Supplementary Document

Analyses of patients with intracranial atherosclerotic stenosis but without atrial fibrillation

Classification process and final grouping

Among the 720 patients enrolled in the registry, 496 were included in the current analyses. We performed a blinded evaluation of the underlying etiology, using endovascular treatment angiography combined with evaluation of repeat angiography during admission following endovascular treatment (EVT) (608 of 720 patients). After patients with atrial fibrillation were excluded from the intracranial atherosclerotic stenosis (ICAS) group, the Embolic and ICAS-related groups comprised included 421 and 75 patients, respectively.

Description of supplementary tables

Supplementary Table 1 describes the baseline clinical and laboratory data according to etiological classification. Supplementary Table 2 shows the comparison of treatments and outcomes. Supplementary Table 3 shows the effects of underlying etiology on good outcomes using a logistic regression model. These results from patients with ICAS-related occlusion but without atrial fibrillation are similar to the results obtained from patients with ICAS occlusion with or without atrial fibrillation in the main manuscript.

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Supplementary Table 1. Comparison of baseline characteristics and risk factors among groups

Characteristic	Embolic group (n=421)	ICAS group (n=75)	P
Age (yr)	68.2±12.4	63.16±13.14	0.002
Male sex	208 (49.8)	50 (66.7)	0.006
Premorbid mRS score	0 (0–0)	0 (0–0)	0.586
Initial NIHSS score	17 (13–21)	15 (11–19)	0.027
ASPECTS on noncontrast CT	7 (4–9)	8 (5–9)	0.248
Location of occlusive lesions on baseline angiography			<0.001
ICA T	170 (40.4)	13 (17.3)	
MCA M1	205 (48.7)	61 (81.3)	
MCA M2	46 (10.9)	1 (1.3)	
Hypertension	257 (61.0)	44 (58.7)	0.698
Diabetes mellitus	96 (22.8)	22 (29.3)	0.221
Coronary artery occlusive disease	53 (12.6)	5 (6.7)	0.141
Current smoking	84 (20.0)	26 (34.7)	0.005
Atrial fibrillation	267 (63.4)	0 (0)	<0.001
Prior antiplatelet	131 (31.1)	8 (10.7)	<0.001
Prior anticoagulant	71 (16.9)	1 (1.3)	<0.001
Laboratory data			
Blood glucose on admission (mg/dL)	137.6±52.0	143.4±54.1	0.376
HbA1c (%)	6.15±1.12	6.21±1.14	0.702
Total cholesterol (mg/dL)	163.0±52.2	188.0±43.4	<0.001
Triglyceride (mg/dL)	101.3±55.0	138.7±149.1	0.035
HDL-C (mg/dL)	47.2±21.6	44.2±10.7	0.252
LDL-C (mg/dL)	96.6±34.4	119.9±40.4	<0.001
ESR (mm/hr)	14.1±14.5	13.7±13.5	0.845
CRP (mg/dL)	0.68±1.70	1.30±4.41	0.229

Values are presented as mean±standard deviation, number (%), or median (interquartile range).
ICAS, intracranial atherosclerotic stenosis; mRS, modified Rankin Scale; NIHSS, National Institutes of Health Stroke Scale; ASPECTS, Alberta Stroke Program Early CT Scores; CT, computed tomography; ICA, internal carotid artery; MCA, middle cerebral artery; HbA1c, glycosylated hemoglobin; HDL-C, high density lipoprotein cholesterol; LDL-C, low density lipoprotein cholesterol; ESR, erythrocyte sedimentation rate; CRP, C-reactive protein.

Supplementary Table 2. Comparison of treatment and outcomes among groups

Variable	Embolic group	ICAS group	P
Onset-to-puncture time (min)	235 (165–374)	320 (245–560)	<0.001
Procedure time (min)	55 (40–83)	68 (49–97)	0.002
Intravenous tPA	235 (55.8)	34 (45.3)	0.093
Balloon guide catheter usage	311 (73.9)	49 (65.3)	0.127
Stent retriever usage	248 (58.9)	61 (81.3)	<0.001
Direct aspiration usage	281 (66.7)	43 (57.3)	0.115
Intracranial stenting	9 (2.1)	9 (12.0)	<0.001
Intracranial ballooning without stenting	2 (0.5)	7 (9.3)	<0.001
Number of techniques	1 (1–2)	2 (2–3)	<0.001
Final reperfusion grade (mTICI)			0.027
Grade 0	7 (1.7)	6 (8.0)	
Grade 1	8 (1.9)	2 (2.7)	
Grade 2a	71 (16.9)	10 (13.3)	
Grade 2b	209 (49.6)	33 (44.0)	
Grade 3	126 (29.9)	24 (32.0)	
Successful reperfusion (mTICI 2b–3)	335 (79.6)	57 (76.0)	0.484
Final recanalization grade (AOL)			<0.001
Grade 0	6 (1.4)	6 (8.0)	
Grade 1	9 (2.1)	16 (21.3)	
Grade 2	31 (7.4)	45 (60.0)	
Grade 3	375 (89.1)	8 (10.7)	
Intracerebral hemorrhage			0.504
No hemorrhage	272 (64.6)	56 (74.7)	
HT type 1	33 (7.8)	4 (5.3)	
HT type 2	48 (11.4)	7 (9.3)	
PH type 1	34 (8.1)	3 (4.0)	
PH type 2	34 (8.1)	5 (6.7)	
Serious hemorrhagic complications	45 (10.7)	6 (8.0)	0.480
Reocclusion on repeat angiographies	9 (2.5)	12 (17.9)	<0.001
3-Month mRS score	2 (1–4)	3 (1–4)	0.729
Good outcomes at 3 months	229 (54.5)	34 (45.3)	0.142

Values are presented as median (interquartile range) or number (%).
ICAS, intracranial atherosclerotic stenosis; tPA, tissue plasminogen activator; mTICI, modified treatment in cerebral ischemia; AOL, arterial occlusive lesion; HT, hemorrhagic transformation; PH, parenchymal hematoma; mRS, modified Rankin Scale.

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Supplementary Table 3. Results of logistic regression model for evaluating the association between occlusion etiologies and good outcomes

Variable	Odds ratio (95% CI)	P
Age (yr)	0.945 (0.925–0.966)	<0.001
Male sex	0.957 (0.585–1.565)	0.861
Premorbid mRS score	0.537 (0.377–0.767)	0.001
Initial NIHSS score	0.897 (0.853–0.944)	<0.001
Baseline intracranial occlusion		0.561
ICA T	Reference	
MCA M1	1.224 (0.723–2.072)	0.452
MCA M2	1.544 (0.656–3.636)	0.320
ASPECTS	1.318 (1.202–1.445)	<0.001
Intravenous tPA use	1.095 (0.634–1.889)	0.745
Onset-to-puncture time (min)	0.999 (0.998–1.000)	0.062
Procedure time (min)	0.980 (0.973–0.987)	<0.001
Successful reperfusion	2.451 (1.344–4.470)	0.003
PH2 or SAH 3–4	0.214 (0.080–0.573)	0.002
Underlying etiology (ICAS vs. embolic occlusion)	0.432 (0.218–0.858)	0.016

CI, confidence interval; mRS, modified Rankin Scale; NIHSS, National Institutes of Health Stroke Scale; ICA, internal carotid artery; MCA, middle cerebral artery; ASPECTS, Alberta Stroke Program Early CT Scores; tPA, tissue plasminogen activator; PH, parenchymal hematoma; SAH, subarachnoid hemorrhage; ICAS, intracranial atherosclerotic stenosis.