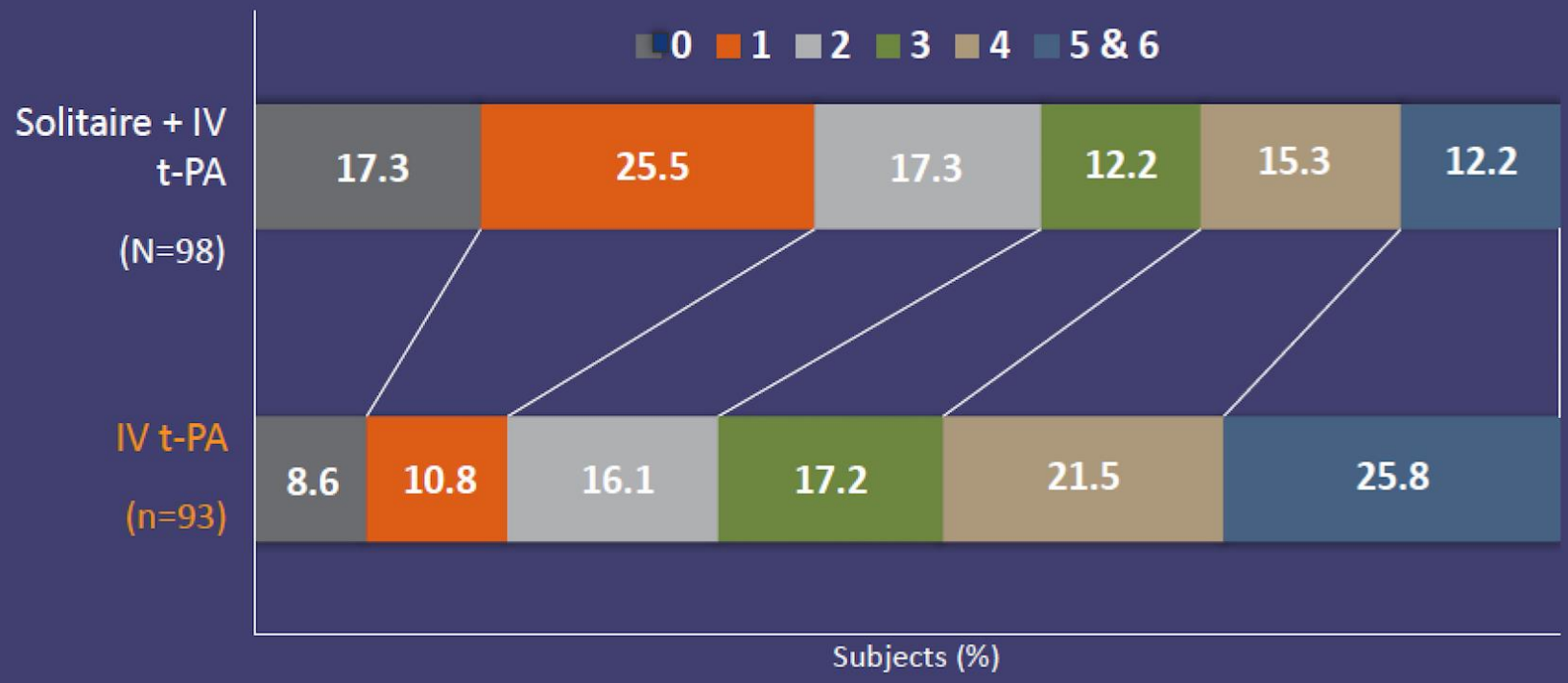
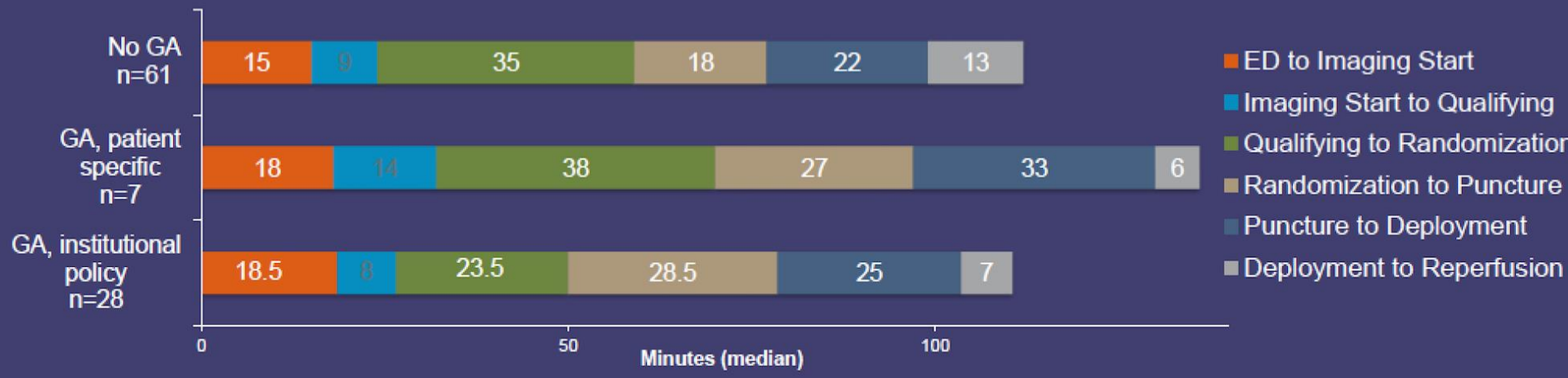
SWIFT PRIME

Modified Rankin Scale Score ***p*= 0.0002** (Cochran-Mantel-Haenszel p value)



	Solitaire + IV t-PA	IV t-PA	
Functional independence (mRS 0-2) at 90D	59 (60.2%)	33 (35.5%)	
Modified Rankin Scale at 90 days – median (IQR) [N]*	2 (1 - 4) [98]	3 (2 - 5) [93]	p < 0.001

Use of General Anesthesia (GA)



Use of GA Definitions:

- No GA – no general anesthesia used
- GA, patient specific – general anesthesia was used due to patient related factors
- GA, institutional policy – general anesthesia was used as part of site routine practice

Median (IQR) - minutes	No GA	GA patient Specific	GA required
Qualifying to puncture	51 (40-83)	82 (53-125)	56.5 (39.5-72)
Qualifying to deployment	81 (60-111)	122 (97-150)	84 (66-102.5)
ED to puncture	95 (66-119)	146 (80-159)	84.5 (66.5-107)
ED to deployment	119 (85-146)	166 (145-184)	112.5 (93.5-136)
ED to reperfusion	137.5 (102-168.5)	187 (160-190)	121 (109-154.5)

Key Results

No delay in workflow observed when GA was administered as part of institutional standard practice

Furious

British Journal of Anaesthesia 113 (S2): ii9–ii16 (2014)
doi:10.1093/bja/aeu372

BJA British Journal of Anaesthesia

NEUROSCIENCES AND NEUROANAESTHESIA

Anaesthetic management of the patient with acute ischaemic stroke

Z. H. Anastasian*

Study	Patients	Anaesthetic management	Outcomes	Limitations
Jumaa and colleagues[13]	Retrospective, single centre, 126 patients with acute ischaemic stroke	Intubated or not intubated	Intubated patients had longer ICU stays, increased in-hospital mortality, worse clinical outcome, larger final infarct size	Intubated patients had higher baseline NIHSS scores
Nichols and colleagues[14]	Retrospective, 75 patients enrolled in IMS II trial with anterior circulation stroke	No sedation, mild sedation, heavy sedation, pharmacological paralysis	Lower sedation was associated with good outcome (modified Rankin score of 0–2), lower mortality and higher successful reperfusion rates	Patients with more sedation had higher baseline NIHSS scores and had less successful angiography reperfusion rates
Abou-Chebl and colleagues[15]	Retrospective, multicentre, 980 patients	General anaesthesia or conscious sedation	Independent predictors of poor outcome and mortality: age, NIHSS, general anaesthesia, recanalization, ICH, carotid terminus occlusion. Predictors of poor outcome: no stent placed	Patients with general anaesthesia had higher baseline NIHSS scores and were more likely to have carotid terminus occlusions
Davis and colleagues[19]	Retrospective, single centre, 96 patients	General anaesthesia or local anaesthesia (local anaesthesia includes light sedation with midazolam and fentanyl, if needed, provided by the stroke neurologist)	Independent predictors for good outcomes are: local anaesthesia, low baseline stroke scores, and systolic pressure >140 mm Hg. General anaesthesia is correlated with low arterial pressures	Patients with general anaesthesia had higher baseline NIHSS scores Good outcomes were associated high higher arterial pressures
Abou-Chebl and colleagues[20]	Retrospective, multicentre (18 sites), 281 patients	General anaesthesia (intubated) or local anaesthesia (not intubated, but unknown if sedated)	Independent predictors of mortality: hypertension, NIHSS, unsuccessful revascularization, non-utilization of balloon guide catheter, and general anaesthesia	Patients who received general anaesthesia had higher baseline NIHSS and lower baseline arterial pressures
Rai and colleagues (abstract)[21]	Retrospective, single centre, 190 patients	General anaesthesia or non-general anaesthesia (both monitored anaesthesia care and local)	General anaesthesia is not an independent factor when NIHSS, age and recanalization are included. Arrival to puncture time is longer with general anaesthesia and arterial pressure variations are larger with general anaesthesia	Patients who received general anaesthesia had higher baseline NIHSS. Arrival to time to puncture time was longer with general anaesthesia

Table 1. Baseline Patient Characteristics and Postintervention Destination

	General Anesthesia (n = 48)	Local Anesthesia (n = 48)	*P* Value	Missing Data (n = 33) (General Anesthesia = 5)
Demographics				
Age in years (mean, SD)	63 (14)	62 (15)	0.72	60 (16)
Male Sex (%, n)	58% (28)	81% (39)	0.03	58% (20)
Clinical (%, n)				
NIHSS (median, IQR)	19.5 (9)	16 (9.5)	0.03	18 (5)
Hypertension	48% (23)	46% (22)	1.00	48% (16)
Atrial fibrillation	21% (10)	27% (13)	0.63	18% (6)
Ischemic heart disease	27% (13)	10% (5)	0.07	27% (9)
Smoking	35% (17)	21% (10)	0.17	30% (10)
Diabetes mellitus	25% (12)	4% (2)	0.01	3% (1)
Obesity	15% (8)	7% (4)	0.82	6% (2)
Valvular heart disease	2% (1)	10% (5)	0.20	12% (4)
Stroke mechanism			0.14	
Large vessel atherosclerosis	34% (16)	19% (9)		24% (8)
Cardioembolic	32% (15)	42% (20)		26% (9)
Other	13% (6)	6% (3)		12% (4)
Undetermined	21% (10)	33% (16)		36% (12)
Stroke Territory				
Middle cerebral artery	60% (28)	79% (34)	0.08	79% (26)
Left hemisphere	64% (18)	56% (19)	0.68	42% (14)
Basilar artery	40% (19)	21% (9)	0.08	21% (7)
Physiological				
Glucose (mM) (mean, SD)	8.0 (1.9)	7.2 (1.9)	0.04	6.8 (1.9)
Minimum SBP (mmHg)	104 (17)	137 (20)	<0.001	127 (25)
Minimum DBP (mmHg)	76 (11)	56 (10)	<0.001	72 (15)
Maximum SBP (mmHg)	165 (24)	162 (27)	0.50	159 (27)
Maximum DBP (mmHg)	91 (20)	91 (12)	0.92	92 (13)
Minimum MAP (mmHg)	72 (15)	96 (15)	<0.001	76 (17)
Maximum MAP (mmHg)	116 (14)	114 (14)	0.69	101 (18)
Discharge Destination			<0.001	
PACU/Direct to ward	14	39		27
ICU	34	9		6
Unknown		1		

Davis M et al. Anesthetic Management and Outcome in Patients during Endovascular Therapy for Acute Stroke. Anesthesiology 2 2012, Vol.116, 396-405.

Hypotension During Endovascular Treatment of Ischemic Stroke Is a Risk Factor for Poor Neurological Outcome

Pia Löwhagen Hendén, MD; Alexandros Rentzos, MD; Jan-Erik Karlsson, MD, PhD; Lars Rosengren, MD, PhD; Henrik Sundeman, MD, PhD; Björn Reinsfelt, MD, PhD; Sven-Erik Ricksten, MD, PhD

Background and Purpose—In retrospective studies, patients receiving general anesthesia for endovascular treatment for acute ischemic stroke have worse neurological outcome compared with patients receiving conscious sedation. It has been suggested that this is caused by general anesthesia–associated hypotension. We investigated the effect of intraprocedural hypotension on neurological outcome.

Methods—One hundred eight patients with acute ischemic stroke, who underwent endovascular treatment in general anesthesia between 2007 and 2012, were included. Analyzed predictors of neurological outcome were age, sex, comorbidities, baseline National Institutes of Health Stroke Scale, intraprocedural relative changes in mean arterial blood pressure from baseline, blood glucose, modified Thrombolysis in Cerebral Infarction score, and elapsed time from stroke to computed tomography, groin puncture, and recanalization/end of procedure.

Results—A fall in mean arterial blood pressure of >40% was an independent predictor for poor neurological outcome (P=0.032), as were higher admission National Institutes of Health Stroke Scale score (P=0.008) and lack of recanalization (P=0.003).

Conclusions—Profound intraprocedural hypotension is an independent predictor for poor neurological outcome in patients with acute ischemic stroke undergoing endovascular therapy in general anesthesia. (***Stroke*. 2015;46:2678-2680. DOI: 10.1161/STROKEAHA.115.009808.**)

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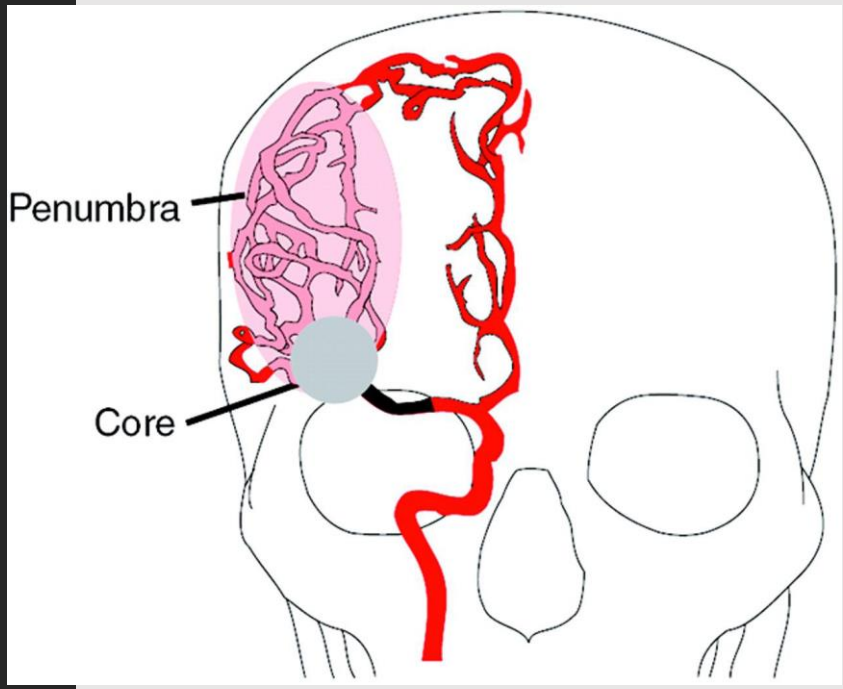
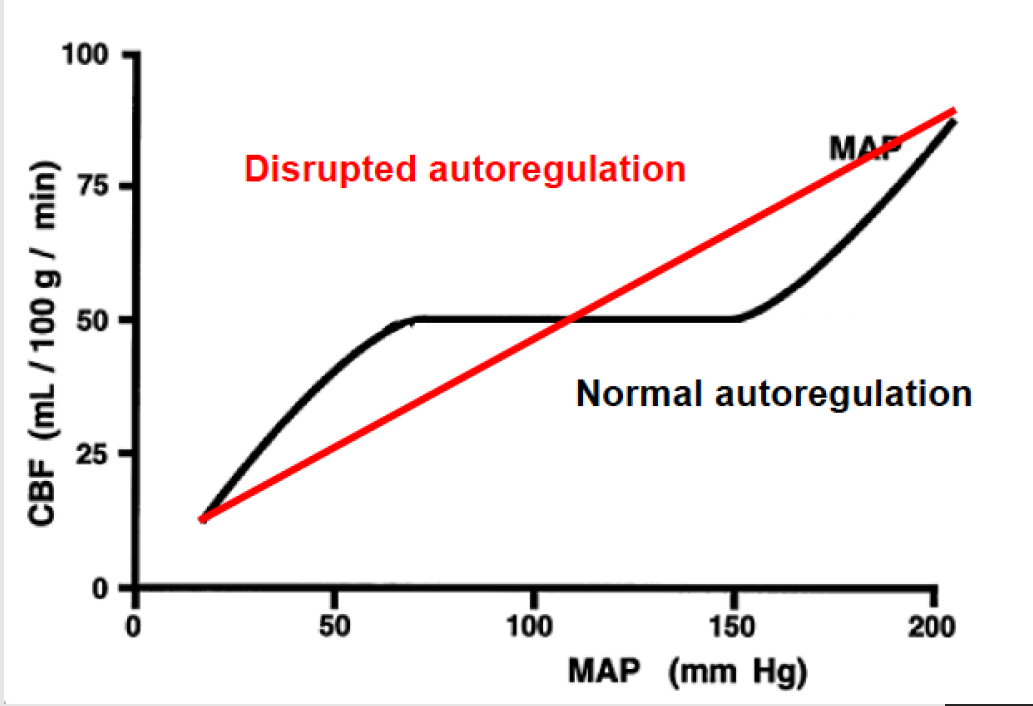
Furious: welke parameters tijdens AA?





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Society for Neuroscience in Anesthesiology and Critical Care Expert Consensus Statement: Anesthetic Management of Endovascular Treatment for Acute Ischemic Stroke*

Endorsed by the Society of NeuroInterventional Surgery and the Neurocritical Care Society

Pekka O. Talke, MD, Deepak Sharma, MD, DM,† Eric J. Heyer, MD, PhD,‡ Sergio D. Bergese, MD,§ Kristine A. Blackham, MD,‖ and Robert D. Stevens, MD¶*

We recommend that systolic blood pressure should be maintained >140mm Hg (fluids and vasopressors) and <180mm Hg (with or without IV tPA), and diastolic blood pressure <105mm Hg (class IIa, level of evidence B).

J Neurosurg Anesthesiol. 2014;26:95–108

Stroke. 2014 Aug;45(8):e138-50

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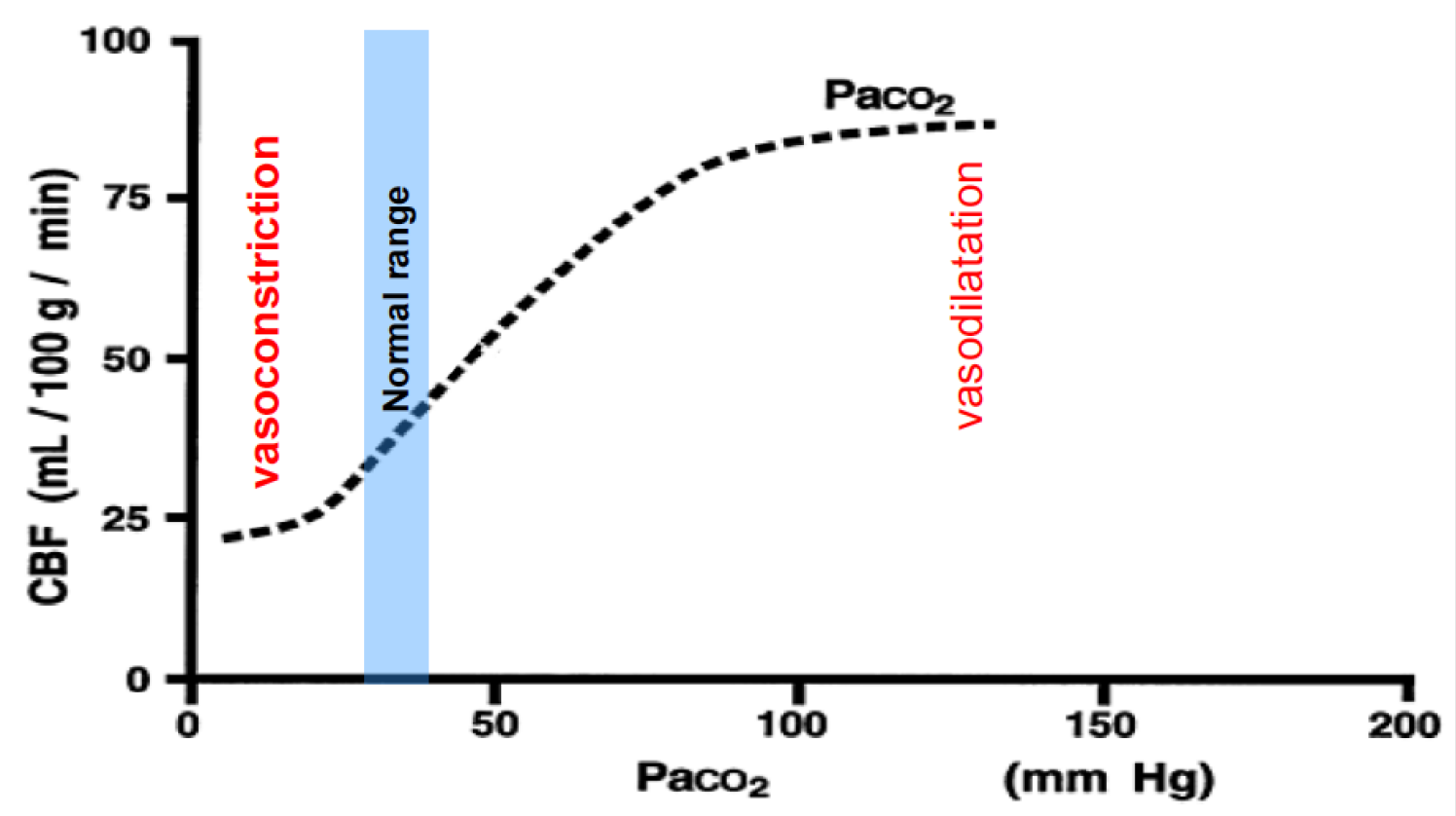
Furious: welke parameters tijdens AA?



$PaCO_2$: 35 mmHg

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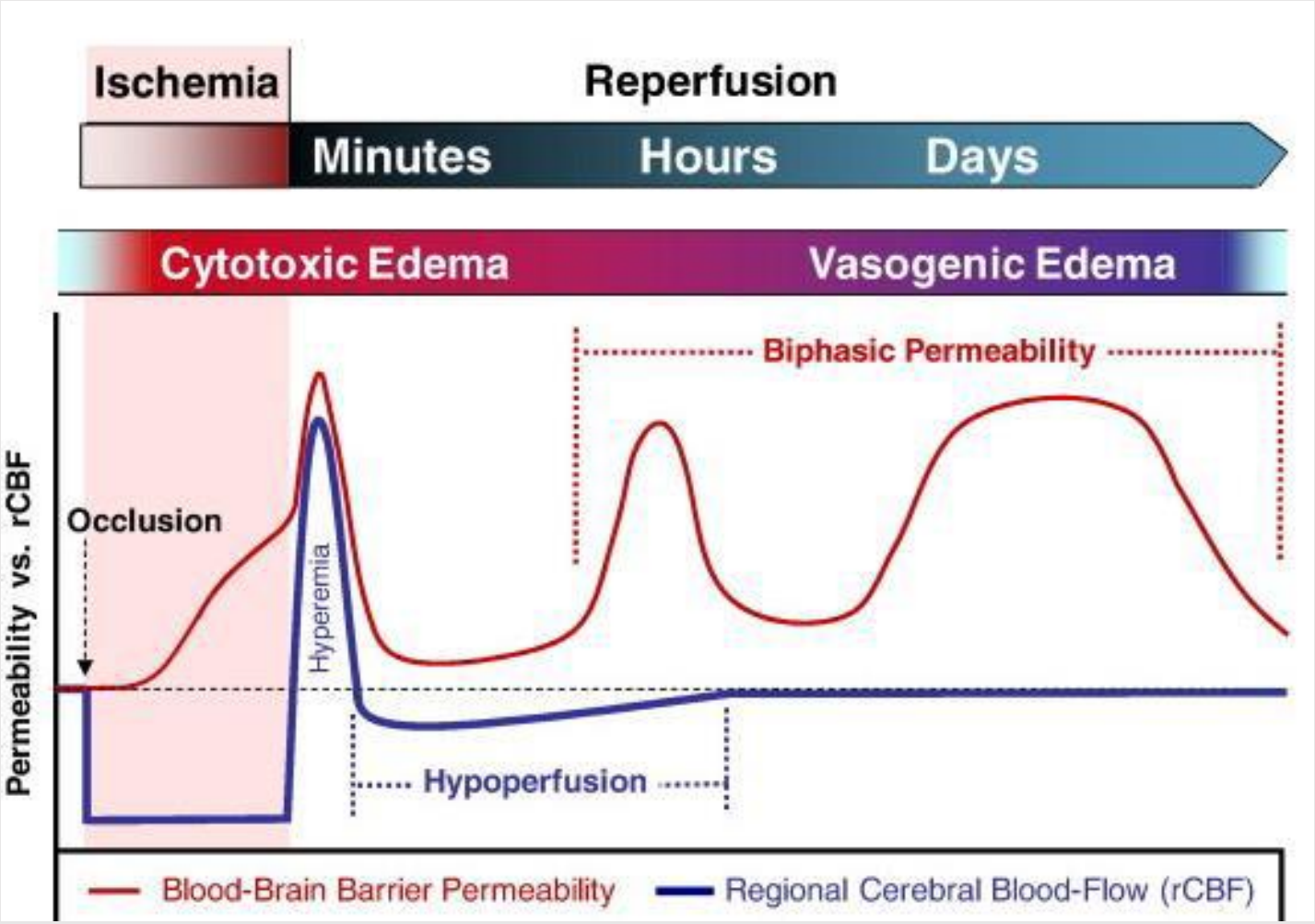

Na thrombectomie: SystBP 100-140 mmHg

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Furious: anesthesie producten

Geen evidentie voor superioriteit van het ene of andere anestheticum

- Etomidate / Fentanyl / Esmeron: crush inductie
- Sevoflurane: onderhoud
- Noradrenaline-drip voor bloeddrukcontrole met eventuele bolussen Neo-synephrine
- Ketamine?

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Sevoflurane pre- and post-conditioning protect the brain via the mitochondrial K_{ATP} channel

S. Adamczyk[1 2], E. Robin[1 2], M. Simerabet[1], E. Kipnis[1 2], B. Tavernier[1 2], B. Vallet[1 2], R. Bordet[1] and G. Lebuffe[1 2*]

[1]*Department of Pharmacology, Lille 2 University Medical School, France.* [2]*Federation of Anaesthesiology and Intensive Care Medicine, Lille University Teaching Hospital, France*

**Corresponding author. E-mail: g-lebuffe@chru-lille.fr*

Background. This study aimed to evaluate whether exposure to sevoflurane at the onset of reperfusion provides protection similar to sevoflurane preconditioning and whether the effect depends on mitochondrial potassium ATP-dependent channel (mitoK_{ATP}) in a rat model of focal cerebral ischaemia.

Methods. Adult Wistar male rats were subjected to focal cerebral ischaemia for 1 h followed by 24 h or 7 days of reperfusion. Preconditioning consisted of 15 min exposure to sevoflurane at 1 minimum alveolar concentration (2.6%) 72 h before ischaemia. Post-conditioning was performed by exposure to sevoflurane immediately at the onset of reperfusion or by a delayed exposure 5 min after the onset of reperfusion. The role of the mitoK_{ATP} channel was assessed by i.p. injection of the selective blocker 5-hydroxydecanoate before each sevoflurane administration or by the mitoK_{ATP} channel opener, diazoxide (DZX), given in place of sevoflurane. Cerebral infarct size, neurological deficit score, and motor coordination were evaluated 24 h and 7 days after reperfusion.

Results. Sevoflurane preconditioning and early post-conditioning reduced both cerebral infarct size and neurological defect score at 24 h of reperfusion whereas the sole sevoflurane post-conditioning improved motor coordination. At 7 days, only infarct volume remained lower in pre- and post-conditioned animals. Neuroprotection mediated by sevoflurane was lost when it was given 5 min after the onset of reperfusion and was abolished by inhibition of mitoK_{ATP} DZX alone mimicked sevoflurane-induced pre- and post-conditioning.

Conclusions. The pretreatment with sevoflurane or its early administration at reperfusion provides neuroprotection via mitoK_{ATP} in a rat model of focal cerebral ischaemia.

Br J Anaesth 2010; **104**: 191–200

Preclinical Evidence Toward the Use of Ketamine for Recombinant Tissue-Type Plasminogen Activator-Mediated Thrombolysis Under Anesthesia or Sedation

Clement Gakuba, MSc*; Maxime Gauberti, MSc*; Mikael Mazighi, MD, PhD; Gilles Defer, MD; Jean-Luc Hanouz, MD, PhD; Denis Vivien, PhD

Background and Purpose—Endovascular treatment of ischemic stroke usually involves recombinant tissue-type plasminogen activator (rtPA)-mediated thrombolysis in anesthetized patients. Paradoxically, differential influences of anesthetic agents on thrombolysis outcome remain unknown.

Methods—In situ thrombotic stroke was induced in mice by local injection of thrombin. Four hours after the ischemic onset, mice underwent rtPA-mediated thrombolysis either awake or subjected to different anesthetic regimens (propofol, isoflurane/N_2O, ketamine). Infarct volume and arterial recanalization were assessed by MRI at 24 hours.

Results—Whatever the anesthetic regimen, infarct volumes measured at 24 hours were not affected. However, in contrast with other anesthetic agents tested, ketamine dramatically reduced infarct volume when combined with rtPA.

Conclusions—Altogether these data suggest that ketamine significantly improves the benefit of rtPA-induced thrombolysis after stroke. (***Stroke*. 2011;42:2947-2949.**)

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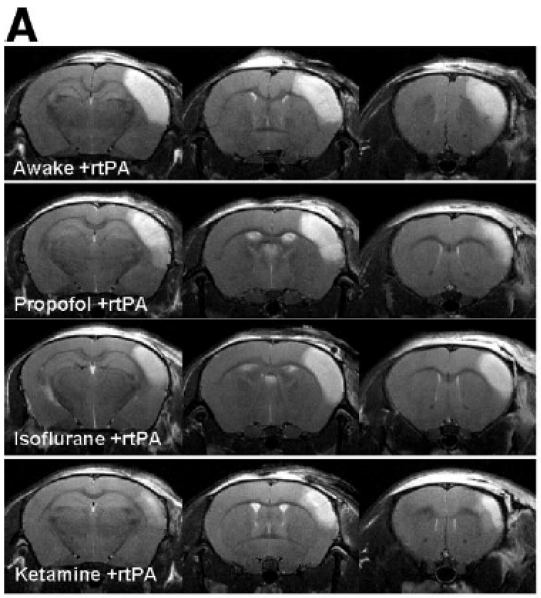
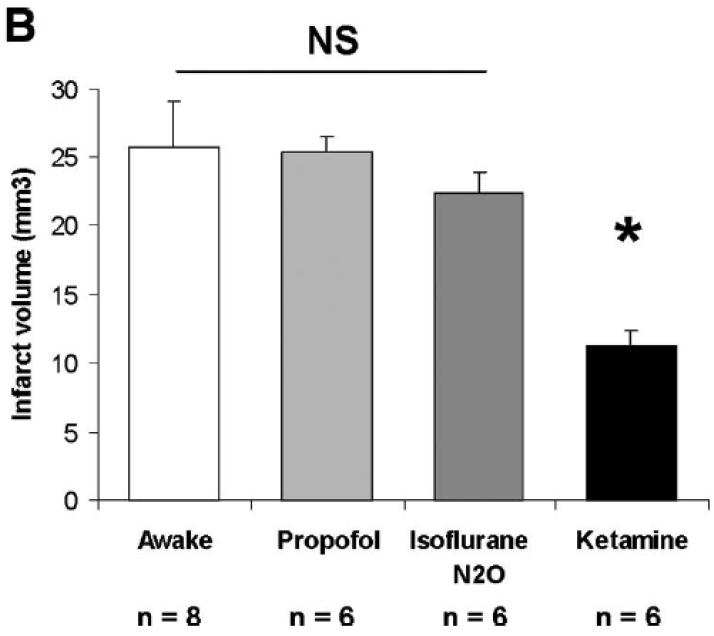
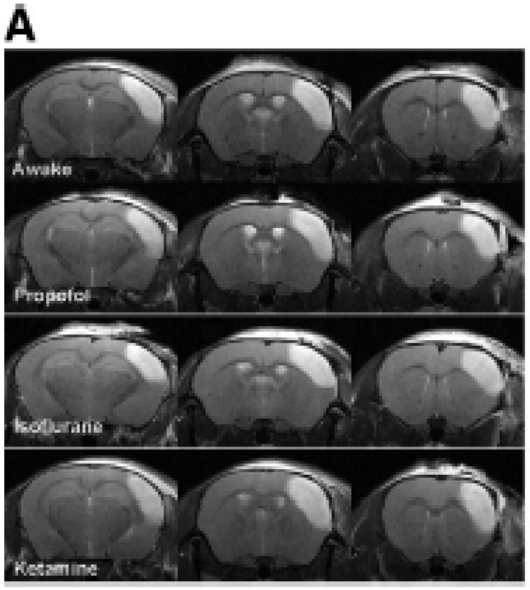
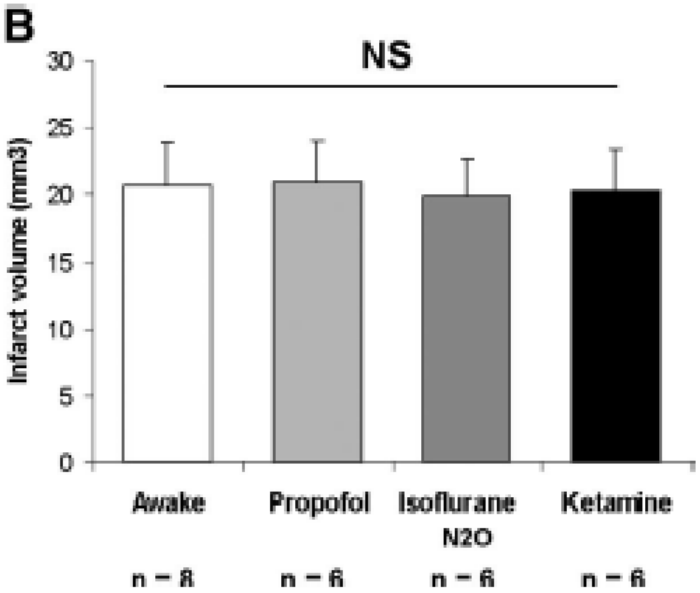

A
Awake +rtPA
Propofol +rtPA
Isoflurane +rtPA
Ketamine +rtPA


B
NS
Infarct volume (mm3)
30
25
20
15
10
5
0
*
Awake
Propofol
Isoflurane
N2O
Ketamine
n = 8
n = 6
n = 6
n = 6


A
Awake
Propofol
Isoflurane
Ketamine


B
NS
Infarct volume (mm3)
30
25
20
15
10
5
0
Awake
Propofol
Isoflurane
N2O
Ketamine
n = 8
n = 6
n = 6
n = 6

‘There are known knowns,

There are known unknowns,

but the unknown unknowns are the most dangerous’

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Bedankt voor uw aandacht!

Ziekenhuis Oost-Limburg