Vall d'Hebron Hospital

DIRECTO A SALA

Experiencia HUVH

START PRESENTATION

Alejandro Tomasello

NRI Hospital Vall d`Hebron

1.

Time Is Brain—Quantified

Jeffrey L. Saver, MD

Background and Purpose—The phrase "time is brain" emphasizes that human nervous tissue is rapidly lost as stroke progresses and emergent evaluation and therapy are required. Recent advances in quantitative neurostereology and

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

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

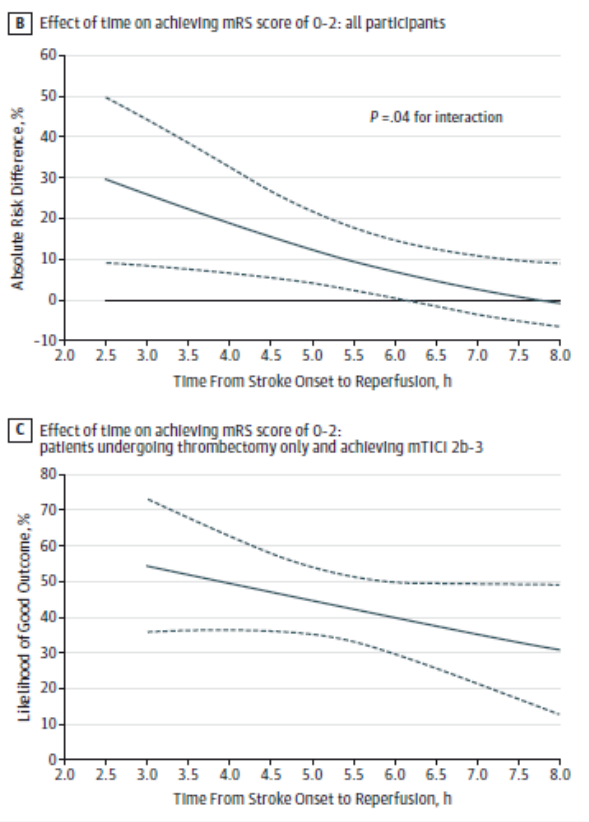
TIEMPO | ESCENARIO | PACIENTES | DIRECTO A SALA | PROS Y CONTRAS

1.

Time to Reperfusion and Treatment Effect for Acute Ischemic Stroke
A Randomized Clinical Trial

JAMA Neurol. doi:10.1001/jamaneurol.2015.3886
Published online December 21, 2015.

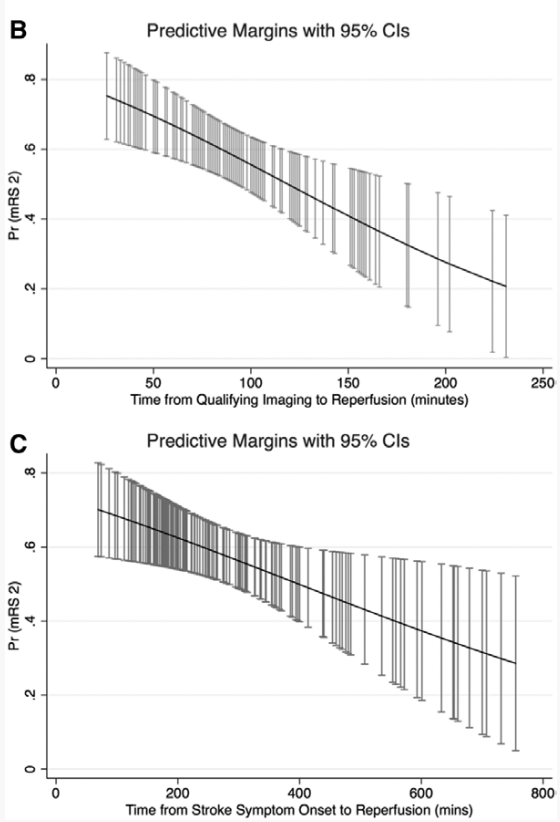
MR CLEAN



Analysis of Workflow and Time to Treatment on Thrombectomy Outcome in the Endovascular Treatment for Small Core and Proximal Occlusion Ischemic Stroke (ESCAPE) Randomized, Controlled Trial

Circulation June 7, 2016

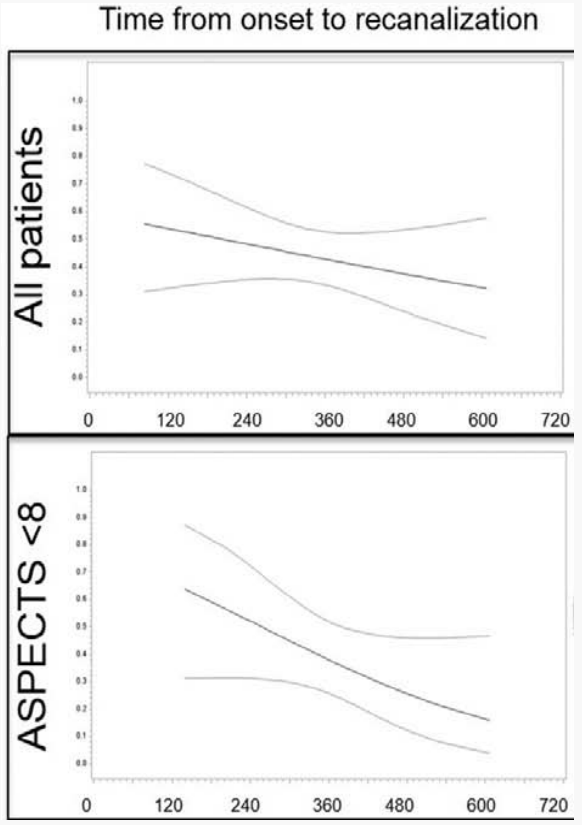
ESCAPE



Association Between Time to Reperfusion and Outcome Is Primarily Driven by the Time From Imaging to Reperfusion

Stroke. 2016;47:999-1004.

REVASCAT



TIEMPO ESCENARIO PACIENTES DIRECTO A SALA PROS Y CONTRAS

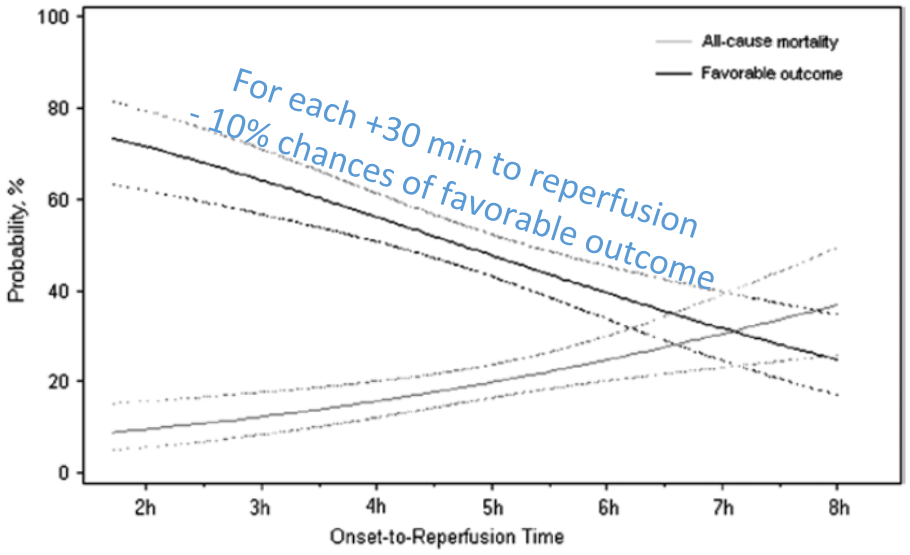
1.

Impact of Onset-to-Reperfusion Time on Stroke Mortality
A Collaborative Pooled Analysis

Mikael Mazighi, MD, PhD; Saqib A. Chaudhry, MD; Marc Ribo, MD; Pooja Khatri, MD, MSc; David Skoloudik, MD; Maxim Mokin, MD; Julien Labreuche, BST; Elena Meseguer, MD; Sharon D. Yeatts, PhD; Adnan H. Siddiqui, MD; Joseph Broderick, MD; Carlos A. Molina, MD; Adnan I. Qureshi, MD; Pierre Amarenco, MD

(*Circulation.* 2013;127:1980-1985.)

480 patients with endovascular treatment & known time of reperfusion

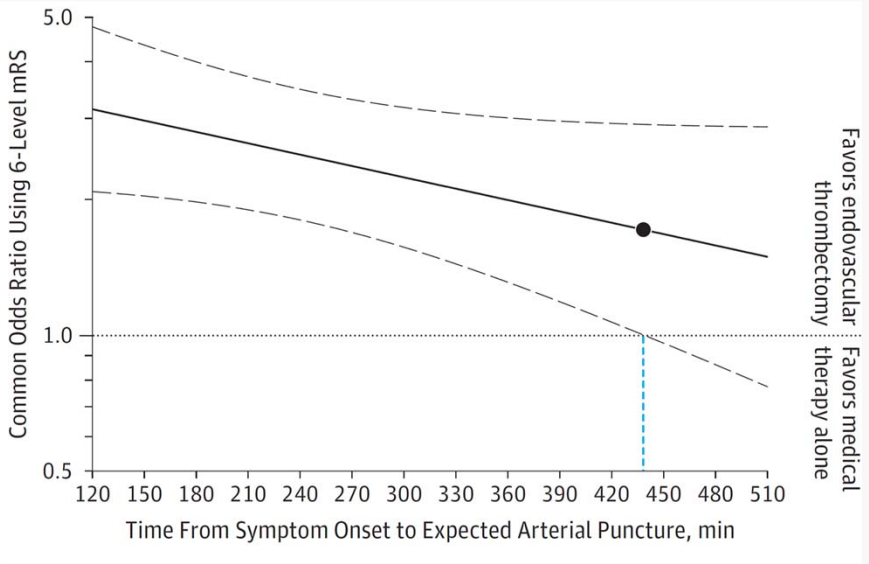


JAMA | Original Investigation

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

Jeffrey L. Saver, MD; Mayank Goyal, MD; Aad van der Lugt, MD; Bijoy K. Menon, MD; Charles B. L. M. Majoie, MD; Diederik W. Dippel, MD; Bruce C. Campbell, MD, PhD; Raul G. Nogueira, MD; Andrew M. Demchuk, MD; Alejandro Tomasello, MD; Pere Cardona, MD; Thomas G. Devlin, MD; Donald F. Frei, MD; Richard du Mesnil de Rochemont, MD; Olvert A. Berkhemer, MD; Tudor G. Jovin, MD; Adnan H. Siddiqui, MD, PhD; Wim H. van Zwam, MD; Stephen M. Davis, MD; Carlos Castaño, MD; Biggya L. Sapkota, MD; Puck S. Fransen, MD; Carlos Molina, MD; Robert J. van Oostenbrugge, MD; Ángel Chamorro, MD; Hester Lingsma, PhD; Frank L. Silver, MD; Geoffrey A. Donnan, MD; Ashfaq Shuaib, MD; Scott Brown, PhD; Bruce Stouch, PhD; Peter J. Mitchell, MD; Antoni Davalos, MD; Yvo B. W. E. M. Roos, MD; Michael D. Hill, MD, MS; for the HERMES Collaborators

JAMA. 2016;316(12):1279-1288. doi:10.1001/jama.2016.13647



1.

AHA/ASA Scientific Statement

Metrics for Measuring Quality of Care in Comprehensive Stroke Centers: Detailed Follow-Up to Brain Attack Coalition Comprehensive Stroke Center Recommendations

A Statement for Healthcare Professionals From the American Heart Association/American Stroke Association (*Stroke*. 2011;42:849-877.)

Endorsed by the Society of Vascular and Interventional Neurology

Metric 6
Median time from arrival to start of treatment for acute ischemic stroke patients undergoing an endovascular intervention.

minutes,[61] we encourage CSCs to at least aim for a goal of 2 hours, given that stroke patients need to undergo imaging before any endovascular procedure.

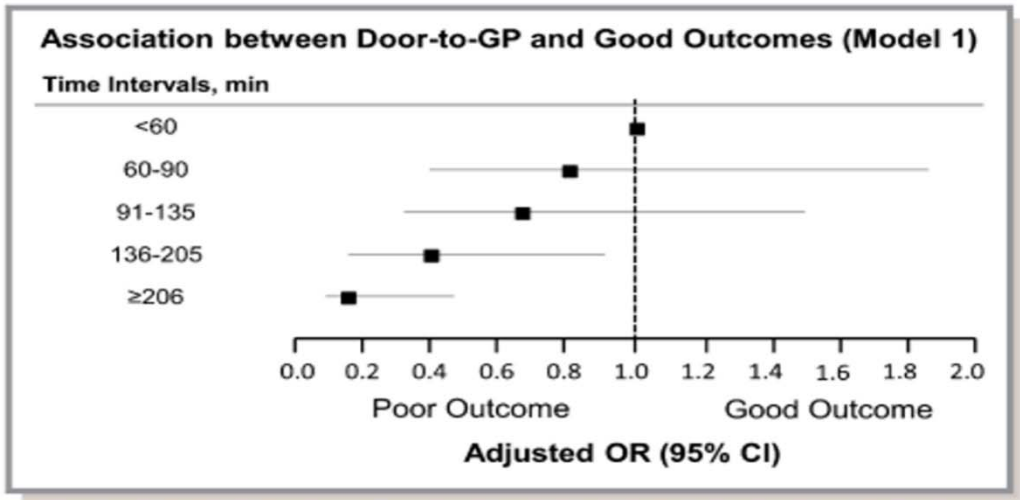
1.

Door-to-Puncture: A Practical Metric for Capturing and Enhancing System Processes Associated With Endovascular Stroke Care, Preliminary Results From the Rapid Reperfusion Registry

Chung-Huan J. Sun, BS; Marc Ribo, MD; Mayank Goyal, MD, FRCPC; Albert J. Yoo, MD; Tudor Jovin, MD; Carolyn A. Cronin, MD, PhD; Osama Zaidat, MD, MS; Raul Nogueira, MD; Thanh Nguyen, MD; M. Shazam Hussain, MD; Bijoy K. Menon, MD; Brijesh Mehta, MD; Gaurav Jindal, MD; Anat Horev, MD; Alexander Norbash, MD; Thabele Leslie-Mazwi, MD; Dolora Wisco, MD; Rishi Gupta, MD, MBA, FANA

J Am Heart Assoc. 2014;3:e000859

	Study Site 1	Study Site 2	Study Site 3	Study Site 4	Study Site 5	Study Site 6	Other Sites (7 to 9)
Door-to-GP, median (IQR)	75 (50 to 128)	164 (129 to 233)	84 (59 to 104)	90 (37 to 120)	259 (213 to 311)	214 (105 to 251)	200 (146 to 221)



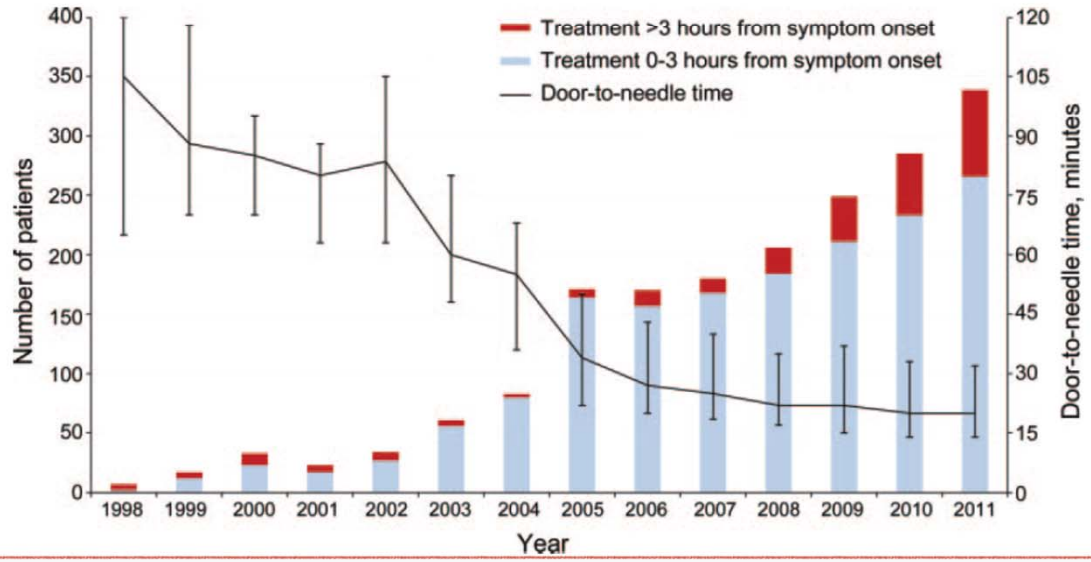
1.

Reducing in-hospital delay to 20 minutes in stroke thrombolysis

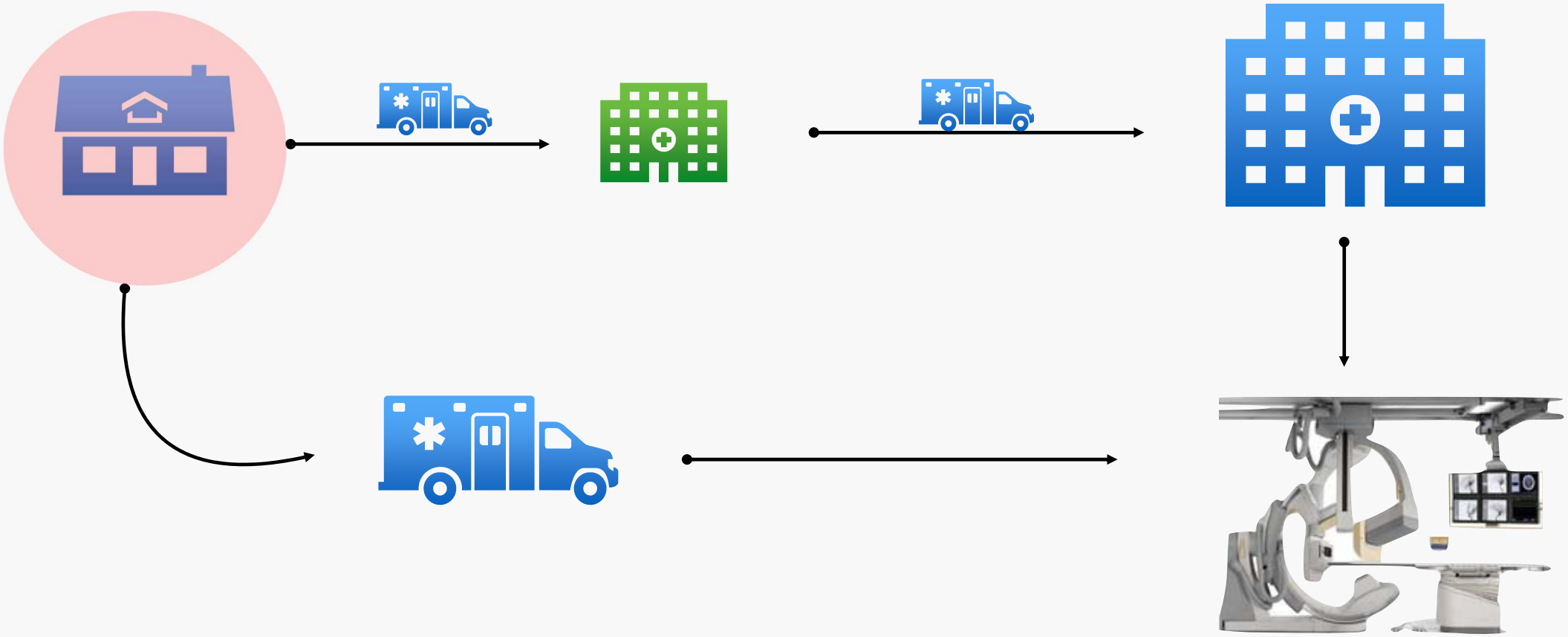
Atte Meretoja, MD, PhD, MSc (StrokeMed)
Daniel Strbian, MD, PhD
Satu Mustanoja, MD, PhD, MSc (StrokeMed)
Turgut Tatlisumak, MD, PhD
Perttu J. Lindsberg, MD, PhD
Markku Kaste, MD, PhD

Neurology® 2012;79:306-313

Figure 1 Number of annually treated patients and median door-to-needle times



2. DIFERENTES FORMAS DE TRASLADOS



2.

Design and Validation of a Prehospital Stroke Scale to Predict Large Arterial Occlusion

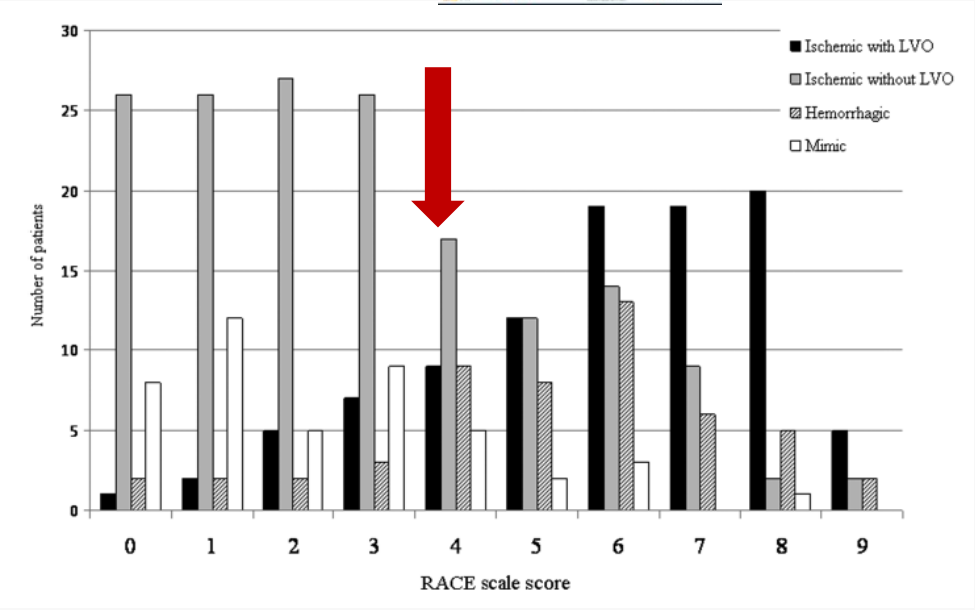
The Rapid Arterial Occlusion Evaluation Scale

Natalia Pérez de la Ossa, MD, PhD; David Carrera, MD; Montse Gorchs, BD; Marisol Querol, BD; Mònica Millán, MD, PhD; Meritxell Gomis, MD, PhD; Laura Dorado, MD, PhD; Elena López-Cancio, MD, PhD; María Hernández-Pérez, MD; Vicente Chicharro, MD; Xavier Escalada, MD; Xavier Jiménez, MD, PhD; Antoni Dávalos, MD, PhD

Table 3. Sensitivity, Specificity, PPV, NPV, and Overall Accuracy of Different Cutoff Values of the RACE Scale for the Detection of Large Artery Occlusion

RACE Score	No.	Sensitivity	Specificity	PPV	NPV	Accuracy
≥1	320	1.00	0.13	0.24	1.00	0.31
≥2	278	0.97	0.27	0.27	0.97	0.42
≥3	239	0.93	0.40	0.30	0.96	0.51
≥4	194	0.89	0.55	0.35	0.95	0.62
≥5	154	0.85	0.68	0.42	0.94	0.72
≥6	120	0.72	0.77	0.46	0.91	0.76
≥7	71	0.53	0.89	0.56	0.87	0.81
≥8	37	0.32	0.95	0.65	0.84	0.82
9	9	0.07	0.99	0.56	0.79	0.79

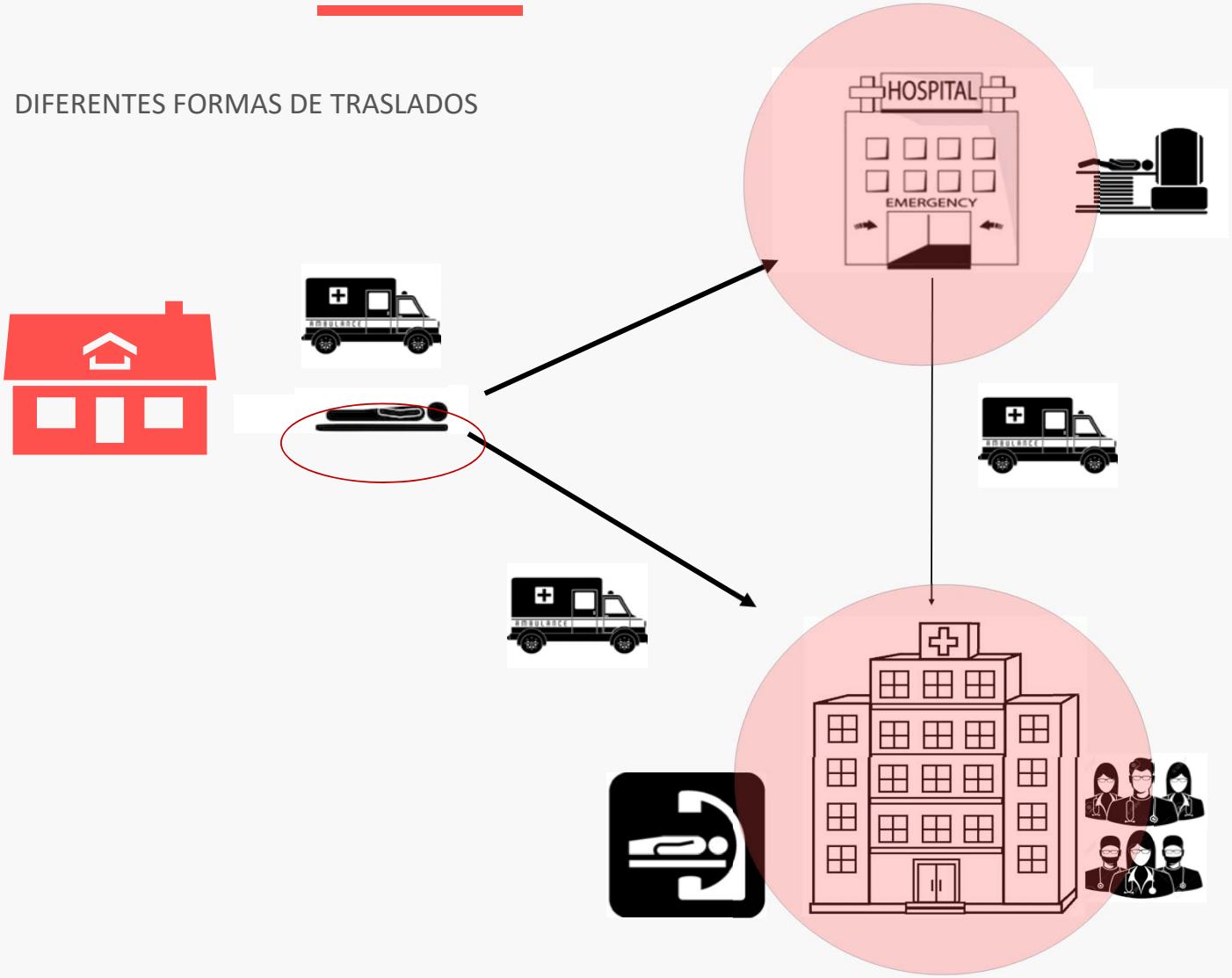
Stroke. 2014;45:87-91.



TIEMPO | ESCENARIO | PACIENTES | DIRECTO A SALA | PROS Y CONTRAS

2.

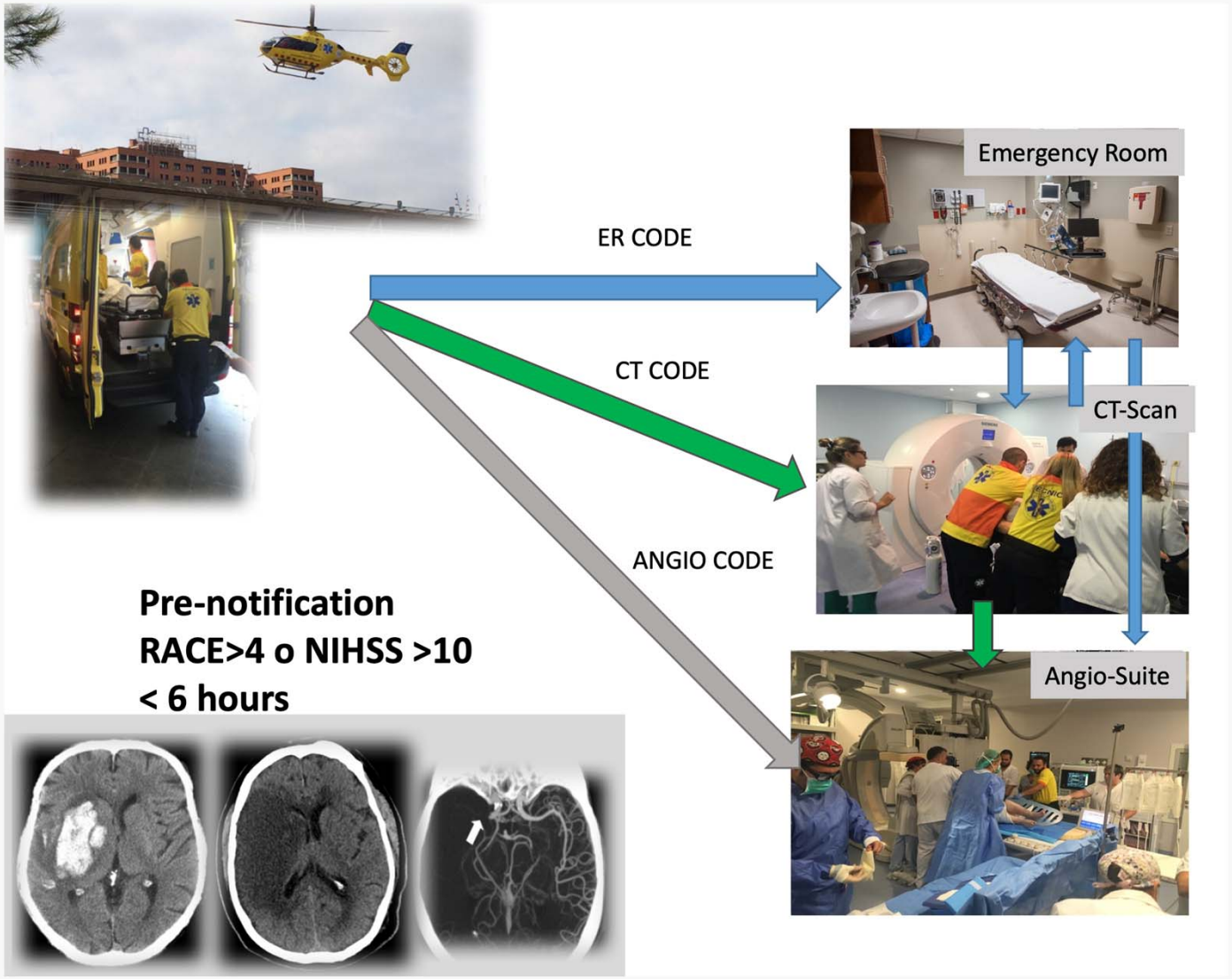
DIFERENTES FORMAS DE TRASLADOS



DEFINIR LOS PACIENTES A LOS CUALES NO REPETIREMOS LAS IMÁGENES !!

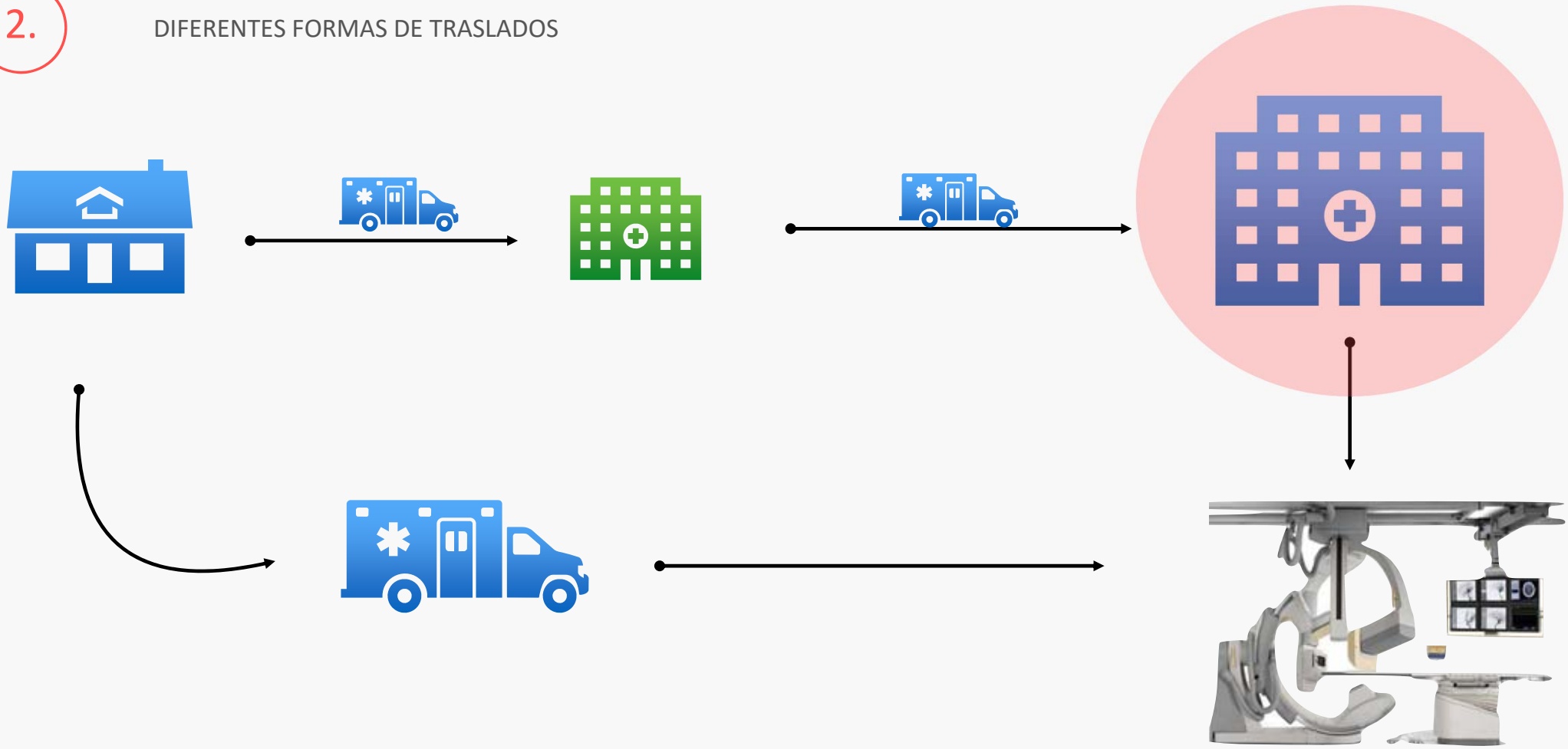
DEFINIR LOS PACIENTES LOS CUALES SERÁN ELEGIBLES PARA DIRECTO A SALA

2.


Emergency Room
ER CODE
CT CODE
CT-Scan
ANGIO CODE
Angio-Suite
Pre-notification
RACE>4 o NIHSS >10
< 6 hours

2.

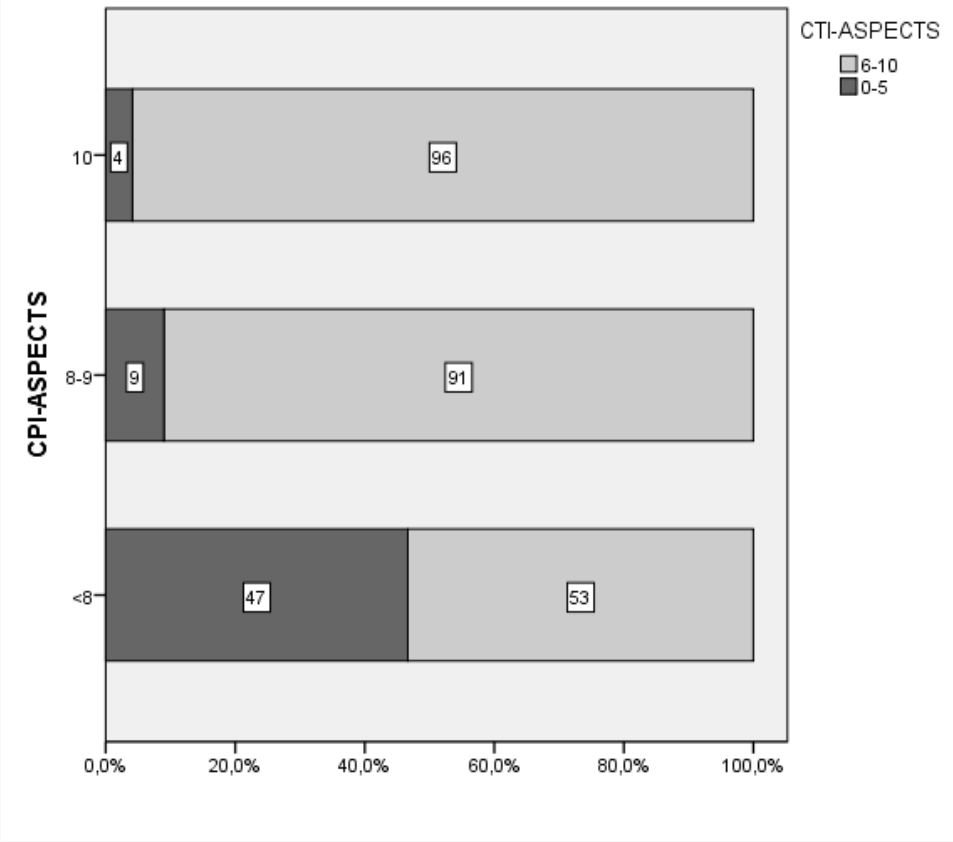
DIFERENTES FORMAS DE TRASLADOS

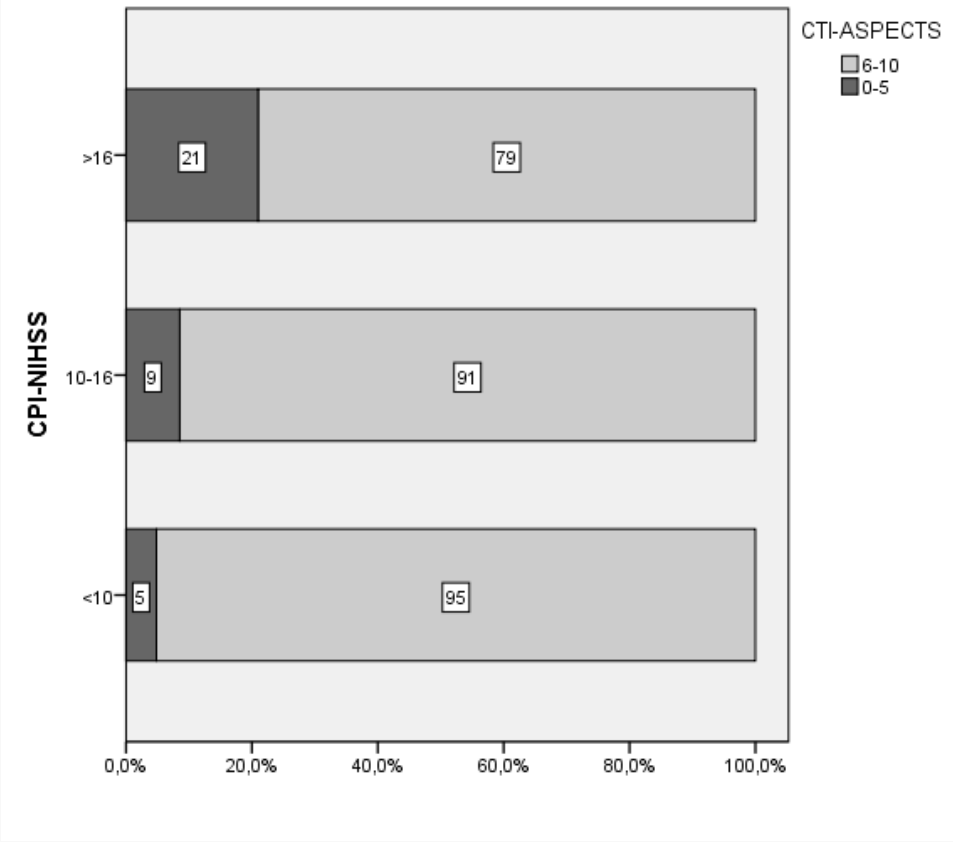


3.

Clinical and neuroimaging criteria to improve the workflow in transfers for endovascular treatment evaluation

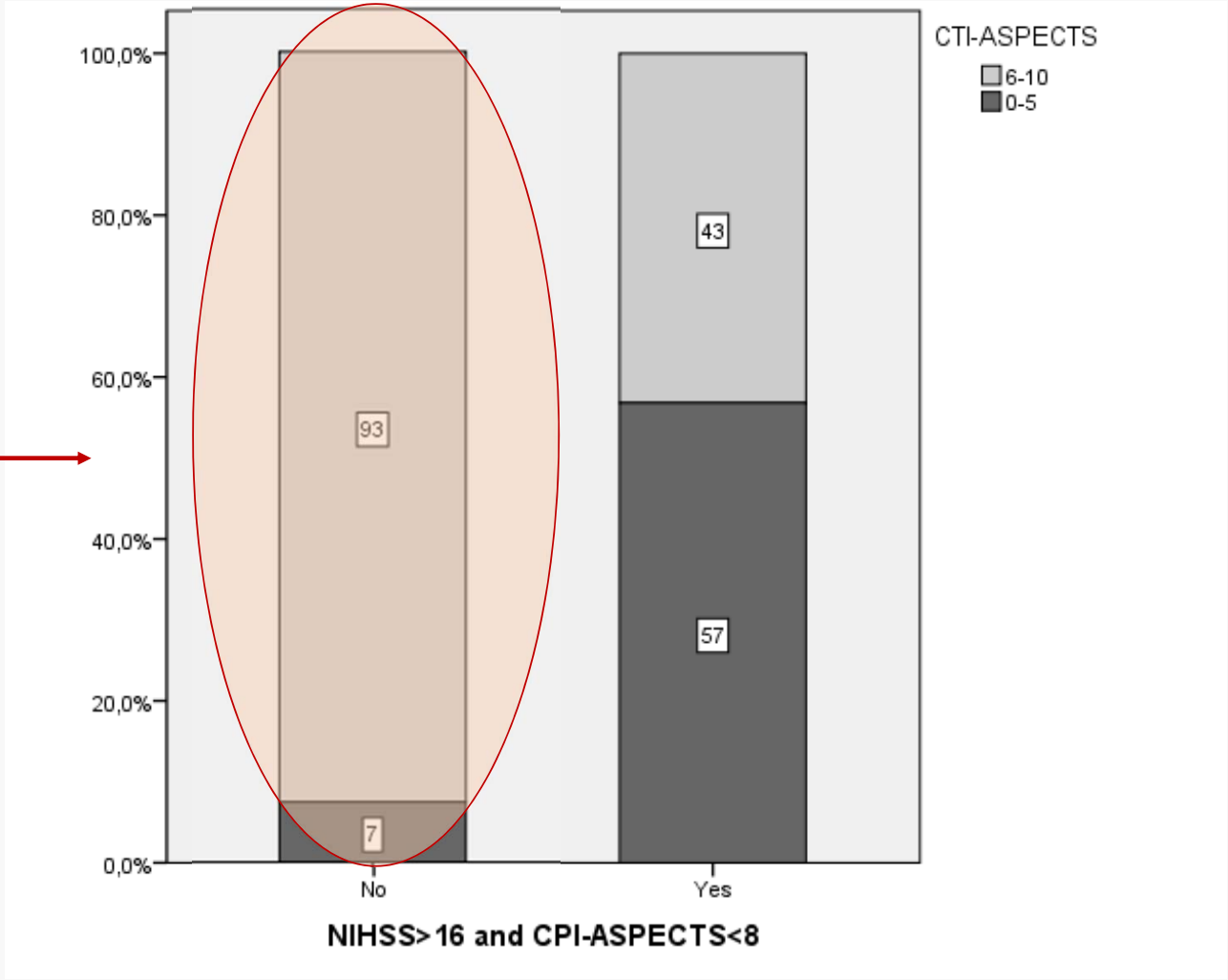
Manuel Requena[1,2], Marta Olivé-Gadea[1], Sandra Boned[1,2], Anna Ramos[3], Pere Cardona[4], Xabier Urra[5], Joaquín Serena[6], Yolanda Silva[6], Francisco Purroy[7], Xavier Ustrell[8], Sonia Abilleira[9], Alejandro Tomasello[10], Natalia Perez de la Ossa[3], Carlos A Molina[1,2], Marc Ribo[1,2] and Marta Rubiera[1,2]; for the Catalan Stroke Code and Reperfusion Consortium (Cat-SCR)





3.


KEEP
CALM
AND
DON'T
REPEAT


CTI-ASPECTS
6-10
0-5
100,0%
80,0%
60,0%
40,0%
20,0%
0,0%
93
7
43
57
No
Yes
NIHSS>16 and CPI-ASPECTS<8

3.

JAMA Neurology | Original Investigation

Clinical Imaging Factors Associated With Infarct Progression in Patients With Ischemic Stroke During Transfer for Mechanical Thrombectomy

Table 2. Multivariable Analysis of Variables Associated With Increasing Odds of ASPECTS Decay

Variable[a]	OR (95% CI)	*P* Value
Age[b]	1.00 (0.97-1.03)	.84
Female	1.75 (0.74-4.23)	.20
RH NIHSS[b]	1.14 (1.06-1.22)	<.001
Initial ASPECTS[b]	0.29 (0.19-0.42)	<.001
RH dense vessel sign		
None	1 [Reference]	NA
Proximal	4.08 (1.70-10.23)	<.001
Interval time, h[b]	1.09 (0.98-1.19)	.100

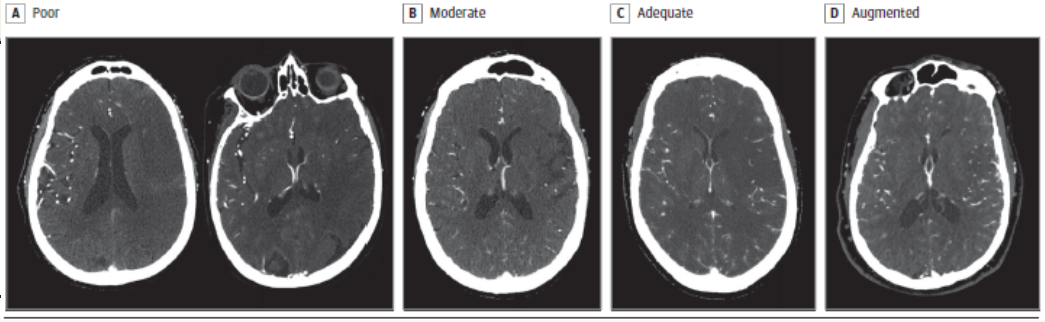
Abbreviations: ASPECTS, Alberta Stroke Program Early CT Score; NA, not applicable; NIHSS, National Institutes of Health Stroke Score; OR, odds ratio; RH, referring hospital.

[a] Only variables available at the RH were included.

[b] Per unit change in variable.

Table 3. Multivariable Analysis of Variables Associated With Increasing Odds of ASPECTS Decay

Variable[a]	OR (95% CI)	*P* Value
Age[b]	0.98 (0.95-1.01)	.27
Female	1.55 (0.65-3.73)	.32
RH NIHSS[b]	1.13 (1.05-1.22)	<.001
Initial ASPECTS[b]	0.33 (0.21-0.47)	<.001
TCSC CTA occlusion		
Not proximal	1 [Reference]	NA
Proximal	2.04 (0.83-5.18)	.12
No or poor collateral blood flow at the TCSC	5.14 (2.20-12.70)	<.001
Interval time, h[b]	1.05 (0.96-1.16)	.24

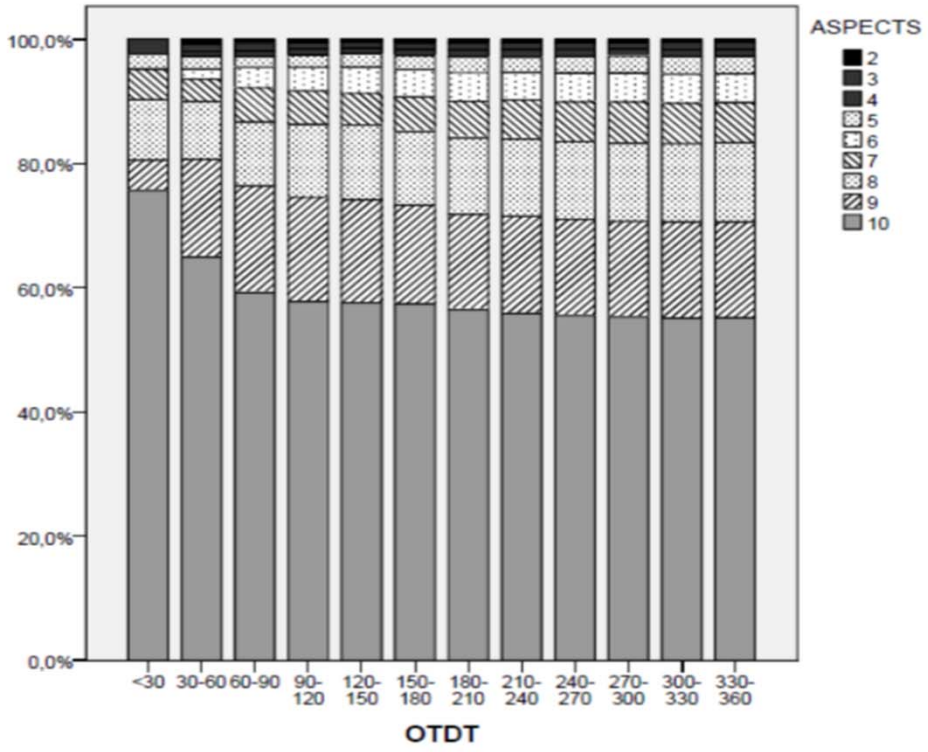


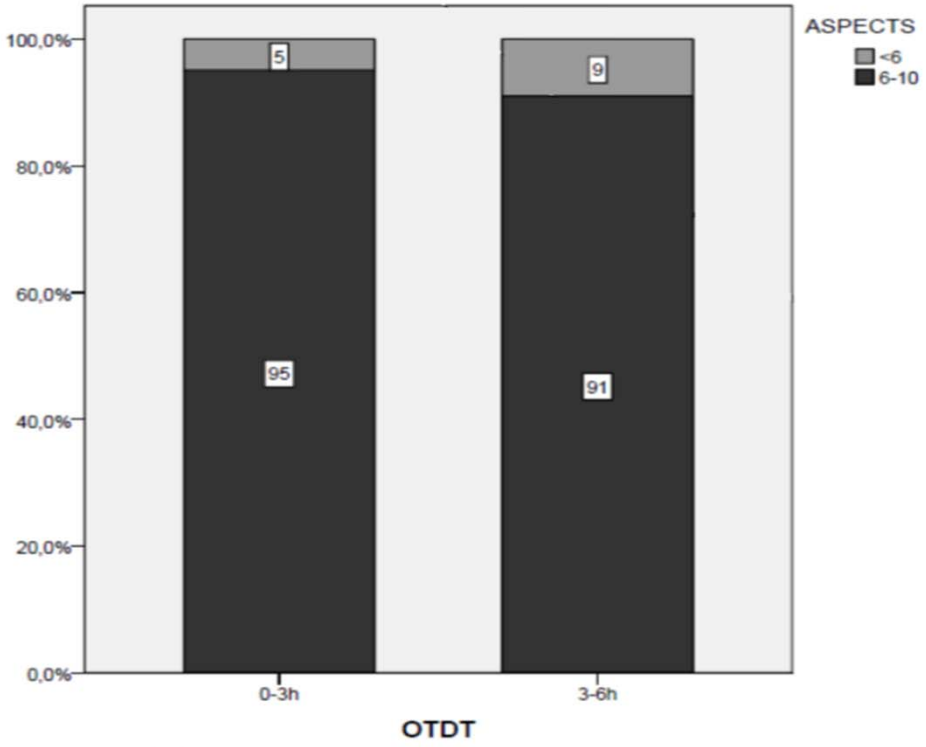
3.

Predictors of Endovascular Treatment Among Stroke Codes Activated Within 6 Hours From Symptom Onset

Manuel Requena, MD; Natalia Pérez de la Ossa, MD, PhD; Sonia Abilleira, MD, PhD; Pere Cardona, MD; Xabier Urra, MD, PhD; Joan Martí-Fabregas, MD, PhD; Anna Rodríguez-Campello, MD; Sandra Boned, MD; Marta Rubiera, MD, PhD; Alejandro Tomasello, MD; Carlos A. Molina, MD, PhD; Marc Ribo, MD, PhD; for Catalan Stroke Code and Reperfusion Consortium

2778 Stroke codes admitted in 5 CSC 0 - 6 hours





4.

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

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

(*Stroke*. 2017;48:1884-1889.

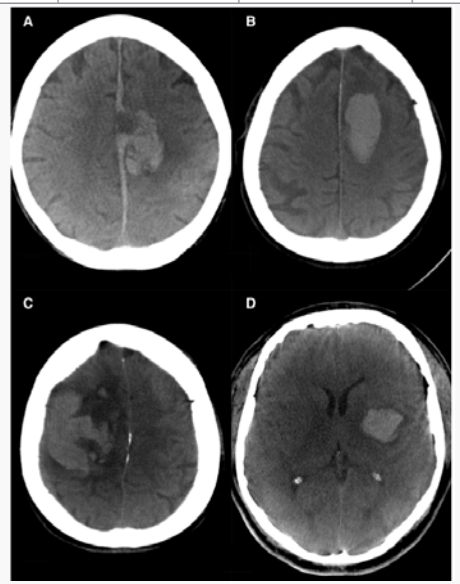
Variable	Transfer Location		*P* Value
	ED (n=150)	DAN (n=111)	
Door to angiosuite	67 (34–72)	10 (3–6)	0.001*
Door to puncture	81 (46–91)	22 (12–25)	0.001*
Door to recanalization	125 (81–146)	66 (39–84)	0.001*
Angiosuite to access	13 (8–17)	12 (8–14)	0.177
Access to recanalization	44 (27–53)	43 (20–61)	0.883
Angiosuite to recanalization	57 (37–74)	56 (29–73)	0.548
LSW to recanalization	429 (258–468)	348 (221–394)	0.052

One-Stop Management of Acute Stroke Patients
Minimizing Door-to-Reperfusion Times

Marios-Nikos Psychogios, MD, PD; Daniel Behme, MD; Katharina Schregel, MD; Ioannis Tsogkas, MD; Ilko L. Maier, MD; Johanna Rosemarie Leyhe, MS; Antonia Zapf, PD; Julia Tran, MS; Mathias Bähr, MD; Jan Liman, MD, PD*; Michael Knauth, MD*

(*Stroke*. 2017;48:3152-3155.

of the control group, we observed a significant reduction of door-to-groin times after introduction of the one-stop management (54.5 minutes [95% confidence interval, 47–61] versus 20.5 minutes [95% confidence interval, 17–26);



4.

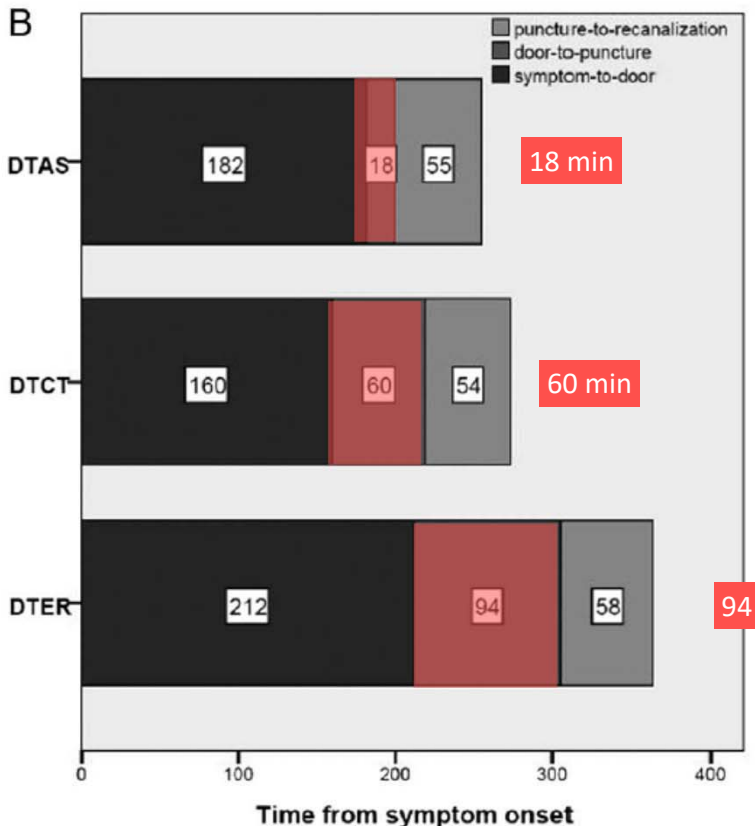
Ischemic stroke

ORIGINAL RESEARCH

J NeuroIntervent Surg 2017

Direct transfer to angiosuite to reduce door-to-puncture time in thrombectomy for acute stroke

Marc Ribo,[1,2] Sandra Boned,[1,2] Marta Rubiera,[1,2] Alejandro Tomasello,[3] Pilar Coscojuela,[3] David Hernández,[3] Jorge Pagola,[1,2] Jesús Juega,[1,2] Noelia Rodriguez,[1,2] Marian Muchada,[1,2] David Rodriguez-Luna,[1,2] Carlos A Molina[1,2]



18 min

60 min

94 min

Vall d'Hebron Hospital

4.

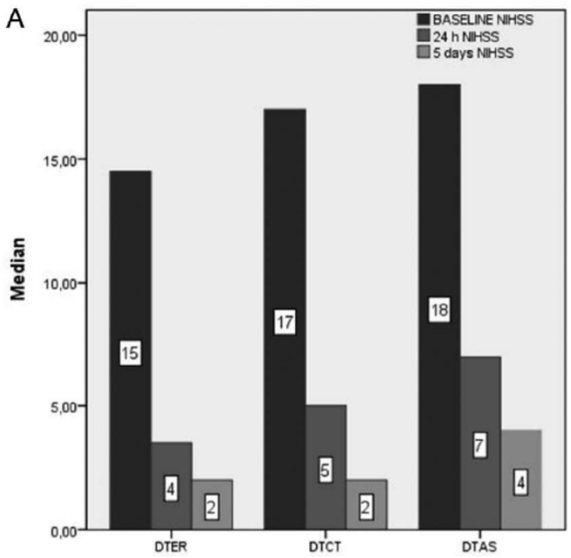
Ischemic stroke

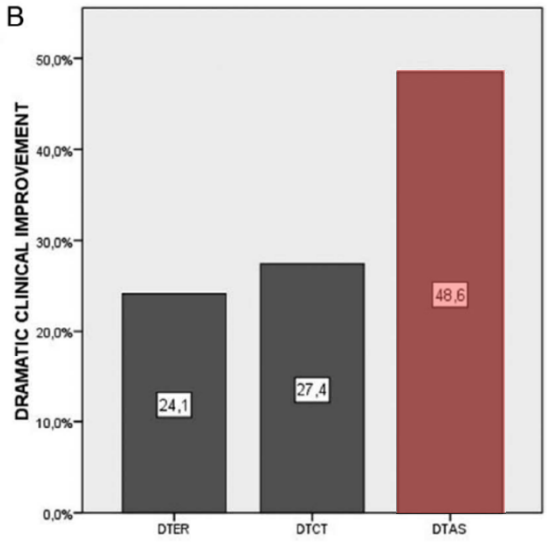
ORIGINAL RESEARCH

J NeuroIntervent Surg 2017

Direct transfer to angiosuite to reduce door-to-puncture time in thrombectomy for acute stroke

Vall d'Hebron Hospital





TIEMPO ESCENARIO PACIENTES DIRECTO A SALA PROS Y CONTRAS

4.

4,5 hrs 6 hrs

Pre-notification
RACE>4 y NIHSS >10
< 6 hours
Angio-suite and team available

4.

4.

INSIDE ANGIOSUITE STEPS

STEP 0

SUHODQJ IR

STEP 1

PRE_TC

STEP 2

SR VWbWF

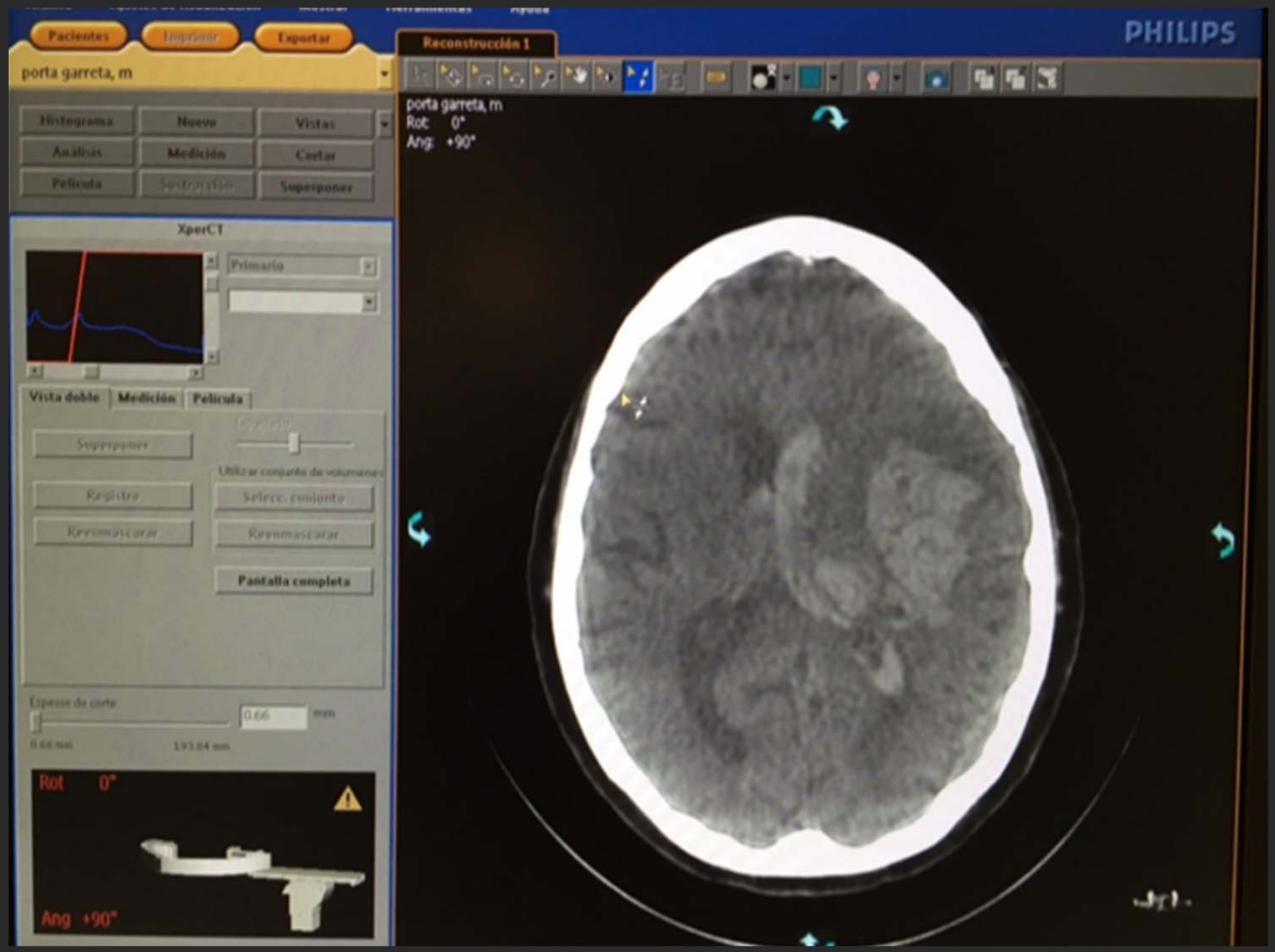
STEP 3

SUR FHGXUH

4.

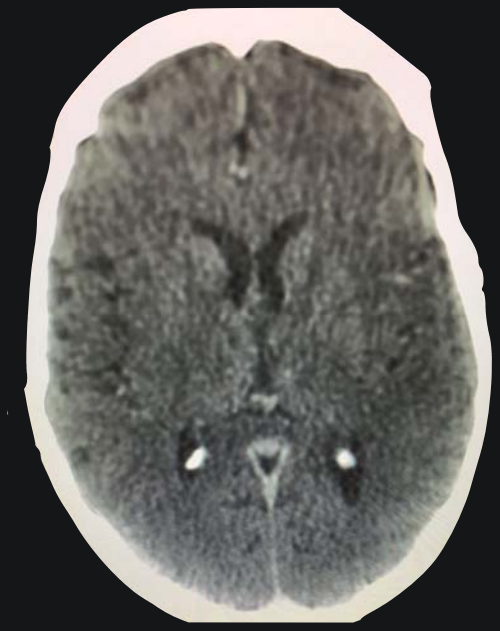
CONE-BEAM CT

- CALIBRACiÓN DIARIA
- CORRECTA POSICiÓN PACIENTE
- “IV CONTRASTE”

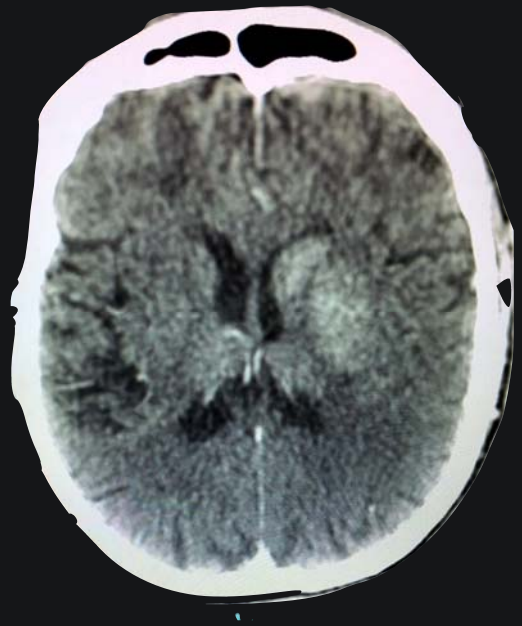


4.

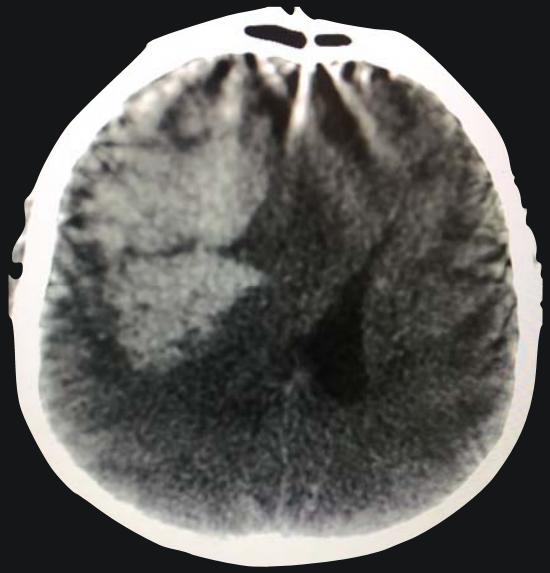
CONE-BEAM CT



PRE TREATMENT



HYPERDENSITY POST THROMBECTOMY



HAEMATOMA

TIEMPO ESCENARIO PACIENTES DIRECTO A SALA RESULTADOS Y CONTRAS

5.

Direct Transfer to Angio-Suite to Reduce Workflow Times and Increase Favorable Clinical Outcome

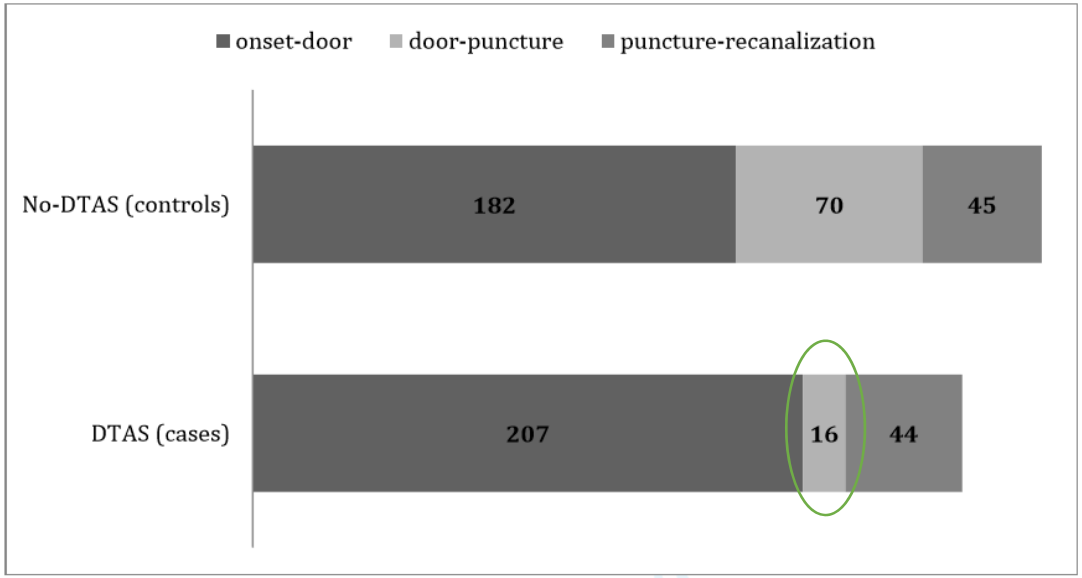
A Case-Control Study

Beatriz Mendez, MD; Manuel Requena, MD; Ana Aires, MD; Nuno Martins, MD; Sandra Boned, MD; Marta Rubiera, MD, PhD; Alejandro Tomasello, MD; Pilar Coscojuela, MD; Marián Muchada, MD, PhD; David Rodríguez-Luna, MD, PhD; Noelia Rodríguez-Villatoro, MD; Jesús Juega, MD; Jorge Pagola, MD, PhD; Carlos A. Molina, MD, PhD; Marc Ribó, MD, PhD

MATCHING VARIABLES

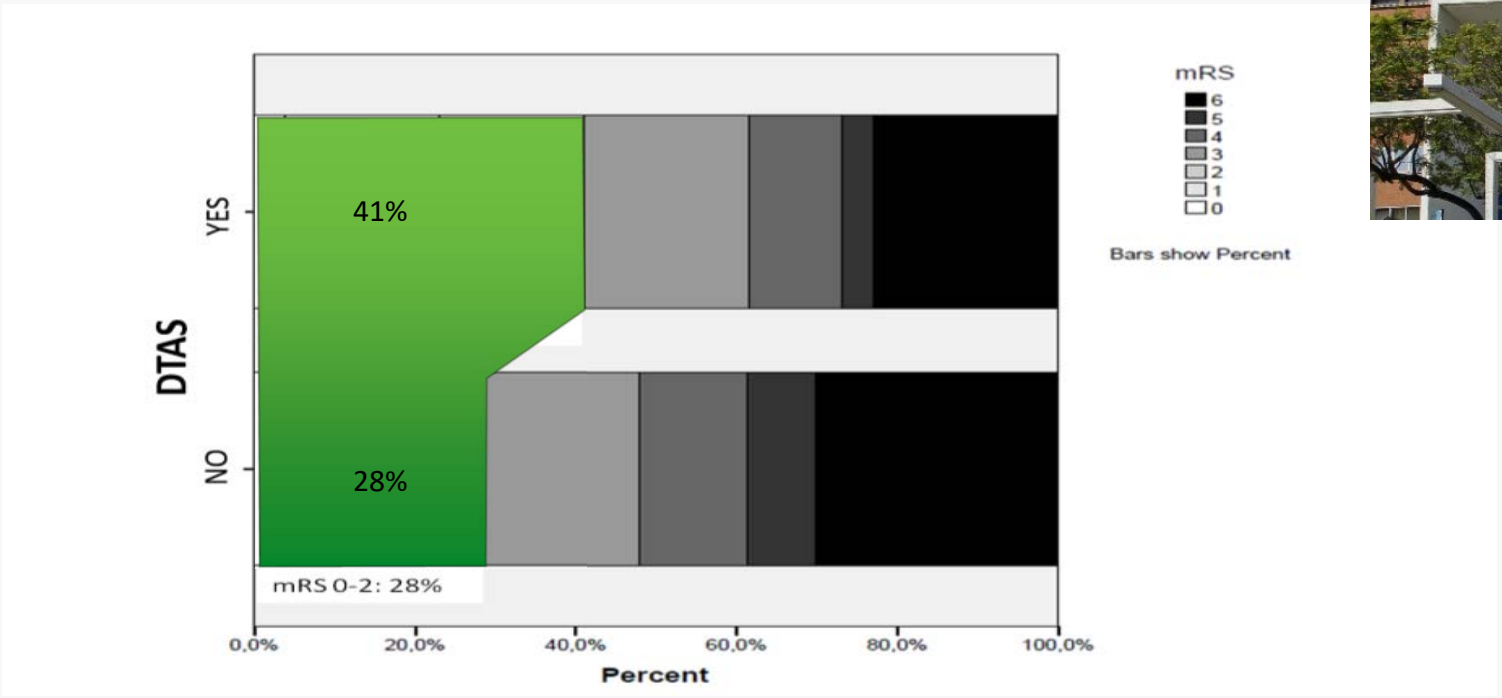
Variable	All Patients n=224	DTAS n=79	No DTAS n=145	p value
Sex (female %)	47.3	43.2	47.5	0.31
Age (years±SD)	74±11	73.8±11	74.5±12	0.37
Hypertension (%)	67.8	70.6	66.7	0.56
Diabetes mellitus (%)	21.3	19.1	22.2	0.6
Tobacco (%)	25.8	25	26.1	0.86
Atrial fibrillation (%)	32.7	22.4	22.9	0.94
Hyperlipidemia (%)	43.2	38.8	45.1	0.39
NIHSS admission, median (IQR)	18 (16-21)	18(15.75-21)	18(16-21)	0.83
Time from onset to door (minutes, median IQR)	192[121-255]	207[129-269]	182[112-247]	0.19
Occlusion location (%): Internal Carotid Artery M1-Middle Cerebral Artery M2-Middle Cerebral Artery Basilar	 26 49 22.1 2.9	 24.7 50.7 21.9 2.7	 26.7 48.1 22 3	0.89

5.



A logistic regression model adjusting for all matching variables (time from onset-to-arrival, LVO location, age, and baseline NIHSS) showed that DTAS protocol was independently associated with 3 months favorable outcome (odds ratio, 2.5; 95% CI, 1.2–5.3; *P*=0.01).

5.


DTAS
YES
NO
41%
28%
mRS 0-2: 28%
0,0%
20,0%
40,0%
60,0%
80,0%
100,0%
Percent
mRS
6
5
4
3
2
1
0
Bars show Percent


Vall d'Hebron


32
88
TaxSlayer
.com
Just Imagine
77

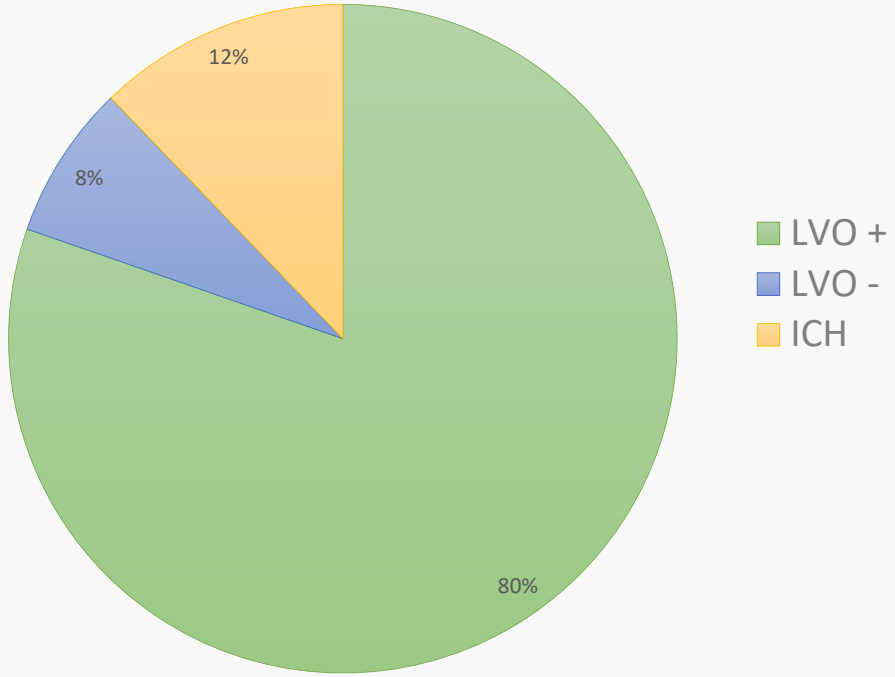
5. AUSENCIA DE OCLUSIÓN

Direct Transfer to Angio-Suite to Reduce Workflow Times and Increase Favorable Clinical Outcome

A Case-Control Study

Beatriz Mendez, MD; Manuel Requena, MD; Ana Aires, MD; Nuno Martins, MD; Sandra Boned, MD; Marta Rubiera, MD, PhD; Alejandro Tomasello, MD; Pilar Coscojuela, MD; Marián Muchada, MD, PhD; David Rodríguez-Luna, MD, PhD; Noelia Rodríguez-Villatoro, MD; Jesús Juega, MD; Jorge Pagola, MD, PhD; Carlos A. Molina, MD, PhD; Marc Ribó, MD, PhD

Stroke. 2018;49:00-00



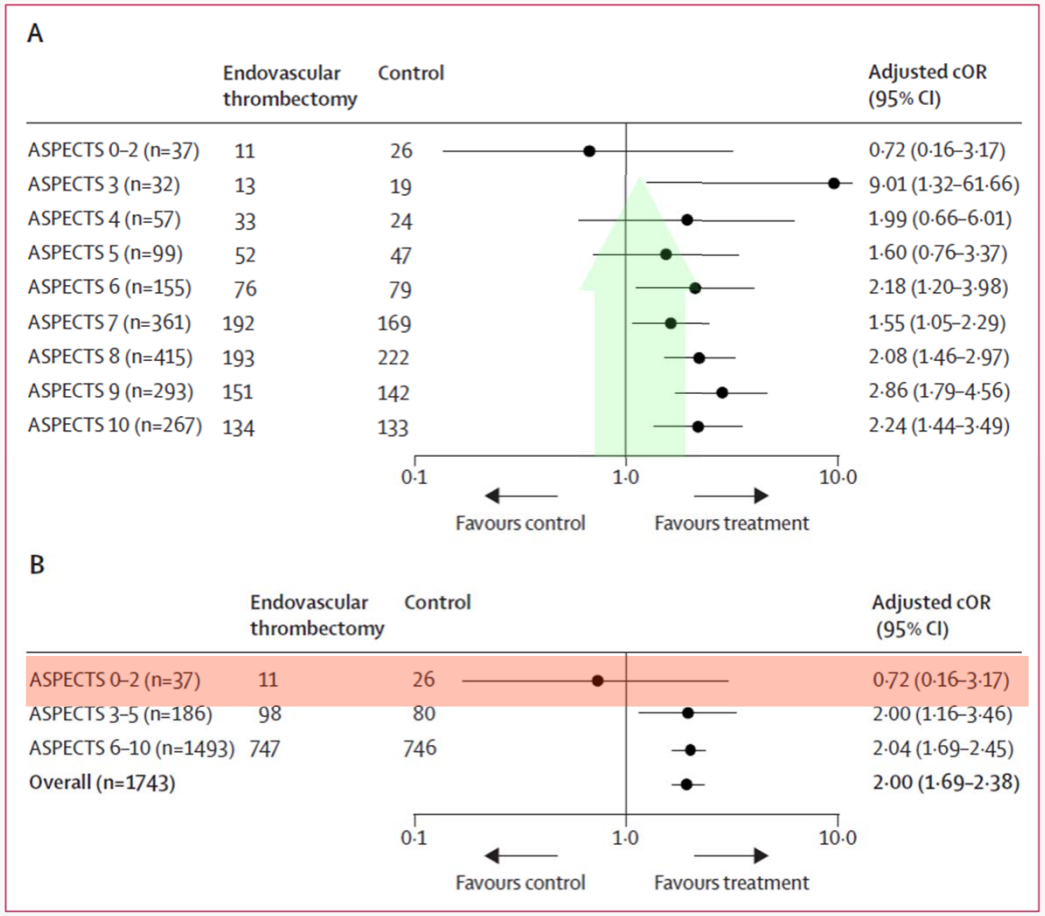
5.

ASPECTS BAJO

Imaging features and safety and efficacy of endovascular stroke treatment: a meta-analysis of individual patient-level data

Luis San Román, Bijoy K Menon*, Jordi Blasco, María Hernández-Pérez, Antoni Dávalos, Charles B L M Majoie, Bruce C V Campbell, Francis Guillemin, Hester Lingsma, René Anxionnat, Jonathan Epstein, Jeffrey L Saver, Henk Marquering, John H Wong, Demetrius Lopes, Gernot Reimann, Hubert Desal, Diederik W J Dippel, Shelagh Coutts, Richard du Mesnil de Rochemont, Dileep Yavagal, Jean Christophe Ferre, Yvo B W E M Roos, David S Liebeskind, Robert Lenthall, Carlos Molina, Fahad S Al Ajlan, Vivek Reddy, Dar Dowlatshahi, Nader-Antoine Sourour, Catherine Oppenheim, Alim P Mitha, Stephen M Davis, Christian Weimar, Robert J van Oostenbrugge, Erik Cobo, Timothy J Kleinig, Geoffrey A Donnan, Aad van der Lugt, Andrew M Demchuk, Olvert A Berkhemer, Anna M M Boers, Gary A Ford, Keith W Muir, B Scott Brown, Tudor Jovin, Wim H van Zwam, Peter J Mitchell, Michael D Hill, Phil White, Serge Bracard, Mayank Goyal, on behalf of the HERMES collaborators†*

Lancet Neurol 2018; 17: 895–904



SWIFT PRIME

MR CLEAN

ESCAPE

REVASCAT

Randomized data

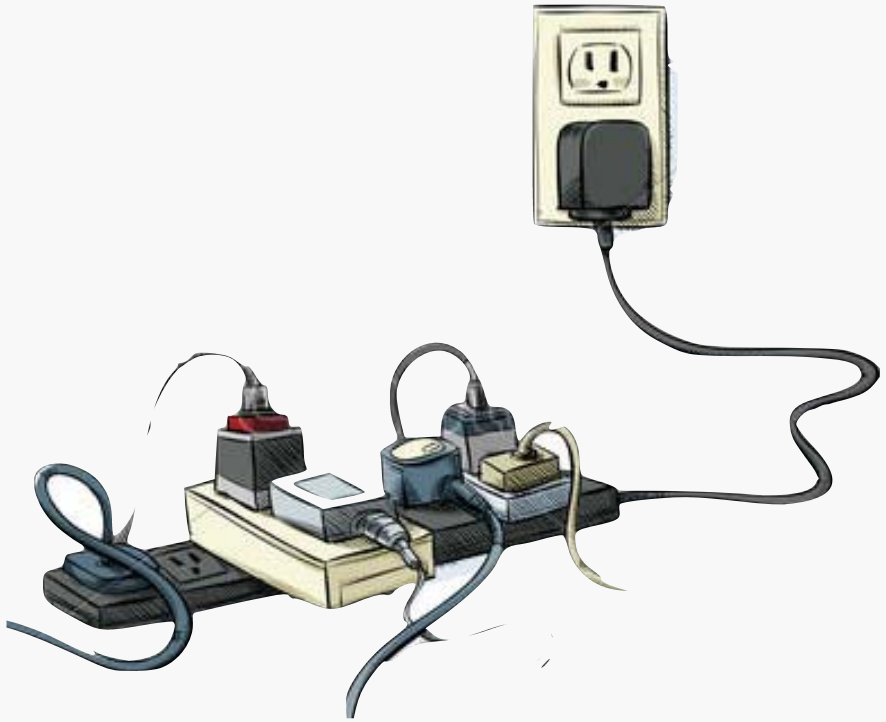
5.

AUSENCIA DE TSA

- TANDEM (DISECCIONES ICA)
- TSA ELONGADOS
- CARGA DE TROMBO ¿?

5.

SOBRECARGA SOBRE LOS RECURSOS HUMANOS



5.

DUDA SOBRE EL EFECTO EN LOS DIFERENTES FRANJAS DE TIEMPO

EXCESIVA SIMPLIFICACIÓN ?

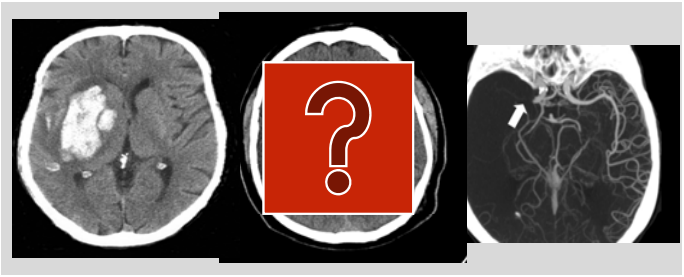
?

ANGIO-CAT
RANDOMIZED
CLINICAL TRIAL

Pre-notification
RACE>4 y NIHSS >10
< 6 hours
Angio-suite and team available

EVT

NO EVT



Vs

EVT

NO EVT

Effect of DIRECT Transfer to ANGIOsuite on Functional Outcome in Severe Acute Stroke (DIRECTANGIO)

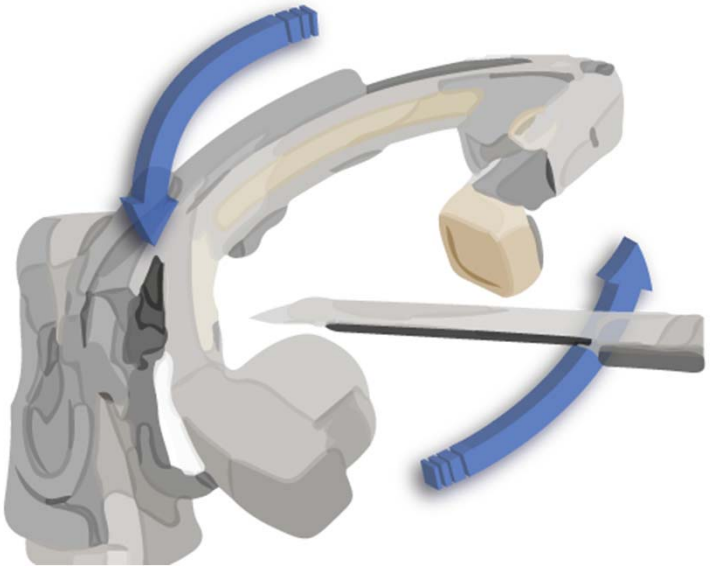
Sponsor:
Central Hospital, Nancy, France

Information provided by (Responsible Party):
Central Hospital, Nancy, France

Estimated Study Start Date :	October 2019
Estimated Primary Completion Date :	December 2019
Estimated Study Completion Date :	April 2022

ClinicalTrials.gov

PRESENTE



MEJORAS EN CONE BEAM CT

SLIDE CT + ANGIO SUITE

GRACIAS

STOP PRESENTATION