

Table S1 Protocol and parameters of brain MR imaging

Parameters	T1W	T2W	FLAIR	DWI
Sequence	FSE	FSE	FSE	EPI
TR/TE, ms	2374/24	5972/70	8400/140	3000/71
Flip angle, degree	111	142	111	–
FOV, mm ²	250×250	250×250	250×250	250×250
Matrix	352×256	384×384	284×224	160×160
Slice thickness, mm	5	5	5	5
Slice number	24	24	24	24
b value	–	–	–	0/1,000
Scanning time	1'24"	1'18"	1'42"	0'24"

DWI, diffusion weighted imaging; EPI, echo planar imaging; FLAIR, fluid-attenuated inversion recovery; FSE, fast spin echo; FOV, field of view; MR, magnetic resonance imaging; TR, repetition time; TE, echo time; T1W, T1-weighted; T2W, T2-weighted.

Table S2 Comparison between included and excluded patients in the study

Characteristics	Mean \pm SD or n (%)		P value
	Included (n=105)	Excluded (n=21)	
Age	65.5 \pm 8.4	64.7 \pm 8.3	0.529
Gender, male	91 (86.7)	19 (90.5)	0.905
BMI, kg/m ²	24.9 \pm 2.7	24.5 \pm 2.4	0.633
Education level, >12 years	35 (33.3)	6 (28.6)	0.671
Hypertension	76 (72.4)	16 (76.2)	0.720
SBP, mmHg	134.0 \pm 16.2	134.3 \pm 22.1	0.394
DBP, mmHg	79.4 \pm 9.8	83.33 \pm 7.6	0.064
BPD, mmHg	54.6 \pm 13.9	51.0 \pm 20.8	0.158
Hyperlipidemia	59 (56.2)	8 (38.1)	0.129
HDL, mmol/L	1.0 \pm 0.2	1.1 \pm 0.3	0.313
LDL, mmol/L	2.1 \pm 0.8	2.2 \pm 0.8	0.966
TC, mmol/L	3.7 \pm 0.8	3.8 \pm 0.9	0.594
TG, mmol/L	1.6 \pm 0.8	1.5 \pm 0.7	0.839
Diabetes	42 (40.0)	11 (52.4)	0.294
Glu, mmol/L	6.2 \pm 1.6	6.4 \pm 1.6	0.471
Smoke	69 (65.7)	14 (66.7)	0.933
Alcohol	70 (66.7)	13 (61.9)	0.674
Coronary heart disease	19 (18.1)	3 (14.30)	0.916
Stroke	31 (29.5)	14 (66.7)	0.001
TIA	48 (45.7)	8 (38.1)	0.521
Antiplatelet	86 (81.9)	16 (76.2)	0.761
Anticoagulation	2 (1.9)	0 (0)	0.693
Statin use	86 (81.9)	12 (57.1)	0.028
Hypoglycemic treatment	34 (32.4)	9 (42.9)	0.355
Antihypertensive treatment	62 (59.0)	14 (66.7)	0.515

BMI, body mass index; SBP, systolic blood pressure; DBP, diastolic blood pressure; BPD, blood pressure difference; HDL, high density lipoprotein; LDL, low density lipoprotein; SD, standard deviation; TC, total cholesterol; TG, triglyceride; Glu, glucose; TIA, transient ischemic attack.

Table S3 Domain scores of MoCA in the study population

Domain of MoCA	All patients (n=105)		Cognitive unimprovement (n=46)		Cognitive improvement (n=59)	
	Pre-CEA	Post-CEA	Pre-CEA	Post-CEA	Pre-CEA	Post-CEA
Visuospatial/executive	3.0 (2.0, 4.0)	3.0 (2.0, 4.0)	3.0 (2.0, 4.0)	3.0 (2.0, 4.0)	3.0 (2.0, 4.0)	3.0 (2.0, 4.0)
Naming	3.0 (2.0, 3.0)	3.0 (2.0, 3.0)	3.0 (2.0, 3.0)	3.0 (2.0, 3.0)	3.0 (2.0, 3.0)	3.0 (2.0, 3.0)
Attention	5.0 (4.0, 6.0)	6.0 (5.0, 6.0)	6.0 (4.75, 6.0)	6.0 (5.0, 6.0)	5.0 (4.0, 6.0)	6.0 (5.0, 6.0)
Language	1.0 (1.0, 2.0)	1.0 (1.0, 2.0)	1.0 (1.0, 2.0)	1.0 (1.0, 2.0)	1.0 (1.0, 2.0)	2.0 (1.0, 2.0)
Abstraction	0.0 (0.0, 1.0)	1.0 (0.0, 1.0)	0.0 (0.0, 1.0)	1.0 (0.0, 1.0)	0.0 (0.0, 1.0)	1.0 (0.0, 1.0)
Delayed recall	0.0 (0.0, 1.0)	2.0 (0.0, 4.0)	0.0 (0.0, 2.0)	1.0 (0.0, 3.0)	0.0 (0.0, 1.0)	3.0 (1.0, 4.0)
Orientation	5.0 (5.0, 6.0)	6.0 (5.0, 6.0)	6.0 (5.0, 6.0)	5.0 (5.0, 6.0)	5.0 (5.0, 6.0)	6.0 (5.0, 6.0)

All the measurements were described as median and interquartile range. CEA, carotid endarterectomy; MoCA, Montreal Cognitive Assessment.

Table S4 Absolute risk for associations between carotid plaque characteristics and changes of MoCA

Characteristics	Univariate regression			Multivariate regression (model 1)			Multivariate regression (model 2)		
	RD	95% CI	P value	ARD	95% CI	P value	ARD	95% CI	P value
Morphology									
Mean lumen area, mm ²	0.0014	-0.0078, 0.0106	0.7638	0.0012	-0.0079, 0.0104	0.7929	0.0017	-0.0072, 0.0106	0.7078
Mean wall area, mm ²	-0.0002	-0.0057, 0.0053	0.9345	0.0016	-0.0041, 0.0073	0.5850	0.0011	-0.0043, 0.0066	0.6843
Mean total vessel area, mm ²	0.0002	-0.0041, 0.0045	0.9350	0.0012	-0.0031, 0.0054	0.5862	0.0010	-0.0031, 0.0051	0.6256
Maximum wall thickness, mm	-0.0111	-0.0555, 0.0333	0.6236	-0.0012	-0.0513, 0.0489	0.9620	-0.0008	-0.0492, 0.0476	0.9744
Mean normalized wall index, %	-0.0024	-0.0080, 0.0033	0.4133	0.0013	-0.0091, 0.0117	0.8108	-0.0014	-0.0102, 0.0073	0.7486
Stenosis, %	0.0038	-0.0043, 0.0118	0.3558	0.0048	-0.0035, 0.0131	0.2604	-	-	-
Presence of plaque components									
LRNC	0.1285	-0.2109, 0.4679	0.4581	0.2340	-0.0785, 0.5464	0.1422	0.2647	-0.0263, 0.5556	0.0746
IPH	-0.0179	-0.2080, 0.1723	0.8540	0.0329	-0.1573, 0.2232	0.7344	0.0651	-0.1168, 0.2470	0.4831
Calcification	0.0077	-0.2444, 0.2598	0.9525	0.0703	-0.1873, 0.3279	0.5928	0.0498	-0.2028, 0.3024	0.6994
Ulcer	-0.0617	-0.2748, 0.1514	0.5703	-0.0273	-0.2390, 0.1845	0.8008	0.0313	-0.1723, 0.2348	0.7635
FCR	-0.0059	-0.1971, 0.1853	0.9518	0.0447	-0.1465, 0.2358	0.6468	0.0919	-0.0900, 0.2738	0.3222
Volume of plaque components*									
LRNC, mm ³	-0.0002	-0.0004, 0.0001	0.3154	-0.0001	-0.0004, 0.0002	0.4464	-0.0000	-0.0004, 0.0003	0.8007
IPH, mm ³	0.0002	-0.0003, 0.0007	0.4735	0.0002	-0.0003, 0.0008	0.4326	0.0003	-0.0002, 0.0009	0.1948
Calcification, mm ³	-0.0014	-0.0028, -0.0000	0.0455	-0.0014	-0.0026, -0.0002	0.0255	-0.0011	-0.0022, -0.0000	0.0433
Ulcer, mm ³	-0.0018	-0.0070, 0.0035	0.5099	-0.0013	-0.0073, 0.0048	0.6828	-0.0009	-0.0061, 0.0044	0.7454
Maximum percentage of plaque component area*									
LRNC, %	0.0012	-0.0039, 0.0063	0.6437	0.0016	-0.0033, 0.0065	0.5227	0.0012	-0.0038, 0.0062	0.6465
IPH, %	0.0017	-0.0042, 0.0077	0.5732	0.0019	-0.0044, 0.0081	0.5592	0.0028	-0.0028, 0.0084	0.3248
Calcification, %	-0.0109	-0.0181, -0.0038	0.0026	-0.0114	-0.0187, -0.0042	0.0021	-0.0109	-0.0178, -0.0040	0.0020
Ulcer, %	-0.0084	-0.0250, 0.0083	0.3263	-0.0083	-0.0285, 0.0120	0.4227	-0.0056	-0.0236, 0.0125	0.5455
Cumulative slice of plaque components*									
LRNC	0.0025	-0.0248, 0.0297	0.8595	0.0087	-0.0182, 0.0357	0.5255	-0.0000	-0.0258, 0.0258	0.9995
IPH	0.0129	-0.0253, 0.0511	0.5089	0.0161	-0.0248, 0.0569	0.4403	0.0222	-0.0150, 0.0594	0.2419
Calcification	-0.0382	-0.0607, -0.0156	0.0009	-0.0408	-0.0631, -0.0186	0.0003	-0.0382	-0.0619, -0.0144	0.0016
Ulcer	0.0891	-0.0807, 0.2589	0.3038	0.1252	-0.0649, 0.3153	0.1968	0.1159	-0.0203, 0.2521	0.0953

*, only patients with the corresponding component present were included in the comparison. Model 1: adjusted for age, gender, education level and Fazekas score; Model 2: adjusted for age, gender, education level, Fazekas score, stenosis, coronary heart disease and antihypertensive treatment. MoCA, Montreal Cognitive Assessment; LRNC, lipid-rich necrotic core; IPH, intraplaque hemorrhage; FCR, fibrous cap rupture; RD, risk difference; ARD, adjusted risk difference.