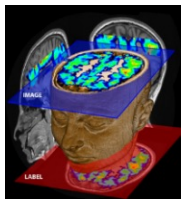


Ärztliche Fortbildung

12. INTENSIVKURS
STROKE-UNIT-STARTER

Mit VR-Kurs

Akuter Schlaganfall -interaktives Fallseminar

21./22. 6. 2024, Berlin

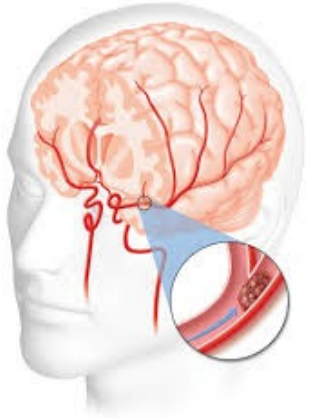
Jan Sobesky

ST. AUGUSTINUS GRUPPE
Johanna Etienne Krankenhaus

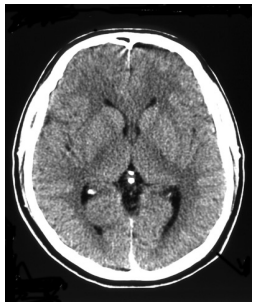
Prof. Dr. J. Sobesky

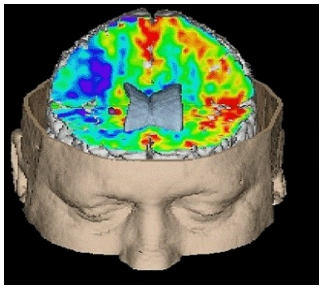
Chefarzt der Klinik für Neurologie
mit Stroke Unit und Frührehabilitation
Johanna-Etienne-Krankenhaus Neuss
j.sobesky@ak-neuss.de

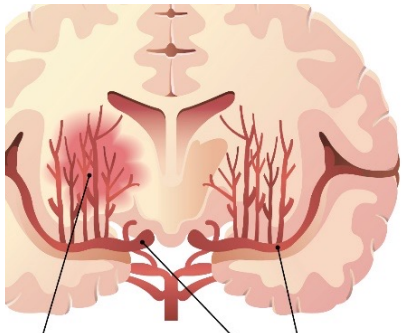
Ursachen des Schlaganfalls



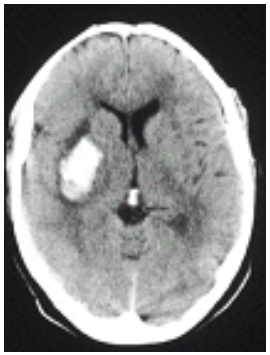
Hirninfarkt 80%

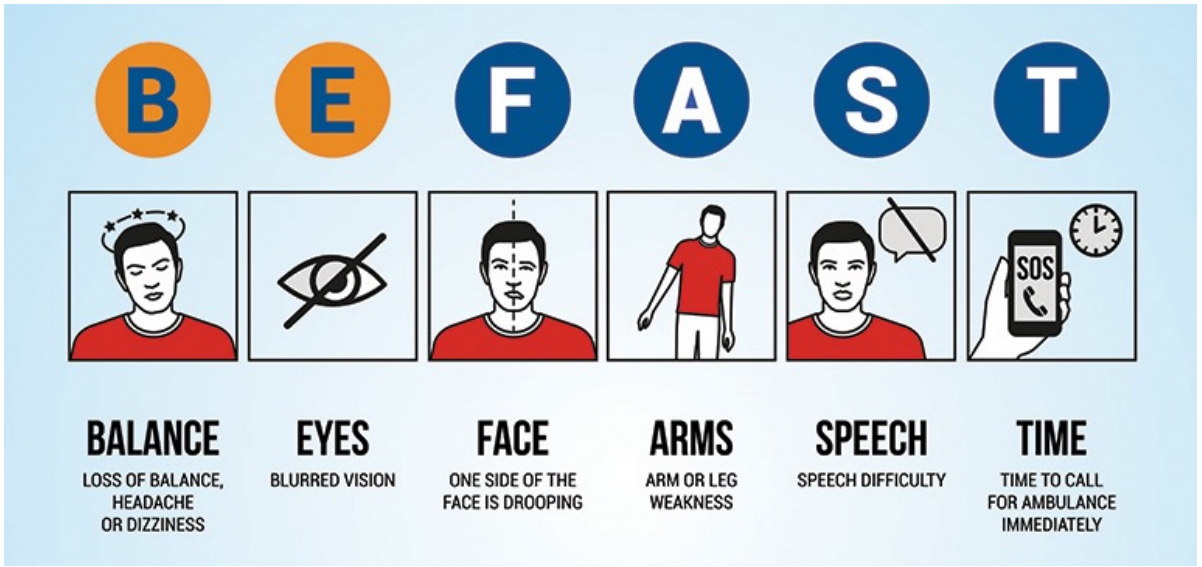






Hirnblutung 20%




B
E
F
A
S
T
SOS
BALANCE
LOSS OF BALANCE, HEADACHE OR DIZZINESS
EYES
BLURRED VISION
FACE
ONE SIDE OF THE FACE IS DROOPING
ARMS
ARM OR LEG WEAKNESS
SPEECH
SPEECH DIFFICULTY
TIME
TIME TO CALL FOR AMBULANCE IMMEDIATELY

Was mache ich in der Akutversorgung?

- Schnelle **Triage**
- **Schneller Neurostatus**
- **Pragmatische** Bildgebung
- Stroke **mimics** erkennen
- Internistische **Komplikationen** erkennen
- Kontrolle **Vitalparameter**
- **Lyse**? Rekanalisation? Gerinnungstherapie?
- **Entscheidung** SU, IMC, ITS, Normalstation (?)

>>> auch am Sonntag früh um 3:30 !!!

Essentials: „akuter stroke“

Standardisierte Übergabe durch Rettungsdienst

Labor bei Eintritt; Strokeverdacht verifizieren

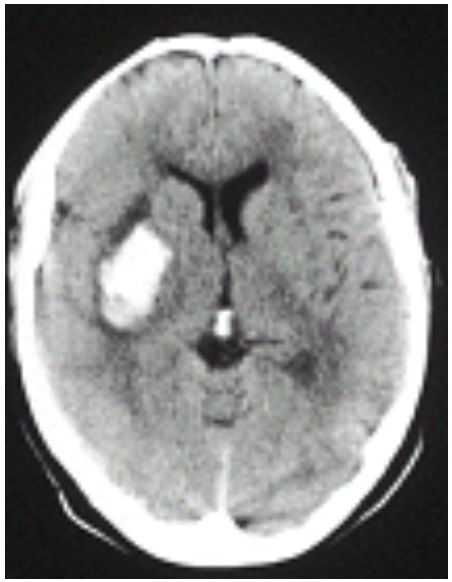
internistischer Check (EKG ?), klinischer Eindruck, Vigilanz (GCS)

Schneller Neurostatus (NIHSS), Onset kontrollieren (!)

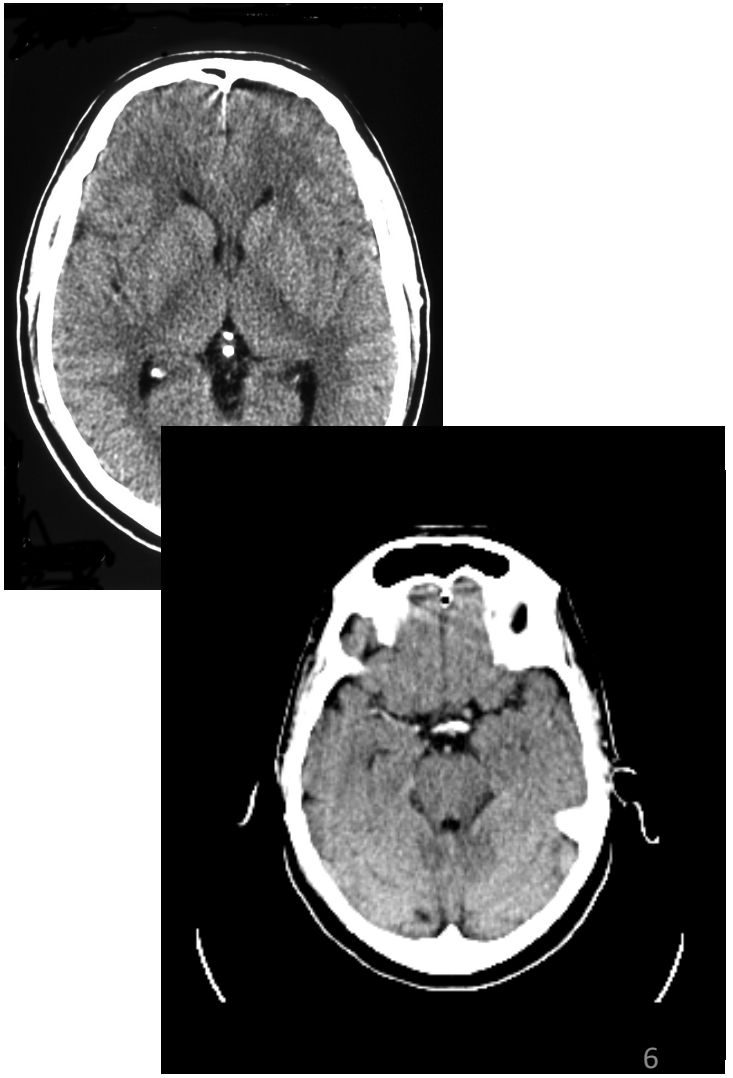
Anamnese: Sturz, Vorerkrankungen, Medikamente, Antikoagulation, Operationen, spezielle Kontraindikationen („on the way“)

1. Welches Imaging? 2. Welche Therapie? 3. Welcher Zielort?

#1: Zeitfenster 0-4,5 h: Frühzeichen, Infarkt, Gefäßverschluss



nCT 2 Stunden
nach Beginn einer
linksseitigen
Hemiparese



CT und CTA:
„Was muss ich erkennen?“

NATIV CT:

- Frühzeichen (early ischemic signs): hilfreich, wenn vorhanden

  Abblassung der Basalganglien

  Kortikale Schwellung

  Hyperdenses Mediazeichen

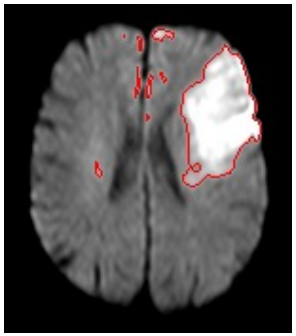
- Demarkierter Infarkt?
- ICB (SAB)?
- andere Pathologie?

CT Angiographie:

- Proximaler Gefäßverschluß (target vessel) z.B. M1, M2, Carotis T Gabel; ggfs. P1, A1?

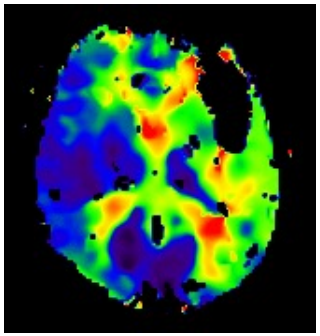
#2: Zeitfenster > 4,5 h:

Risikogewebe = Penumbra = Mismatch



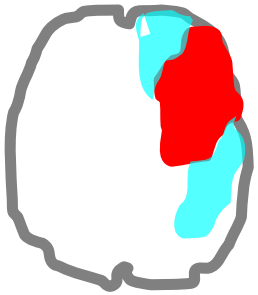
DWI

(Infarkt)



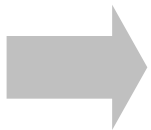
PWI

(hypoperfusion)

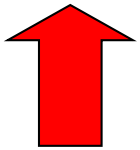


„mismatch“

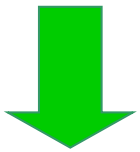
(penumbra)



mismatch DWI/PWI ratio 1.2?



nein



ja

Bildgebung Risikogewebe (Penumbra/Mismatch)

Methode

MRT= Diffusion/Perfusionsmismatch

oder

pCT= Mismatch zwischen core (CBV oder CBF) und Perfusion (TTP oderMTT)

Mismatchbildgebung: Was muss ich erkennen?

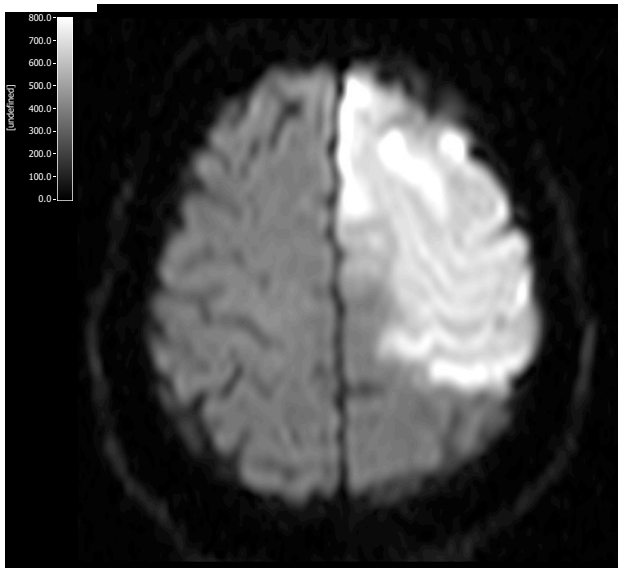
Infarktkern

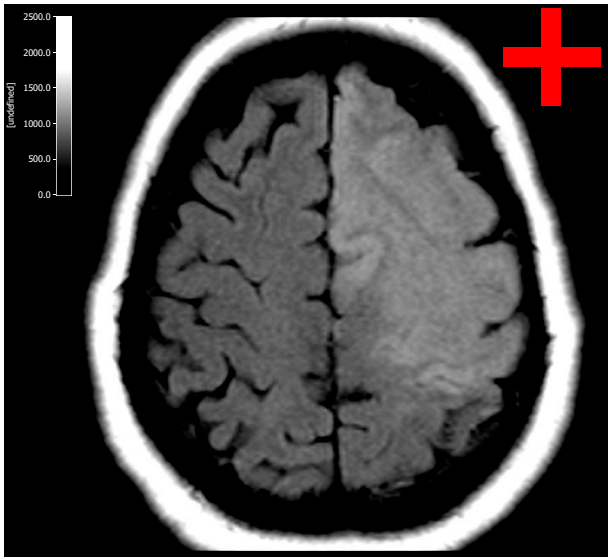
„Rettbares Gewebe“

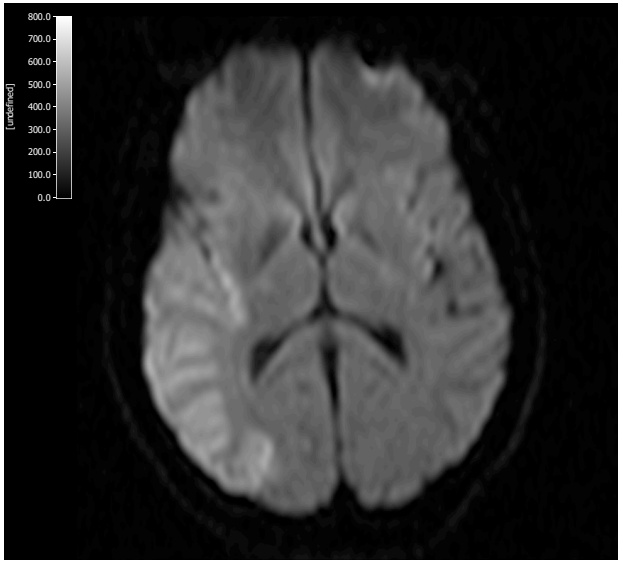
ggfs. Therapiegefahr

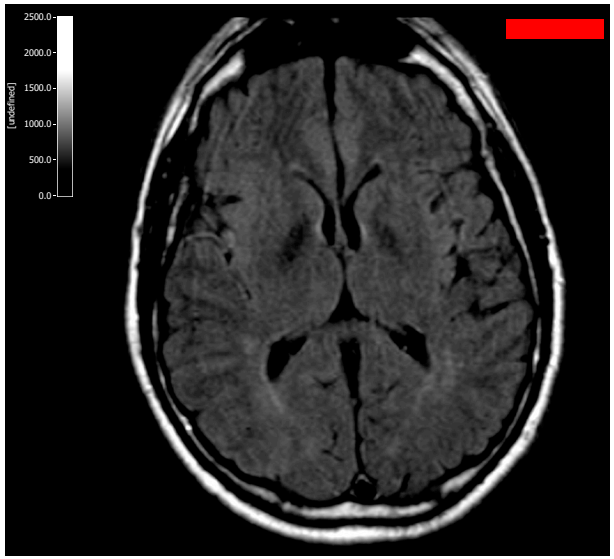
Tissue clock?

DWI FLAIR mismatch









DWI FLAIR Mismatch

Welche Methode?

MRT

(CT???)

Was muss ich erkennnen?

Ausdehnung FLAIR Läsion und DWI Läsion

Welches Aussage hat es?

Wahrscheinlichkeit, dass stroke < 4,5 h

„Rettbares Gewebe“?

Ggfs. Therapiegefahr?

Tissue clock?

IV Thrombolyse < 4,5 h mit rtPA (IVT)

… ist Standardtherapie des akuten Schlaganfalls < 4,5 h mit und ohne Nachweis eines target vessel

Besonderheiten*….

Alter

Vorbehandlung TFH

„relevanter Stroke“ ?

Gerinnung

Zeitfenster

Vorerkrankungen

„lakunäres Syndrom“

Diabetes

Frühzeichen im CT

microbleeds im MRT

rtPA lyse light?

Tenecteplase?

**Bitte Fachinformation und lokale Manuale beachten*

Metaanalyse EXTEND, ECASS4, EPITHET: Lyse 4,5-9 h und WUS

Extending thrombolysis to 4·5–9 h and wake-up stroke using perfusion imaging: a systematic review and meta-analysis of individual patient data

Bruce C V Campbell, Henry Ma*, Peter A Ringleb*, Mark W Parsons, Leonid Churilov, Martin Bendszus, Christopher R Levi, Chung Hsu,*

- Individuelle Patienten Metaanalyse
- Lyse > 4,5-9 h und WUS
- EXTEND 225, ECASS4 119, EPITHET 70
- mRS 0-1: 36% vs 29%
- SICH 5% vs 1%

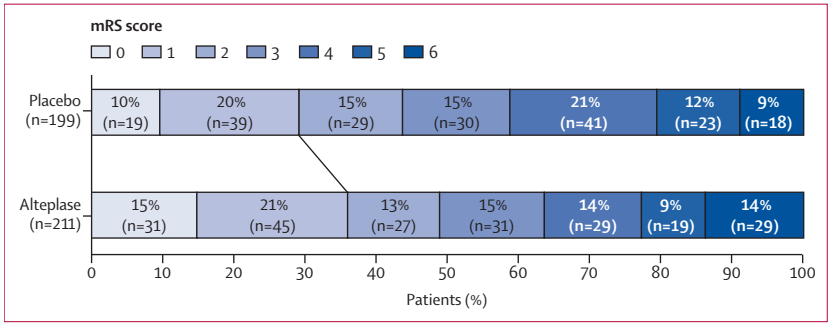
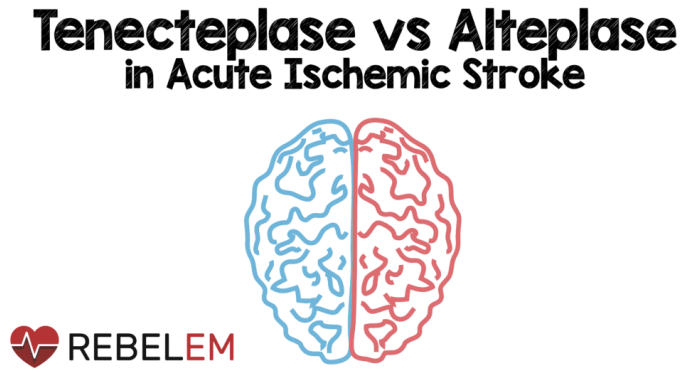


Figure 1: **mRS scores at 3 months for all patients**
mRS=modified Rankin Scale.

Campbell et al. 2019 Lancet

Alteplase vs Tenecteplase



- TRACE-2 Studie: Wang et al. 2023 Lancet Neur
- TWIST Studie: Roaldsen et al. 2023 Lancet Neur

https://rebelem.com/tenecteplase-vs-alteplase-in-acute-ischemic-stroke/

NOAK und Antagonisierung

	Idarucizumab	Andexanet alfa	PPSB
Target	Dabigatran (spezifisch)	Apixaban/ Rivaroxaban (spezifisch)	Gerinnungsfaktoren (varia)
Spezifität	+++	+++	+
Dosis	2x Kurzinfusion; fixe Dosis	Bolus + Kurzinfusion; 2 Regimes	Kurzinfusion, nach KG adaptiert
Zulassung	+	+	-
Kosten	++	+++	+

Thrombolyse und NOAK

JAMA Neurology | Original Investigation

Intravenous Thrombolysis in Patients With Ischemic Stroke and Recent Ingestion of Direct Oral Anticoagulants

Thomas R. Meinel, MD; Duncan Wilson, PhD; Henrik Gensicke, MD; Jan F. Scheitz, MD; Peter Ringleb, MD;

CONCLUSIONS AND RELEVANCE In this study, there was insufficient evidence of excess harm associated with off-label IVT in selected patients after ischemic stroke with recent DOAC ingestion.

JAMA Neurology March 2023 Volume 80, Number 3

Type of anticoagulation used					
Dabigatran	832	15 (6.7)	75 (21.1)	252 (100)	<.001
Rivaroxaban		119 (52.9)	139 (39.2)	0	
Apixaban		73 (32.4)	90 (25.4)	0	
Edoxaban		18 (8.0)	50 (14.1)	0	
DOAC agent not specified		0	1 (0.3)	0	
Time from last ingestion to admission					
<12 h	832	39 (17.3)	73 (20.6)	130 (51.6)	<.001
12-24 h		48 (21.3)	78 (22.0)	32 (12.7)	
24-48 h		43 (19.1)	59 (16.6)	1 (0.4)	
Exact time point unknown but <48 h		95 (42.2)	145 (40.8)	89 (35.3)	

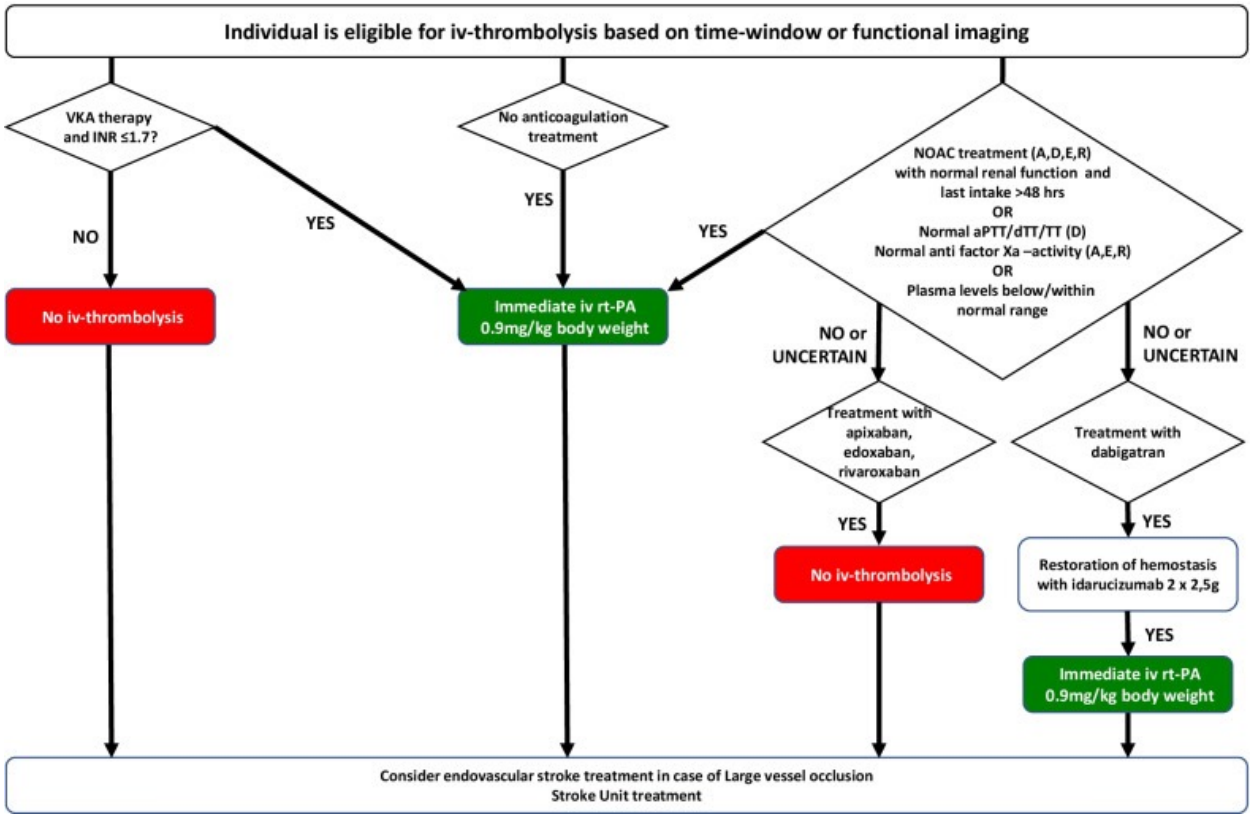
Table 3. Outcomes of Patients With Acute Ischemic Stroke Treated With Intravenous Thrombolysis by Selection Strategy

Outcome	Controls (n = 32 035)	All patients with recent ingestion of DOACs (n = 832)	DOAC plasma levels measured (n = 225)	Idarucizumab (n = 252)	Neither known levels nor idarucizumab (n = 355)
Primary outcome					
Symptomatic intracranial hemorrhage within 36 h, % (95% CI)	4.1 (3.9-4.4)	2.5 (1.6-3.8)	3.1 (1.3-6.3)	1.2 (0.2-3.4)	3.1 (1.6-5.5)
Unadjusted OR (95% CI)	NA	0.62 (0.40-0.96)	0.66 (0.31-1.40)	0.30 (0.09-0.92)	0.84 (0.46-1.53)
P value	NA	.03	.28	.04	.56
Adjusted OR (95% CI)	NA	0.57 (0.36-0.92)	0.56 (0.26-1.21)	0.36 (0.09-1.48)	0.66 (0.35-1.25)
P value	NA	.02	.14	.16	.20

Kann unter OAK eine IV Lyse durchgeführt werden*?*

SOP: thrombolysis in ischemic stroke under oral anticoagulation therapy

Pawel Kermer, Peter D. Schellinger, Peter A. Ringleb and Martin Köhrmann



Neurol Res Pract. 2022; 4: 7.

Start der OAK nach VHF-Schlaganfall:
1 3 6 12 „Dieners‘ Rule“

TIA	Nach 1 Tag
Leichter Schlaganfall	Nach 3 Tagen
Mittelschwerer Schlaganfall	Nach 6 Tagen
Schwerer Schlaganfall	Nach 12 Tagen

Tab. 1: «1-3-6-12-Tagesregel»: Beginn oder Neustart der oralen Antikoagulation nach TIA oder ischämischem Schlaganfall (nach Diener et al.[4])

Diener HC et al.: Choosing a particular oral anticoagulant and dose for stroke prevention in individual patients with non-valvular atrial fibrillation: part 2. Eur Heart J 2016; 38: 860-8

OAK früh oder spät bei VHF?
ELAN Study

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 JUNE 29, 2023 VOL. 388 NO. 26

Early versus Later Anticoagulation for Stroke with Atrial Fibrillation

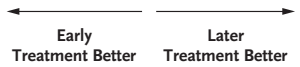
U. Fischer, M. Koga, D. Strbian, M. Branca, S. Abend, S. Trelle, M. Paciaroni, G. Thomalla, P. Michel,

CONCLUSIONS

In this trial, the incidence of recurrent ischemic stroke, systemic embolism, major extracranial bleeding, symptomatic intracranial hemorrhage, or vascular death at 30 days was estimated to range from 2.8 percentage points lower to 0.5 percentage points higher (based on the 95% confidence interval) with early than with later use of DOACs. (Funded by the Swiss National Science Foundation and others; ELAN ClinicalTrials.gov number, NCT03148457.)

A

Outcome within 30 Days	Early-Treatment Group (N=984)	Later-Treatment Group (N=991)	Adjusted Risk Difference (95% CI)
	no. of events (%)		*percentage points*
Primary-outcome event	29 (2.9)	41 (4.1)	−1.18 (−2.84 to 0.47)
Major extracranial bleeding	3 (0.3)	5 (0.5)	−0.25 (−0.90 to 0.41)
Symptomatic intracranial hemorrhage	2 (0.2)	2 (0.2)	0.01 (−0.52 to 0.53)
Recurrent ischemic stroke	14 (1.4)	25 (2.5)	−1.14 (−2.41 to 0.13)
Systemic embolism	4 (0.4)	9 (0.9)	−0.55 (−1.34 to 0.23)
Death from vascular cause	11 (1.1)	10 (1.0)	0.13 (−0.84 to 1.09)



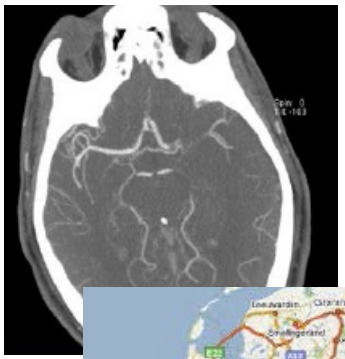
Outcome	Early-Treatment Group (N=1006)	Later-Treatment Group (N=1007)	Adjusted Odds Ratio (95% CI)*
	no./total no. (%)		
Primary outcome: composite outcome at 30 days	29/1006 (2.9)†	41/1007 (4.1)†	0.70 (0.44 to 1.14)‡

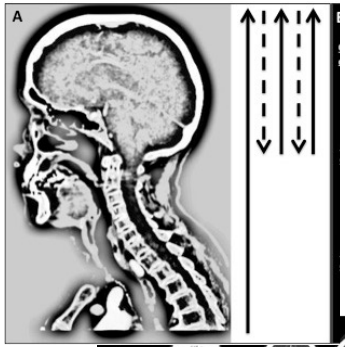
MR CLEAN

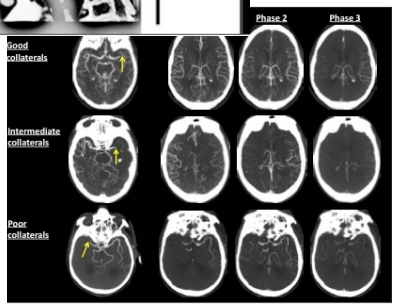
A Multicenter Randomized CLinical trial of Endovascular treatment for Acute ischemic stroke in the Netherlands

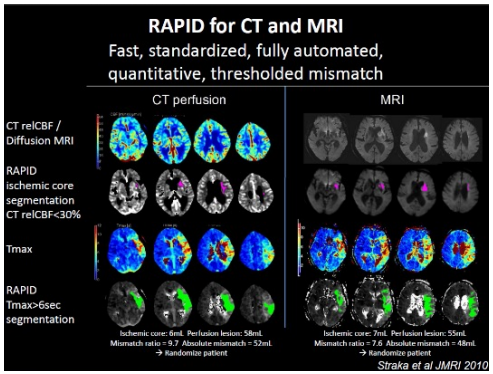
ESCAPE

EXTEND - IA









Thrombektomie mit oder ohne IV Lyse?

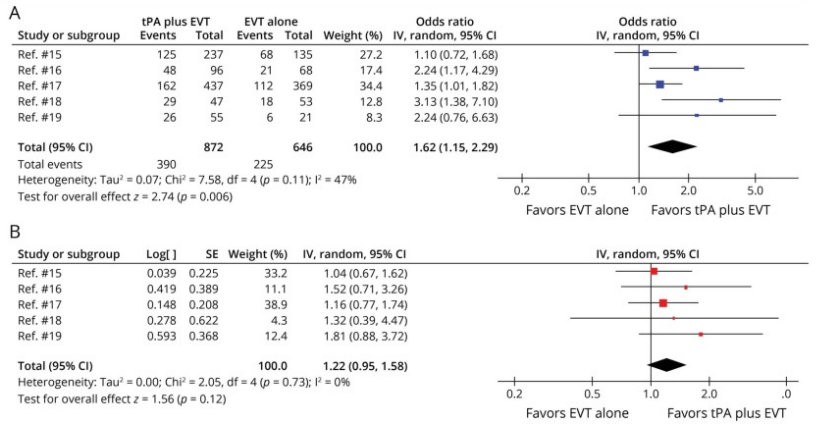
IV Thrombolysis Initiated Before Transfer for Endovascular Stroke Thrombectomy

A Systematic Review and Meta-analysis

Aristeidis H. Katsanos. MD. Amrou Sarrai. MD. Michael Froehler. MD. Ian Purrucker. MD. Nitin Goval. MD. **Correspondence**

Neurology® 2023;100:e1436-e1443.

Figure 2 Probability for Good Functional Outcome at 3 Months



(A) Unadjusted and (B) adjusted probability of good functional outcome (modified Rankin Scale score 2 or less) at 3 months between patients receiving IV thrombolysis before transfer for endovascular thrombectomy compared with patients receiving endovascular thrombectomy alone.

Mit Lyse !!!

Discussion

Patients with LVO receiving IVT at a PSC before an EVT transfer have a higher likelihood of excellent functional recovery and lower odds of mortality, with no increase in sICH and onset-to-groin puncture times, compared with those transferred for EVT without previously receiving IVT.

Original Investigation

February 7, 2024

Time to Treatment With Intravenous Thrombolysis Before Thrombectomy and Functional Outcomes in Acute Ischemic Stroke

A Meta-Analysis

Johannes Kaesmacher, MD, PhD[1]; Fabiano Cavalcante, MD[2]; Manon Kappelhof, MD, PhD[2]; et al

Author Affiliations

JAMA. 2024;331(9):764-777. doi:10.1001/jama.2024.0589

Key Points

Question In patients with acute ischemic stroke undergoing thrombectomy, does a potential benefit associated with intravenous thrombolysis vary according to treatment times?

Findings In this individual participant data meta-analysis (n=2313) of 6 randomized clinical trials, intravenous thrombolysis plus thrombectomy was significantly associated with a favorable shift in functional outcome at 90 days vs thrombectomy alone if the time from symptom onset to expected administration of intravenous thrombolysis was within 2 hours 20 minutes. Thereafter, there was no statistically significant association.

Meaning The findings indicate that the benefit associated with intravenous thrombolysis prior to thrombectomy was time dependent and lessened with longer times between symptom onset and expected administration of intravenous thrombolysis.

Mit Lyse nur bis 3 h ???

n=206

Thrombekotomie **6-24** h vs BMT

Clinical/infarct-mismatch

(Group A: > 80j, NIHSS > 10, infarct core < 21ml;
Group B: < 80j, NIHSS > 20, infarct core 31-51ml;
Infarct core by DWI or PCT (CBV))

Nogueira 2017

N= 180

Thrombekotomie **6-16** h vs BMT

Diffusion/Perfusion mismatch > 1.8

(Infarct < 70 ml; RAPID)

Albers 2018

Weches Imaging?

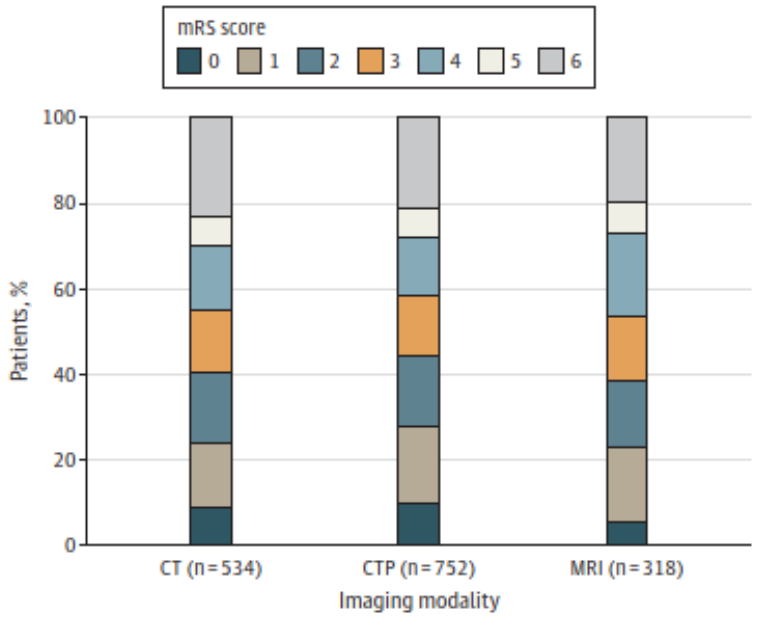
Ist nCT bei large vessel occlusion ausreichend?

Brauche ich noch CTP oder MRT?

- 1604 pat. Mit LVO und 6-24 h; mögliche MT
- Selektion durch CT (534), CTP (752) und MRT (318)
- Klinischer Benefit gleich in CT vs CTP
- Blutungsraten gleich in CT vs CTP

(Nguyen et al, JAMA Neurol 2022)

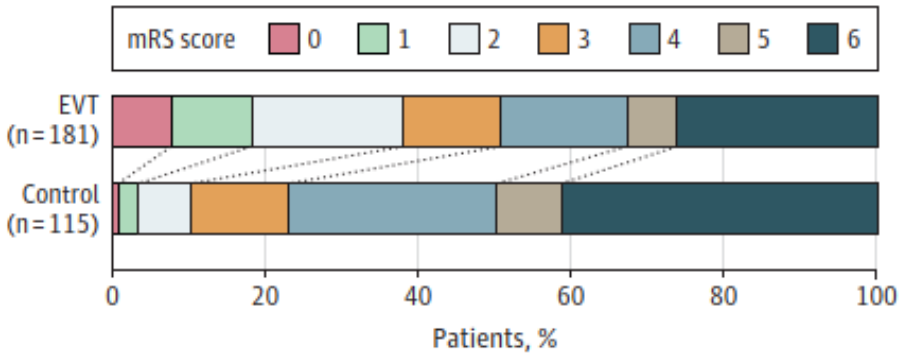
Figure 2. Distribution of 90-Day Modified Rankin Scale Score (mRS) in Patients Presenting in the Window 6 to 24 Hours After Time Last Seen Well With Internal Carotid Artery and Middle Cerebral Artery M1/M2 Occlusions, by Imaging Modality



Bald nur noch nCT und CTA?

MT> 24h?

Figure 2. Distribution of 90-Day Modified Rankin Scale (mRS) Scores in the Study Population According to Type of Treatment Received



The control group received medical management only. Modified Rankin Scale scores range from 0 to 6 with higher scores indicating worse outcomes.

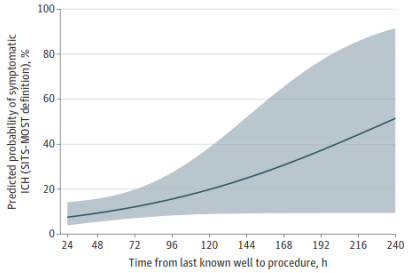
JAMA Neurology | Original Investigation

Association of Endovascular Thrombectomy vs Medical Management With Functional and Safety Outcomes in Patients Treated Beyond 24 Hours of Last Known Well
The SELECT Late Study

Amrou Sarraj, MD; Timothy J. Kleinig, MBBS(Hons), PhD; Ameer E. Hassan, DO; Pere Cardona Portela, MD; Santiago Ortega-Gutierrez, MD;

JAMA Neurology February 2023 Volume 80, Number 2

Figure 3. Predicted Probability of Symptomatic Intracranial Hemorrhage (ICH) and Association With Time Between Symptom Onset and Treatment



The graph illustrates the potential increase in the rate of symptomatic ICH as time progresses (P = .06). Shading indicates 95% CIs. SITS-MOST indicates the Safe Implementation of Thrombolysis in Stroke–Monitoring Study.

CONCLUSIONS AND RELEVANCE In this study of treatment beyond 24 hours of last known well, EVT was associated with higher odds of functional independence compared with medical management, with consistent results obtained in PS-matched subpopulations and patients with presence of mismatch, despite increased odds of sICH. Our findings support EVT feasibility in selected patients beyond 24 hours. Prospective studies are warranted for confirmation.

MT bei niedrigem NIHSS?

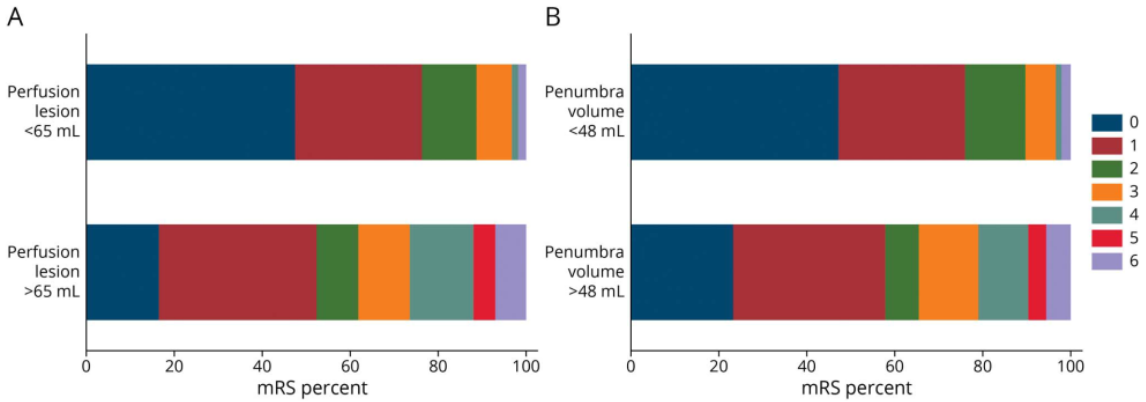
news !

Association of Perfusion Lesion Variables With Functional Outcome in Patients With Mild Stroke and Large Vessel Occlusion Managed Medically

Peng Wang, MD,* Wenhuo Chen, MD,* Chushuang Chen, PhD,* Andrew Bivard, PhD, Geng Yu, MD, and Longting Lin, PhD,† on behalf of INSPIRE

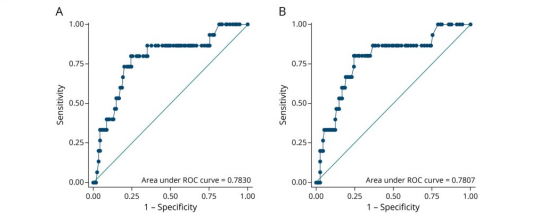
Correspondence
Dr. Lin
longting.lin@newcastle.edu.au

27-e638. doi:10.1212/WNL.0000000000201498



(A) Perfusion lesion volume <65 mL vs =65 mL and (B) penumbra volume <48 mL vs =48 mL. LVO = large vessel occlusion; mRS = modified Rankin Scale.

Figure 3 Receiver Operating Characteristic Curve of Early Neurologic Deterioration Predicted by Perfusion Lesion Volume (A) and Penumbra Volume (B)



Discussion

A perfusion lesion of ≥65 mL predicted poor functional outcome in mild stroke patients with LVO.

MT bei großem Infarkt?

ORIGINAL ARTICLE

Trial of Endovascular Therapy for Acute Ischemic Stroke with Large Infarct

Xiaochuan Huo, M.D., Ph.D., Gaoting Ma, M.D., Ph.D., Xu Tong, M.D., Ph.D., Xuelei Zhang, M.D., Ph.D., Yuesong Pan, Ph.D., Thanh N. Nguyen, M.D., Guangxiong Yuan, M.D., Hongxing Han, Ph.D., Wenhuo Chen, Ph.D., Ming Wei, M.D., Jiangang Zhang, M.D., Zhiming Zhou, M.D., et al., for the ANGEL-ASPECT Investigators*

Article Figures/Media Metrics

April 6, 2023
N Engl J Med 2023; 388:1272-1283

Conclusions
In a trial conducted in China, patients with large cerebral infarctions had better outcomes with endovascular therapy administered within 24 hours than with medical management alone but had more intracranial hemorrhages. (Funded by Covidien Healthcare International Trading [Shanghai] and others; ANGEL-ASPECT ClinicalTrials.gov number, NCT04551664. opens in new tab.)

Spätes Zeitfenster/hoher ASPECT

JAMA Network Open

Original Investigation | Neurology

Association of Thrombectomy With Functional Outcome for Patients With Ischemic Stroke Who Presented in the Extended Time Window With Extensive Signs of Infarction

JAMA Network Open. 2022;5(10):e2235733. doi:10.1001/jamanetworkopen.2022.35733

Gabriel Broocks, MD; Uta Hanning, MD; Matthias Bechstein, MD; Sarah Elsayed, MD; Tobias D. Faizy, MD; Caspar Brekenfeld, MD; Fabian Flottmann, MD;

Figure 1. Association of Baseline Alberta Stroke Program Early CT Score (ASPECTS) and Recanalization With Favorable Outcome

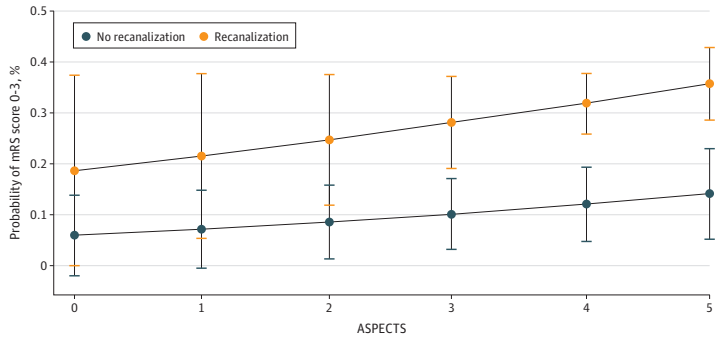
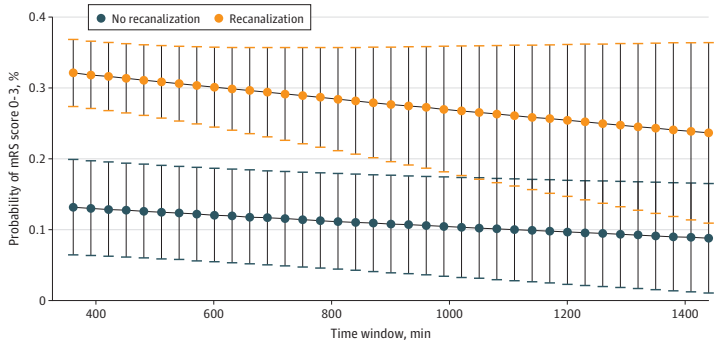


Figure 2. Association of Time and Recanalization With Estimated Favorable Outcome



CONCLUSIONS AND RELEVANCE In this cohort study reflecting daily clinical practice, vessel recanalization for patients with a low ASPECTS and extended time window was associated with better functional outcomes in a time window up to 17.6 hours and ASPECTS of 3 to 5. The results of

MT bei mRS>2?

Neurology® 2023;100:e751-e763.

Endovascular vs Medical Management for Late Anterior Large Vessel Occlusion With Prestroke Disability

Analysis of CLEAR and RESCUE-Japan

James E. Siegler, MD, Muhammad M. Qureshi, MBBS, MPH, Raul G. Nogueira, MD, Kanta Tanaka, MD, PhD, **Correspondence**

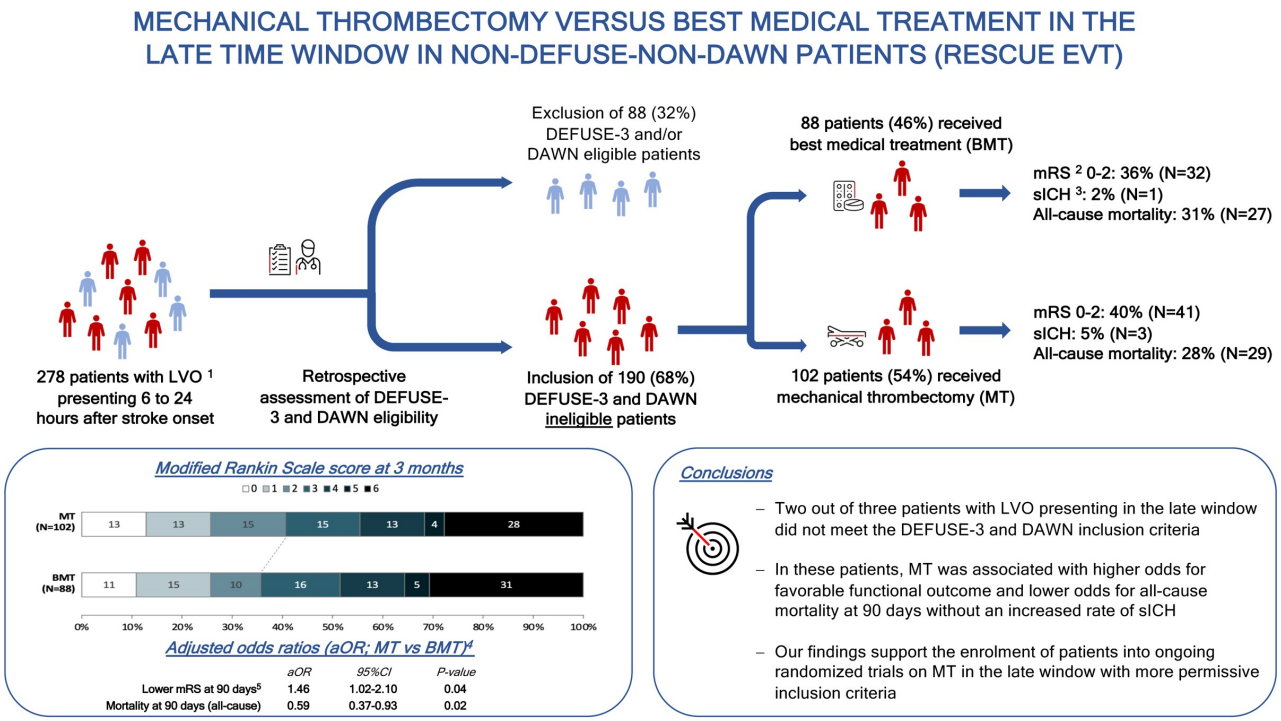
Table 3 Multivariable Logistic Regression, SMR, and IPTW Evaluation of Thrombectomy for Return of Rankin[a]

	Multivariable model		SMR model OR (95% CI), *p*		IPTW model	
			Overall mRS 2–4 (n = 554)			
Medical management	Referent					
Mechanical thrombectomy	3.96 (1.78–8.79)	0.001	3.00 (1.10–8.15)	0.032	3.10 (1.20–7.98)	0.020
			Premorbid mRS 2 (n = 276)			
Medical management	Referent					
Mechanical thrombectomy	4.36 (1.01–18.79)	0.048	2.99 (0.47–19.07)	0.247	3.18 (0.53–19.05)	0.206
			Premorbid mRS 3 (n = 205)			
Medical management	Referent					
Mechanical thrombectomy	3.80 (1.01–14.24)	0.048	4.40 (0.86–22.50)	0.075	4.22 (0.91–19.54)	0.066
			Premorbid mRS 4 (n = 73)			
Medical management	Referent					
Mechanical thrombectomy	4.00 (0.76–21.06)	0.102	2.03 (0.38–10.93)	0.410	2.21 (0.45–10.79)	0.325

Discussion

In patients with preexisting disability presenting in the 6- to 24-hour time window, MT is associated with a higher probability of returning to baseline function compared with medical management.

MT: später Patient, der nicht „passt“….



[1] LVO: large vessel occlusion of the anterior circulation; [2] mRS: modified Rankin Scale score; [3] sICH: symptomatic intracranial hemorrhage; [4] according to inverse probability of treatment weighting analysis; [5] adjusted common odds ratios

Dittrich et al., 2023 Mar;54(3):722-730.

.

Basilar Artery Occlusion BAO
MT mit IVT?:

news !

ATTENTION Studie

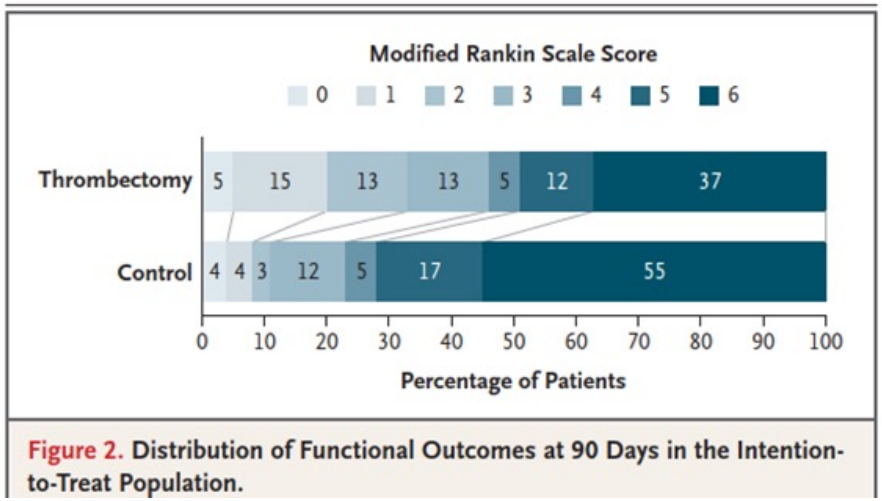


Figure 2. Distribution of Functional Outcomes at 90 Days in the Intention-to-Treat Population.

BAOCHE Studie

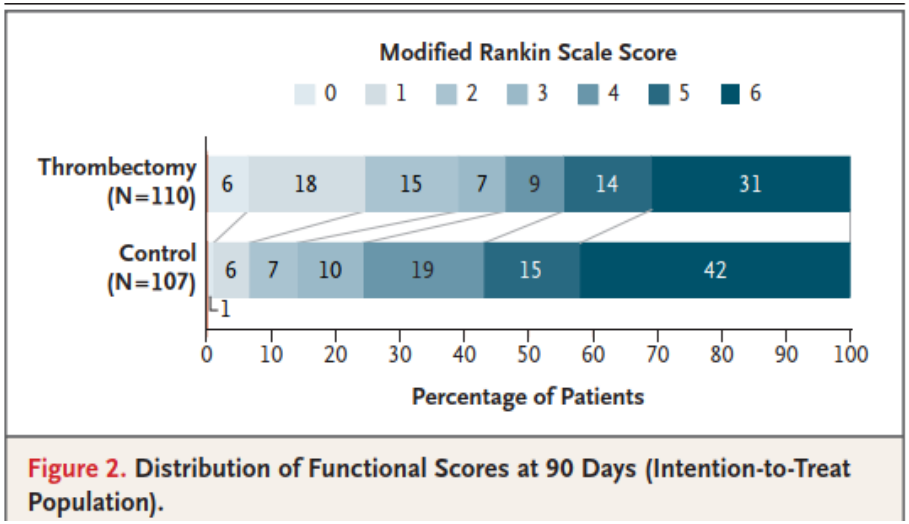


Figure 2. Distribution of Functional Scores at 90 Days (Intention-to-Treat Population).

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

T.G. Jovin, C. Li, L. Wu, C. Wu, Jian Chen, C. Jiang, Z. Shi, Z. Gao, C. Song,

N Engl J Med 2022;387:1373-84.
DOI: 10.1056/NEJMoa2207576

Therapieoptionen mit Gefäßverschluss

Frühes Zeitfenster:

Thrombektomie **mit** Lyse (wenn möglich)

Spätes Zeitfenster:

Penumbrabildgebung durch **MRT** (DW/PW-mismatch) oder durch **Perfusions CT** (CBV oder CBF/TTP-mismatch)

oder

Infarktkern (MRT/pCT) vs. klinische Beeinträchtigung (!)

…check your local stroke manual…

Lyse nach DWI/FLAIR Mismatch

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

MRI-Guided Thrombolysis for Stroke with Unknown Time of Onset

G. Thomalla, C.Z. Simonsen, F. Boutitie, G. Andersen, Y. Berthezene, B. Cheng,

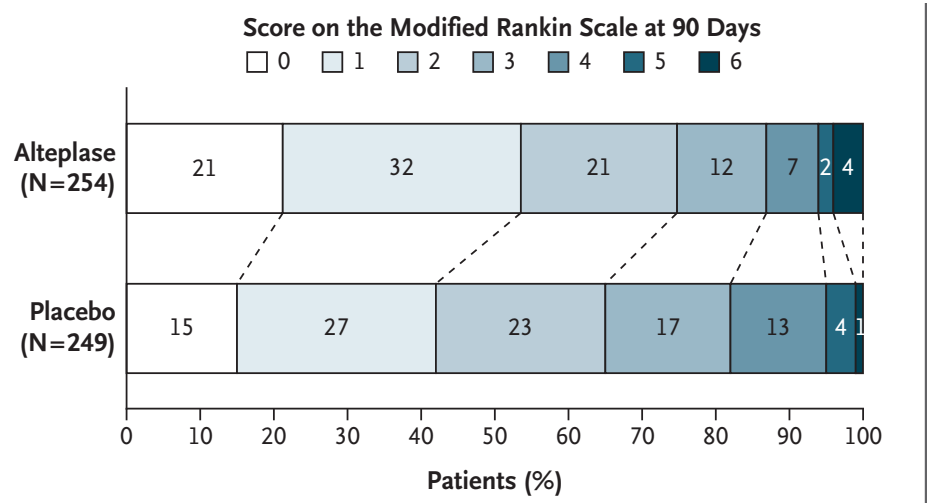


Figure 2. Distribution of Scores on the Modified Rankin Scale at 90 Days (Intention-to-Treat Population).

Outcome	Alteplase Group (N=254)	Placebo Group (N=249)	Effect Variable	Adjusted Value (95% CI)†	P Value
Primary efficacy end point					
Favorable outcome at 90 days — no./total no. (%)‡	131/246 (53.3)	102/244 (41.8)	Odds ratio	1.61 (1.09 to 2.36)	0.02
Secondary efficacy end points					
Median score on modified Rankin scale at 90 days (IQR)§	1 (1 to 3)	2 (1 to 3)	Common odds ratio	1.62 (1.17 to 2.23)	0.003¶

Thomalla et al. 2018 NEJM

Therapieoptionen im unbekannten Zeitfenster, jedoch < 9h (auch Wake Up Stroke) ohne Gefäßverschluss

Falls Wake Up: Bestimmung des 4,5 h **Zeitfenster** mittels DWI/FLAIR MRT (alternativ gfs. Perfusions CT*)

Falls 4,5-9h: Mismatchbildgebung zur Frage tissue at risk durch

- MRT (DW/PW-mismatch) oder
- Perfusions CT (z.B. CBV/MTT-mismatch)

…check your local stroke manual…

Die 3+3 Fragen der Schlaganfallversorgung

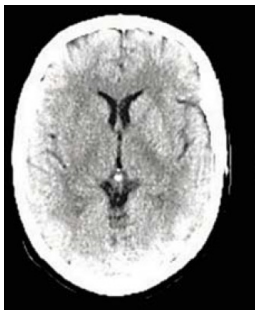
Was ist das Zeitfenster? **A**lter des Stroke

Wie relevant ist der stroke? **A**lltagsrelevanz

Ist Patient:in lysefähig? **A**lteplase (noch)

= 3A

Wahl der Bildgebung



Infarktkern? **G**ewebe

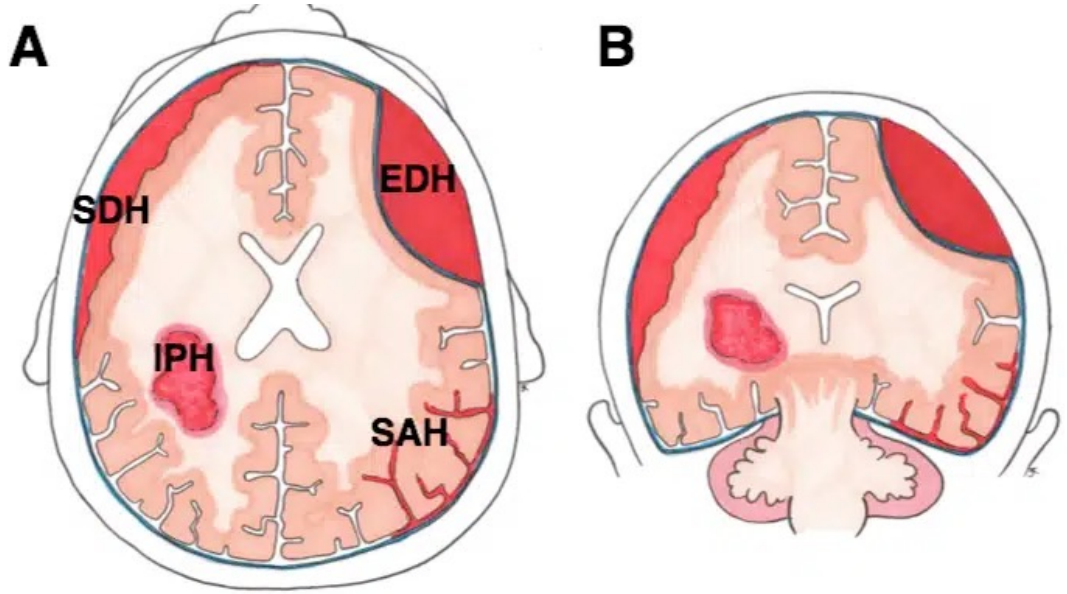
Target vessel? **G**efässe

Mismatch? **G**ewinn

= 3G

Intracranielle Blutungen

- Intrazerebral
- Epidural
- Subdural
- Subarachnoideal
- SVT



ICB vs Hirninfarkt

- Keine kausale Therapie (Lyse/Thrombektomie)
- Keine „TIA“ als Warnsignal
- Therapiefenster unklar
- Geringere Evidenzlage für Therapie (Häufigkeit)
- Schwerer Defizit (Gewebsläsion)
- Schnelle Dekompensation (infratentoriell)
- RR Kontrolle und Gerinnungskontrolle essentiell

⇨ Therapie immer auf SU oder IMC/ITS

Lancet Neurology 2018;17:885-894

ICB: Hauptfragen

- Überwachung
- Bildgebung? Kontrolle?
- **RR Kontrolle**
- **Gerinnungskontrolle**
- Operative Therapie

ICB: RR Kontrolle und Studien

Name	Inhalt	Ergebnis
INTERACT Anderson et al., Lancet Neurol 2008	Intensive (< 140 mm Hg) vs. mässige (140-180 mmHg) RR Senkung; meist Urapidil	Intensive Senkung reduziert Volumenzunahme
INTERACT2 Anderson et la. NEJM 2013	s. INTERACT	Klinischer Endpunkt (mRS 0-2) nicht signifikant besser; aber: Shift -Analyse zeigt Vorteil der intensiven RR Therapie
ATACH2 Qureshi et al. NEJM 2016	S. INTERACT plus Korridor für intensive RR Senkung: 140-110 mm Hg	Klinischer Endpunkt (mRS 0-3)
Post hoc Analyse ATACH2 Li et al Ann Neurolo 2020	Volumenzunahme 24 h geringer und funktionelles Outcome nach 3 Monaten besser, wenn: **RR Senkung innerhalb 2 h nach ICB startet**	

Lancet Neurology 2018;17:885-894

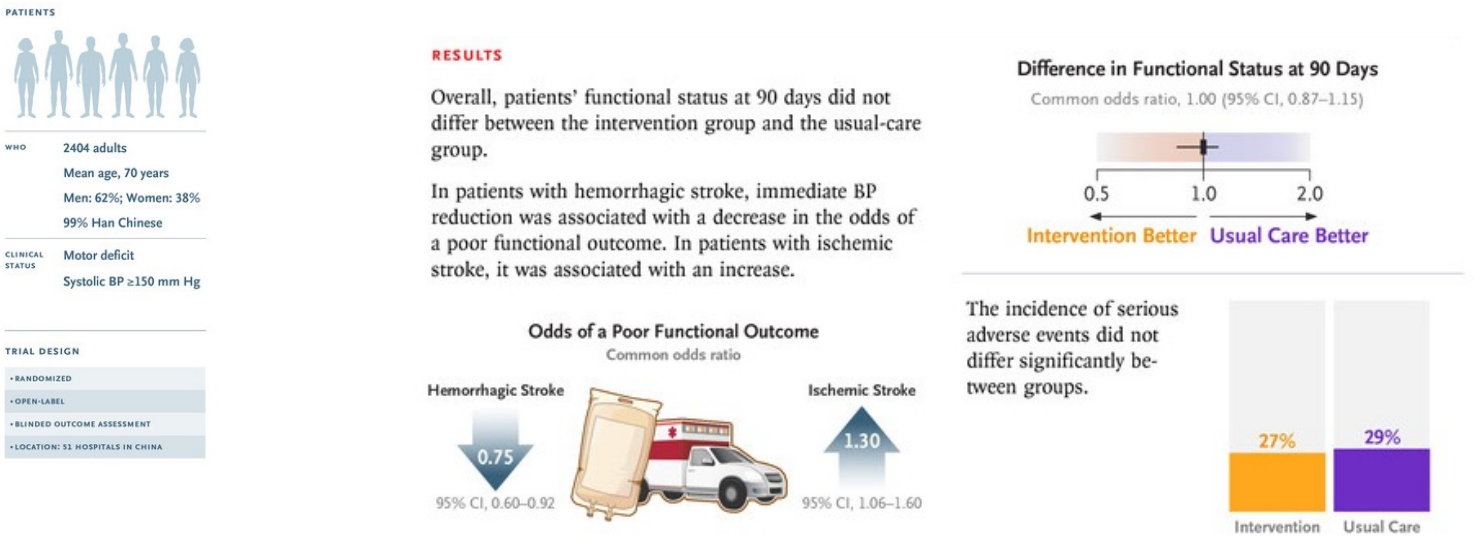
ICB: RR Therapie

- RR Senkung in RCT oft zu spät !
- Falls frühe RR Kontrolle > klinischer Benefit!
- Falls RR zu tief: Niereninsuffizienz
- Time is brain !

RR syst 140-100 mmHg innerhalb von 2 h
(RR syst. Sollte nicht unter 90 mmHg gehen)

RR Senkung im RTW?: INTERACT 4

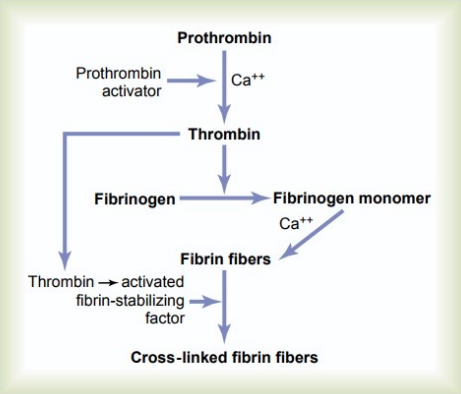
Based on the NEJM publication: Intensive Ambulance-Delivered Blood-Pressure Reduction in Hyperacute Stroke by G. Li et al. (published May 13, 2024)



Ergebnisse: ESOC 2024

ICB unter NOAK

	Idarucizumab	Andexanet alfa	PPSB
Target	Dabigatran (spezifisch)	Apixaban/ Rivaroxaban (spezifisch)	Gerinnungsfaktoren (varia)
Spezifität	+++	+++	+
Dosis	2x Kurzinfusion; fixe Dosis	Bolus + Kurzinfusion; 2 Regimes	Kurzinfusion, nach KG adaptiert
Zulassung	+	+	-
Kosten	++	+++	+



PPSB: wenig Evidenz
aber **klinische Realität**

(Prothrombin-konzentrat: II, VII, IX)

www.brainkart.com

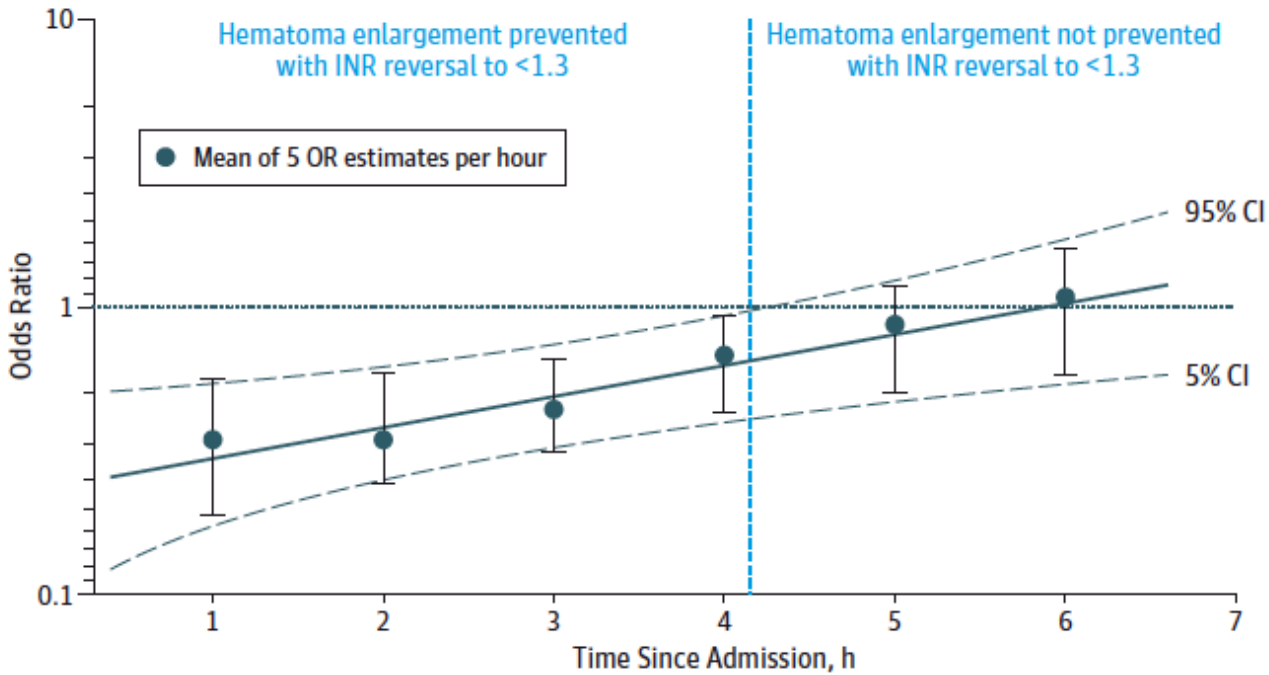
Hämatomwachstum bei ICB unter OAK

Original Investigation

Anticoagulant Reversal, Blood Pressure Levels, and Anticoagulant Resumption in Patients With Anticoagulation-Related Intracerebral Hemorrhage

Joji B. Kuramatsu, MD; Stefan T. Gerner, MD; Peter D. Schellinger, MD; Jörg Glahn, MD; Matthias Endres, MD; Jan Sobesky, MD; Julia Flechsenhar, MD;

Figure 2. Association of Timing and Extent of INR Reversal With Hematoma Enlargement

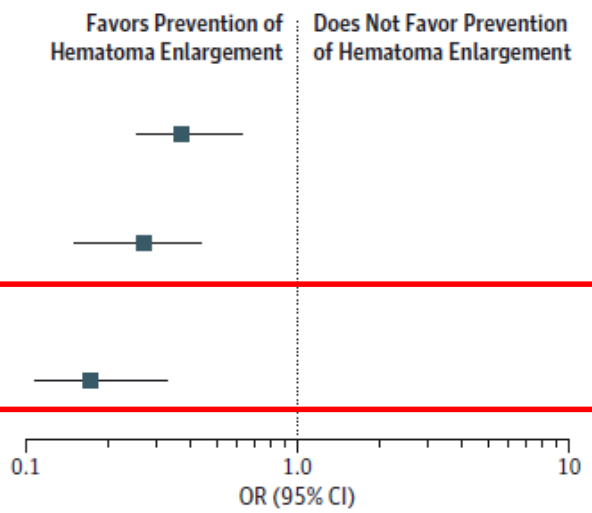


CONCLUSIONS AND RELEVANCE Among patients with OAC-associated ICH, reversal of INR <1.3 within 4 hours and systolic BP <160 mm Hg at 4 hours were associated with lower rates of hematoma enlargement, and resumption of OAC therapy was associated with lower risk of

Kuramatsu et al 2015, JAMA

ICB unter OAK: RR- und INR-Kontrolle „time ist brain“ in ICB

	No. of Patients	Patients With Hematoma Enlargement, No. (%)	OR (95% CI)	P Value
INR <1.3				
Achieved	432	116 (26.9)	0.37 (0.26-0.59)	<.001
Did not achieve	421	191 (45.4)		
INR <1.3 within 4 hours				
Achieved	217	43 (19.8)	0.27 (0.15-0.43)	<.001
Did not achieve	636	264 (41.5)		
INR <1.3 within 4 hours and systolic BP <160 mm Hg within 4 hours				
Achieved	193	35 (18.1)	0.17 (0.11-0.33)	<.001
Did not achieve	498	220 (44.2)		

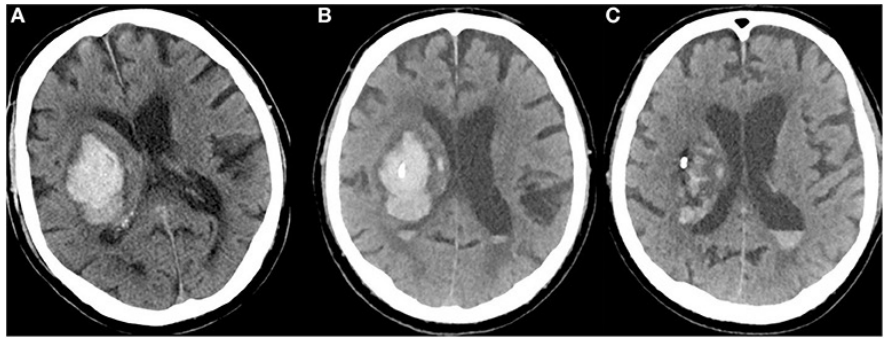


Kuramatsu et al 2015, JAMA

ICB: offene operative Therapie

STICH , STICH II

Reanalyse STICH



OP (=chirurgische Hämatomausräumung) bei supratentorieller ICB

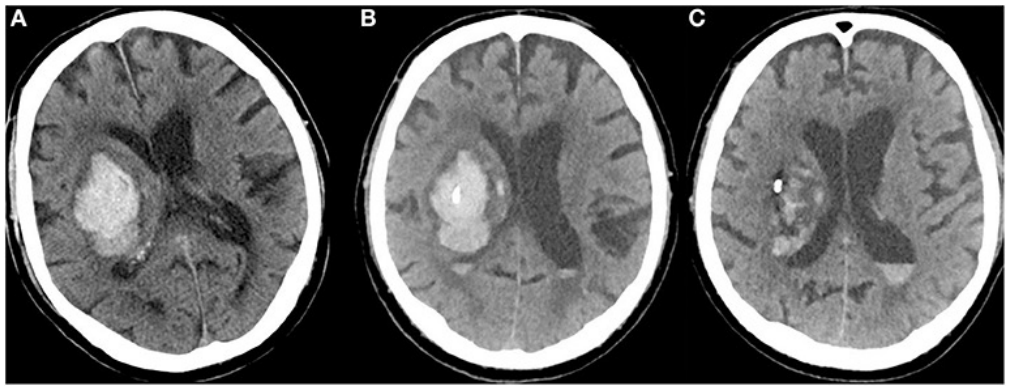
kann erwogen werden,

falls oberflächlich, lobär, ohne Ventrikeleinbruch

Übersicht in: Sondag et al, Ann Neurol 2020; LL DGN 2021

ICB: minimalinvasive Evakuation plus Thrombolyse

MISTIE, MISTIE III



Minimalinvasive Hämatomevakuation plus intrathekale Thrombolyse kann bei akuter spontaner ICB > 30 ml Volumen erwogen werden i.R. einer klinischen Studie

SWITCH ???

Übersicht in: Sondag et al, Ann Neurol 2020; LL DGN 2021

ICB und Operation: SWITCH

Decompressive craniectomy plus best medical treatment versus best medical treatment alone for spontaneous severe deep supratentorial intracerebral haemorrhage: a randomised controlled clinical trial

www.thelancet.com Vol 403 June 1, 2024

Interpretation SWITCH provides weak evidence that decompressive craniectomy plus best medical treatment might be superior to best medical treatment alone in people with severe deep intracerebral haemorrhage. The results do not apply to intracerebral haemorrhage in other locations, and survival is associated with severe disability in both groups.

Jürgen Beck, Christian Fung, Daniel Strbian, Lukas Bütikofer, Werner J Z'Graggen, Matthias F Lang, Seraina Beyeler, Jan Gralla, Florian Ringel,

	Decompressive craniectomy plus best medical treatment (n=96)		Best medical treatment alone (n=101)		Adjusted effect (95% CI)*	p value†
	N‡ (imputed)	N (%) or median (IQR)	N‡ (imputed)	N (%) or median (IQR)		
Primary outcome (mRS 5–6 at 180 days)						
Complete cases (main analysis)	95	42 (44%)	95	55 (58%)	RR 0·77 (0·59 to 1·01); RD −13% (−26 to 0)	0·057
With multiple imputations	96 (1)	43 (45%)	101 (6)	59 (58%)	RR 0·76 (0·59 to 0·99); RD −14% (−27 to 0)	0·042
Secondary efficacy outcomes						
mRS 5–6 at 365 days	96 (3)	41 (43%)	101 (12)	52 (51%)	RR 0·81 (0·60 to 1·08); RD −10% (−23 to 4)	0·15
Mortality at 180 days	96	16 (17%)	101	27 (27%)	RR 0·61 (0·36 to 1·01); RD −11% (−21 to 0)	0·065
Mortality at 365 days	96	21 (22%)	101	30 (31%)	RR 0·70 (0·45 to 1·08); RD −9% (−21 to 2)	0·14
mRS 4–6 at 180 days	96 (1)	83 (86%)	101 (6)	87 (86%)	RR 0·99 (0·89 to 1·11); RD −1% (−10 to 9)	0·89
mRS at 180 days	96 (1)	4 (4–5)	101 (6)	5 (4 to 6)	Common OR 0·57 (0·34 to 0·97); Mann–Whitney statistic§ 0·43 (0·35 to 0·50)	0·039; 0·074 (0·046)¶

ICB: sonstige Massnahmen

Externe Ventrikeldrainange (EVD) bei intraventrikulärer ICB und Hydrozephalus

(Keine RCT Daten)

EVD mit intrathekaler Thrombolyse: CLEAR III

EVD mit intrathekaler Thrombolyse und lumbaler Drainage

ICP Messung: ICP > 20 mm Hg prädiktiv für schlechtes outcome

(Hanley et al., Lancet 2017; Staykov et al. , Ann Neurol 2016; Hawryluk et al. JAMA Neurol 2020)

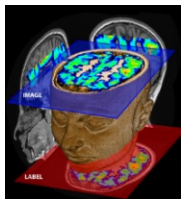
ICB: infratentoriell

Kuramatsu et al. 2019:

- Registerdaten für n= 6580
- n= 152 infratentoriellen Pat. mit/ohne Evakuation
- nur Effekte auf Überleben nach 3 und 12 Monaten

Bei spontaner zerebellärer Blutung > 15 ml Volumen kann eine Hämatomevakuation erwogen werden

Kuramatsu et al. , JAMA 2019; LL DGN 2021



Ärztliche Fortbildung

12. INTENSIVKURS
STROKE-UNIT-STARTER

Mit
VR-Kurs

Akuter Schlaganfall

21./22. 6. 2024, Berlin

Jan Sobesky

ST. AUGUSTINUS GRUPPE
Johanna Etienne Krankenhaus

Prof. Dr. J. Sobesky

Chefarzt der Klinik für Neurologie
mit Stroke Unit und Frührehabilitation
Johanna-Etienne-Krankenhaus Neuss
j.sobesky@ak-neuss.de