

Determinants and Clinical Relevance of Iodine Contrast Extravasation after Endovascular Thrombectomy: a Dual-Energy CT study

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MRI protocol:

Sequences performed on 1.5T Aera Siemens machine:

- **DWI** (diffusion weighted imaging, 2D): isotropic single-shot echo-planar sequence with the following parameters: echo time (1) 68ms, (2) 110ms, repetition time= 5750ms, matrix 139x154 pixels, FOV=240mm, $b=1000\text{ s/mm}^2$, slice thickness: 4mm with an interslice gap of 0.8mm, and two b values of 0 and 1000s/mm.
- **FLAIR** (fluid-attenuated inversion recovery): axial orientation, repetition time=9000ms, echo time=79ms, inversion time=2500 ms, matrix 168x320 pixels, FOV=240mm, slice thickness: 4mm, interslice gap: 0.8mm.
- **SWI** (susceptibility-weighted imaging): axial orientation, repetition time 49ms, echo time=40ms, flip angle: 19°, matrix 236x288 pixels, FOV=230mm, slice thickness: 2mm, interslice gap: 0.4mm, partial Fourier's plan acquisition of 6/8 images. Minimum-intensity projection post processing was performed with a slice thickness of 16mm and an interslice gap of 2mm with the post-treatment software of the manufacturer.
- **TOF-MRA** (time of flight-magnetic resonance angiography): axial orientation, repetition time=27ms, echo time=7ms, matrix 255x320 pixels, FOV=190mm, flip angle: 25°, slice thickness: 0.6mm, concatenation of 4.
- **Perfusion MRI**: axial orientation, dynamic T2*-weighted images during gradient echo echo-planar imaging pulse sequence, repetition time=1880ms, echo time=30ms, matrix 128x128 pixels, FOV=230mm, flip angle: 90°, slice thickness: 5mm, concatenation of 4, temporal resolution of 1.30-1.90 seconds. Perfusion maps are generated with the dedicated software (Syngovia, Siemens Healthcare, Erlangen, Germany).
- **Gadolinium-enhanced MRA**: fluoro-3D pre and post-gadolinium, coronal orientation, repetition time/echo time=3,59/1,34 ms, matrix 115x128 pixels, FOV=34 cm, flip angle: 25°, slice thickness: 0.8mm, one volume of 120 slices.

Sequences performed on 3T Prisma Siemens machine:

- **DWI** (diffusion weighted imaging, 2D): isotropic single-shot echo-planar sequence with the following parameters: echo time=73ms, repetition time= 6070ms, matrix 129x144 pixels, FOV=220mm, $b=1000\text{ s/mm}^2$, slice thickness: 4mm with an interslice gap of 0.8mm, and two b values of 0 and 1000s/mm.
- **FLAIR** (fluid-attenuated inversion recovery): axial orientation, repetition time=8000ms, echo time=111ms, inversion time=2500 ms, matrix 276x320 pixels, FOV=240mm, slice thickness: 4mm, interslice gap: 0.8mm.
- **SWI** (susceptibility-weighted imaging): axial orientation, repetition time=27ms, echo time=20ms, flip angle: 19°, matrix 236x288 pixels, FOV=220mm, slice thickness: 2mm, interslice gap: 0.4mm, partial Fourier's plan acquisition of 6/8 images. Minimum-intensity projection post processing was performed with a slice thickness of 16mm and an interslice gap of 2mm with the post-treatment software of the manufacturer.
- **TOF-MRA** (time of flight-magnetic resonance angiography): axial orientation, repetition time=21ms, echo time=3.43ms, matrix 313x384 pixels, FOV=181x200mm, flip angle: 18°, slice thickness: 0.5mm, concatenation of 4.
- **Perfusion MRI**: axial orientation, dynamic T2*-weighted images during single-shot gradient echo echo-planar imaging pulse sequence, repetition time=1200-1850ms, echo time=30ms, matrix 128x128 pixels, FOV=240mm, flip angle: 60°, slice thickness: 5mm, no interslice gap, temporal resolution of 1.20-1.85 seconds. Perfusion maps are generated with the dedicated software (Syngovia, Siemens Healthcare, Erlangen, Germany).
- **Gadolinium-enhanced MRA**: fluoro-3D pre and post-gadolinium, coronal orientation, repetition time/echo time=3/1,20ms, matrix 115x128 pixels, FOV=34 cm, flip angle: 20°, slice thickness: 0.8mm, one volume of 120 slices.

Method for volume evaluation of initial ischemic core

First, the neuroradiologist used the Carestream Vue PACS Lesion Management lesion segmentation tool to delineate the hyperintense lesion corresponding to the ischemic core. This was done through an automated process that defined the lesion slice by slice. Then, the neuroradiologist visually inspected the segmentation in all three directions to ensure that it was neither too restrictive nor too extensive for the core delimitation. She made necessary corrections to the edges when required. As a default approach, pixels that were deemed uncertain were excluded from the ischemic core.

	ICE Group (n=53)	No-ICE Group (n=144)	P value
Imaging parameters			
Initial DWI-Volume (mL)	73.5 (27.6-105.3)	20.0 (7.5-45.0)	0.008
Initial ASPECTS-DWI	6 (5-7)	7 (6-8)	0.002
Initial lowest-ADC ($\times 10^{-6}$)	362 (319-417)	445 (402-492)	<0.001
MCA ischemic territory			0.002
deep	18 (35.3)	40 (31.7)	
superficial	8 (15.7)	52 (41.3)	
deep+superficial	25 (47.2)	34 (27.0)	
Thrombus localisation			0.036
Internal-Carotid-Artery	18 (34.0)	24 (17.3)	
Middle-Cerebral-Artery	32 (60.4)	92 (66.2)	
M1	3 (5.6)	22 (15.8)	
M2	0	1 (0.7)	
M3			
Ischemia side: left	24 (45.3)	77 (54.2)	0.334
Mass effect	36 (67.9)	53 (36.8)	<0.001
EVT parameters			
Iodine-contrast-volume injected during EVT (mL)	200 (150-300)	100 (100-200)	0.047
Anesthesia technique			0.999
Local	41 (97.6)	123 (97.6)	
General	1 (0.02)	3 (0.02)	
Procedure duration (mins)	90 (75-125)	75 (60-100)	<0.001
Number of device passes			<0.001
< 2	14 (34.1)	78 (73.6)	
≥ 2	27 (65.9)	28 (26.4)	
Thrombectomy technique			0.011
Stent	10/49 (20.4)	32 (22.5)	
Aspiration	1 (2.0)	14 (9.9)	
Combined	35 (71.4)	69 (48.6)	
Other	3 (6.1)	26 (18.3)	
Recanalisation rate (mTICI $\geq 2b$)	36 (67.9)	121 (84.6)	0.015
Delays			
Onset to MRI (min)	144 (68-262)	155 (54-270)	0.117
Onset to Thrombolysis (min)	179 (150-204)	171 (137-206)	0.484
Onset to TICImax (min)	345 (265-435)	300 (225-381)	0.089
Clinical Outcome			
NIHSS-at-24h	15 (12-20)	7 (2-15)	<0.001
mRs ≤ 2 at M3-M6	16/49 (32.7)	70/135 (51.9)	0.029
Hemorrhagic Transformation	23 (43.4)	35 (24.3)	0.009

Table 1. Univariate analysis on iodine contrast extravasation

Data are presented as median, interquartile range (IQR₂₅-IQR₇₅) for continuous variables and count (percentage) for categorical variables. ICE : iodine contrast extravasation, ICH : intracranial hemorrhage ; EVT: endovascular treatment

	Pure ICE Group (n=30)	ICE+ICH Group (n=23)	Pure ICH Group (n=35)	No ICE, No ICH Group (n=109)	P value
Imaging parameters					
Initial DWI-Volume (mL)	64.8 (16.0-113.6)	81.1 (10.2-152.0)	40.8 (6.3-75.3)	27.4 (3.7-56.5)	<0.001
Initial ASPECTS-DWI	5 (3-6)	6 (4-8)	6 (5-7)	7 (6-8)	0.002
Initial lowest-ADC ($\times 10^{-6}$)	466 (306-626)	408 (264-552)	505 (324-686)	534 (337-691)	<0.001
MCA ischemic territory					
deep	6 (20.0)	11 (47.8)	12 (34.3)	29 (26.6)	0.119
superficial	6 (20.0)	2 (8.7)	8 (22.9)	44 (40.4)	0.005
deep+superficial	14 (46.7)	11 (47.8)	13 (37.1)	21 (19.3)	0.003
Thrombus localisation					
Internal-Carotid-Artery	10 (33.3)	8 (34.8)	8 (22.9)	16 (14.7)	0.005
Middle-Cerebral-Artery	16 (53.3)	16 (69.6)	25 (71.4)	67 (61.5)	0.423
M1	2 (6.7)	1 (4.3)	2 (5.7)	20 (18.3)	0.068
M2	0	0	0	1 (9.2)	-
M3					
Ischemia side: left	11 (36.7)	13 (56.5)	22 (62.9)	55 (50.5)	0.193
Mass effect	16 (53.3)	20 (87.0)	23 (65.7)	30 (27.5)	<0.001
EVT parameters					
Iodine-contrast-volume injected during EVT (mL)	200 (100-300)	250 (200-300)	100 (100-150)	200 (100-200)	0.088
Anesthesia technique					
Local	22 (73.3)	19 (82.6)	33 (94.3)	90 (82.6)	0.157
General	1 (3.3)	0	0	3 (2.8)	-
Procedure duration (mins)	93 (79-129)	85 (65-115)	70 (60-95)	75 (60-100)	<0.001
Number of device passes					
< 2	7 (23.3)	7 (30.4)	15 (42.9)	63 (57.8)	0.002
≥ 2	18 (60.0)	9 (39.1)	11 (31.4)	17 (15.6)	<0.001
Thrombectomy technique					
Stent	6 (20.0)	4 (17.4)	13 (37.1)	19 (17.4)	0.092
Aspiration	0	1 (4.3)	4 (11.4)	10 (9.2)	-
Combined	21 (70.0)	14 (60.9)	21 (60.0)	48 (44.0)	0.041
Other	2 (6.7)	1 (4.3)	7 (20.0)	19 (17.4)	0.177
Recanalisation rate (mTICI $\geq 2b$)	19 (63.3)	17 (73.9)	33 (94.3)	88 (80.7)	0.010
Delays					
Onset to MRI (min)	145 (61-280)	152 (62-271)	150 (56-266)	148 (60-259)	0.354
Onset to Thrombolysis (min)	166 (139-226)	180 (155-197)	170 (140-222)	175 (136-199)	0.744
Onset to TICImax (min)	343 (250-409)	350 (295-465)	288 (234-369)	300 (225-390)	0.127
Clinical Outcome					
NIHSS-at-24h	15 (14-20)	12 (7-20)	13 (6-22)	6 (2-12)	<0.001
mRs ≤ 2 at M3-M6	8 (26.7)	8 (34.8)	15 (42.9)	55 (50.5)	0.021
Hemorrhagic Transformation	0	23 (100.0)	35 (100.0)	0	-

Table A. Univariate analysis on iodine contrast extravasation, details on subgroups

Data are presented as median, interquartile range (IQR₂₅-IQR₇₅) for continuous variables and count (percentage) for categorical variables. ICE : iodine contrast extravasation, ICH : intracranial hemorrhage ; EVT: endovascular treatment

	Total population (n=197)		ICE Group (n=53)	No-ICE Group (n=144)	P value		Pure ICE Group (n=30)	ICE+ICH Group (n=23)	Pure ICH Group (n=35)	No ICE, No ICH Group (n=109)	P value
General characteristics											
Age	72 (61-82)		71 (59-80)	75 (65-82)	0.162		71 (59-80)	70 (59-80)	77 (65-83)	73 (64-82)	0.368
Gender (Female)	89 (45)		23 (43.4)	66 (46.2)	0.750		12 (40.0)	11 (47.8)	15 (42.9)	51 (46.8)	0.901
Antiplatelet treatment	50 (25.8)		12 (23.1)	38 (26.8)	0.712		7 (23.3)	5 (21.7)	12 (34.3)	26 (23.9)	0.609
Anticoagulation treatment	30 (15.4)		6 (11.5)	24 (16.8)	0.502		5 (16.7)	1 (4.3)	6 (17.1)	18 (16.5)	0.494
Diabetes	40 (20.5)		12 (22.6)	28 (19.7)	0.692		7 (23.3)	5 (21.7)	8 (22.9)	20 (18.3)	0.897
Dyslipidemia	79 (40.5)		16 (30.2)	63 (44.4)	0.101		11 (36.7)	5 (21.7)	21 (60.0)	42 (38.5)	0.026
Obesity	66 (34.2)		15 (29.4)	51 (35.9)	0.492		7 (23.3)	8 (34.8)	9 (25.7)	42 (38.5)	0.308
Smoking	25 (16.5)		5 (11.9)	20 (18.3)	0.465		2 (6.7)	3 (13.0)	5 (14.3)	15 (13.8)	0.758
Atrial fibrillation	73 (37.4)		21 (40.4)	52 (36.4)	0.619		15 (50.0)	6 (26.1)	13 (37.1)	39 (35.8)	0.332
Data at admission											
Glycemia (g/l)	1.29 (1.11-1.48)		1.38 (1.20-1.82)	1.27 (1.09-1.48)	0.016		1.43 (1.25-1.70)	1.27 (1.15-1.86)	1.39 (1.15-1.55)	1.22 (1.08-1.42)	0.527
NIHSS	15 (9-20)		17 (12-21)	15 (9-20)	0.262		18 (13-21)	15 (12-19)	15 (9-20)	14 (8-19)	0.012
Thrombolysis	104 (52.8)		26 (49.1)	78 (54.2)	0.630		15 (50.0)	11 (47.8)	18 (51.4)	60 (55.0)	0.903
Onset to thrombolysis delay(mins)	179 (145-205)		179 (150-204)	171 (137-206)	0.484		166 (139-226)	180 (155-197)	170 (140-222)	175 (136-199)	0.744
AIS											
Side (Left)	101 (51.8)		See Table 1								
Ischemia territory (superficial/deep/both)	60 (33.3) 58 (32.2) 59 (32.7)										
Thrombus localisation (ICA, M1, M2, M3)	42 (21.9) 124 (64.6) 25 (13.0) 1 (0.5)										
Initial lowest ADC (x10 ⁻⁶)	403 (328-470)										
Initial ASPECT score	7 (5-8)										
Initial DWI Volume	20 (7-65)										
EVT											
Procedure duration (min)	80 (60-106)										
Contrast Volume (mL)	200 (50-200)										
Delays											
Onset to MRI (min)	158 (63-254)										
Onset to Thrombolysis (min)	175 (144-210)										
Onset to TICImax (min)	302 (240-405)										
Evolution											
NIHSS at 24h	9 (3-16)										
ICH	58 (29.4)										
mRs≤2 at M3-M6	86 (43.7)										

Table B. Patient's characteristics for total population, ICE vs no-ICE groups and the four subgroups

Data are presented as median, interquartile range (IQR₂₅-IQR₇₅) for continuous variables and count (percentage) for categorical variables.

NIHSS: Baseline National Institutes of Health Stroke Scale ; ASPECT score: Alberta Stroke Program Early CT Score; ICH: intracranial hemorrhage; ICE: iodine contrast extravasation.

	Pure ICE Group (n=30)	ICE+HT Group (n=23)	P value
General characteristics			
Age	71 (59-80)	70 (59-80)	0.429
Gender (Female)	12 (40.0)	11 (47.8)	0.590
Antiplatelet treatment	7 (23.3)	5 (21.7)	0.999
Anticoagulation treatment	5 (16.7)	1 (4.3)	0.217
Diabetes	7 (23.3)	5 (21.7)	0.999
Dyslipidemia	11 (36.7)	5 (21.7)	0.366
Obesity	7 (23.3)	8 (34.8)	0.378
Smoking	2 (6.7)	3 (13.0)	0.642
Atrial fibrillation	15 (50.0)	6 (26.1)	0.096
Data at admission			
Glycemia (g/l)	1.43 (1.25-1.70)	1.27 (1.15-1.86)	0.402
NIHSS	18 (13-21)	15 (12-19)	0.328
Thrombolysis	15 (50.0)	11 (47.8)	0.999
Imaging parameters			
Initial DWI-Volume (mL)	64.8 (16.0-113.6)	81.1 (10.2-152.0)	0.877
Initial ASPECTS-DWI	5 (3-6)	6 (4-8)	0.002
Initial lowest-ADC (x10 ⁻⁶)	466 (306-626)	408 (264-552)	0.670
MCA ischemic territory			
deep	6 (20.0)	11 (47.8)	0.041
superficial	6 (20.0)	2 (8.7)	0.441
deep+superficial	14 (46.7)	11 (47.8)	0.999
Thrombus localisation			
Internal-Carotid-Artery	10 (33.3)	8 (34.8)	0.999
Middle-Cerebral-Artery			
M1	16 (53.3)	16 (69.6)	0.269
M2	2 (6.7)	1 (4.3)	0.999
M3	0	0	-
Ischemia side: left	11 (36.7)	13 (56.5)	0.174
Mass effect	16 (53.3)	20 (87.0)	0.616
EVT parameters			
Iodine-contrast-volume injected during	200 (100-300)	250 (200-300)	0.169
Anesthesia technique			
Local	22 (73.3)	19 (82.6)	0.519
General	1 (3.3)	0	-
Procedure duration (mins)	93 (79-129)	85 (65-115)	0.199
Number of device passes			
< 2	7 (23.3)	7 (30.4)	0.754
>2	18 (60.0)	9 (39.1)	0.170
Thrombectomy technique			
Stent	6 (20.0)	4 (17.4)	0.999
Aspiration	0	1 (4.3)	-
Combined	21 (70.0)	14 (60.9)	0.565
Other	2 (6.7)	1 (4.3)	0.999
Recanalisation rate (mTICI≥2b)	19 (63.3)	17 (73.9)	0.555
Delays			
Onset to MRI (min)	145 (61-280)	152 (62-271)	0.354
Onset to Thrombolysis (min)	166 (139-226)	180 (155-197)	0.333
Onset to TICImax (min)	343 (250-409)	350 (295-465)	0.127
Clinical Outcome			
NIHSS-at-24h	15 (14-20)	12 (7-20)	0.528
mRs≤2 at M3-M6	8 (26.7)	8 (34.8)	0.559
Hemorrhagic Transformation	0	23 (100.0)	-

Table C. Univariate analysis on iodine contrast extravasation (ICE) population (pure ICE vs. ICE+ICH groups)

Data are presented as mean, standard deviation (SD) or median for continuous variables and count (percentage) for categorical variables.

NIHSS: Baseline National Institutes of Health Stroke Scale ; ASPECT score: Alberta Stroke Program Early CT Score; mRs score: modified Rankin Scale score; EVT: endovascular treatment; ICE: iodine contrast extravasation ; ICH : intracranial hemorrhage

	ICH+ (n=58)	ICH- (n=139)	P value		Pure ICH group (n=35)	ICH+ICE group (n=23)	P value
ICH type (Heidelberg Bleeding Classification)			-				0.077
0	0	0			0	0	
1a	4 (6.9)				1a 1 (2.9)	2 (8.7)	
1b	3 (5.2)				1b 2 (5.8)	1 (4.3)	
1b+3c	1 (1.7)				1b+3c 1 (2.9)	0	
1c	21 (36.2)				1c 13 (37.1)	8 (34.9)	
1c+3c	2 (3.4)				1c+3c 1 (2.9)	1 (4.3)	
2	10 (17.3)				2 5 (14.3)	5 (21.8)	
2+3	6 (10.4)				2+3 5 (14.3)	1 (4.3)	
3a	2 (3.4)				3a 2 (5.8)	0	
3b+c	2 (3.4)				3b+c 1 (2.9)	1 (4.3)	
3c	6 (10.4)				3c 2 (5.8)	4 (17.4)	
3d	1 (1.7)				3d 1 (2.9)	0	
General characteristics							
Age	74 (61-83)	77 (66-84)	0.959		77 (65-83)	70 (59-80)	0.141
Gender (Female)	27 (13.8)	62 (31.6)	0.835		15 (42.9)	11 (47.8)	0.790
Antiplatelet traitement	15(7.7)	35 (18.0)	0.911		12 (34.3)	5 (21.7)	0.384
Anticoagulation traitement	8 (4.1)	22 (11.3)	0.689		6 (17.1)	1 (4.3)	0.226
Diabetes	14 (7.2)	26 (13.3)	0.415		8 (22.9)	5 (21.7)	0.999
Dyslipidemia	27 (13.8)	52 (26.7)	0.210		21 (60.0)	5 (21.7)	0.007
Obesity	17 (8.8)	49 (25.4)	0.348		9 (25.7)	8 (34.8)	0.559
Smoking	8 (5.3)	17 (11.3)	0.730		5 (14.3)	3 (13.0)	0.999
Atrial fibrillation	20 (10.3)	53 (27.2)	0.663		13 (37.1)	6 (26.1)	0.410
Data at admission							
Glycemia (g/l)	1.34 (1.16-1.60)	1.30 (1.16-1.54)	0.130		1.39 (1.15-1.55)	1.27 (1.15-1.86)	0.863
NIHSS	17 (13-21)	18 (13-21)	0.068		15 (9-20)	15 (12-19)	0.038
Thrombolysis	32 (16.2)	72 (36.5)	0.665		18 (51.4)	11 (47.8)	0.999
Onset to thrombolysis delay (min)	180 (146-210)	167 (135-197)	0.430		170 (140-222)	180 (155-197)	0.820
Imaging parameters							
Initial DWI Volume (mL)	51 (20-83)	20 (8-45)	0.012		40.8 (6.3-75.3)	81.1 (10.2-152.0)	0.051
Initial ASPECT	6 (5-7)	7 (6-8)	0.006		6 (5-7)	6 (4-8)	0.597
Initial lowest ADC (x10 ⁻⁶)	406 (346-459)	442 (390-495)	0.006		505 (324-686)	408 (264-552)	0.020
Ischemia territory (MCA)			0.017				0.520
deep	22 (40.0)	36 (28.8)			12 (34.3)	10 (47.8)	
superficial	10 (18.2)	50 (40.0)			8 (22.9)	2 (8.7)	
deep+superficial	23 (41.8)	36 (28.8)			12 (37.1)	11 (47.8)	
Thrombus localisation			0.166				0.999
internal carotid artery	15 (7.8)	27 (14.1)			8 (22.9)	7 (34.8)	
middle cerebral artery							
M1	39 (20.3)	85 (44.3)			26 (71.4)	13 (69.6)	
M2	3 (1.6)	22 (11.5)			2 (5.7)	1 (4.3)	
M3	0	1 (0.5)			0	0	
Ischemia side			0.215				0.412
left	34 (17.4)	67 (34.3)			23 (17.4)	11 (34.3)	
right	24 (12.3)	70 (35.9)			12 (12.3)	12 (35.9)	
EVT parameters							
Iodine contrast volume injected during EVT (mL)	200 (100-250)	200 (100-200)	0.480		100 (100-150)	250 (200-300)	0.024
Procedure duration (min)	75 (60-108)	78 (64-100)	0.588		70 (60-95)	85 (65-115)	0.117
Number of device passes	1 (1-2)	1 (1-2)	0.431		1 (0-2)	2 (1-3)	0.046
Recanalisation Rate	52 (89.7)	95 (68.3)	0.002		33 (94.3)	17 (73.9)	0.048
Delays							
Onset to MRI (min)	140 (66-254)	141 (50-274)	0.386		150 (56-266)	152 (62-271)	0.883
Onset to Thrombolysis (min)	180 (146-210)	165 (135-201)	0.430		170 (140-222)	180 (155-197)	0.741
Onset to TICImax (min)	317 (261-418)	300 (230-405)	0.334		288 (234-369)	350 (295-465)	0.296
Clinical Outcome							
NIHSS at 24h	14 (6-21)	7 (2-15)	0.001		13 (6-22)	12 (7-20)	0.778
mRs≤2 at M3-M6	23 (39.7)	63 (45.3)	0.529		15 (42.9)	8 (34.8)	0.593
Association with ICE	23 (39.7)	30 (23.6)	0.009		0 (0)	23 (100)	-

Table D. Univariate analysis on intracranial hemorrhage (ICH)

Data are presented as mean, standard deviation (SD) or median for continuous variables and count (percentage) for categorical variables.

NIHSS: Baseline National Institutes of Health Stroke Scale ; ASPECT score: Alberta Stroke Program Early CT Score; mRs score: modified Rankin Scale score; EVT: endovascular traitement; ICE: iodine contrast extravasation.

ICH			
	OR	CI 95%	P Value
General characteristics			
Age	0.972	0.93-1.02	0.228
Gender (Female)	0.535	0.15-1.87	0.327
Data at admission			
NIHSS	1.098	0.97-1.25	0.154
Imaging parameters			
Initial DWI-Volume(mL)	1.003	0.99-1.02	0.628
Clinical Outcome			
ICE (all cases)	4.080	1.02-16.39	0.047

Table E. Multivariable analysis on intracranial hemorrhage (ICH)

NIHSS: Baseline National Institutes of Health Stroke Scale; ICE: iodine contrast extravasation.

	Favorable outcome (n=86)	Unfavorable outcome (n=98)	P Value
General characteristics			
Age	70 (58-78)	78 (65-85)	0.001
Gender (Female)	36 (19.7)	48 (26.2)	0.302
Antiplatelet-treatment	15 (8.2)	32 (17.6)	0.014
Anticoagulation-treatment	12 (6.6)	14 (7.7)	0.926
Diabetes	11 (6)	28 (15.2)	0.008
Dyslipidemia	30 (16.4)	43 (23.5)	0.193
Obesity	28 (15.4)	37 (20.3)	0.465
Smoking	11 (7.7)	13 (9.1)	0.525
Atrial fibrillation	25 (13.7)	41 (22.4)	0.081
Data at admission			
Glycemia (g/l)	1.20 (1.09-1.41)	1.37 (1.20-1.61)	0.004
NIHSS	12 (7-17)	19 (13-21)	<0.001
Thrombolysis	53 (28.8)	46 (25)	0.046
Imaging parameters			
Initial DWI-Volume(mL)	16 (5-35)	45 (19-80)	<0.001
Initial ASPECT	7 (7-8)	6 (5-7)	<0.001
Initial lowest-ADC (x10 ⁻⁶)	439 (394-492)	412 (342-478)	0.061
MCA ischemic territory			
deep	25 (15)	25 (15)	0.036
superficial	33 (19.8)	24 (14.4)	
deep+superficial	18 (10.8)	39 (23.3)	
Thrombus localisation			
Internal-Carotid-Artery	10 (5.6)	31 (17.3)	0.003
Middle-Cerebral-Artery			
M1	58 (32.4)	57 (31.8)	
M2	15 (8.4)	7 (3.9)	
M3	1 (0.6)	0	
Ischemia side: left	44 (24.2)	48 (26.4)	0.647
Mass effect	27 (31.4)	65 (66.3)	<0.001
EVT parameters			
Iodine-contrast-volume injected during EVT (mL)	200 (100-300)	200 (100-200)	0.165
Procedure duration(min)	75 (60-100)	80 (65-106)	0.173
Number of passes	1 (1-2)	1 (1-2)	0.484
Recanalization rate	75 (87.2)	72 (73.5)	0.026
Delays			
Onset to MRI (min)	139 (65-278)	149 (74-282)	0.654
Onset to Thrombolysis (min)	180 (140-212)	167 (137-205)	0.473
Onset to TICI _{max} (min)	300 (232-415)	311 (238-414)	0.987
Clinical Outcome			
NIHSS-at-24h	4 (1-7)	16 (11-21)	<0.001
Iodine-Contrast-Extravasation (ICE), all cases (n=53)	16 (18.6)	33 (33.7)	0.020
Intracranial hemorrhage (ICH), all cases (n=58)	23 (26.7)	35 (35.7)	0.207
Pure ICE (n=30)	8 (9.3)	20 (20.4)	0.041
Association of ICE and ICH (n=23)	8 (9.3)	15 (15.3)	0.267
Pure ICH (n=35)	15 (17.4)	19 (19.4)	0.849

No ICE and no ICH (n=109)	55 (64.0)	40 (40.8)	0.002
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Table F. Univariate analysis on favorable outcome

Data are presented as mean, standard deviation (SD) or median for continuous variables and count (percentage) for categorical variables.

Favorable outcome mRs≤2			
	OR	CI 95%	P Value
General characteristics			
Age	1.058	1.00-1.12	0.027
Gender (Female)	0.535	0.15-1.88	0.323
Data at admission			
Glycemia	5.394	1.09-26.67	0.032
NIHSS	1.182	1.04-1.34	0.004
Thrombolysis (No)	0.638	0.19-2.18	0.471
Imaging parameters			
Initial ASPECT	0.630	0.42-0.95	0.015
Thrombus localisation (proximal)	0.025	0.00-1.50	0.100
EVT parameters			
Delay successss revascularisation mTICI max (min)	1.003	1.00-1.01	0.374
Clinical Outcome			
ICH (No)	2.242	0.63-8.02	0.211
ICE (No)	2.412	0.57-10.17	0.223
Pure ICH (No)	1.425	0.60-3.41	0.428
Pure ICE (No)	2.488	0.53-11.71	0.248

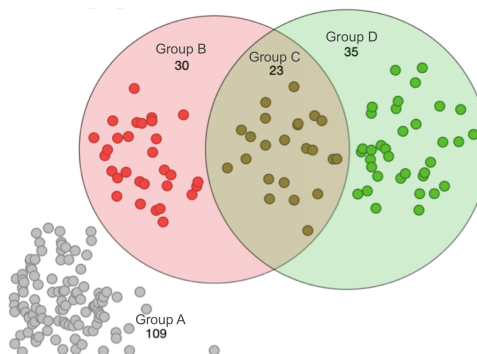
Table G. Results on outcome, multivariable analysis

NIHSS: Baseline National Institutes of Health Stroke Scale; ASPECT score: Alberta Stroke Program Early CT Score; mTICI: Modified Thrombolysis In Cerebral Infarction Score; ICH : intracranial hemorrhage; ICE: iodine contrast extravasation.

	Included patients (n=197)	Excluded patients (n=153)	P Value
General characteristics			
Age	72 (61-82)	75 (61-83)	0.255
Gender (Female)	89 (45)	63 (41.1)	0.514
Antiplatelet treatment	50 (25.8)	49 (32.0)	0.189
Anticoagulation treatment	30 (15.4)	30 (19.6)	0.318
Diabetes	40 (20.5)	31 (20.3)	0.999
Dyslipidemia	79 (40.5)	54 (35.3)	0.376
Obesity	66 (34.2)	52 (34.0)	0.999
Smoking	25 (16.5)	21 (13.7)	0.873
Atrial fibrillation	73 (37.4)	60 (39.2)	0.739
Data at admission			
Glycemia (g/l)	1.29 (1.11-1.48)	1.24 (1.09-1.56)	0.750
NIHSS	15 (9-20)	16 (11-19)	0.854
Thrombolysis	104 (52.8)	81 (52.9)	0.999
AIS			
Side (Left)	101 (51.8)	83 (54.2)	0.591
Ischemia territory			0.831
deep	60 (33.3)	24 (15.7)	
superficial	58 (32.2)	43 (28.1)	
deep+superficial	59 (32.7)	43 (28.1)	
Internal-Carotid-Artery	42 (21.9)	37 (24.2)	0.005
Middle-Cerebral-Artery			
M1	124 (64.6)	54 (35.3)	
M2	25 (13.0)	15 (9.8)	
M3	1 (0.5)	2 (1.3)	
Vertebro-basilar territory	0	15 (9.8)	
Initial lowest ADC (x10 ⁻⁶)	403 (328-470)	409 (354-471)	0.566
Initial ASPECT score	7 (5-8)	7 (5-8)	0.949
Initial DWI Volume	20 (7-65)	24 (5-69)	0.909
EVT			
Procedure duration (min)	80 (60-106)	75 (60-110)	0.556
Contrast Volume (mL)	200 (50-200)	100 (100-200)	0.217
Delays			
Onset to MRI (min)	158 (63-254)	143 (58-197)	0.355
Onset to Thrombolysis (min)	179 (145-205)	175 (140-210)	0.805
Onset to TICImax (min)	305 (240-385)	340 (246-385)	0.462
Evolution			
NIHSS at 24h	9 (3-16)	8 (3-17)	0.979
ICH	58 (29.4)	15/60 (25)	0.624
Simple-energy CT (n=123)	-	13/55 (23.6)	0.498

Table G. Univariate analysis comparing main parameters for included and excluded population

NIHSS: Baseline National Institutes of Health Stroke Scale; ASPECT score: Alberta Stroke Program Early CT Score; ICH : intracranial hemorrhage



Supplemental Figure. Distribution of patients according to the presence or absence of Iodine Contrast Extravasation (ICE) and Intracranial Hemorrhage (ICH).

Group A (grey dots) : no ICE and no ICH, n=109

Group B (red dots) : pure ICE, n=30

Group C (brown dots) : mix of ICE and ICH, n=23

Group D (green dots) : pure ICH, n=35