


**Praktyczne spojrzenie na obrazowanie i kwalifikacja  
pacjentów do leczenia wewnątrznaczyniowego wczesnej fazy  
udarów niedokrwiennego mózgu.**

**Wojciech Poncyłjusz**

**Zakład Diagnostyki Obrazowej i Radiologii Interwencyjnej**

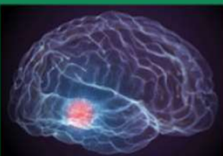
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# Polski Przegląd Neurologiczny

CZASOPISMO EDUKACYJNE POLSKIEGO TOWARZYSTWA NEUROLOGICZNEGO



Suplement A  
Tom 15  
Rok 2019

**Wytoczne postępowania w udarze mózgu**

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## AHA/ASA Guideline

### Guidelines for the Early Management of Patients With Acute Ischemic Stroke: 2019 Update to the 2018 Guidelines for the Early Management of Acute Ischemic Stroke

A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association

Endorsed by the Society for Academic Emergency Medicine and The Neurocritical Care Society

Reviewed for evidence-based integrity and endorsed by the American Association of Neurological Surgeons and Congress of Neurological Surgeons.

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**Background and Purpose**—The purpose of these guidelines is to provide an up-to-date comprehensive set of recommendations in a single document for clinicians caring for adult patients with acute arterial ischemic stroke. The intended audiences are prehospital care providers, physicians, allied health professionals, and hospital administrators. These guidelines supersede the 2013 Acute Ischemic Stroke (AIS) Guidelines and are an update of the 2018 AIS Guidelines.

**Methods**—Members of the writing group were appointed by the American Heart Association (AHA) Stroke Council's Scientific Statements Oversight Committee, representing various areas of medical expertise. Members were not allowed to participate in discussions or to vote on topics relevant to their relations with industry. An update of the 2013 AIS Guidelines was originally published in January 2018. This guideline was approved by the AHA Science Advisory and Coordinating Committee and the AHA Executive Committee. In April 2018, a revision to these guidelines, deleting some recommendations, was published online by the AHA. The writing group was asked review the original document and revise if appropriate. In June 2018, the writing group submitted a document with minor changes and with inclusion of important newly published randomized controlled trials with >100 participants and clinical outcomes at least 90 days after AIS. The document was sent to 14 peer reviewers. The writing group evaluated the peer reviewers' comments and revised.

The American Heart Association makes every effort to avoid any actual or potential conflicts of interest that may arise as a result of an outside relationship or a personal, professional, or business interest of a member of the writing panel. Specifically, all members of the writing group are required to complete and submit a Disclosure Questionnaire showing all such relationships that might be perceived as real or potential conflicts of interest. This statement was approved by the American Heart Association Science Advisory and Coordinating Committee on September 12, 2019, and the American Heart Association Executive Committee on October 3, 2019. A copy of the document is available at <https://professional.heart.org/statements> by using either "Search for Guidelines & Statements" or the "Browse by Topic" area. To purchase additional reprints, call 843-216-2533 or email [kelle.ramsey@wharton.upenn.edu](mailto:kelle.ramsey@wharton.upenn.edu).

The online-only Data Supplements are available with this article at <https://www.ahajournals.org/doi/suppl/10.1161/STR.0000000000000211>. The American Heart Association requests that this document be cited as follows: Powers WJ, Rabinstein AA, Ackerson T, Adeoye OM, Bambakidis NC, Becker K, Biller J, Brown M, Demerschalk BM, Hob B, Jauch EC, Kidwell CS, Leslie-Mazwi TM, Ovbiagele B, Scott PA, Sheth KN, Southerland AM, Summers DV, Tirschwell DL, on behalf of the American Heart Association Stroke Council. Guidelines for the early management of patients with acute ischemic stroke: 2019 update to the 2018 guidelines for the early management of acute ischemic stroke: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke*. 2019;50:e344–e418. doi: 10.1161/STR.0000000000000211.

The expert peer review of AHA-commissioned documents (ie, scientific statements, clinical practice guidelines, systematic reviews) is conducted by the AHA Office of Science Operations. For more on AHA statements and guidelines development, visit <https://professional.heart.org/statements>. Select the "Guidelines & Statements" drop-down menu, then click "Publication Development."

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e344

Additional material is published online only. To view please visit the journal online (<http://ahajournals.org>).

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Endorsed by Stroke Alliance for Europe (SAFE).

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BMJ

Standards

## European Stroke Organisation (ESO) - European Society for Minimally Invasive Neurological Therapy (ESMINT) Guidelines on Mechanical Thrombectomy in Acute Ischemic Stroke

Guillaume Turc,<sup>1,2,3,4</sup> Pervinder Bhogal,<sup>5</sup> Urs Fischer,<sup>6</sup> Pooja Khatri,<sup>7</sup> Kyriakos Lobotzis,<sup>8</sup> Mikael Mazighi,<sup>2,9,10,11</sup> Peter D. Schellinger,<sup>12</sup> Danilo Toni,<sup>13</sup> Joost de Vries,<sup>14</sup> Philip White,<sup>15</sup> Jens Fiehler<sup>16</sup>

**ABSTRACT** Mechanical thrombectomy (MT) has become the cornerstone of acute ischemic stroke management in patients with large vessel occlusion (LVO). **Objective** To assist physicians in their clinical decisions with regard to MT. **Methods** These guidelines were developed based on the standard operating procedure of the European Stroke Organisation and followed the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) approach. An interdisciplinary working group identified 15 relevant questions, performed systematic reviews and meta-analyses of the literature, assessed the quality of the available evidence, and wrote evidence-based recommendations. Expert opinion was provided if not enough evidence was available to provide recommendations based on the GRADE approach.

**Results** We found high-quality evidence to recommend MT plus best medical management (BMM, including intravenous thrombolysis whenever indicated) to improve functional outcome in patients with LVO-related acute ischemic stroke within 6 hours after symptom onset. We found moderate quality of evidence to recommend MT plus BMM in the 6–24 h time window in patients meeting the eligibility criteria of published randomized trials. These guidelines details aspects of prehospital management, patient selection based on clinical and imaging characteristics, and treatment modalities. **Conclusions** MT is the standard of care in patients with LVO-related acute stroke. Appropriate patient selection and timely reperfusion are crucial. Further randomized trials are needed to inform clinical decision-making with regard to the mesh and drip-and-ship approaches, anaesthesia modalities during MT, and to determine whether MT is beneficial in patients with low stroke severity or large infarct volume.

**INTRODUCTION** Mechanical thrombectomy (MT) in addition to best medical management (BMM) has become the standard of care for patients with acute ischemic stroke with large vessel occlusion (LVO) since the publication in 2015 of five pivotal trials using modern endovascular devices.<sup>1–5</sup> Those trials demonstrated major benefits for patients randomized to MT plus

BMM versus BMM alone, with numbers needed to treat of 3 and 5 to achieve any better functional outcome and functional independence, respectively.<sup>6</sup> Major scientific advances have been made since the publication of the 2014/2015 consensus statement by the ESO-Karolinska Stroke Update and the 2016 European Recommendations on Organisation of Interventional Care in Acute Stroke (EROICAS),<sup>7,8</sup> notably in the treatment of patients in late time windows.<sup>9,10</sup> The European Stroke Organisation (ESO) and the European Society for Minimally Invasive Neurological Therapy (ESMINT) decided to update those recommendations and provide guidelines based on a systematic literature review and on the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) system. The aim of this guideline is to assist physicians treating patients with acute ischemic stroke in their clinical decisions with regard to MT.

**METHODS** These joint ESO-ESMINT guidelines were initiated by the ESO. A modular working group (MWG) was formed, composed of five ESO representatives (GT: co-chair, UF: MM, PDS, DT), five ESMINT representatives (JF: co-chair, PB, JdV, KL, PW), and 1 US expert (PK). The MWG consisted of six neuro-interventionalists (five radiologists and one neurologist) and five vascular neurologists. Based on the review of the intellectual and financial disclosures of all MWG members (online supplemental table 1), the composition of the group was approved by the ESO guidelines board, the ESMINT guidelines committee, and the executive committees of ESO and ESMINT.

These guidelines were prepared following the GRADE methodology and the ESO standard operating procedure.<sup>11,12</sup>

The steps undertaken by the working group are summarized below:

1. A list of topics of clinical interest for guidelines users was produced and agreed by all MWG members.
2. A list of relevant outcomes was produced and ranked according to GRADE definitions as critical, important, or of limited importance.<sup>11,12</sup> Functional outcome and survival were the only outcomes rated as of critical importance. As a

Turc G, et al. *Neurocritical Care* 2019;18:344–418. doi: 10.1136/nct.2018.014569

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J Neurocrit Care. First published as 10.1136/nct.2018.014569 on 28 February 2019. Downloaded from <http://nct.bmj.com/> on July 16, 2022 by guest. Protected by copyright.



COR	LOE
I	A

**U wszystkich pacjentów z podejrzeniem ostrego udaru mózgu należy przeprowadzić diagnostykę obrazową mózgu niezwłocznie po przybyciu do szpitala oraz przed rozpoczęciem jakiegokolwiek terapii swoistej ostrego udaru niedokrwiennego mózgu.**

COR- Class of recommendation (klasa rekomendacji)

LOE-Level of evidence ( poziom dowodów)

# RadioGraphics

## Imaging-based Selection for Endovascular Treatment in Stroke

 Kambiz Nael ,  Yu Sakai, Pooja Khatri,  Charles J. Prestigiacomo,  Josep Puig, Achala Vagal

✓ **Author Affiliations**

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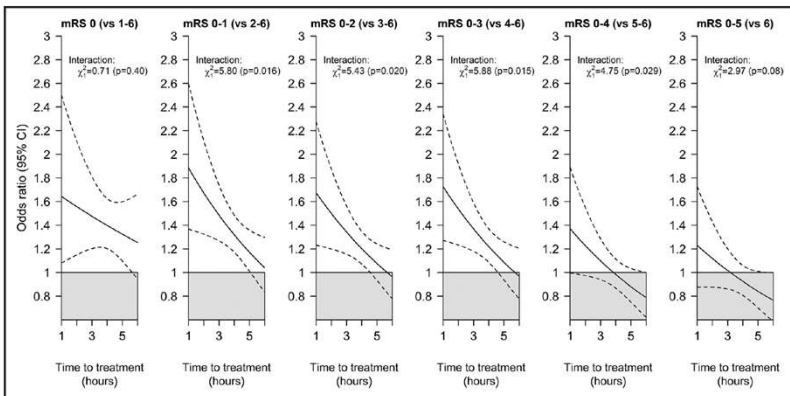


COR	LOE
I	B-NR

Należy wprowadzić procedury umożliwiające wykonanie badań obrazowych mózgu jak najszybciej u pacjentów, którzy mogą być kandydatami do leczenia za pomocą trombolizy dożylniej i/lub trombektomii mechanicznej.

## Effects of Alteplase for Acute Stroke on the Distribution of Functional Outcomes

### A Pooled Analysis of 9 Trials



**Background**—Thrombolytic therapy with intravenous alteplase within 4.5 hours of ischemic stroke onset increases the overall likelihood of an excellent outcome (no, or nondisabling, symptoms). Any improvement in functional outcome distribution has value, and herein we provide an assessment of the effect of alteplase on the distribution of the functional level by treatment delay, age, and stroke severity.

**Methods**—Prespecified pooled analysis of 6756 patients from 9 randomized trials comparing alteplase versus placebo/open control. Ordinal logistic regression models assessed treatment differences after adjustment for treatment delay, age, stroke severity, and relevant interaction term(s).

**Results**—Treatment with alteplase was beneficial for a delay in treatment extending to 4.5 hours after stroke onset, with a greater benefit with earlier treatment. Neither age nor stroke severity significantly influenced the slope of the relationship between benefit and time to treatment initiation. For the observed case mix of patients treated within 4.5 hours of stroke onset (mean 3 hours and 20 minutes), the net absolute benefit from alteplase (ie, the difference between those who would do better if given alteplase and those who would do worse) was 55 patients per 1000 treated (95% confidence interval, 13–91;  $P=0.004$ ).

**Conclusions**—Treatment with intravenous alteplase initiated within 4.5 hours of stroke onset increases the chance of achieving an improved level of function for all patients across the age spectrum, including the over 80s and across all severities of stroke studied (top versus bottom fifth means: 22 versus 4); **the earlier that treatment is initiated, the greater the benefit.** (*Stroke*. 2016;47:2373-2379. DOI: 10.1161/STROKEAHA.116.013644.)



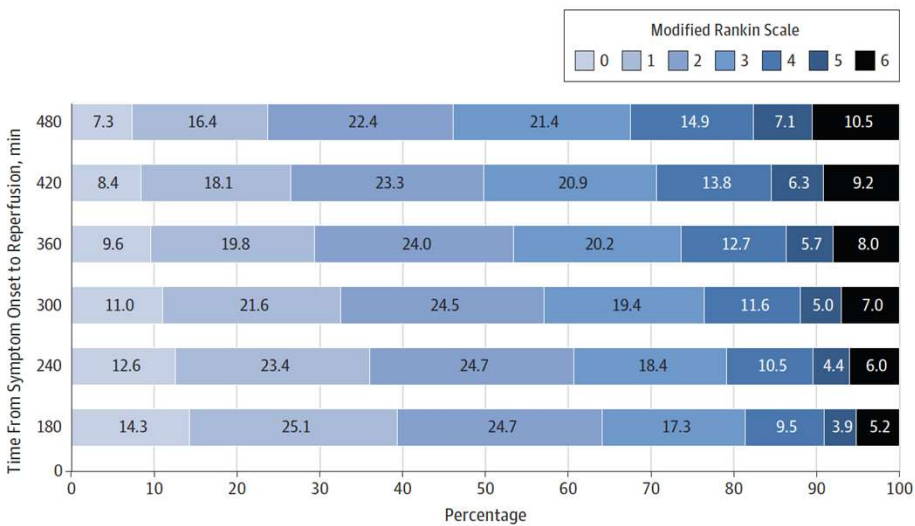
American Stroke Association.  
A division of the American Heart Association.

COR	LOE
I	B-NR

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JAMA | Original Investigation

# Time to Treatment With Endovascular Thrombectomy and Outcomes From Ischemic Stroke: A Meta-analysis



**RESULTS** Among all 1287 patients (endovascular thrombectomy + medical therapy [n = 634]; medical therapy alone [n = 653]) enrolled in the 5 trials (mean age, 66.5 years [SD, 13.1]; women, 47.0%), time from symptom onset to randomization was 196 minutes (IQR, 142 to 267). Among the endovascular group, symptom onset to arterial puncture was 238 minutes (IQR, 180 to 302) and symptom onset to reperfusion was 286 minutes (IQR, 215 to 363). At 90 days, the mean mRS score was 2.9 (95% CI, 2.7 to 3.1) in the endovascular group and 3.6 (95% CI, 3.5 to 3.8) in the medical therapy group. The odds of better disability outcomes at 90 days (mRS scale distribution) with the endovascular group declined with longer time from symptom onset to arterial puncture: cOR at 3 hours, 2.79 (95% CI, 1.96 to 3.98), absolute risk difference (ARD) for lower disability scores, 39.2%; cOR at 6 hours, 1.98 (95% CI, 1.30 to 3.00), ARD, 30.2%; cOR at 8 hours, 1.57 (95% CI, 0.86 to 2.88), ARD, 15.7%; retaining statistical significance through 7 hours and 18 minutes. Among 390 patients who achieved substantial reperfusion with endovascular thrombectomy, each 1-hour delay to reperfusion was associated with a less favorable degree of disability (cOR, 0.84 [95% CI, 0.76 to 0.93]; ARD, -6.7%) and less functional independence (OR, 0.81 [95% CI, 0.71 to 0.92], ARD, -5.2% [95% CI, -8.3% to -2.1%]), but no change in mortality (OR, 1.12 [95% CI, 0.93 to 1.34]; ARD, 1.5% [95% CI, -0.9% to 4.2%]).



COR	LOE
I	B-NR

Należy wprowadzić procedury umożliwiające wykonanie badań obrazowych mózgu jak najszybciej u pacjentów, którzy mogą być kandydatami do leczenia za pomocą trombolizy dożylniej i/lub trombektomii mechanicznej.

### Stroke care: initial data from a county-based bypass protocol for patients with acute stroke

	RACE alerts (N=109)	Stroke alerts (N=142)	p Value
IV tPA (N (%))	28 (25.7)	18 (12.7)	<0.05
Times (min), median (IQR)			
911 Dispatch to ER	31 (22–38)	32 (20–51)	0.06
Door to CT completion	10 (5–16)	28 (20–41)	<0.05
Door to tPA	46 (28–55)	75 (60–95)	<0.05
Mechanical thrombectomy, N (%)	22 (20.2)	11 (7.7)	0.03
Times (min), median (IQR)			
Onset to arrival	71 (37–560)	128 (91–207)	0.3
Arrival to CT	8.5 (6–15)	15 (7–17)	0.3
Arrival to puncture	68 (60–93)	128 (101–142)	0.04
Arrival to recanalization	101 (88–118)	205 (131–218)	0.001

**Results** An increased treatment rate (25.6% vs 12.6%,  $p<0.05$ ) and improved time efficiency (median door-to-CT 10 vs 28 min,  $p<0.05$ ; door-to-needle 46 vs 75 min,  $p<0.05$ ) of IV tissue plasminogen activator within the RA cohort was achieved. The rate of MT (20.1% vs 7.7%,  $p=0.03$ ) increased and treatment times improved, including median arrival-to-puncture (68 vs 128 min,  $p=0.04$ ) and arrival-to-recanalization times (101 vs 205 min,  $p=0.001$ ) in favor of the RA cohort. A non-significant trend towards improved outcome (50% vs 36.4%,  $p=0.3$ ) in the RA cohort was noted. The RA protocol also showed improved diagnostic specificity for ischemic stroke (52.3% vs 30.1%,  $p<0.05$ ).

Skrócenie czasu od przybycia pacjenta na SOR do badania obrazowego mózgu może pomóc skrócić czas do rozpoczęcia leczenia. Badania wykazały, że mediana lub średni „door-to-imaging time”  $\leq 20$  minut jest do osiągnięcia w różnych warunkach szpitalnych.



COR	LOE
I	A

TK bez podania środka kontrastowego jest narzędziem obrazowym skutecznie wykluczającym krwawienie śródmózgowe przed podaniem trombolizy dożylniej.

TK=MR



COR	LOE
I	B-NR

MRI jest narzędziem obrazowym skutecznie wykluczającym krwawienie śródmózgowe przed podaniem trombolizy dożylniej.

## Comparison of MRI and CT for Detection of Acute Intracerebral Hemorrhage

**Results** The study was stopped early, after 200 patients were enrolled, when it became apparent at the time of an unplanned interim analysis that MRI was detecting cases of hemorrhagic transformation not detected by CT. For the diagnosis of any hemorrhage, MRI was positive in 71 patients with CT positive in 29 ( $P < .001$ ). For the diagnosis of acute hemorrhage, MRI and CT were equivalent (96% concordance). Acute hemorrhage was diagnosed in 25 patients on both MRI and CT. In 4 other patients, acute hemorrhage was present on MRI but not on the corresponding CT—each of these 4 cases was interpreted as hemorrhagic transformation of an ischemic infarct. In 3 patients, regions interpreted as acute hemorrhage on CT were interpreted as chronic hemorrhage on MRI. In 1 patient, subarachnoid hemorrhage was diagnosed on CT but not on MRI. In 49 patients, chronic hemorrhage, most often microbleeds, was visualized on MRI but not on CT.

**Conclusion** MRI may be as accurate as CT for the detection of acute hemorrhage in patients presenting with acute focal stroke symptoms and is more accurate than CT for the detection of chronic intracerebral hemorrhage.

JAMA. 2004;292:1823-1830

www.jama.com

## Stroke magnetic resonance imaging is accurate in hyperacute intracerebral hemorrhage: a multicenter study on the validity of stroke imaging

**Background and Purpose**—Although modern multisequence stroke MRI protocols are an emerging imaging routine for the diagnostic assessment of acute ischemic stroke, their sensitivity for intracerebral hemorrhage (ICH), the most important differential diagnosis, is still a matter of debate. We hypothesized that stroke MRI is accurate in the detection of ICH. To evaluate our hypotheses, we conducted a prospective multicenter trial.

**Methods**—Stroke MRI protocols of 6 university hospitals were standardized. Images from 62 ICH patients and 62 nonhemorrhagic stroke patients, all imaged within the first 6 hours after symptom onset (mean, 3 hours 18 minutes), were analyzed. For diagnosis of hemorrhage, CT served as the “gold standard.” Three readers experienced in stroke imaging and 3 final-year medical students, unaware of clinical details, separately evaluated sets of diffusion-, T2-, and T2\*-weighted images. The extent and phenomenology of the hemorrhage on MRI were assessed separately.

**Results**—Mean patient age was 65.5 years; median National Institutes of Health Stroke Scale score was 10. The experienced readers identified ICH with 100% sensitivity (confidence interval, 97.1 to 100) and 100% overall accuracy. Mean ICH size was 17.3 mL (range, 1 to 101.5 mL). The students reached a mean sensitivity of 95.16% (confidence interval, 90.32 to 98.39).

**Conclusions**—Hyperacute ICH causes a characteristic imaging pattern on stroke MRI and is detectable with excellent accuracy. Even raters with limited film-reading experience reached good accuracy. Stroke MRI alone can rule out ICH and demonstrate the underlying pathology in hyperacute stroke. (*Stroke*. 2004;35:502-507.)

Kidwell CS et al. Comparison of MRI and CT for detection of acute intracerebral hemorrhage. JAMA. 2004 Oct 20;292(15):1823-30.

Fiebach JB et al. Stroke magnetic resonance imaging is accurate in hyperacute intracerebral hemorrhage: a multicenter study on the validity of stroke imaging. Stroke. 2004 Feb;35(2):502-6.



COR	LOE
I	A

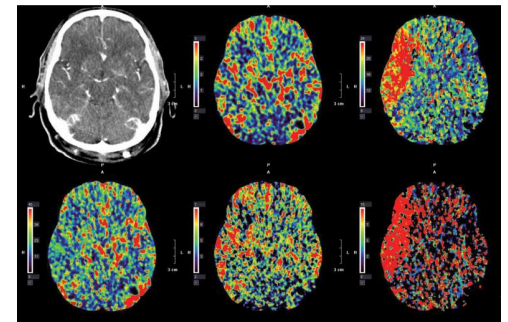
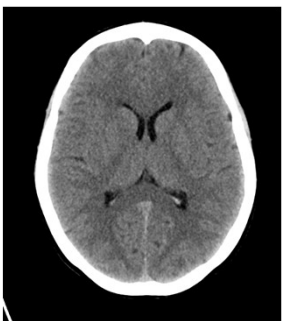
U części pacjentów zaleca się poszerzenie diagnostyki o dodatkowe badania neuroobrazowe (CTA + CTP lub MRA + DWI +/- perfuzja-MR)

TK bez podania środka kontrastowego jest wystarczającym narzędziem obrazowym do podjęcia decyzji o podaniu trombolizy dożylniej u większości pacjentów.



COR	LOE
I	B-NR

U pacjentów kwalifikujących się do trombolizy dożylniej, leczenie należy rozpocząć tak szybko, jak to możliwe. Nie powinno ono być opóźnione przez wykonywanie dodatkowych badań neuroobrazowych takich jak CTA z CTP.





AHL

RFA

RFA

**TK przed trombolizą.**

**Kontrolna TK 24h po trombolizie.**

Kobieta, 84 lata. Niedowład twarzowo-ramienny prawostronny. NIHSS 3. Objawy od 2,5h. Możemy diagnostykę skończyć na TK



U chorych budzących się z objawami udaru ze snu nocnego lub o niejasnym czasie zachorowania, wykonanie badania MR (w celu identyfikacji ognisk ograniczających dyfuzję cząsteczek wody, bez towarzyszącej zmiany sygnału w obrazach FLAIR) może być przydatne w wyborze pacjentów, którzy mogą odnieść korzyści z trombolizy dożylniej.

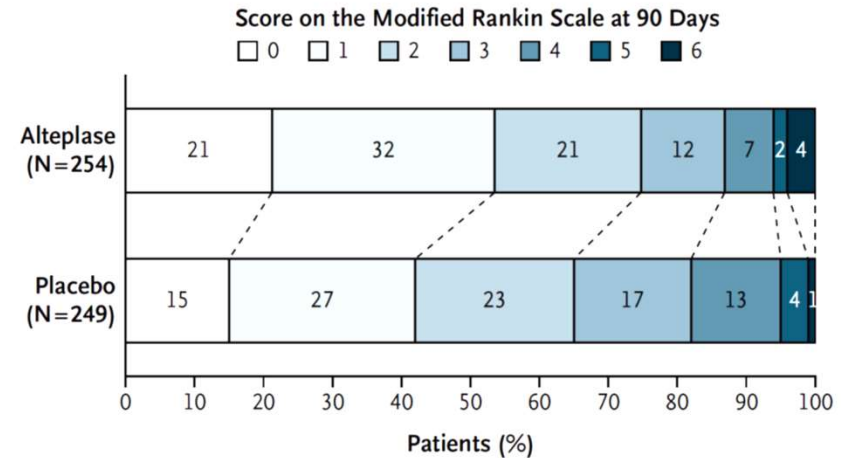


ORIGINAL ARTICLE

## MRI-Guided Thrombolysis for Stroke with Unknown Time of Onset

### RESULTS

The trial was stopped early owing to cessation of funding after the enrollment of 503 of an anticipated 800 patients. Of these patients, 254 were randomly assigned to receive alteplase and 249 to receive placebo. A favorable outcome at 90 days was reported in 131 of 246 patients (53.3%) in the alteplase group and in 102 of 244 patients (41.8%) in the placebo group (adjusted odds ratio, 1.61; 95% confidence interval [CI], 1.09 to 2.36;  $P=0.02$ ). The median score on the modified Rankin scale at 90 days was 1 in the alteplase group and 2 in the placebo group (adjusted common odds ratio, 1.62; 95% CI, 1.17 to 2.23;  $P=0.003$ ). There were 10 deaths (4.1%) in the alteplase group and 3 (1.2%) in the placebo group (odds ratio, 3.38; 95% CI, 0.92 to 12.52;  $P=0.07$ ). The rate of symptomatic intracranial hemorrhage was 2.0% in the alteplase group and 0.4% in the placebo group (odds ratio, 4.95; 95% CI, 0.57 to 42.87;  $P=0.15$ ).



## MRI-Guided Thrombolysis for Stroke with Unknown Time of Onset



### Radiologiczne kryteria włączenia:

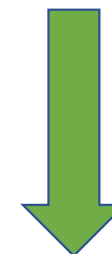
- DWI-FLAIR-mismatch, tj. ognisko niedokrwienne widoczne w DWI, bez wyraźnego podwyższenia intensywności sygnału w obrazach FLAIR („no marked *parenchymal hyperintensity visible on FLAIR*”)

### Radiologiczne kryteria wyłączenia:

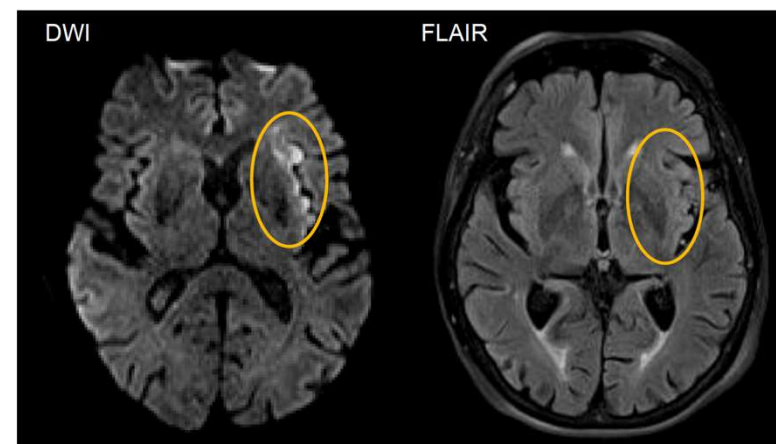
- niska jakość badania, uniemożliwiająca interpretację
- cechy krwawienia wewnątrzczaszkowego
- Ognisko w DWI > 1/3 MCA lub > 1/2 ACA lub 1/2 PCA lub > 100 ml
- jakiegokolwiek znaleziska wskazujące na wysokie ryzyko objawowego krwotoku śródczaszkowego związanego z potencjalnym leczeniem trombolitycznym

### DWI/FLAIR MISMATCH

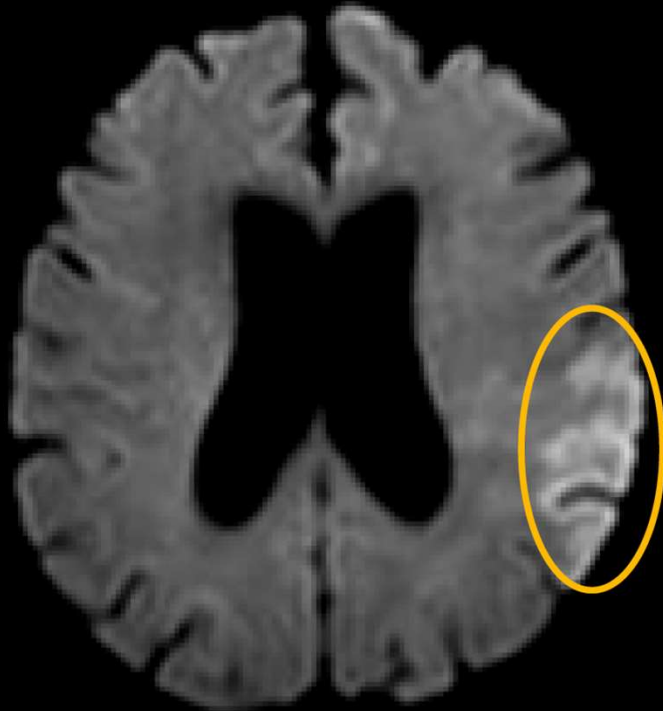
visible on MRI diffusion-weighted imaging  
no parenchymal hyperintensity on FLAIR



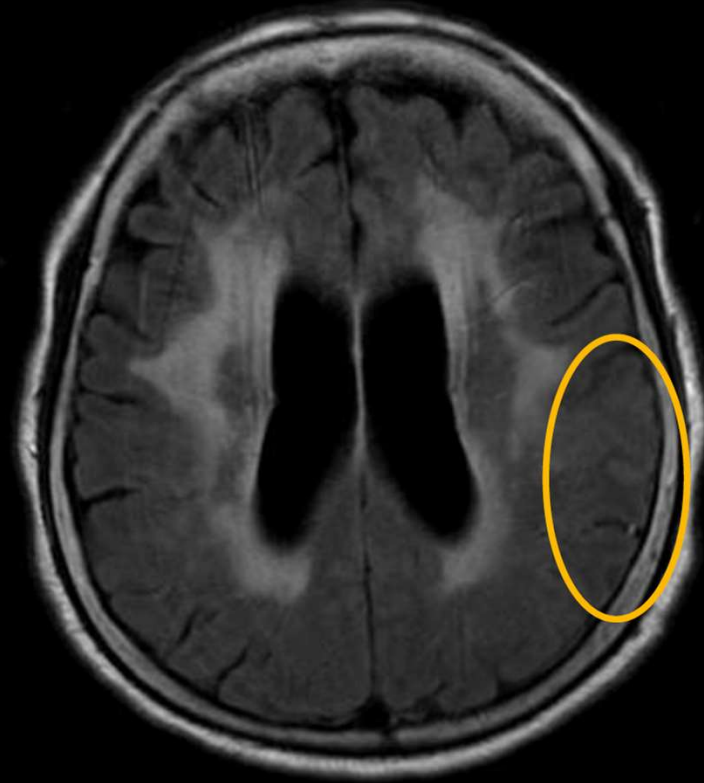
predictive of symptom onset within  
4.5 hours before imaging.



DWI



FLAIR



## DWI-FLAIR Match or Mismatch?



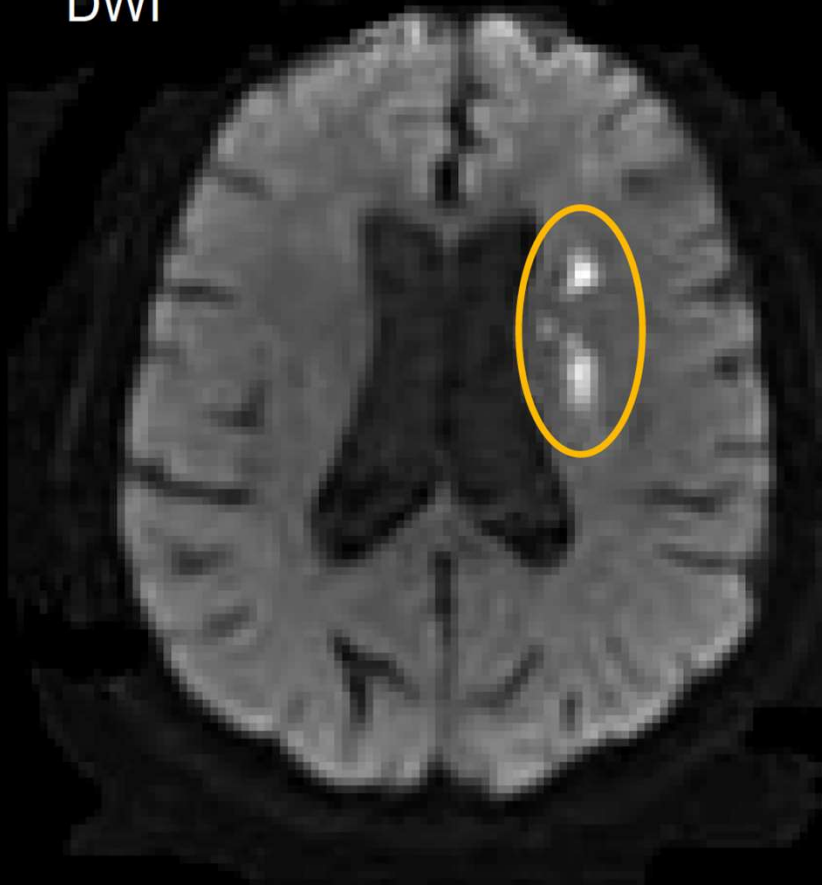
Ognisko wykazujące cechy restrykcji dyfuzji cząsteczek wody nie jest wyraźnie widoczne w obrazach FLAIR - **DWI-FLAIR MISMATCH**



Intravenous Thrombolysis in Stroke Patients with Unknown Time of Symptom Onset. Illustrated imaging manual of the WAKE-UP trial. I. Galinovic, J.B. Fiebach, G. Thomalla, B. Cheng on behalf of the WAKE-UP Investigators

DWI

FLAIR



## DWI-FLAIR Match or Mismatch?



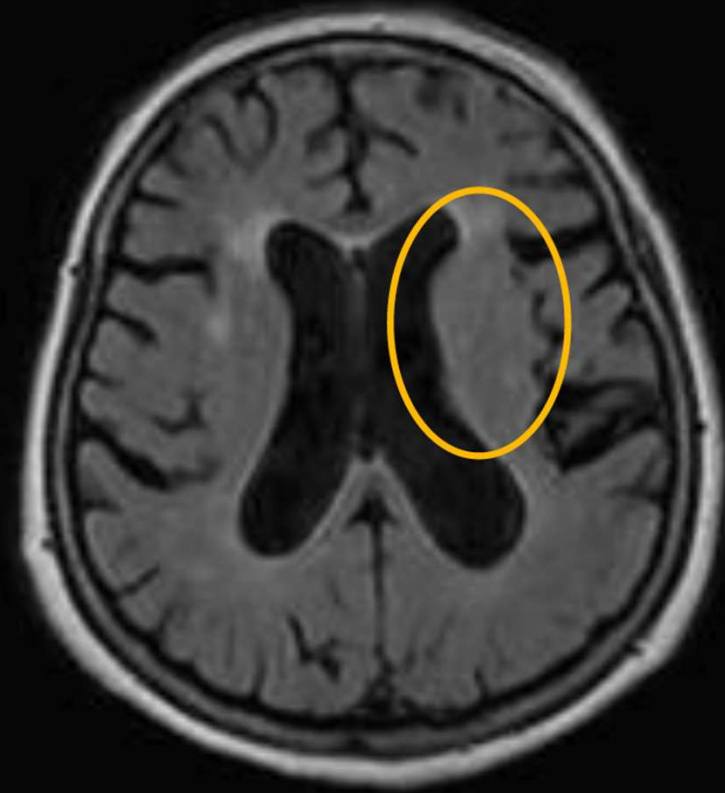
Ogniska wykazujące cechy restrypcji dyfuzji cząsteczek wody są wyraźnie widoczne w obrazach FLAIR - **DWI-FLAIR MATCH**



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DWI

FLAIR



## DWI-FLAIR Match or Mismatch?

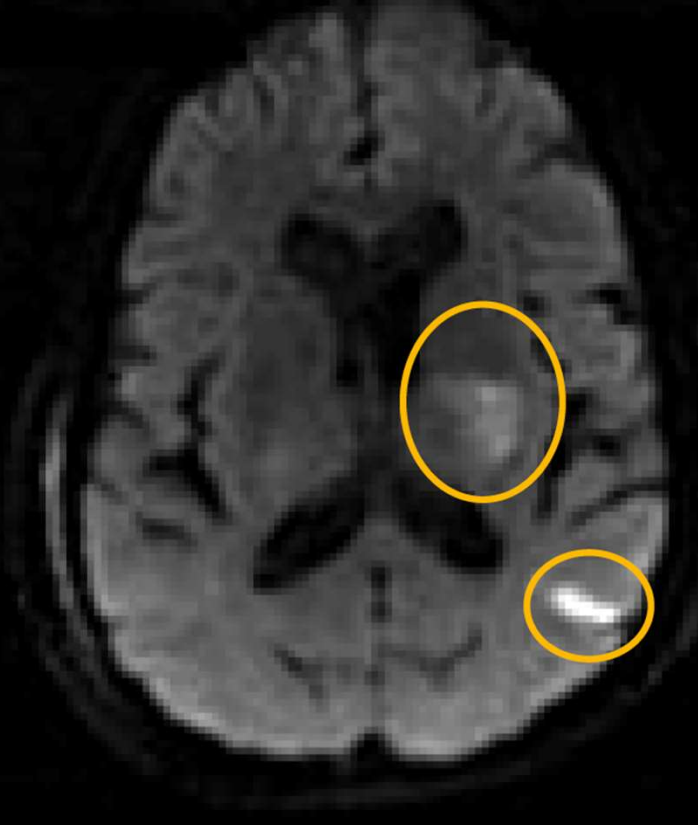


Ognisko wykazujące cechy restrykcji dyfuzji cząsteczek wody nie jest wyraźnie widoczne w obrazach FLAIR - **DWI-FLAIR MISMATCH**

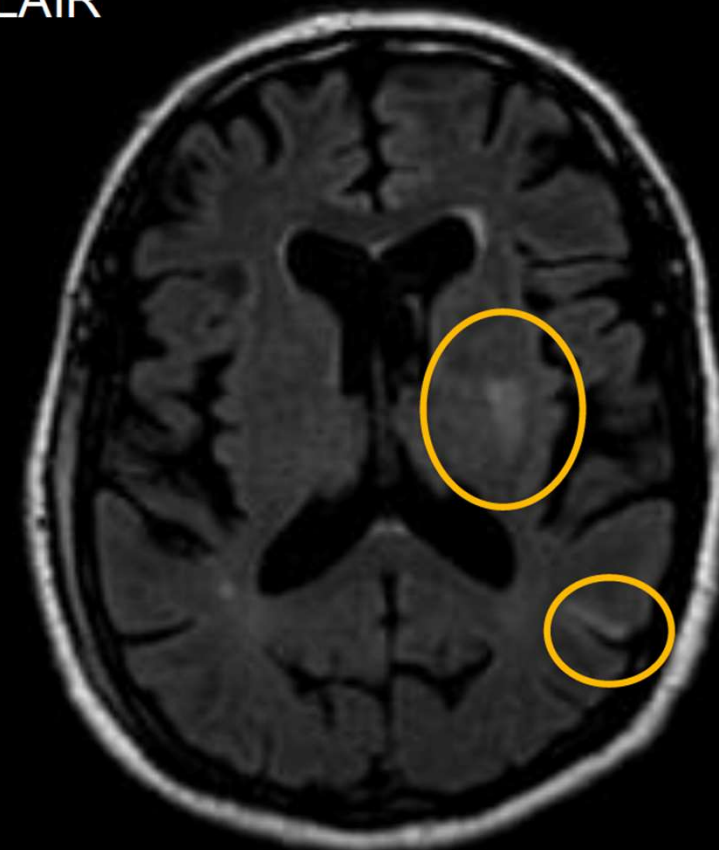


Intravenous Thrombolysis in Stroke Patients with Unknown Time of Symptom Onset. Illustrated imaging manual of the WAKE-UP trial. I. Galinovic, J.B. Fiebach, G. Thomalla, B. Cheng on behalf of the WAKE-UP Investigators

DWI



FLAIR



## DWI-FLAIR Match or Mismatch?

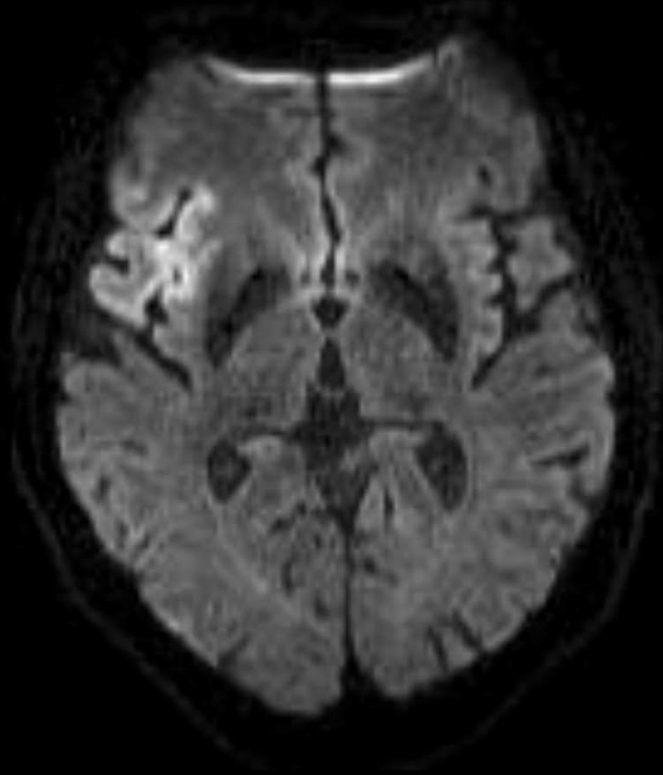


Ogniska wykazujące cechy restrykcji dyfuzji cząsteczek wody są wyraźnie widoczne w obrazach FLAIR - **DWI-FLAIR MATCH**

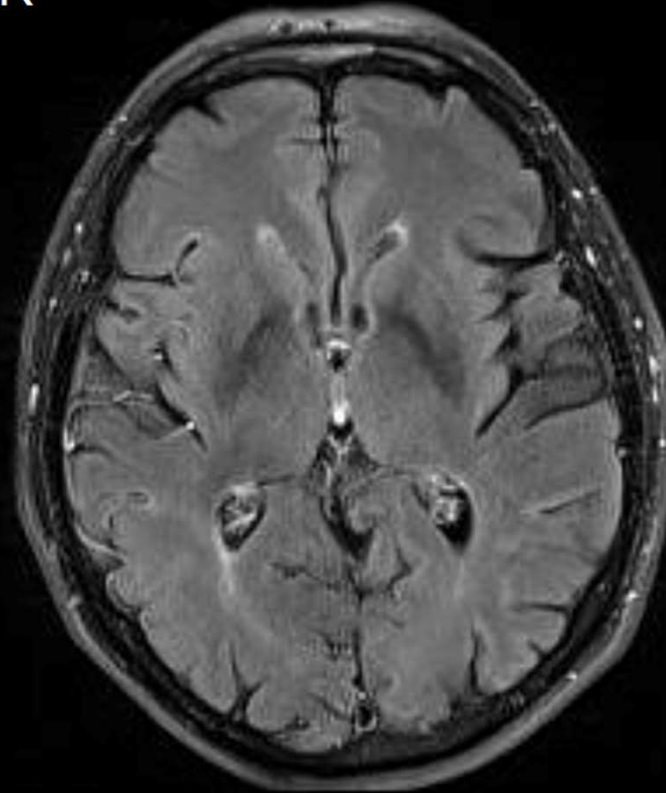


Intravenous Thrombolysis in Stroke Patients with Unknown Time of Symptom Onset. Illustrated imaging manual of the WAKE-UP trial. I. Galinovic, J.B. Fiebach, G. Thomalla, B. Cheng on behalf of the WAKE-UP Investigators

DWI



FLAIR



## DWI-FLAIR Match or Mismatch?



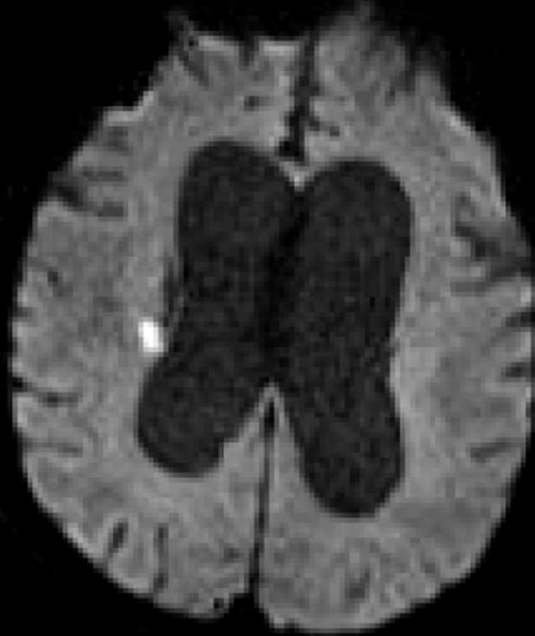
Ognisko wykazujące cechy restrykcji dyfuzji cząsteczek wody nie jest wyraźnie widoczne w obrazach FLAIR - **DWI-FLAIR MISMATCH**



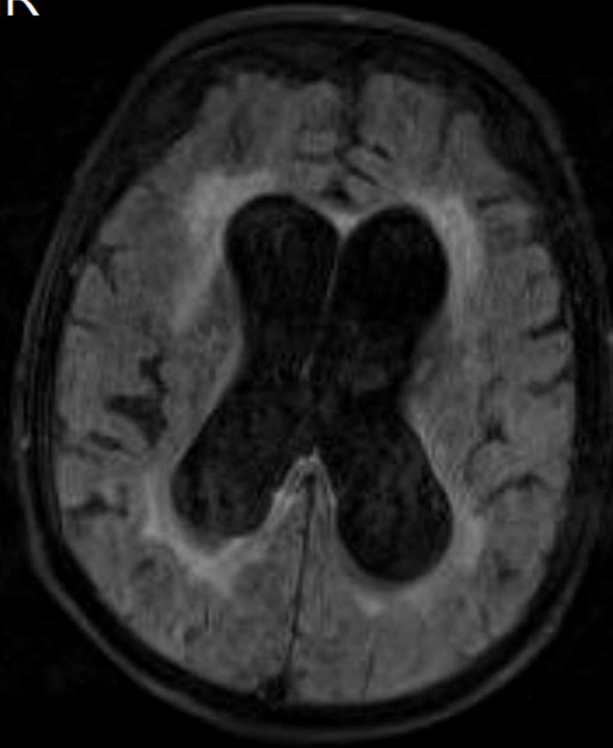
Intravenous Thrombolysis in Stroke Patients with Unknown Time of Symptom Onset. Illustrated imaging manual of the WAKE-UP trial. I. Galinovic, J.B. Fiebach, G. Thomalla, B. Cheng on behalf of the WAKE-UP Investigators



DWI



FLAIR



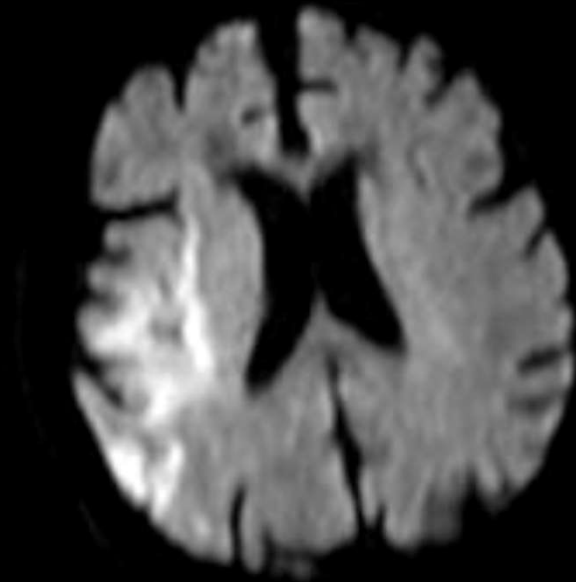
## DWI-FLAIR Match or Mismatch?



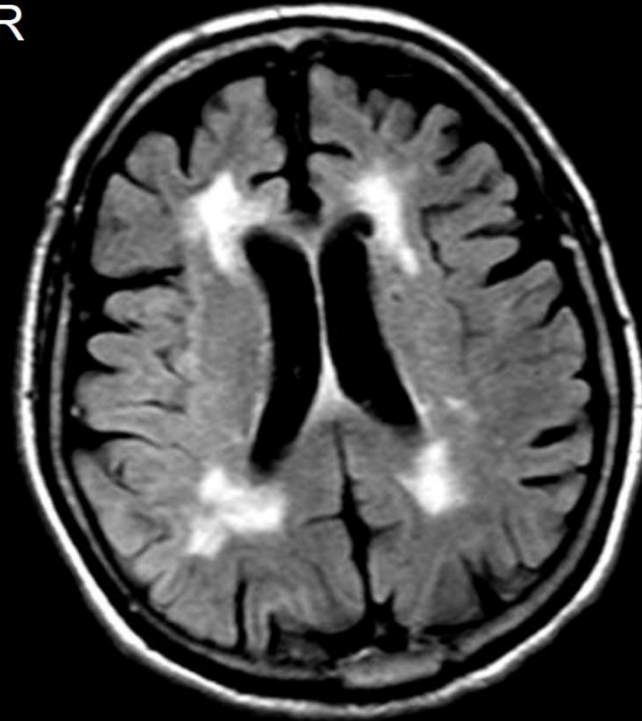
Ognisko wykazujące cechy restrykcji dyfuzji cząsteczek wody nie jest wyraźnie widoczne w obrazach FLAIR - **DWI-FLAIR MISMATCH**



DWI



FLAIR



*Przy wystarczającym kontraście wiele zmian może być subtelnie widocznych w obrazach FLAIR.  
Nie zaleca się "agresywnego kontrastowania".*

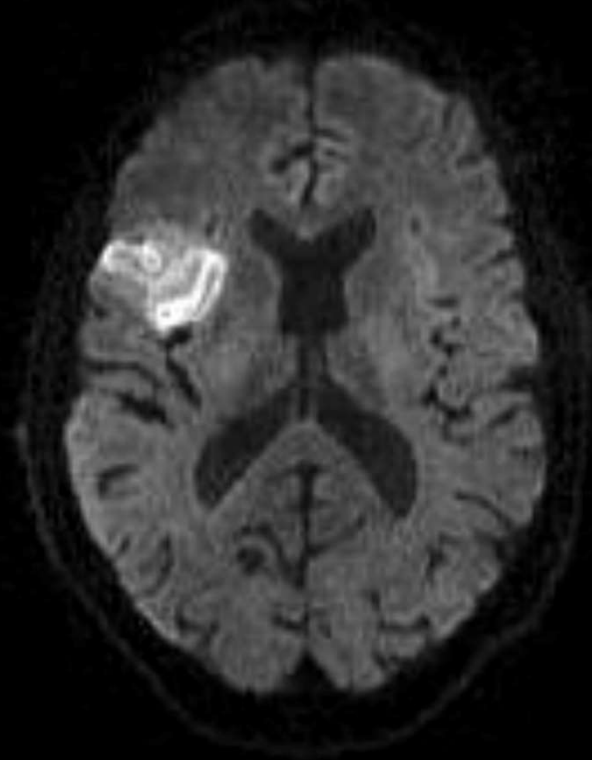
## DWI-FLAIR Match or Mismatch?



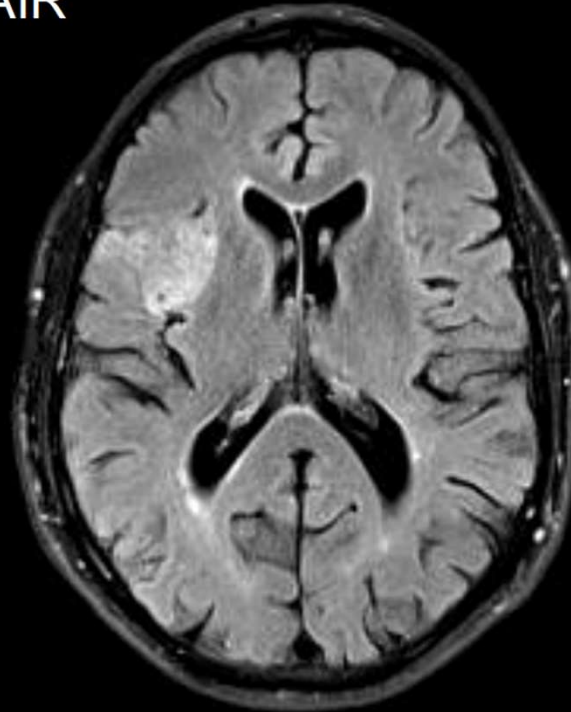
Ognisko wykazujące cechy restrykcji dyfuzji cząsteczek wody nie jest **wyraźnie** widoczne w obrazach FLAIR - **DWI-FLAIR MISMATCH**



DWI



FLAIR



## DWI-FLAIR Match or Mismatch?



Ognisko wykazujące cechy restrykcji dyfuzji cząsteczek wody jest wyraźnie widoczne w obrazach FLAIR - **DWI-FLAIR MATCH**



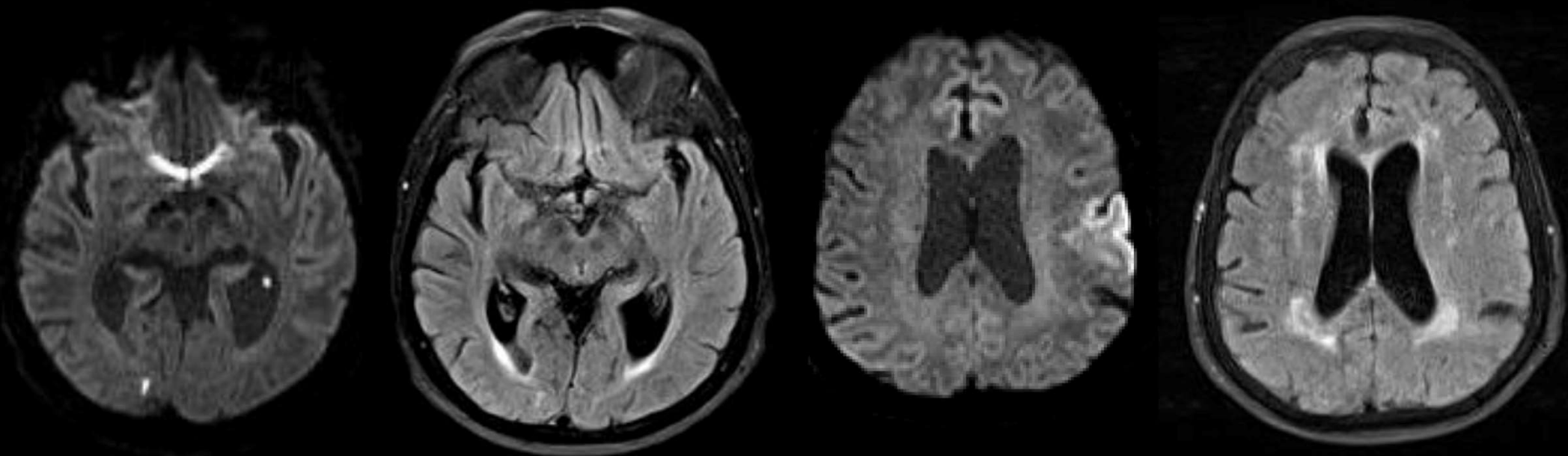
Intravenous Thrombolysis in Stroke Patients with Unknown Time of Symptom Onset. Illustrated imaging manual of the WAKE-UP trial. I. Galinovic, J.B. Fiebach, G. Thomalla, B. Cheng on behalf of the WAKE-UP Investigators

DWI

FLAIR

DWI

FLAIR



*Ognisko zawału w terytorium RPCA (widoczne w obrazach FLAIR) oraz LMCA (niewidoczne w obrazach FLAIR).  
Jeśli jakiegokolwiek ognisko zawału jest widoczne w obrazach FLAIR oznacza to DWI-FLAIR MATCH.*

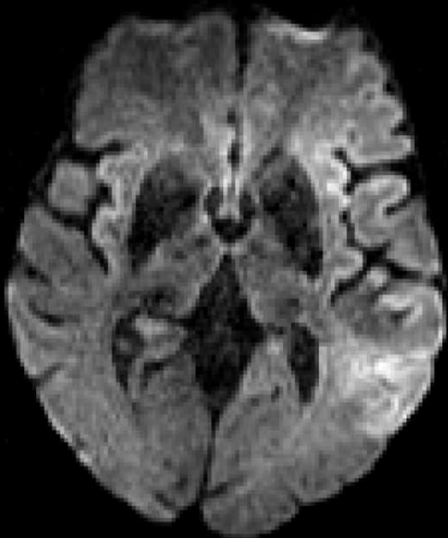
## DWI-FLAIR Match or Mismatch?



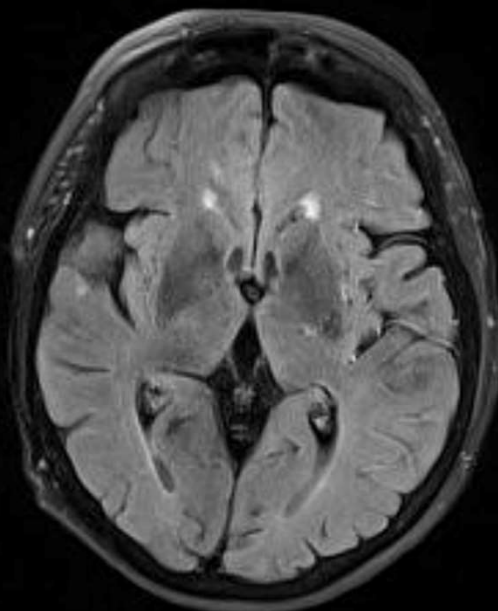
Jedno z ognisk wykazujące cechy restrykcji dyfuzji cząsteczek wody jest wyraźnie widoczne w obrazach FLAIR - **DWI-FLAIR MATCH**

Intravenous Thrombolysis in Stroke Patients with Unknown Time of Symptom Onset. Illustrated imaging manual of the WAKE-UP trial. I. Galinovic, J.B. Fiebach, G. Thomalla, B. Cheng on behalf of the WAKE-UP Investigators

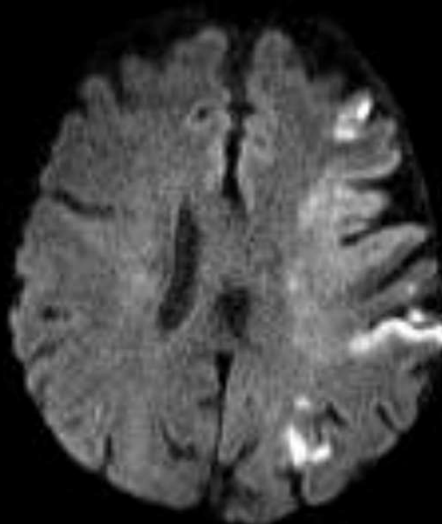
DWI



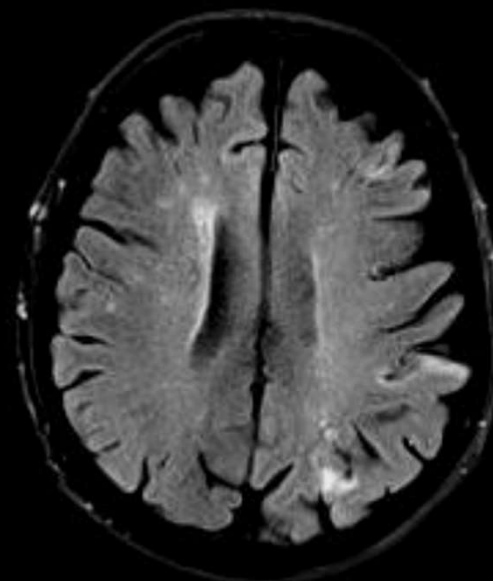
FLAIR



DWI



FLAIR



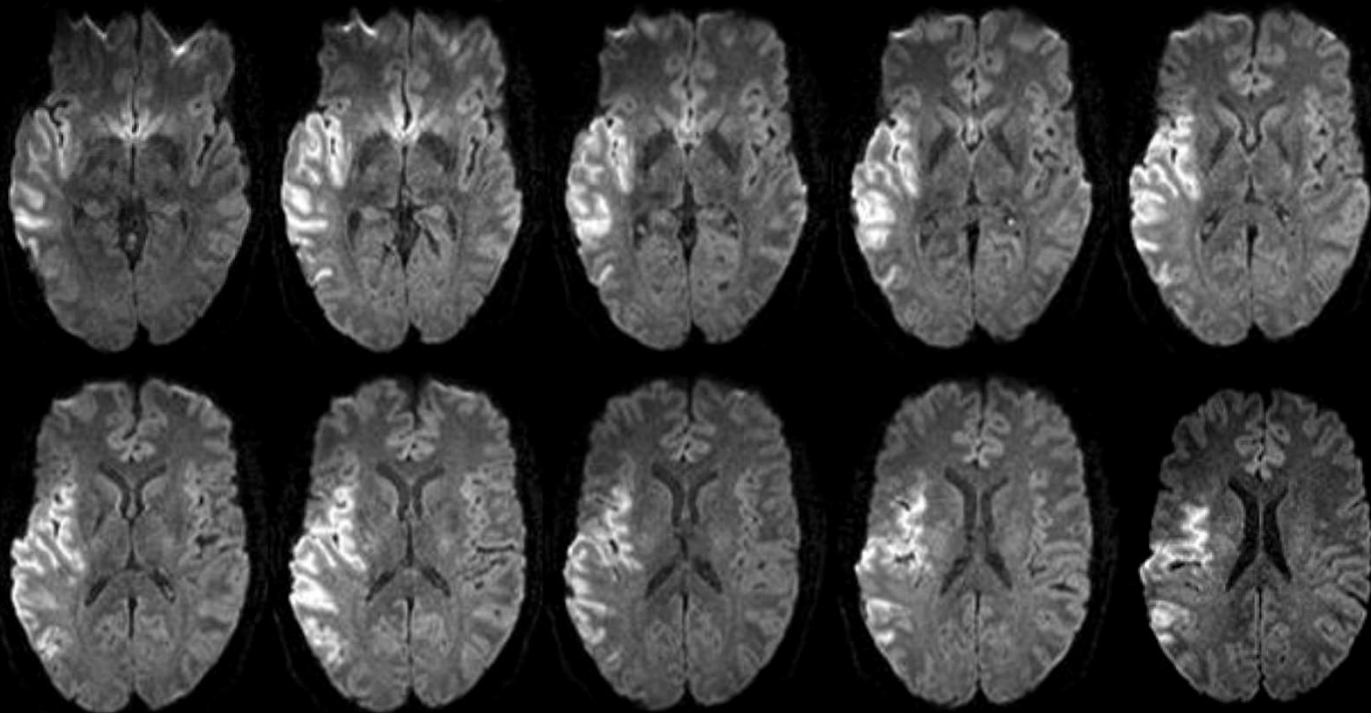
*Ogniska zawału w terytorium LMCA (widoczne oraz niewidoczne w obrazach FLAIR).  
Jeśli jakiegokolwiek ognisko zawału jest widoczne w obrazach FLAIR oznacza to DWI-FLAIR MATCH.*

## DWI-FLAIR Match or Mismatch?



Część z ognisk wykazujących cechy restrykcji dyfuzji cząsteczek wody jest wyraźnie widoczne w obrazach FLAIR - **DWI-FLAIR MATCH**

Intravenous Thrombolysis in Stroke Patients with Unknown Time of Symptom Onset. Illustrated imaging manual of the WAKE-UP trial. I. Galinovic, J.B. Fiebach, G. Thomalla, B. Cheng on behalf of the WAKE-UP Investigators



*Ognisko zawału > 1/3 terytorium MCA*



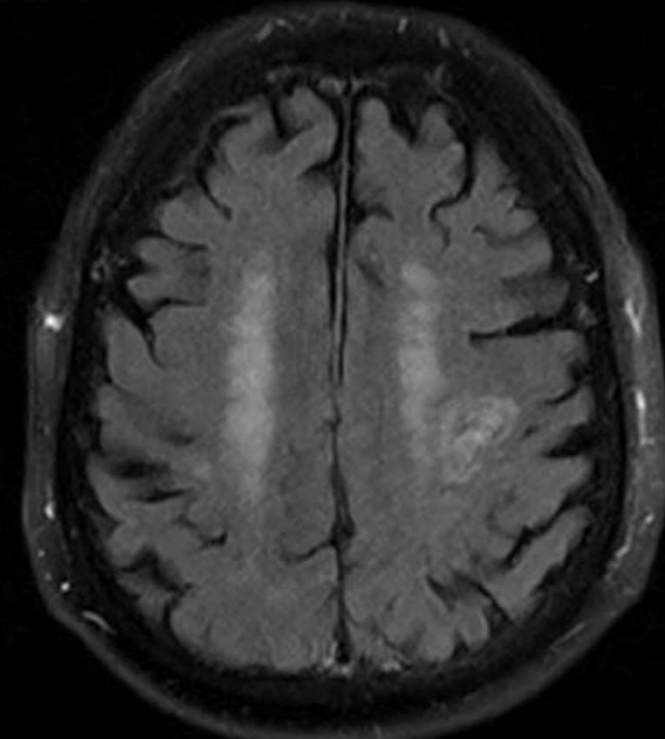
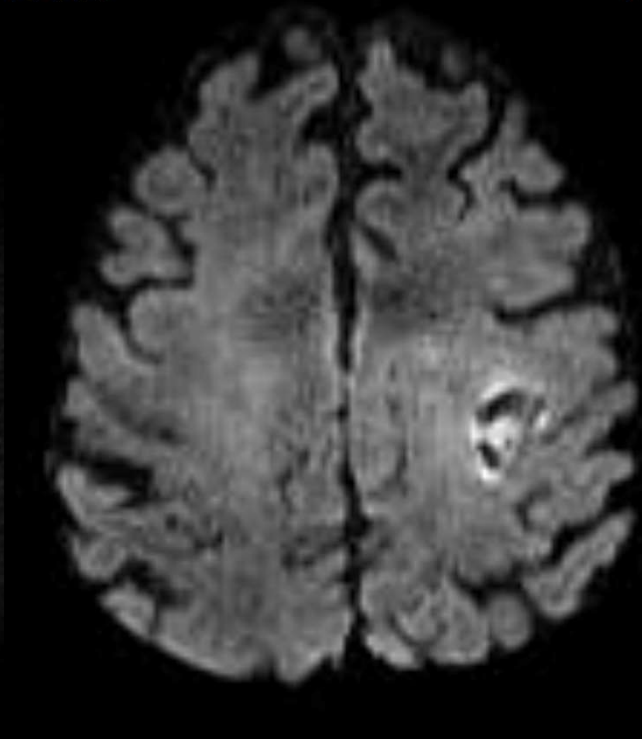
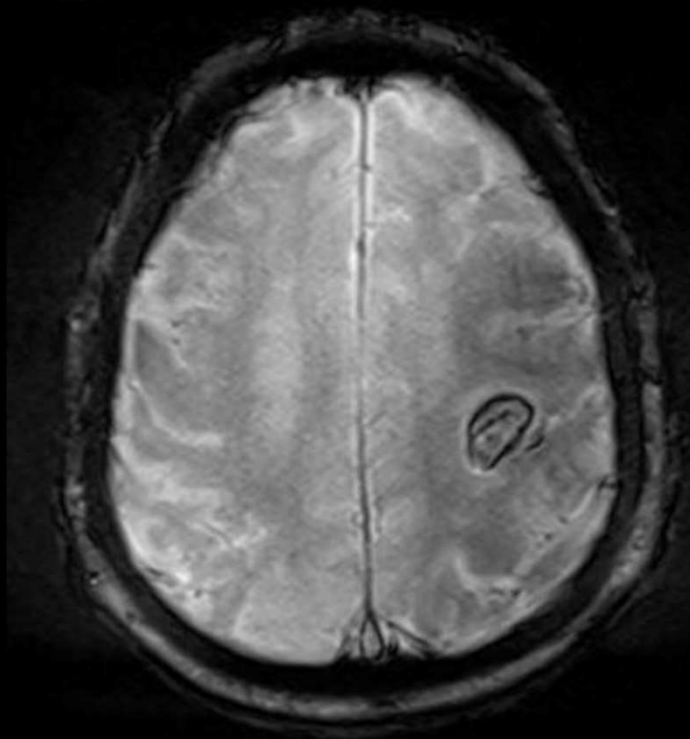
Ognisko w DWI > 1/3 MCA lub > 1/2 ACA lub 1/2 PCA lub > 100 ml było kryterium wykluczającym w trial'u WAKE-UP



T2\*

DWI

FLAIR



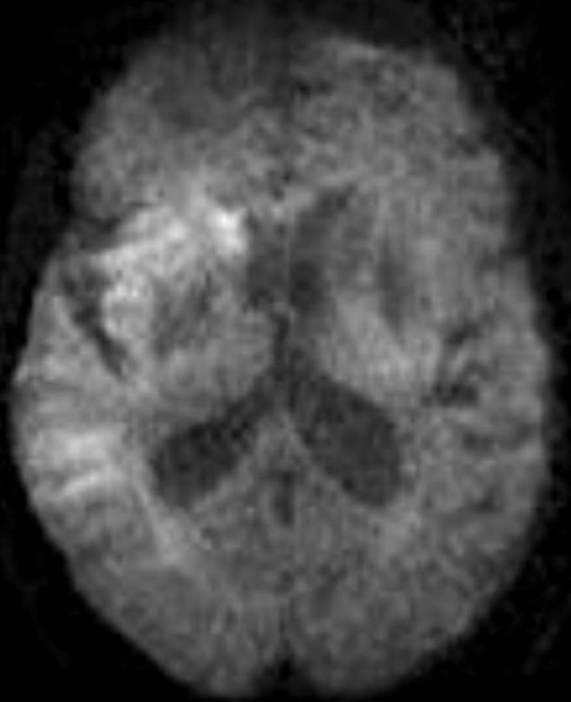
Ognisko krwotoczne w lewym płacie czołowym.



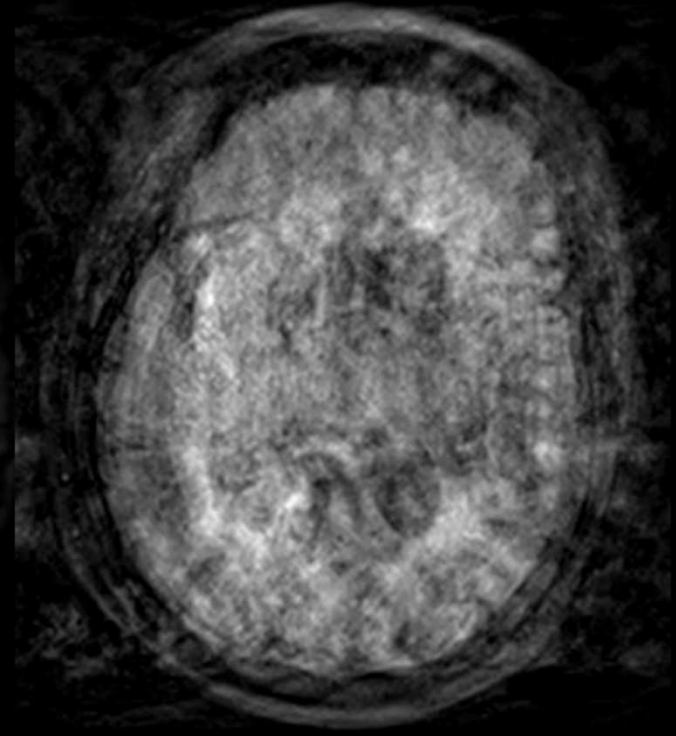
Cechy krwawienia wewnątrzczaszkowego były kryterium wykluczającym w trial'u WAKE-UP



DWI



FLAIR



Znaczne artefakty ruchowe uniemożliwiają pewną ocenę DWI-FLAIR Mismatch.

Ognisko zawału w terytorium RMCA.



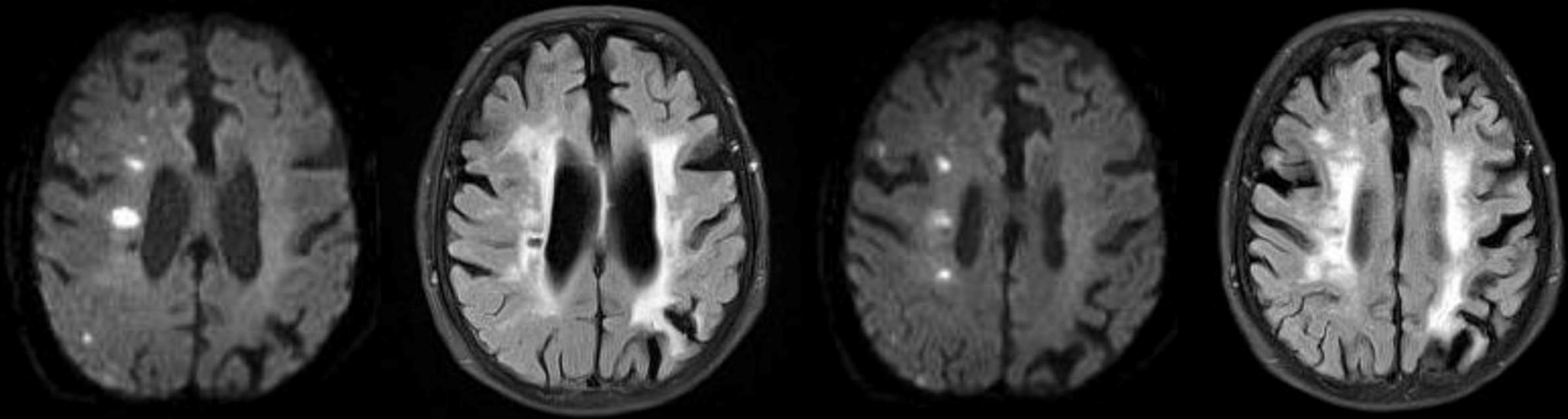


DWI

FLAIR

DWI

FLAIR



Ogniska zawału pokrywają się z obszarami leukoarajozy, co uniemożliwia pewną ocenę DWI-FLAIR Mismatch.

Rozsiane podkorowe ogniska zawału w terytorium RMCA.



# Leczenie rtPA w oparciu o perfuzję

udar w trakcie snu lub okno terapeutyczne 4,5-9 h

## 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 CV Campbell\*, Henry Ma\*, Peter A Ringleb\*, Mark W Parsons, Leonid Churilov, Martin Bendszus, Christopher R Levi, Chung Hsu, Timothy J Kleinig, Marc Fatar, Didier Leys, Carlos Molina, Tissa Wijeratne, Sami Curtze, Helen M Dewey, P Alan Barber, Kenneth S Butcher, Deidre A De Silva, Christopher F Bladin, Nawaf Yassi, Johannes A R Pfaff, Gagan Sharma, Andrew Bivard, Patricia M Desmond, Stefan Schwab, Peter D Schellinger, Bernard Yan, Peter J Mitchell, Joaquín Serena, Danilo Toni, Vincent Thijs, Werner Hacke†, Stephen M Davis†, Geoffrey A Donnan†, on behalf of the EXTEND, ECASS-4, and EPITHET Investigators‡*

**Lancet 2019; 394: 139–47**

Published **Online**  
May 22, 2019

ECASS-4 2014-7 + EXTEND 2010-8 + EPITHET 2001-7

# Leczenie rtPA w oparciu o perfuzję

udar w trakcie snu lub okno terapeutyczne 4,5-9 h

## Wszyscy pacjenci (tj. bez RAPID)

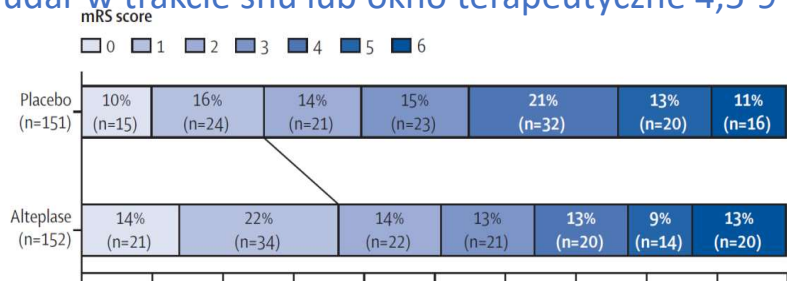
	Placebo (n=201)	Alteplase (n=213)	Odds ratio* (95% CI)	p value
<b>Primary outcome</b>				
Excellent functional outcome (mRS score 0-1) at 3 months	58/199 (29%)	76/211 (36%)	1.86 (1.15-2.99)	0.01
<b>Secondary outcomes</b>				
Functional improvement in mRS score at 3 months†	NA	NA	1.60 (1.12-2.27)	0.009
Functional independence (mRS score 0-2) at 3 months	87/199 (44%)	103/211 (49%)	1.74 (1.08-2.81)	0.02
Early neurological improvement at 72 h‡	31/197 (16%)	58/206 (28%)	2.54 (1.51-4.27)	<0.0001
<b>Safety outcomes</b>				
Death at 3 months	18/201 (9%)	29/213 (14%)	1.55 (0.81-2.97)	0.19
Symptomatic intracerebral haemorrhage§	1/201 (<1%)	10/213 (5%)	9.70 (1.23-76.55)	0.03

Data are n/N (%). mRS=modified Rankin Scale. NIHSS=National Institutes of Health Stroke Scale. NA=not applicable.  
\*Adjusted for baseline age and NIHSS. †Reduction of  $\geq 1$  point in mRS score (with mRS categories 5 and 6 merged), analysed using ordinal logistic regression. ‡Reduction of  $\geq 8$  points on NIHSS or reaching NIHSS score 0-1 at 72 h.  
§Within 36h of treatment.

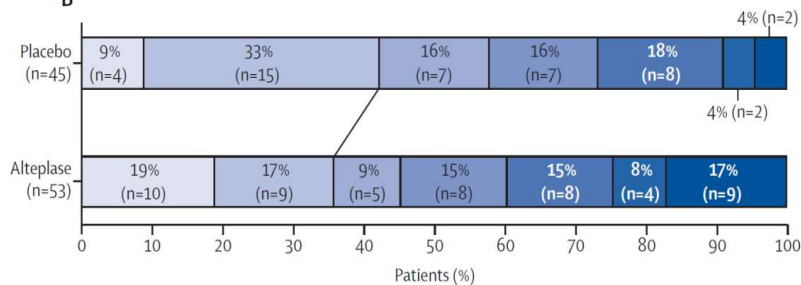
- Najważniejsze wyniki
  - 51% udarów po przebudzeniu ze snu (ok. 11 godz. od zaśnięcia)
  - NIHSS 10-12
  - 61% z niedrożnością dużego naczynia
  - Perfuzja TK  $\approx$  perfuzja MR (ok. 1 : 1)
  - Objętości ogniska zawałowego 8 ml
  - Objętości obszaru hipoperfuzji 64 ml

# Leczenie rtPA w oparciu o perfuzję

A udar w trakcie snu lub okno terapeutyczne 4,5-9 h



B



- Kryteria mismatch
  - Hipoperfuzja/ognisko >1,2
  - Ognisko <70 ml
  - Różnica między hipoperfuzją a ogniskiem >10 ml

- 75% z mismatchem RAPID (A)
- 25% bez mismatchu (B)

**Interpretation:** Patients with ischaemic stroke 4-5-9 h from stroke onset or wake-up stroke with salvageable brain tissue who were treated with alteplase achieved better functional outcomes than did patients given placebo. The rate of symptomatic intracerebral haemorrhage was higher with alteplase, but this increase did not negate the overall net benefit of thrombolysis.



COR	LOE
I	A

U pacjentów, którzy potencjalnie kwalifikują się do trombektomii mechanicznej zaleca się wykonanie nieinwazyjnego badania naczyniowego podczas wstępnej oceny radiologicznej.



COR	LOE
I	A

U pacjentów z podejrzeniem niedrożności dużego naczynia, którzy nie mieli wykonanego nieinwazyjnego badania naczyniowego podczas wstępnej oceny radiologicznej, powinno ono być wykonane jak najszybciej.

### Kiedy podejrzewać niedrożność dużego naczynia (LVO)?

Wynik NIHSS jest najlepszym dotychczas poznany predyktorem LVO:

NIHSS  $\geq 10$  – czułość 73%, swoistość 74%

NIHSS  $\geq 6$  – czułość 87%, swoistość 52%

## Accuracy of Prediction Instruments for Diagnosing Large Vessel Occlusion in Individuals With Suspected Stroke: A Systematic Review for the 2018 Guidelines for the Early Management of Patients With Acute Ischemic Stroke

Eric E. Smith, David M. Kent, Ketan R. Bulsara, Lester Y. Leung, Judith H. Lichtman, Mathew J. Reeves, Amytis Towfighi, William N. Whiteley and Darin B. Zahuranec  
and on behalf of the American Heart Association Stroke Council

Originally published 24 Jan 2018 | <https://doi.org/10.1161/STR.000000000000160> | Stroke. 2018;49:e111–e122



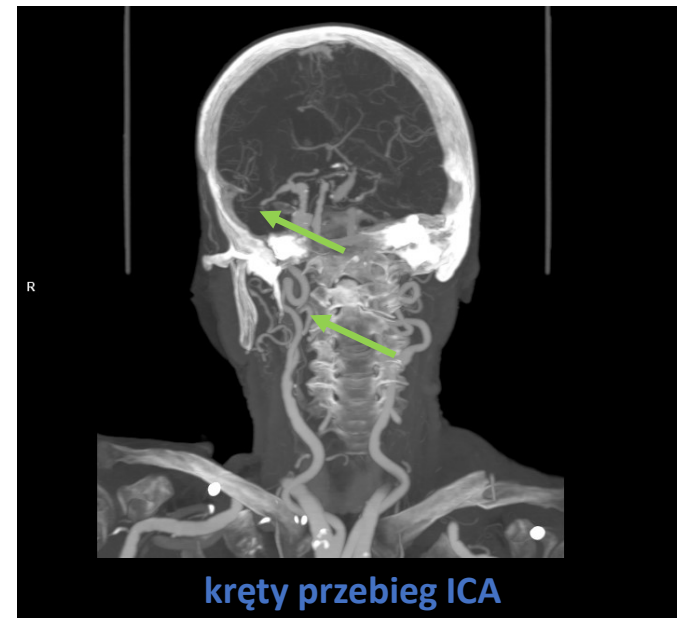
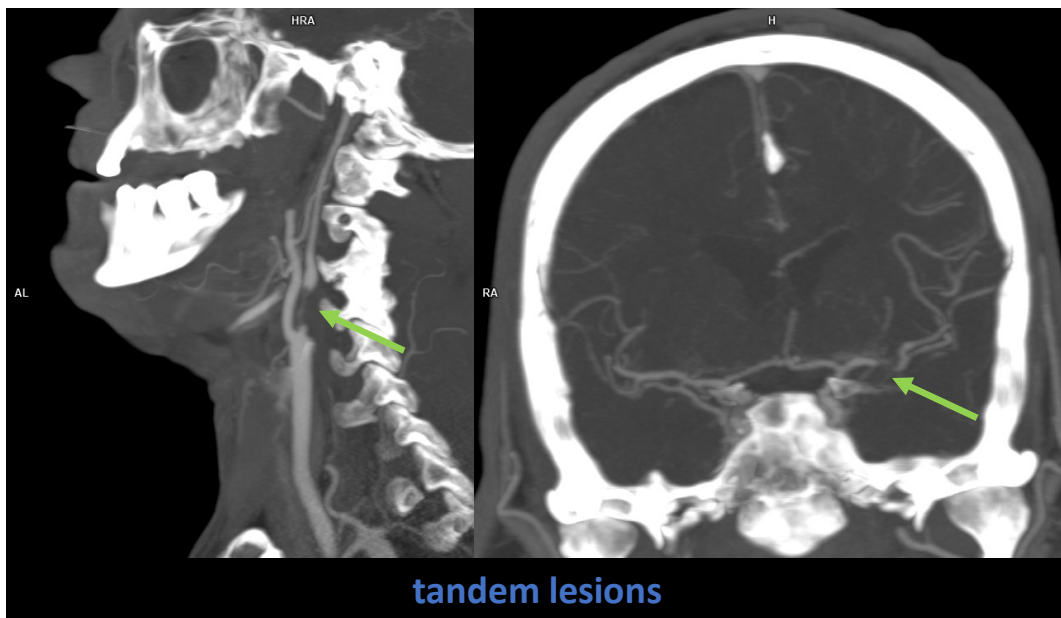
COR	LOE
Ila	B-NR

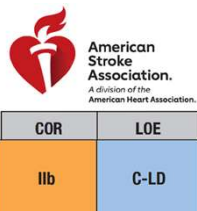
U pacjentów z podejrzeniem niedrożności dużego naczynia oraz bez dodatniego wywiadu w kierunku upośledzenia funkcji nerek uzasadnione jest wykonanie CTA przed uzyskaniem wyniku stężenia kreatyniny w surowicy.



COR	LOE
I Ib	C-EO

U pacjentów, którzy są potencjalnymi kandydatami do trombektomii mechanicznej, obrazowanie tętnic dogłowych wydaje się być uzasadnione, gdyż dostarcza informacji przydatnych dla planowania zabiegu endowaskularnego.





## Uwzględnienie oceny obrazu krążenia obocznego podczas kwalifikacji pacjentów do trombektomii mechanicznej wydaje się być uzasadnione w części przypadków.

### Stroke

Volume 47, Issue 3, March 2016; Pages 768-776  
<https://doi.org/10.1161/STROKEAHA.115.011788>



#### ORIGINAL CONTRIBUTIONS

### Collateral Status on Baseline Computed Tomographic Angiography and Intra-Arterial Treatment Effect in Patients With Proximal Anterior Circulation Stroke

### Stroke

Volume 46, Issue 5, May 2015; Pages 1239-1244  
<https://doi.org/10.1161/STROKEAHA.115.009009>



#### ORIGINAL CONTRIBUTIONS

### Differential Effect of Baseline Computed Tomographic Angiography Collaterals on Clinical Outcome in Patients Enrolled in the Interventional Management of Stroke III Trial

Randomized Controlled Trial > N Engl J Med. 2015 Mar 12;372(11):1019-30.  
doi: 10.1056/NEJMoa1414905. Epub 2015 Feb 11.

### Randomized assessment of rapid endovascular treatment of ischemic stroke

### Conclusions—

In MR CLEAN, baseline computed tomographic angiography collateral status modified the treatment effect. The benefit of IAT was greatest in patients with good collaterals on baseline computed tomographic angiography. Treatment benefit appeared less and may be absent in patients with absent or poor collaterals.

### Conclusion—

Using data from a large randomized controlled trial (IMS III), we show that baseline computed tomographic angiography collaterals are a robust determinant of final clinical outcome and could be used to select patients for endovascular therapy.

**Conclusions:** Among patients with acute ischemic stroke with a proximal vessel occlusion, a small infarct core, and moderate-to-good collateral circulation, rapid endovascular treatment improved functional outcomes and reduced mortality. (Funded by Covidien and others; ESCAPE ClinicalTrials.gov number, [NCT01778335](https://clinicaltrials.gov/ct2/show/study/NCT01778335)).

Berkhemer OA et al. Collateral Status on Baseline Computed Tomographic Angiography and Intra-Arterial Treatment Effect in Patients With Proximal Anterior Circulation Stroke. Stroke. 2016 Mar;47(3):768-76.  
Menon BK et al. Differential Effect of Baseline Computed Tomographic Angiography Collaterals on Clinical Outcome in Patients Enrolled in the Interventional Management of Stroke III Trial. Stroke. 2015 May;46(5):1239-44.  
Goyal M et al. Randomized assessment of rapid endovascular treatment of ischemic stroke. N Engl J Med. 2015 Mar 12;372(11):1019-30.

## Ocena krążenia obocznego

### Jak oceniać krążenie oboczne?

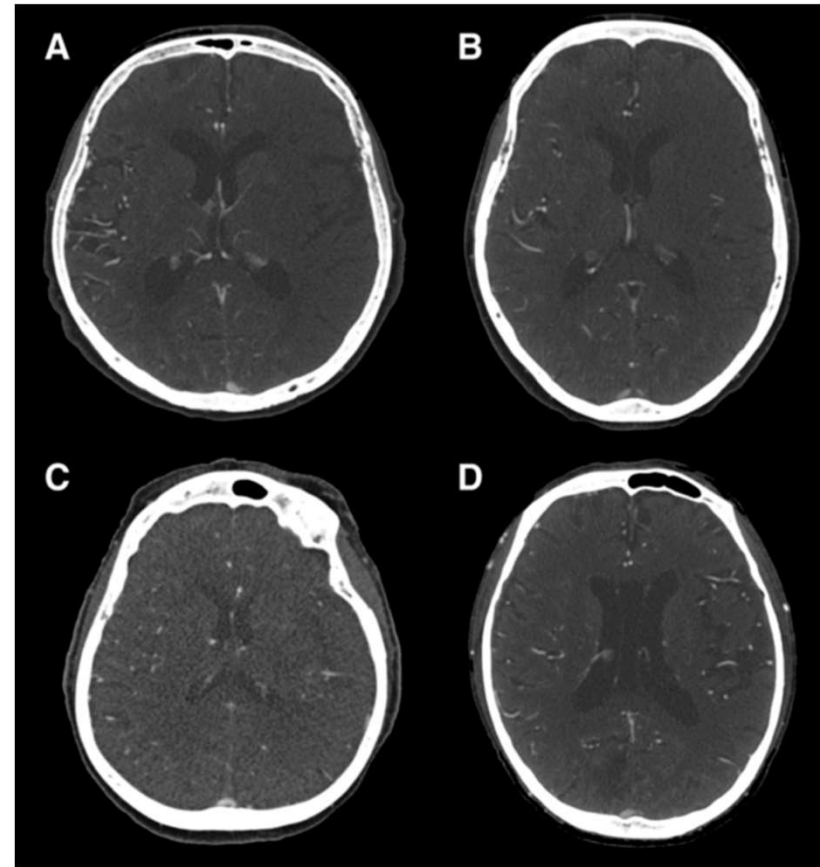
#### 4-stopniowa skala:

Stopień 0 (A): brak krążenia obocznego (0% zakontrastowanych naczyń w obszarze za niedrożnością)

Stopień 1 (B): słabe krążenie oboczne (>0% oraz  $\leq 50\%$  zakontrastowanych naczyń w obszarze za niedrożnością)

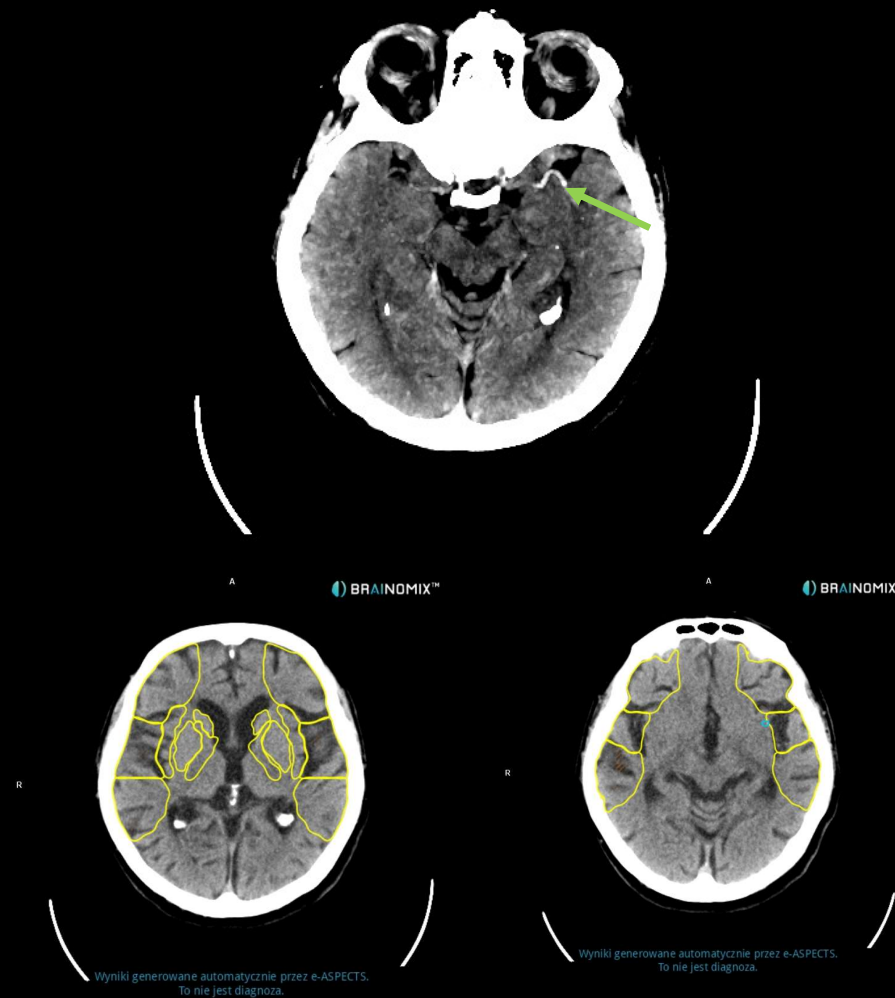
Stopień 2 (C): umiarkowane krążenie oboczne (>50% oraz <100% zakontrastowanych naczyń w obszarze za niedrożnością)

Stopień 3 (D): dobre krążenie oboczne (100% zakontrastowanych naczyń w obszarze za niedrożnością)



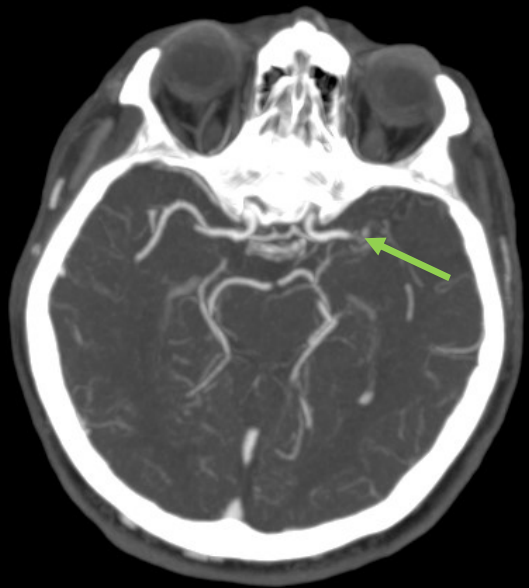


AF



Kobieta, 74 lata. Niedowład połowiczy prawostronny. Afazja. NIHSS 17. Objawy od 1h.

A



AF

H



A



■ penumbra  
■ infarct core



A

R

**Kontrolna TK 24h po trombektomii.**

Niedowład połowiczny prawostronny. Afazja. NIHSS 14. mRS 3.



COR	LOE
I	A

Podczas kwalifikacji do trombektomii mechanicznej pacjenta z ostrym udarem niedokrwiennym mózgu oraz LVO w zakresie krążenia przedniego, między 6 a 24 godziną od czasu, kiedy pacjent był po raz ostatni widziany bez objawów, zaleca się wykonanie dodatkowych badań neuroobrazowych (CTP lub MRI-DWI z/bez perfuzją-MR), ale tylko wtedy, gdy pacjent spełnia pozostałe kryteria określone w jednym z RCT, które wykazały korzyści z trombektomii mechanicznej w wydłużonym oknie terapeutycznym.



Time window

Age

mRS before qualifying stroke

NIHSS score

Arterial occlusion

Mismatch definition

6–16 h since time last known well

18–90 years

$\leq 2$ ; life expectancy  $\geq 6$  months

$\geq 6$

ICA and/or MI<sup>a</sup>

Target mismatch profile on CT or MR perfusion imaging, as determined by an automated image post-processing system:

Infarct core volume  $< 70$  mL<sup>b</sup>

and mismatch volume  $> 15$  mL ( $T_{\max} > 6$  s<sup>c</sup>)

and mismatch ratio (penumbra/core)  $> 1.8$

6–24 h since time last known well

$\geq 18$  years

$\leq 1$ ; life expectancy  $\geq 6$  months

$\geq 10$  (see below)

ICA and/or MI

Clinical-imaging mismatch

Age  $< 80$  y.o. and NIHSS  $\geq 10$  and infarct core 0–30 mL

or age  $< 80$  y.o. and NIHSS  $\geq 20$  and infarct core 31–51 mL

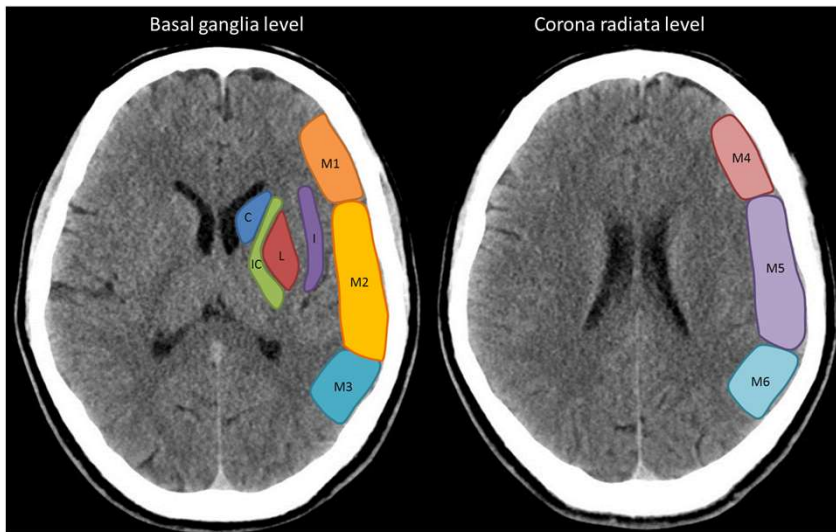
or age  $\geq 80$  y.o. and NIHSS  $\geq 10$  and infarct core 0–20 mL

COR	LOE
I	A

U pacjenta z ostrym udarem niedokrwiennym mózgu spowodowanym niedrożnością dużego naczynia oraz ASPECTS  $\geq 6$ , do 6 godzin od czasu, kiedy pacjent był po raz ostatni widziany bez objawów, zaleca się kwalifikację do trombektomii mechanicznej na podstawie CT + CTA lub MRI + MRA.

Konieczne są dalsze randomizowane kontrolowane badania kliniczne dla ustalenia, czy wykonywanie dodatkowych badań neuroobrazowych (CTP lub MRI-DWI z/bez perfuzją-MR) jest korzystne podczas kwalifikacji do trombektomii mechanicznej pacjentów z ASPECTS  $< 6$ , do 6 godzin od czasu, kiedy pacjent był po raz ostatni widziany bez objawów.

MCA Alberta stroke program early CT score (ASPECTS)



C: Caudate; IC: internal capsule; L: lentiform nucleus; I: Insular Cortex.

### ASPECTS (Alberta Stroke Programme Early Computed Tomography Score)

- skala do oceny rozległości zmian niedokrwiennych w rejonie unaczynienia tętnicy środkowej mózgu
- dzieli ona rejon unaczynienia tętnicy środkowej mózgu na 10 obszarów
- wartość skali dla danego pacjenta oblicza się poprzez odjęcie od 10 po jednym punkcie za każdy obszar, w którym uwidocznione zostały zmiany niedokrwienne
  - ASPECTS 10 – brak jakiegokolwiek widocznego świeżego ogniska niedokrwiennego
  - ASPECTS 0 – świeże ognisko obejmujące obszar unaczynienia całej tętnicy środkowej mózgu

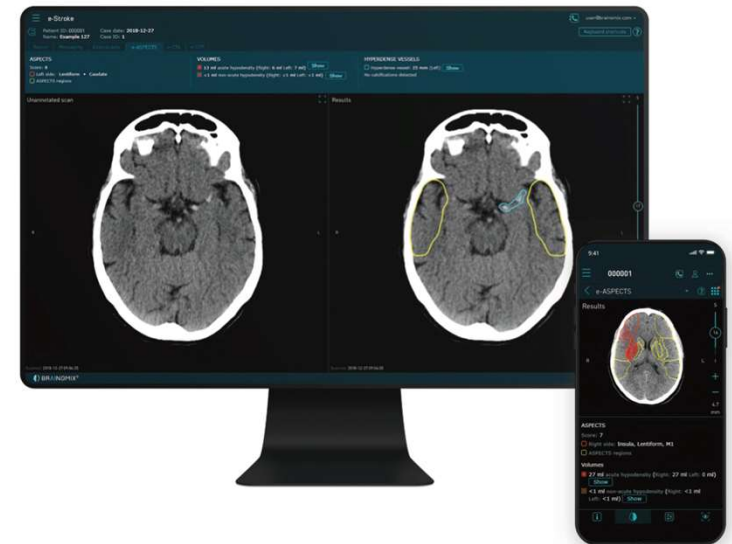
# Sztuczna inteligencja w diagnostyce udaru mózgu

> [Int J Stroke](#). 2017 Aug;12(6):615–622. doi: 10.1177/1747493016681020. Epub 2016 Dec 1.

## e-ASPECTS software is non-inferior to neuroradiologists in applying the ASPECT score to computed tomography scans of acute ischemic stroke patients

Simon Nagel <sup>1</sup>, Devesh Sinha <sup>2</sup>, Diana Day <sup>3</sup>, Wolfgang Reith <sup>4</sup>, René Chapot <sup>5</sup>, Panagiotis Papanagiotou <sup>6</sup>, Elizabeth A Warburton <sup>7</sup>, Paul Guyler <sup>2</sup>, Sharon Tysoe <sup>2</sup>, Klaus Fassbender <sup>8</sup>, Silke Walter <sup>8 9</sup>, Marco Essig <sup>10</sup>, Jens Heidenrich <sup>11</sup>, Angelos A Konstas <sup>12</sup>, Michael Harrison <sup>13</sup>, Michalis Papadakis <sup>14</sup>, Eric Greveson <sup>14</sup>, Olivier Joly <sup>14</sup>, Stephen Gerry <sup>15</sup>, Holly Maguire <sup>16</sup>, Christine Roffe <sup>16</sup>, James Hampton-Till <sup>13</sup>, Alastair M Buchan <sup>9</sup>, Iris Q Grunwald <sup>2 14 17</sup>

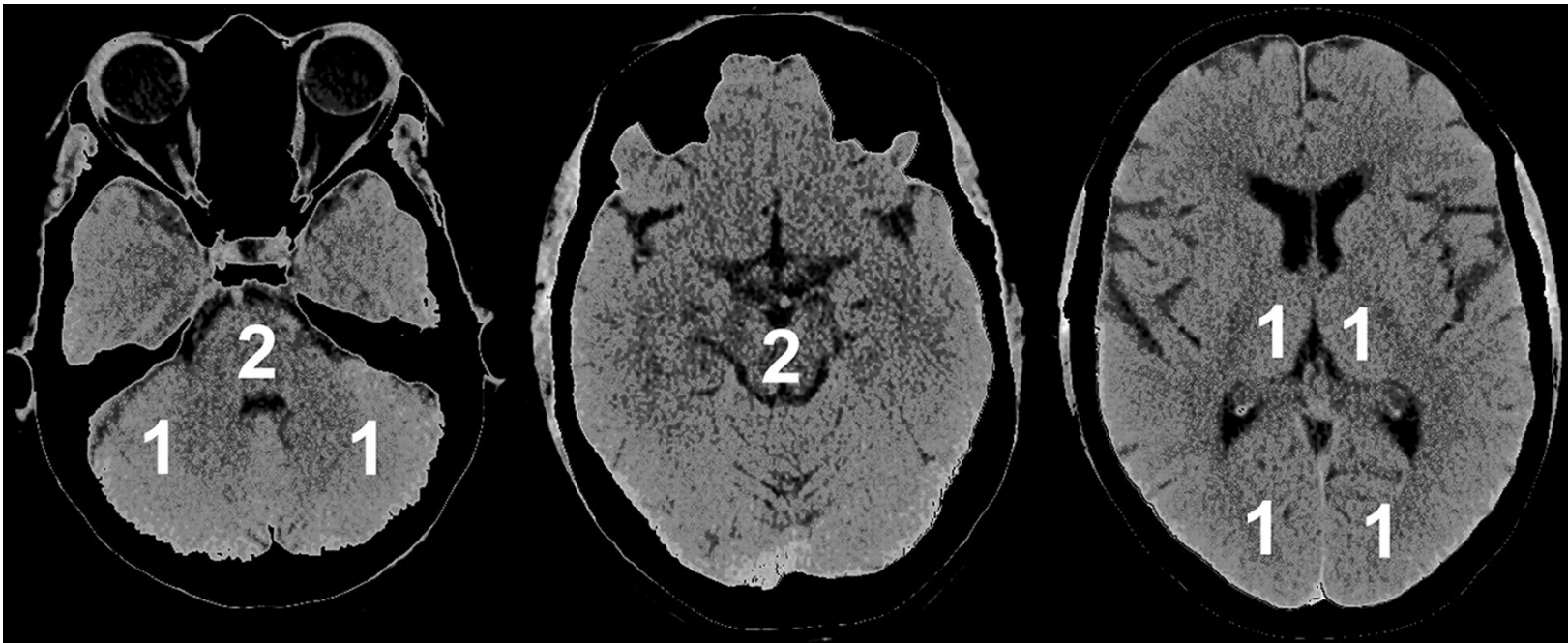
 BRAINOMIX



**Conclusions:** e-ASPECTS was non-inferior to three neuroradiologists in scoring ASPECTS on non-contrast enhanced computed tomography images of acute stroke patients.



## pc-ASPECTS



The posterior circulation Acute Stroke Prognosis Early CT score (**pc-ASPECTS**). From 10 points, 1 or 2 points each (as indicated) are subtracted for early ischemic changes (NCCT) or hypoattenuation (CTASI) in: left or right thalamus, cerebellum or PCA-territory, respectively (1 point); any part of midbrain or pons (2 points). Pc-ASPECTS=10 indicates a normal scan, pc-ASPECTS=0 indicates early ischemic changes (NCCT) or hypoattenuation (CTASI) in all above territories.

# pc-ASPECTS DWI

## Research

### **MRI in patients with acute basilar artery occlusion – DWI lesion scoring is an independent predictor of outcome**

Simon Nagel<sup>1\*</sup>, Christian Herweh<sup>2</sup>, Martin Köhrmann<sup>3</sup>, Hagen B. Huttner<sup>3</sup>, Sven Poli<sup>1</sup>, Marius Hartmann<sup>2,4</sup>, Stefan Hähnel<sup>2</sup>, Thorsten Steiner<sup>1</sup>, Peter Ringleb<sup>1</sup>, and Werner Hacke<sup>1</sup>

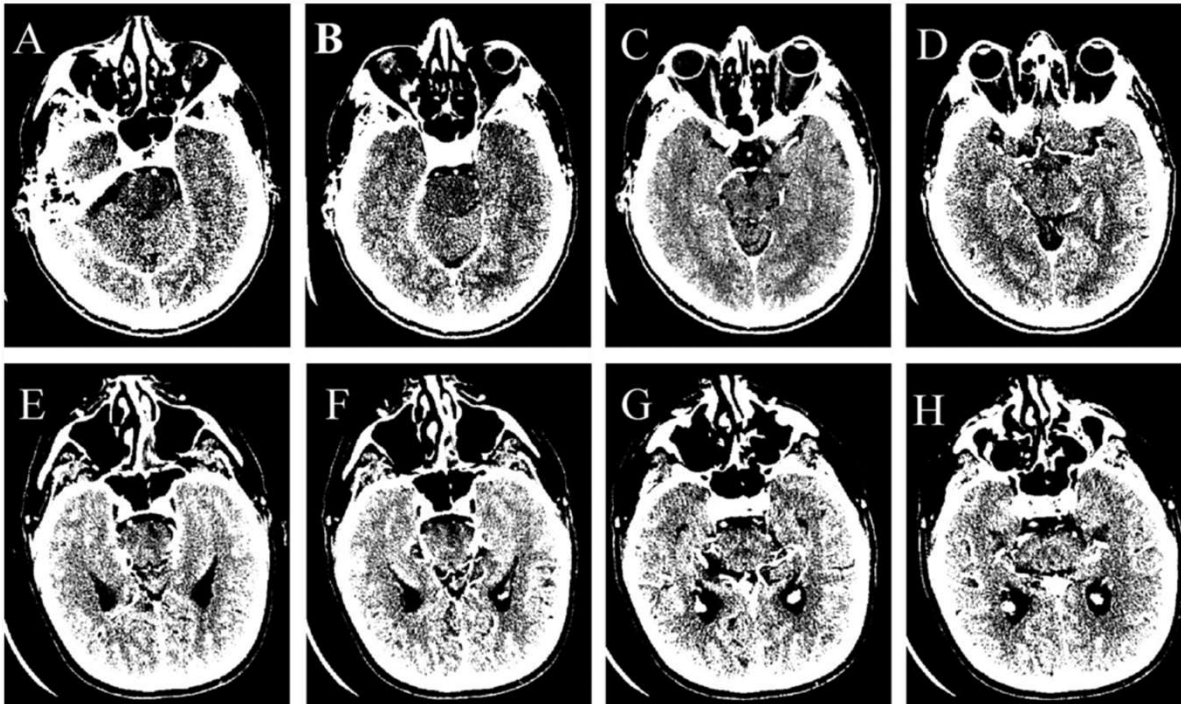
**Conclusion** In patients with acute basilar artery occlusion, posterior circulation Acute Stroke Prognosis Early CT Score of 8 or more points on early diffusion weighted imaging is an independent predictor for favorable outcome.



pc-ASPECTS 6:

## Pons–midbrain Index (PMI)

The CTA-SI is analyzed for hypoattenuation in the pons and midbrain. The pons and midbrain are bisected and each side is evaluated for hypoattenuation. A score of 0 implies no hypoattenuation; a score of 1 implies <50% hypoattenuation; and a score of 2 implies >50% hypoattenuation. Therefore, a score of 0 implies no hypoattenuation in the brainstem and a score of 8 implies >50% hypoattenuation bilaterally in the pons and midbrain.



**Pons-midbrain Index 6:** right pons, 2; left pons, 2; right midbrain, 1; left midbrain, 1;

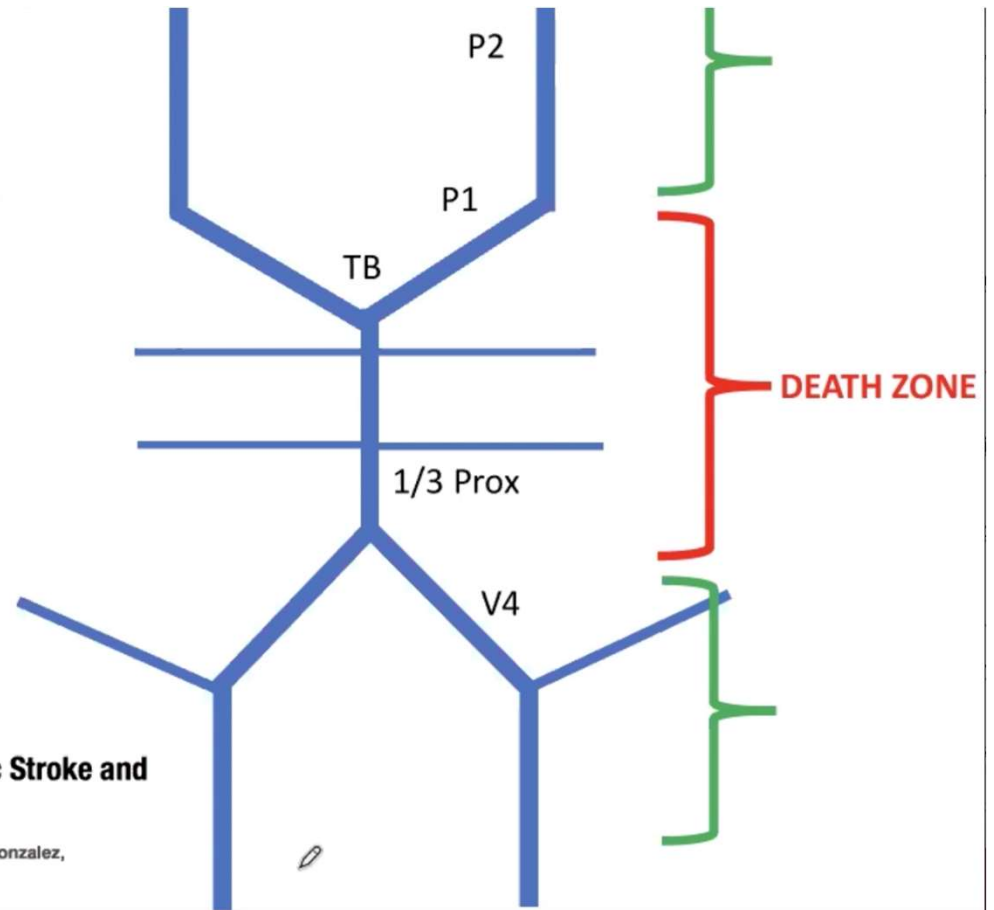
**Pons-midbrain Index 1:** left pons, 1; right pons, 0; left midbrain, 0; right midbrain, 0;

Garg R. et al. Neuroimaging Predictors of Clinical Outcome in Acute Basilar Artery Occlusion. *Front Neurol.* 2017; 8: 293.

Schaefer P. et al. CT angiography-source image hypoattenuation predicts clinical outcome in posterior circulation strokes treated with intra-arterial therapy. *Stroke.* 2008 Nov;39(11):3107-9.

# Historia Naturalna

LOCATION	mRS 3-6	Mortality
P2 Occlusion	76%	0%
P1 Occlusion	87%	25%
Top Basilar	81%	50%
1/3 Part of BA	- %	- %
V4 Occlusion	47%	25%
Tandem Lesion	-%	-%



## Significance of Large Vessel Intracranial Occlusion Causing Acute Ischemic Stroke and

le S. Smith, Michael H. Lev, Joey D. English, Erica C. Camargo, Maggie Chou, S. Claiborne Johnston, Gilberto Gonzalez, Iela W. Schaefer, William P. Dillon, Walter J. Koroshetz, and Karen L. Furie

inally published 15 Oct 2009 | <https://doi.org/10.1161/STROKEAHA.109.561787> | Stroke. 2009;40:3834-3840

# MT u pacjentów z BAO

## BAOCHE Conclusions:

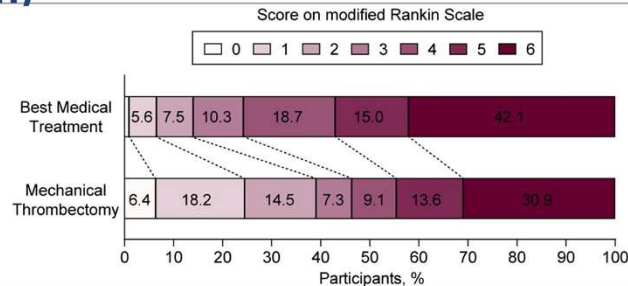
ACTIVE, NOT RECRUITING

### Basilar Artery Occlusion Chinese Endovascular Trial

Information provided by Xuanwu Hospital, Beijing (Responsible Party)

Last Updated: May 25, 2022

### Primary analysis (N=217, ITT population)



	Thrombectomy (N=110)	BMT (N=107)	Unadjusted OR (95% CI), P Value	Adjusted OR (95% CI)*, P Value
mRS 0-3 at 90 days, n (%)	51 (46.4)	26 (24.3)	2.69 (1.51, 4.81) P=0.001	2.92 (1.56, 5.47) P=0.001

\*Odds ratio was adjusted for minimization factor: age ( $\leq 70$  or  $> 70$  years), baseline NIHSS (6–20 or  $> 20$ ), therapeutic window (6–12h or  $> 12$ h).

- BAOCHE compared EVT vs BMT in patients with acute stroke due to basilar occlusion and absence of large posterior circulation infarct burden presenting in the 6–24 hours time window.
- EVT improved mRS 0–3 rates at 90 days, by 22.1% from 24.3% to 46.4%. NNT = 4.5
- Trend towards higher rates of symptomatic intracranial hemorrhage with thrombectomy
- Trend towards lower mortality rates with thrombectomy.
- BAOCHE results support the concept that EVT for late presenting patients with basilar occlusion stroke has similar efficacy compared to EVT for early presenting patients with BAO or in patients with anterior circulation stroke proximal LVO.

# MT u pacjentów z BAO

ClinicalTrials.gov BETA

Resources ▾ About ▾

Home > Search Results > Study Record

ClinicalTrials.gov Identifier: NCT02737189

ACTIVE, NOT RECRUITING ⓘ

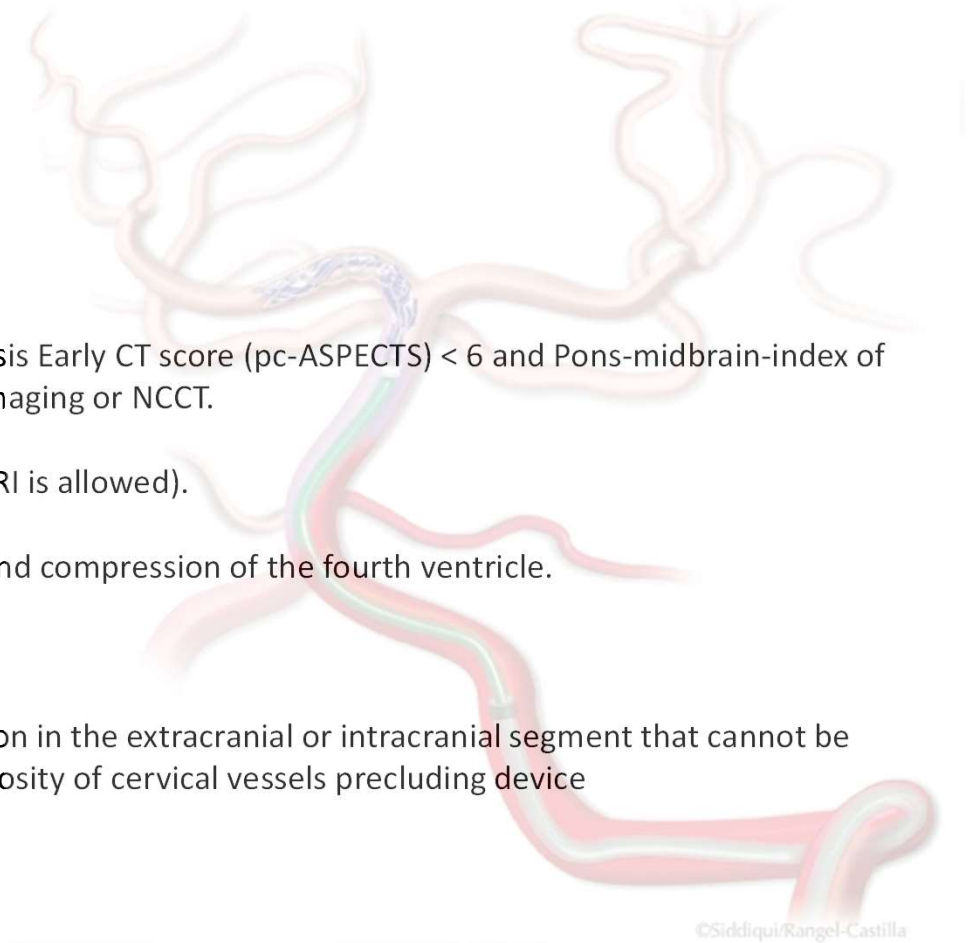
## Basilar Artery Occlusion Chinese Endovascular Trial

Information provided by Xuanwu Hospital, Beijing (Responsible Party)

Last Updated: May 25, 2022

### BAOCHE Neuroimaging Exclusion Criteria:

1. Hypodensity amounting to a posterior circulation Acute Stroke Prognosis Early CT score (pc-ASPECTS)  $< 6$  and Pons-midbrain-index of  $\geq 3$  on CT angiography source images or MR with diffusion-weighted imaging or NCCT.
2. CT or MR evidence of hemorrhage (the presence of microbleeds on MRI is allowed).
3. Complete cerebellar infarct on CT or MRI with significant mass effect and compression of the fourth ventricle.
4. Complete unilateral or bilateral thalamic infarction on CT or MRI
5. Evidence of vertebral occlusion, high grade stenosis or arterial dissection in the extracranial or intracranial segment that cannot be treated or will prevent access to the intracranial clot or excessive tortuosity of cervical vessels precluding device delivery/deployment.
6. Subjects with occlusions in both anterior and posterior circulation.
7. Evidence of intracranial tumor (except small meningioma).



©Siddiqui/Rangel-Castilla

RECRUITING ⓘ

## Endovascular Treatment for Acute Basilar Artery Occlusion

Information provided by Wei Hu, The First Affiliated Hospital of University of Science and Technology of China (Responsible Party)

Last Updated: June 10, 2021

### ATTENTION Imaging Exclusion Criteria:

1. CT/MR shows intracranial hemorrhage (patients with microbleeds on MR can be included if lesion diameter  $\leq 5\text{mm}$ ).
2. CTA/MRA/DSA shows the artery is seriously tortuous, variability or dissection, and thrombectomy device cannot reach the target vessel.
3. PC-ASPECTS on CT/CTA-Source Images/MRI-DWI  $< 6$  for patients  $< 80$  years ( $< 8$  for patients  $\geq 80$  years).
4. CT or MR shows the cerebellar infarction with obvious space occupying effect and obvious compression of the fourth ventricle.
5. Complete bilateral thalami or bilateral brainstem infarction confirmed by CT/MR.
6. Occlusion of both anterior and posterior circulation confirmed by CTA/MRA/DSA.
7. Intracranial tumors (except small meningiomas).

<https://clinicaltrials.gov/ct2/show/NCT04751708>; <https://vjneurology.com/video/lgaawnmahq-attention-results-endovascular-therapy-vs-best-medical-management-for-basilar-artery-occlusion/>



Share this video



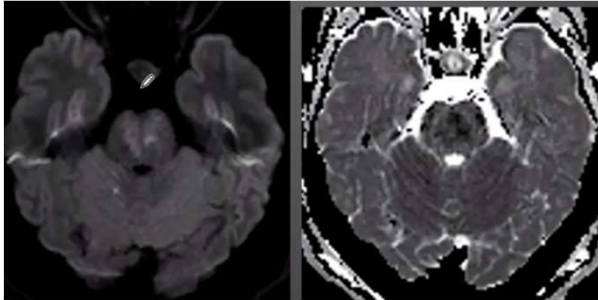
RATE VIDEO

### ESOC 2022 | ATTENTION results: endovascular therapy vs. best medical management for basilar artery occlusion

Raul Nogueira • 5 May 2022 [ESOC 2022](#) [Stroke](#) [ATTENTION](#) [Treatment](#) [Trial Updates](#)

Raul Nogueira, MD, University of Pittsburgh, Pittsburgh, PA, shares the anticipated findings of the randomized, controlled ATTENTION trial (NCT04751708), assessing the safety and efficacy of endovascular treatment for acute basilar artery occlusion (BAO), compared to best medical management (BMM). In total, 340 patients with acute ischemic stroke with basilar artery occlusion were recruited and followed up for 90 days. The primary outcome of the trial was a favorable outcome, defined as a modified Rankin scale score of 0-3. There was a significant difference in favorable outcomes in the thrombectomy group compared to BMM (46% vs. 24%), as well as a lower degree of overall disability, lower mortality rate, and more patients achieving independence. A significant increase in the rate of symptomatic intracranial hemorrhage with endovascular treatment was reported, compared to BMM. This interview took place at European Stroke Organisation Conference 2022 in Lyon, France.

## Podójcie praktyczne -selekcja pacjentów krążenie tylne?



MRI/CT

PC-ASPECT SCORE

OKNO TERAPEUTYCZNE

BĄDŹ OSTROŻNY

-NIEJEDNOLITY NA WARSTWIE=NIEPRZEWIDYWALNA EWOLUCJA

-ODWRACALNE DWI CZĘSTRZE W TYLNYM KRĄŻENIU

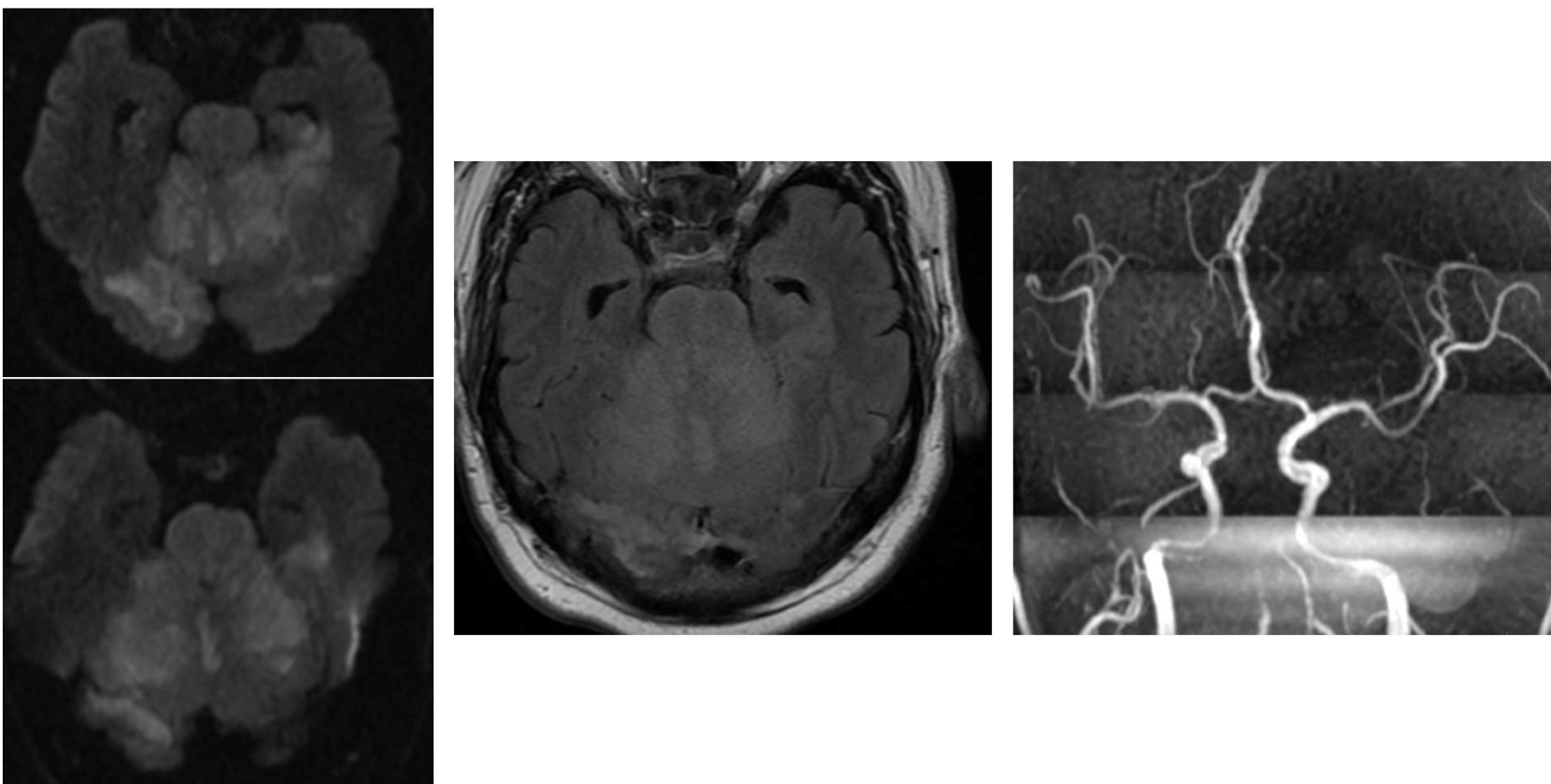
**KRYTERIA PRAKTYCZNE WIĘKSZOŚCI NEURORADIOLOGÓW ZABIEGOWYCH-**

**NIE LECZYĆ =**

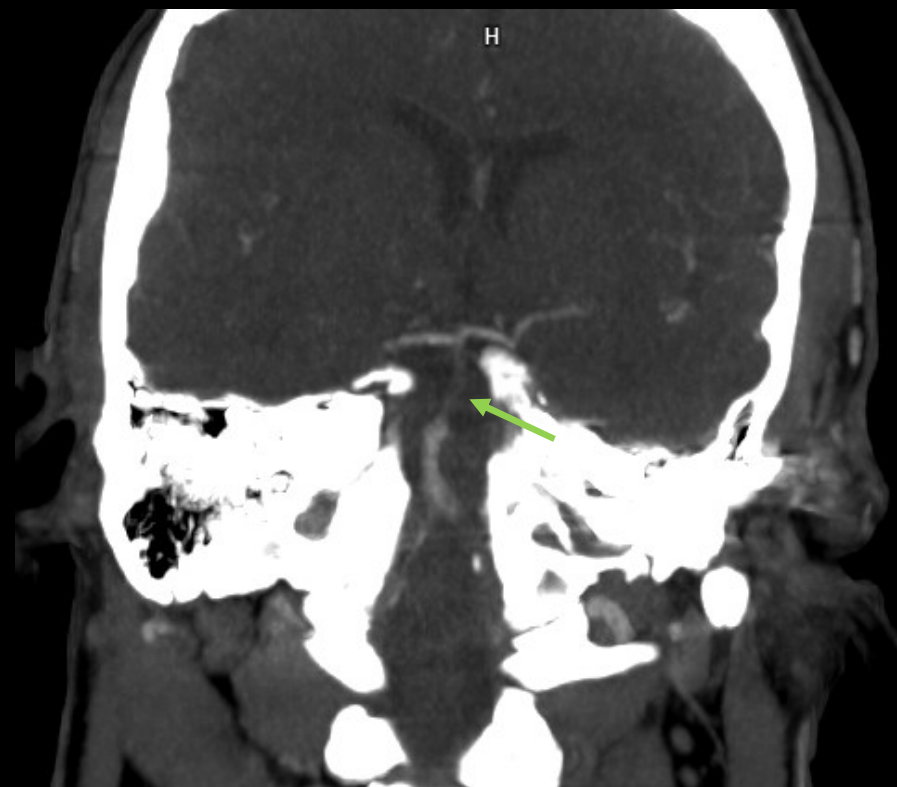
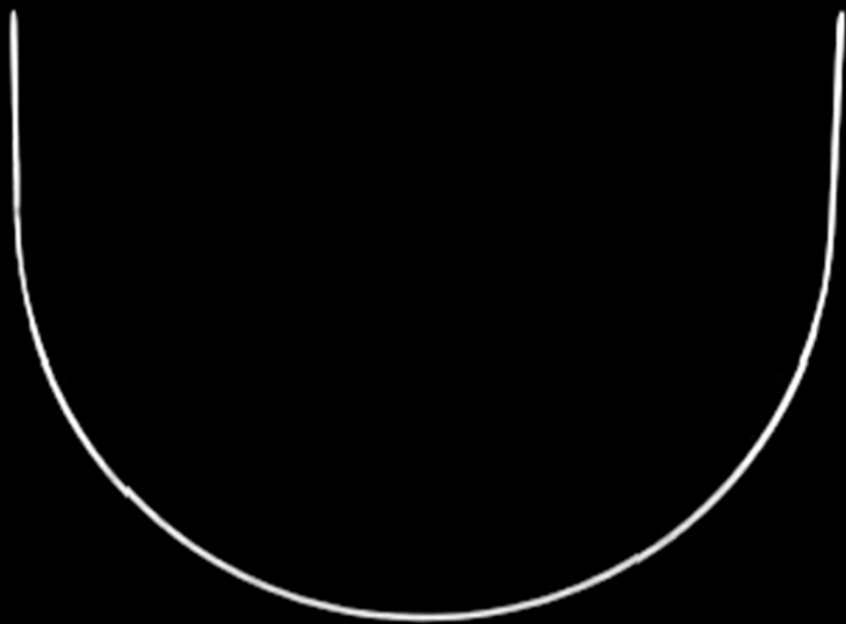
**DWIE PEŁNE WARSTY W MOŚCIE LUB ŚRÓDMÓZGOWIU NA MAPACH ADC**



## Podejście praktyczne -selekcja pacjentów krążenie tylne?

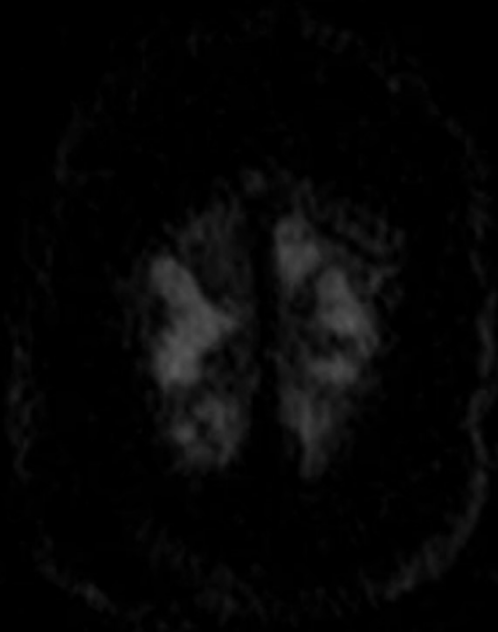


KRYTERIA WIĘKSZOŚCI NEURORADIOLOGÓW ZABIEGOWYCH-NIE LECZYĆ =  
DWIE PEŁNE WARSTY W MOŚCIE LUB ŚRÓDMÓZGOWIU NA MAPACH ADC

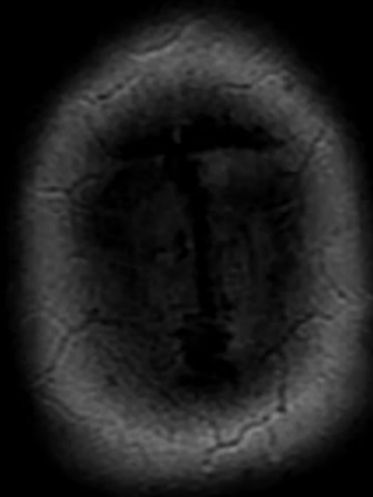


Mężczyzna, 51 lat. Wiotki cztero kończynowo. Zaintubowany. NIHSS >24. Czas >6h Przekazany do SPSK1 PUM z innego ośrodka.

AHL



AHL





RHP

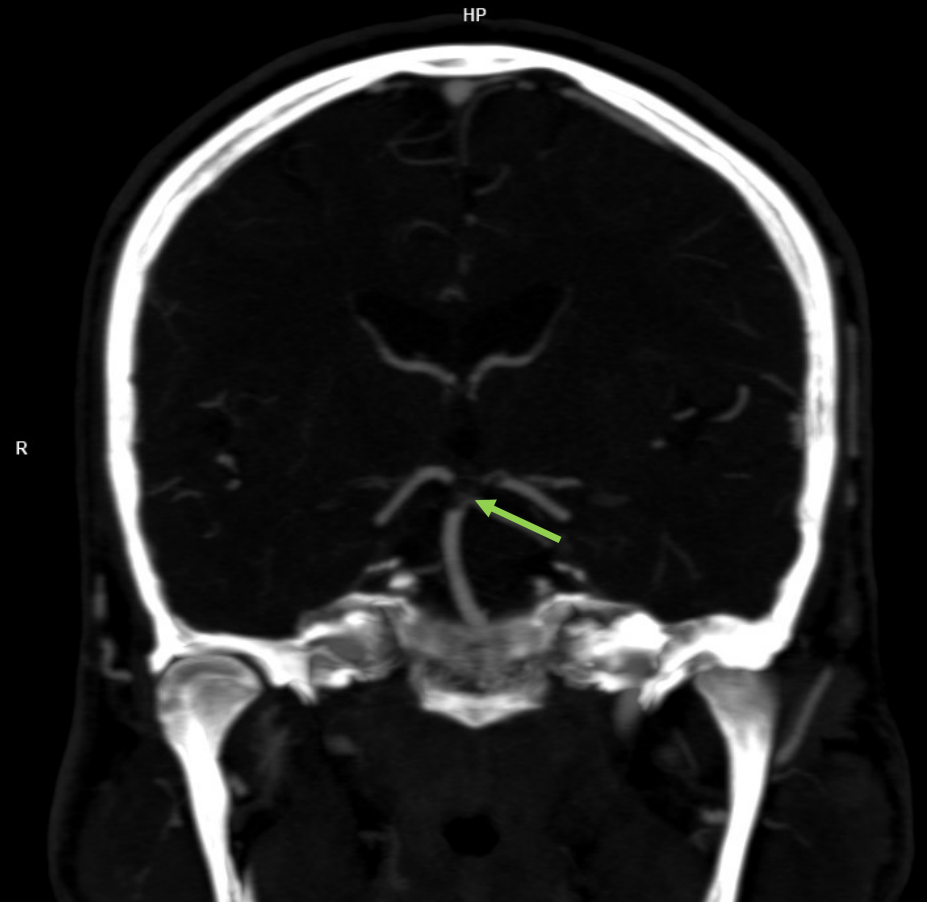
Kontrolna TK 24h po trombektomii.

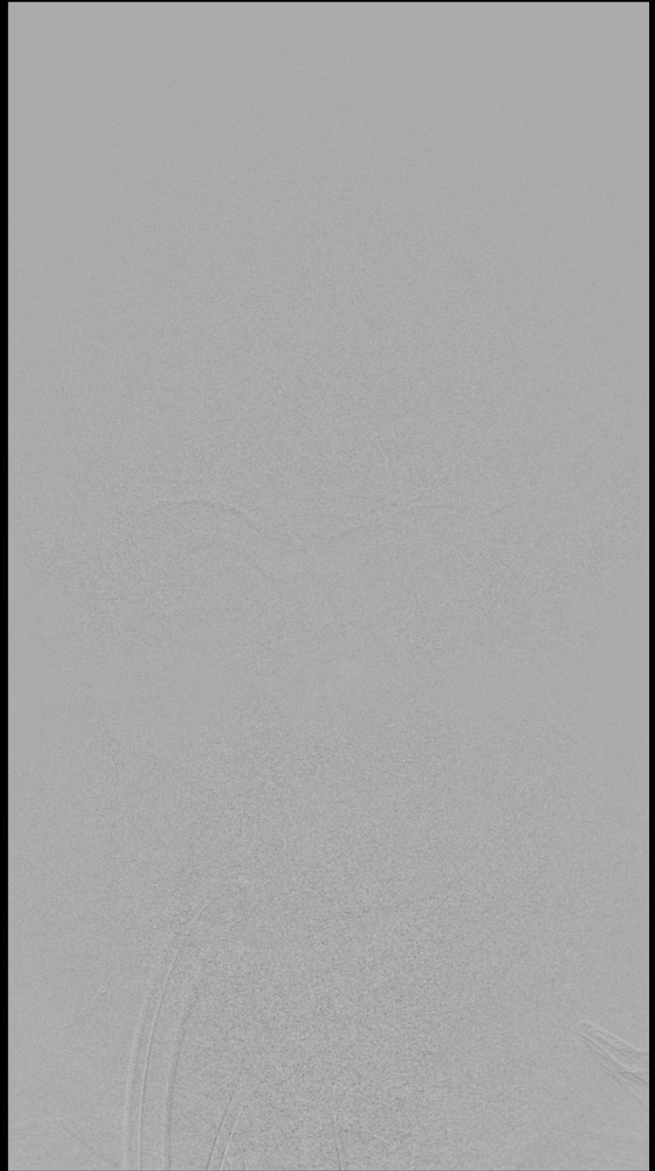
AH

RFA

Mężczyzna, 61 lat. Dyzartria. Niedowład połowiczny prawostronny. Zaburzenia gałkoruchowe.

AH





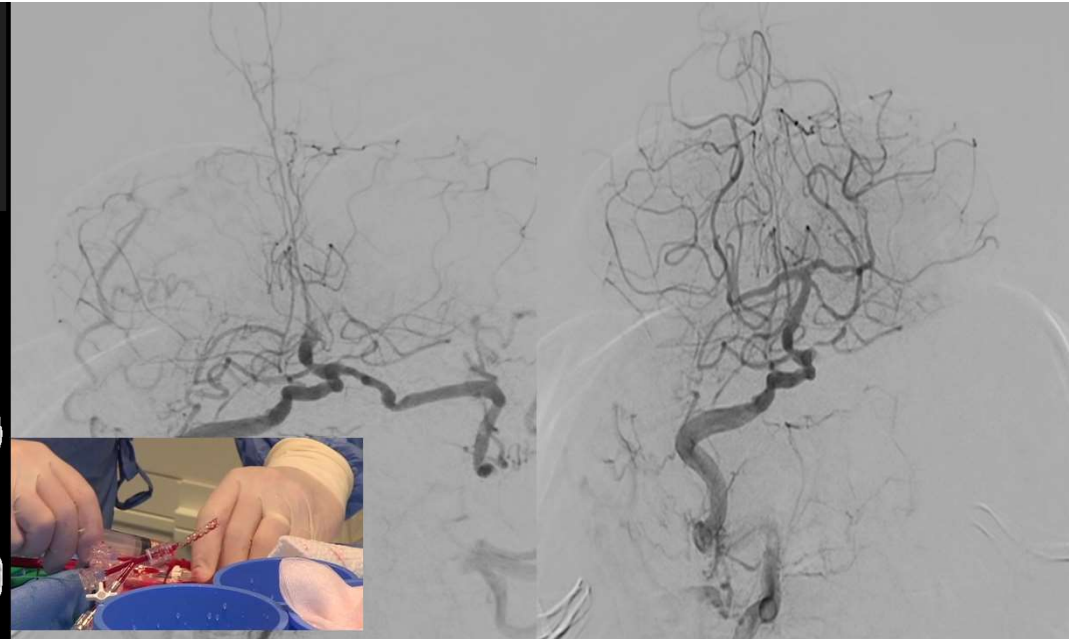
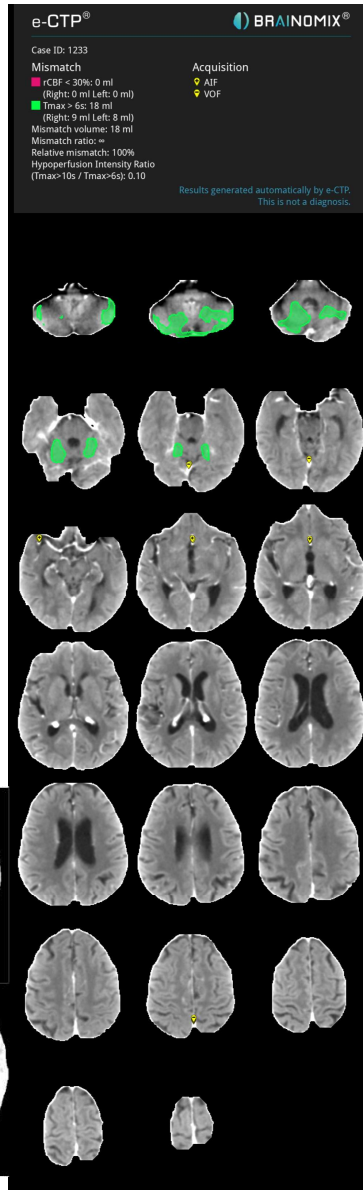
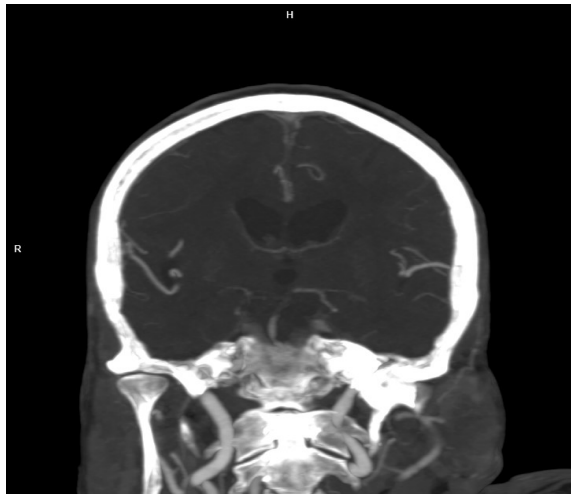


A

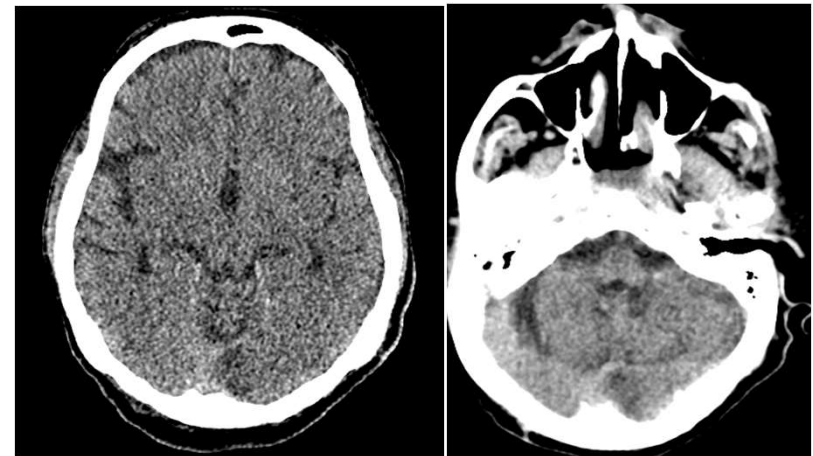
R

Kontrolna TK 24h po trombektomii.

L. 80 Rozbieżne ustawienie gałek ocznych, niedowład lewostronny, porażenie prawostronne, porażenie wyprostne, deficyt poznawczy z wywiadu



Kontrola w opcji Dual Energy-deficyt poznawczy



Które badanie kliniczne pozwala u części pacjentów na przedłużenie okna czasowego trombektomi powyżej 6 godzin?

- A. ECASS 3 i DOWN, BAOUCHE
- B. DEFUSE 3 i DOWN, BAOUCHE
- C. MR CLEAN
- D. HERMES i MARS
- E. ESCAPE 3 i OPTIMUS PRIME

Wielokrotny wybór (prawidłowa odpowiedź jedna, kilka lub wszystkie)

Które badanie kliniczne pozwala u części pacjentów na przedłużenie okna czasowego trombektomi powyżej 6 godzin?

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