

SUPPLEMENTARY MATERIAL

Infarct Growth in Patients with Emergent Large Vessel Occlusion Stroke Transferred for Endovascular Thrombectomy

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Supplemental Table1 Demographics, baseline and outcomes characteristics in transferred patients without repeated imaging

Variables	Transferred patients without repeated imaging (n=99)
Demographic characteristics	
Age, y, median	71(62-76)
Female sex, n (%)	56(56.6)
Past Medical History, n (%)	
Hypertension	63(63.6)
Diabetes mellitus	19(19.2)
Atrial fibrillation	50(50.5)
Clinical data	
Admission SBP	151(138-164)
Admission DBP	82(72-93)
Admission NIHSS	13(12-18)
Intravenous thrombolysis, n (%)	6(6.1)
Occlusion site, n (%)	
ICA	44(44.4)
MCA-M1	30(30.3)
MCA-M2	13(13.1)
ACA	2(2.0)
MVO	10(10.1)
TOAST type, n (%)	
LAA	26(26.3)
CE	65(65.7)
Unknown	5(5.1)
Other	3(3.0)
Procedure process	
OTIP, median	88(50-144)
Door in door out, median, min ^a	74(53-100)
OTP, median, min	270(222-330)
OTR, median, min	356(278-429)
PT, median, min	63(43-90)
OTP>6h	21(21.2)
Collateral status, n (%)	
good	51(51.5)
poor	48(48.5)
mTICI (2b/3), n (%)	81(81.8)

ASPECT	
Primary Center, median (IQR)	9(8-9)
<6, n (%)	7(7.1)
HT ^b	35(37.2)
HI1	14(14.9)
HI2	6(6.4)
PH, n (%)	15(15.9)
PH1	4(4.3)
PH2	11(11.7)
sICH ^b	9(9.3)
mRS	3(1-6)
mRS ≤ 2	45(45.5)
Death	30(30.3)

SBP, Systolic blood pressure; DBP, Diastolic blood pressure; NIHSS, National Institutes of Health Stroke Scale; ICA, internal carotid artery; MCA, middle cerebral artery; ACA: arteria cerebri anterior; MVO: multiple vessel occlusion; LAA, large-artery atherosclerosis; CE, cardio embolism; OTIP, onset to imaging at primary center; OTP, symptoms onset to groin puncture time; OTR, symptoms onset to recanalization time; PT, operation time; ASPECT, Alberta Stroke Program Early CT; ICH, intracranial hemorrhage; HT, Hemorrhagic transformation; mTICI, modified Thrombolysis in Cerebral Infarction; PH, Parenchymal hemorrhage; sICH, Symptomatic intracranial hemorrhage; mRS, Modified Rankin Scale. TOAST, Trial of ORG 10172 in Acute Stroke Treatment.

a Missing data in six patients

b Missing data in five patients.

Table S2 Comparison of variables stratified by favorable outcome in the overall cohort

Variables	Favorable outcome (n=157)	Poor outcome (n=152)	P-value
Demographic characteristics			
Age, y, median	69(63-75)	73(67-78)	0.003
Female sex, n (%)	55(35.0)	68(44.7)	0.081
Past Medical History, n (%)			
Hypertension	100(63.7)	100(65.8)	0.700
Diabetes mellitus	18(11.5)	20(13.2)	0.651
Atrial fibrillation	75(47.8)	106(69.7)	<0.001
Clinical data			
Admission SBP	154(137-170)	160(138-172)	0.273
Admission DBP	85(75-95)	87(77-95)	0.661
Admission NIHSS	12(10-16)	16(12-20)	<0.001
Intravenous thrombolysis, n (%)	24(15.3)	26(17.1)	0.664
Occlusion site, n (%)			0.015
ICA	53(30.6)	76(50.0)	
MCA-M1	86(54.8)	63(41.4)	
MCA-M2	18(11.5)	13(8.6)	
TOAST type, n (%)			0.047
LAA	48(30.6)	28(18.4)	
CE	91(58.0)	111(73.0)	
Unknown	11(7.0)	8(5.3)	
Other	7(4.5)	5(3.3)	
Procedure process			
OTIP, median, min	90(57-154)	100(63-172)	0.444
Door in door out, median, min ^a	70(50-120)	80(44-148)	0.459
ITI, median, min	159(122-209)	161(122-209)	0.770
OTIC, median, min	281(215-374)	294(228-394)	0.309
OTP, median, min	314(250-405)	345(272-440)	0.122
OTR, median, min	380(305-463)	402(336-530)	0.105
PT, median, min	53(40-79)	60(40-89)	0.133
OTP>6h	48(41.7)	67(58.3)	0.014
Collateral status, n (%)			<0.001
good	125(79.6)	66(43.4)	
poor	32(20.4)	86(56.6)	
mTICI (2b/3), n (%)	152(96.8)	132(86.8)	0.001
ASPECT			
Primary Center, median (IQR)	10(9-10)	9(8-10)	<0.001

<6, n (%)	2(1.3)	3(2.0)	0.625
Comprehensive Center, median (IQR)	9(8-10)	7(4-8)	<0.001
ASPECT decay, median (IQR)	1(0-1)	3(1-4)	<0.001
≥1, n (%)	81(51.6)	127(83.6)	<0.001
≥2, n (%)	36(22.9)	98(64.5)	<0.001
≥3, n (%)	14(8.9)	78(51.3)	<0.001
Absolute attenuation rate, median (IQR)	0.13(0-0.52)	0.78(0.29-1.47)	<0.001
fast progressors (0.42-6.55), n (%)	48(30.6)	106(69.7)	<0.001
slow progressors (0-0.42), n (%)	109(69.4)	46(30.3)	<0.001
Relative attenuation ratio, median (IQR)	0.10(0-0.12)	0.10(0.04-0.18)	<0.001
Relative fast progressors, n (%)	39(24.8)	104(68.4)	
Relative slow progressors, n (%)	118(75.2)	48(31.6)	
HT ^b , n (%)	28(17.8)	63(42.3)	<0.001
HI1	16(10.2)	18(12.1)	0.599
HI2	4(2.5)	14(9.4)	0.011
PH, n (%)	8(5.1)	31(20.8)	<0.001
PH1	6(3.8)	6(4.0)	0.926
PH2	2(1.3)	25(16.8)	<0.001
sICH ^c ,	2(1.3)	21(14.1)	<0.001

SBP, Systolic blood pressure; DBP, Diastolic blood pressure; NIHSS, National Institutes of Health Stroke Scale; ICA, internal carotid artery; MCA, middle cerebral artery; LAA, large-artery atherosclerosis; CE, cardio embolism; OTIP, onset to imaging at primary center; ITI: imaging time at Primary Center to imaging at Comprehensive Center; OTP, symptoms onset to groin puncture time; OTR, symptoms onset to recanalization time; PT, operation time; ASPECT, Alberta Stroke Program Early CT; HT, Hemorrhagic transformation; mTICI, modified Thrombolysis in Cerebral Infarction; PH, Parenchymal hemorrhage; sICH, Symptomatic intracranial hemorrhage; mRS, Modified Rankin Scale. TOAST, Trial of ORG 10172 in Acute Stroke Treatment.

a Missing data in eleven patients

b Missing data in three patients.

c Missing data in three patients

Table S3 Comparison of variables stratified by HT

Variables	Non-HT (n=215)	HT (n=91)	P-value
Demographic characteristics			
Age, y, median	71(64-76)	73(66-77)	0.263
Female sex, n (%)	82(38.1)	40(44.0)	0.342
Past Medical History, n (%)			
Hypertension	146(67.9)	51(56.0)	0.048
Diabetes mellitus	30(14.0)	8(8.8)	0.211
Atrial fibrillation	114(53.0)	64(70.3)	0.005
Clinical data			
Admission SBP	155(138-170)	152(135-170)	0.288
Admission DBP	84(75-95)	87(79-98)	0.494
Admission NIHSS	13(11-18)	15(12-20)	0.003
Intravenous thrombolysis, n (%)	32(14.9)	18(19.8)	0.290
Occlusion site, n (%)			0.207
ICA	83(38.6)	44(48.4)	
MCA-M1	111(51.6)	37(40.7)	
MCA-M2	21(9.8)	10(11.0)	
TOAST type, n (%)			0.007
LAA	65(30.2)	11(12.1)	
CE	129(60.0)	70(76.9)	
Unknown	14(6.5)	5(5.5)	
Other	7(3.3)	5(5.5)	
Procedure process			
OTIP, median, min	90(60-156)	108(71-186)	0.200
Door in door out, median, min ^a	78(47-130)	80(50-121)	0.891
ITI, median, min	161(123-210)	159(121-204)	0.656
OTIC, median, min	282(218-393)	307(228-405)	0.697
OTP, median, min	316(256-420)	346(285-440)	0.201
OTR, median, min	380(305-520)	410(341-530)	0.135
PT, median, min	50(38-80)	60(40-90)	0.024
OTP>6h	77(35.8)	38(41.8)	0.326
Collateral status, n (%)			0.079
good	141(65.6)	50(54.9)	
poor	74(34.4)	41(45.1)	
mTICI (2b/3), n (%)	201(93.5)	80(87.9)	0.104
ASPECT			
Primary Center, median (IQR)	10(9-10)	9(8-10)	0.006
<6, n (%)	3(1.4)	2(2.2)	0.636
Comprehensive Center, median (IQR)	8(7-10)	7(4-9)	<0.001

ASPECT decay, median (IQR)	1(0-2)	2(1-4)	0.002
≥1, n (%)	136(63.3)	69(75.8)	0.033
≥2, n (%)	83(38.6)	48(52.7)	0.022
≥3, n (%)	52(24.2)	37(40.7)	0.004
Absolute attenuation rate, median (IQR)	0.39(0-0.93)	0.63(0.13-1.44)	0.003
Absolute fast progressors (0.42-6.55), n (%)	95(44.2)	56(61.5)	0.006
Absolute slow progressors (0-0.42), n (%)	120(55.8)	35(38.5)	
Relative attenuation ratio, median (IQR)	0.10(0.0-0.30)	0.20(0.10-0.50)	0.001
Relative fast progressors, n (%)	85(39.5)	55(60.4)	0.001
Relative slow progressors, n (%)	130(60.5)	36(39.6)	
mRS	2(1-4)	3(2-6)	<0.001
mRS≤2	129(60.0)	28(30.8)	<0.001
Death	26(12.1)	32(35.2)	<0.001

HT, hemorrhagic transformation; SBP, Systolic blood pressure; DBP, Diastolic blood pressure; NIHSS, National Institutes of Health Stroke Scale; ICA, internal carotid artery; MCA, middle cerebral artery; LAA, large-artery atherosclerosis; CE, cardio embolism; OTIP, onset to imaging at primary center; ITI: imaging time at Primary Center to imaging at Comprehensive Center; OTP, symptoms onset to groin puncture time; OTR, symptoms onset to recanalization time; PT, operation time; ASPECT, Alberta Stroke Program Early CT; HT, Hemorrhagic transformation; mTICI, modified Thrombolysis in Cerebral Infarction; PH, Parenchymal hemorrhage; sICH, Symptomatic intracranial hemorrhage; mRS, Modified Rankin Scale. TOAST, Trial of ORG 10172 in Acute Stroke Treatment.

a Missing data in eleven patients

Table S4 Comparison of variables stratified by sICH

Variables	Non-sICH (n=283)	sICH (n=23)	P-value
Demographic characteristics			
Age, y, median	71(64-76)	76(69-80)	0.031
Female sex, n (%)	112(39.6)	10(43.5)	0.713
Past Medical History, n (%)			
Hypertension	185(65.4)	12(52.2)	0.204
Diabetes mellitus	37(13.1)	1(4.3)	0.169
Atrial fibrillation	161(56.9)	17(73.9)	0.111
Clinical data			
Admission SBP	155(137-170)	145(135-165)	0.171
Admission DBP	85(77-95)	87(65-98)	0.679
Admission NIHSS	14(11-18)	14(12-20)	0.178
Intravenous thrombolysis, n (%)	44(15.5)	6(26.1)	0.216
Occlusion site, n (%)			0.892
ICA	118(41.7)	9(39.1)	
MCA-M1	137(48.4)	11(47.8)	
MCA-M2	28(9.9)	3(13.0)	
TOAST type, n (%)			0.232
LAA	74(26.1)	2(8.7)	
CE	181(64.0)	18(78.3)	
Unknown	17(6.0)	2(8.7)	
Other	11(3.9)	1(4.3)	
Procedure process			
OTIP, median, min	99(60-155)	86(60-223)	0.990
Door in door out, median, min ^a	80(45-127)	75(59-126)	0.634
ITI, median, min	159(123-209)	162(131-207)	0.958
OTIC, median, min	287(220-394)	292(231-375)	0.985
OTP, median, min	325(260-440)	340(270-420)	0.798
OTR, median, min	385(320-520)	410(332-518)	0.674
PT, median, min	55(40-80)	66(47-80)	0.309
OTP>6h	105(37.1)	10(43.5)	0.544
Collateral status, n (%)			0.051
good	181(64.0)	10(43.5)	
poor	102(36.0)	13(56.5)	
mTICI (2b/3), n (%)	264(93.3)	17(73.9)	0.007
ASPECT			
Primary Center, median (IQR)	10(9-10)	9(8-10)	0.079
<6, n (%)	5(1.8)	0(0.0)	1.000
Comprehensive Center, median (IQR)	8(6-9)	7(3-8)	0.040

ASPECT decay, median (IQR)	1(0-3)	2(1-3)	0.094
≥1, n (%)	187(66.1)	18(78.3)	0.232
≥2, n (%)	117(41.3)	14(60.9)	0.069
≥3, n (%)	80(28.3)	9(39.1)	0.270
Absolute attenuation rate, median (IQR)	0.41(0-1.04)	0.73(0.23-1.54)	0.121
Absolute fast progressors (0.42-6.55), n (%)	137(48.4)	14(60.9)	0.250
Absolute slow progressors (0-0.42), n (%)	146(51.6)	9(39.1)	
Relative attenuation ratio, median (IQR)	0.10(0.0-0.30)	0.20(0.10-0.50)	0.054
Relative fast progressors, n (%)	158(55.8)	8(34.8)	0.051
Relative slow progressors, n (%)	125(44.2)	15(65.2)	
mRS	2(1-4)	6(3-6)	<0.001
mRS≤2	155(54.8)	2(8.7)	<0.001
Death	44(15.5)	14(60.9)	<0.001

sICH: symptomatic intracranial hemorrhage; SBP, Systolic blood pressure; DBP, Diastolic blood pressure; NIHSS, National Institutes of Health Stroke Scale; ICA, internal carotid artery; MCA, middle cerebral artery; LAA, large-artery atherosclerosis; CE, cardio embolism; OTIP, onset to imaging at primary center; ITI: imaging time at Primary Center to imaging at Comprehensive Center; OTP, symptoms onset to groin puncture time; OTR, symptoms onset to recanalization time; PT, operation time; ASPECT, Alberta Stroke Program Early CT; HT, Hemorrhagic transformation; mTICI, modified Thrombolysis in Cerebral Infarction; PH, Parenchymal hemorrhage; sICH, Symptomatic intracranial hemorrhage; mRS, Modified Rankin Scale. TOAST, Trial of ORG 10172 in Acute Stroke Treatment.

a Missing data in eleven patients

Table S5 Comparison of variables stratified by death

Variables	Non-death (n=248)	Death (n=61)	P-value
Demographic characteristics			
Age, y, median	71(63-76)	74(67-80)	0.006
Female sex, n (%)	97(39.1)	26(42.6)	0.616
Past Medical History, n (%)			
Hypertension	157(63.3)	43(70.5)	0.293
Diabetes mellitus	28(11.3)	10(16.4)	0.277
Atrial fibrillation	136(54.8)	45(73.8)	0.007
Clinical data			
Admission SBP	155(137-170)	160(137-176)	0.452
Admission DBP	85(77-95)	87(74-98)	0.847
Admission NIHSS	13(11-17)	18(14-20)	<0.001
Intravenous thrombolysis, n (%)	41(16.5)	9(14.8)	0.735
Occlusion site, n (%)			0.147
ICA	97(39.1)	32(52.5)	
MCA-M1	124(50.0)	25(41.0)	
MCA-M2	27(10.9)	4(6.6)	
TOAST type, n (%)			0.045
LAA	67(27.0)	9(14.8)	
CE	154(62.1)	48(78.7)	
Unknown	15(6.0)	4(6.6)	
Other	12(4.8)	0(0)	
Procedure process			
OTIP, median, min	91(60-151)	106(67-215)	0.192
Door in door out, median, min ^a	80(50-131)	64(40-118)	0.185
ITI, median, min	166(123-216)	143(111-191)	0.022
OTIC, median, min	292(224-394)	269(209-374)	0.467
OTP, median, min	328(266-434)	324(235-428)	0.675
OTR, median, min	385(323-518)	400(311-529)	0.863
PT, median, min	55(40-80)	60(45-90)	0.071
OTP>6h	90(36.3)	25(41.0)	0.497
Collateral status, n (%)			<0.001
good	169(68.1)	22(36.1)	
poor	79(31.9)	39(63.9)	
mTICI (2b/3), n (%)	236(95.2)	48(78.7)	<0.001
ASPECT			
Primary Center, median (IQR)	10(9-10)	8(7-10)	<0.001
<6, n (%)	2(0.8)	3(4.9)	0.054
Comprehensive Center, median (IQR)	8(7-9)	5(3-8)	<0.001

ASPECT decay, median (IQR)	1(0-2)	3(1-4)	<0.001
≥1, n (%)	158(63.7)	50(82.0)	0.006
≥2, n (%)	91(36.7)	43(70.5)	<0.001
≥3, n (%)	55(22.2)	37(60.7)	<0.001
Absolute attenuation rate, median (IQR)	0.34(0-0.80)	1.07(0.44-2.21)	<0.001
Absolute fast progressors (0.42-6.55), n (%)	108(43.5)	46(75.4)	<0.001
Absolute slow progressors (0-0.42), n (%)	140(56.5)	15(24.6)	
Relative attenuation ratio, median (IQR)	0.10(0-0.22)	0.38(0.11-0.57)	<0.001
Relative fast progressors, n (%)	98(39.5)	45(73.8)	<0.001
Relative slow progressors, n (%)	150(60.5)	16(26.2)	
HT ^b , n (%)	59(23.8)	32(55.2)	<0.001
HI1	27(10.9)	7(12.1)	0.797
HI2	13(5.2)	5(8.6)	0.325
PH, n (%)	19(7.7)	20(34.5)	<0.001
PH1	7(2.8)	5(8.6)	0.056
PH2	12(4.8)	15(25.9)	<0.001
sICH ^c	9(3.6)	14(24.1)	<0.001

SBP, Systolic blood pressure; DBP, Diastolic blood pressure; NIHSS, National Institutes of Health Stroke Scale; ICA, internal carotid artery; MCA, middle cerebral artery; LAA, large-artery atherosclerosis; CE, cardio embolism; OTIP, onset to imaging at primary center; ITI: imaging time at Primary Center to imaging at Comprehensive Center; OTP, symptoms onset to groin puncture time; OTR, symptoms onset to recanalization time; PT, operation time; ASPECT, Alberta Stroke Program Early CT; HT, Hemorrhagic transformation; mTICI, modified Thrombolysis in Cerebral Infarction; PH, Parenchymal hemorrhage; sICH, Symptomatic intracranial hemorrhage; mRS, Modified Rankin Scale. TOAST, Trial of ORG 10172 in Acute Stroke Treatment.

a Missing data in eleven patients

b Missing data in three patients.

c Missing data in three patients

Table S6 Multivariable models of different outcomes

Multivariable models with favorable outcome as the dependent factor						
	Model1		Mode 2		Mode3	
	OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value
Sex	1.840 (1.011-3.348)	0.046	1.873 (1.025-3.424)	0.041	1.974 (1.078-3.614)	0.028
Admission NIHSS	1.105 (1.034-1.180)	0.003	1.110 (1.038-1.186)	0.002	1.096 (1.025-1.172)	0.007
Collateral status	0.370 (0.196-0.699)	0.002	0.445 (0.234-0.847)	0.014	0.433 (0.225-0.834)	0.012
mTICI (2b/3)	0.353 (0.101-1.228)	0.102	0.260 (0.073-0.923)	0.037	0.295 (0.084-1.030)	0.056
OTP 6-24h	3.340 (1.791-6.226)	<0.001	2.797 (1.524-5.131)	0.001	3.049 (1.652-5.626)	0.001
sICH ^a	11.257 (2.311-54.846)	0.003	9.675 (2.011-46.552)	0.005	10.577(2.193-51.020)	0.003
Absolute fast progressors	3.395 (1.844-6.250)	<0.001	-	-	-	-
Relative fast progressors	-	-	3.754 (2.050-6.873)	<0.001	-	-
ASPECT decay	-	-	-	-	1.556 (1.272-1.903)	<0.001
Multivariable models with hemorrhagic transformation as the dependent factor						
	Model1		Mode 2		Mode3	
	OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value
CE	2.597 (1.185-5.689)	0.017	2.676 (1.223-5.858)	0.014	2.639 (1.206-5.775)	0.015
PT	1.009 (1.002-1.016)	0.008	1.009 (1.002-1.016)	0.010	1.009 (1.002-1.015)	0.013
Absolute fast progressors	1.534 (0.856-2.747)	0.150	-	-	-	-
Relative fast progressors	-	-	1.909 (1.061-3.434)	0.031	-	-
ASPECT decay	-	-	-	-	1.170 (0.998-1.370)	0.052
Multivariable models with symptomatic intracranial hemorrhage as the dependent factor						
	Model1		Mode 2		Mode3	
	OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value
mTICI (2b/3)	-	-	0.220 (0.073-0.660)	0.007	0.232 (0.078-0.688)	0.008
Absolute fast progressors	-	-	-	-	-	-

Relative fast progressors	-	-	1.955 (0.701-5.4510)	0.200	-	-
ASPECT decay	-	-	-	-	1.107 (0.871-1.408)	0.406
Multivariable models with death as the dependent factor						
	Model1		Mode 2		Mode3	
	OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value
Admission NIHSS	1.215(1.114-1.325)	<0.001	1.208 (1.107-1.318)	<0.001	1.196 (1.095-1.305)	<0.001
sICH ^a	9.940 (3.405-29.011)	<0.001	9.409 (3.229-27.423)	<0.001	9.096 (3.131-26.422)	<0.001
Absolute fast progressors	1.883 (0.836-4.243)	0.127	-	-	-	-
Relative fast progressors	-	-	2.571 (1.134-5.829)	0.024	-	-
ASPECT decay	-	-	-	-	1.250 (1.025-1.525)	0.028

NIHSS, National Institutes of Health Stroke Scale; mTICI, modified Thrombolysis in Cerebral Infarction; OTP, symptoms onset to groin puncture time; ICH, intracranial hemorrhage; sICH, Symptomatic intracranial hemorrhage; ASPECT, Alberta Stroke Program Early CT; CE, cardio embolism; PT, operation time

a Missing data in three patients