Vessel wall differences between middle cerebral artery and basilar artery plaques on magnetic resonance imaging

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Supplementary Table S1. Estimates of null model for remodeling ratio.

Parameter	Estimate	Std. Error	T/Z value	P value
Fixed Effects				
Intercept	1.0673	0.0156	68.57	<0.001
Covariance Parameters				
Residual	0.0119	0.0033	3.59	<0.001
Intercept	0.0074	0.0041	1.81	0.035

-2LL = -108.7, AIC = -104.7, AICC = -104.6, BIC = -100.2.

ICC = 38.34%.

The restricted maximum likelihood estimation was used.

LL, log likelihood; AIC, Akaike's information criterion; AICC, finite sample corrected version of AIC; BIC, Bayesian information criterion; ICC, intra-class correlation coefficient.

Supplementary Table S2. Estimates of the final model for remodeling ratio.

Parameter	Estimate	Std. Error	T/Z value	P value
Fixed Effects				
Intercept	1.1977	0.0412	29.05	<.0001
Plaque location*	-0.0095	0.0317	-0.30	0.7681
Degree of stenosis	-0.3849	0.0811	-4.75	<.0001
Symptomatic plaque	-0.0268	0.0286	-0.94	0.3636
Indeterminate plaque	-0.0031	0.0388	-0.08	0.9368
Asymptomatic plaque†	0	—	—	—
Covariance Parameters				
Residual	0.0106	0.0032	3.34	0.0004
Intercept	0.0047	0.0036	1.31	0.0956

-2LL = -114.7, AIC = -110.7, AICC = -110.6, BIC = -106.3

Explained variance at level 1: (0.0119 -0.0106)/0.0119 = 0.109. Explained variance at level 2: (0.0074 - 0.0047)/0.0074 = 0.365.

The restricted maximum likelihood estimation was used.

* Middle cerebral artery plaque vs. basilar artery plaque.

†Reference for symptomatic plaque and indeterminate plaque.

LL, log likelihood; AIC, Akaike's information criterion; AICC, finite sample corrected version of AIC; BIC, Bayesian information criterion; ICC, intra-class correlation coefficient.

Supplementary Table S3. Model fit of final model and null model for remodeling ratio.

Parameter	Final Model	Null Model
-2LL	-140.3	-115.2
AIC	-126.3	-109.2
AICC	-125.0	-109.0
BIC	-110.8	-102.4

The lower the better for the parameters.

The -2LL of the final model was small than that of the null model (chi-square value=-115.2-(-140.3) = 25.1, degree of freedom=7-3=4, $P<0.001$).

The maximum likelihood estimation was used.

LL, log likelihood; AIC, Akaike's information criterion; AICC, finite sample corrected version of AIC; BIC, Bayesian information criterion.

Supplementary Table S4. Estimates of null model for eccentricity index.

Parameter	Estimate	Std. Error	T/Z value	P value
Fixed Effects				
Intercept	0.5540	0.0110	50.59	<0.001
Covariance Parameters				
Residual	0.0027	0.0008	3.52	<0.001
Intercept	0.0064	0.0017	3.76	<0.001

-2LL = -204.7, AIC = -200.7, AICC = -200.6, BIC = -196.2.

ICC= 29.67%.

About 30 per cent of the variance in eccentricity index stems from differences among patients. This clearly indicates that a multilevel model is required.

The restricted maximum likelihood estimation was used.

LL, log likelihood; AIC, Akaike's information criterion; AICC, finite sample corrected version of AIC; BIC, Bayesian information criterion; ICC, intra-class correlation coefficient.

Supplementary Table S5. Estimates of the final model for eccentricity index.

Parameter	Estimate	Std. Error	T/Z value	P value
Fixed Effects				
Intercept	0.6113	0.0529	11.55	<.0001
Plaque location*	0.0158	0.0179	0.88	0.3865
Plaque burden	-0.0559	0.0382	-1.46	0.1556
Symptomatic plaque	0.0361	0.0147	2.45	0.0280
Indeterminate plaque	-0.0008	0.0206	-0.04	0.9694
Asymptomatic plaque†	0	—	—	—
Covariance Parameters				
Residual	0.0018	0.0006	3.01	0.0013
Intercept	0.0049	0.0014	3.38	0.0004

-2LL = -210.2, AIC = -206.2, AICC = -206.0, BIC = -201.7

Explained variance at level 1: (0.0027 -0.0018)/0.0027 = 0.333. Explained variance at level 2: (0.0064 - 0.0049)/0.0064 = 0.234.

The restricted maximum likelihood estimation was used.

* Middle cerebral artery plaque vs. basilar artery plaque.

†Reference for symptomatic plaque and indeterminate plaque.

LL, log likelihood; AIC, Akaike's information criterion; AICC, finite sample corrected version of AIC; BIC, Bayesian information criterion; ICC, intra-class correlation coefficient.

Supplementary Table S6. Estimates of null model for plaque range.

Parameter	Estimate	Std. Error	T/Z value	P value
Fixed Effects				
Intercept	146.37	6.37	22.98	<0.001
Covariance Parameters				
Residual	1927.90	628.36	3.07	0.001
Intercept	1385.88	826.20	1.68	0.047

-2LL = 1092.2, AIC = 1096.2, AICC = 1096.3, BIC = -1100.7.

ICC= 41.82%.

About 42 per cent of the variance in plaque range stems from differences among patients. This clearly indicates that a multilevel model is required.

The restricted maximum likelihood estimation was used.

LL, log likelihood; AIC, Akaike's information criterion; AICC, finite sample corrected version of AIC; BIC, Bayesian information criterion; ICC, intra-class correlation coefficient.

Supplementary Table S7. Estimates of the final model for plaque range.

Parameter	Estimate	Std. Error	T /Z value	P value
Fixed Effects				
Intercept	87.7430	30.4984	2.88	0.0054
Plaque location*	5.4762	10.2353	0.54	0.5972
Plaque burden	47.3883	21.5642	2.20	0.0371
Symptomatic plaque	-21.2443	9.4811	-2.24	0.0418
Indeterminate plaque	-29.4718	12.3427	-2.39	0.0316
Asymptomatic plaque†	0	—	—	—
Covariance Parameters				
Residual	1460.55	343.58	4.25	<0.001
Intercept	139.02	291.71	0.48	0.3168

-2LL = 963.9, AIC = 967.9, AICC = 968.0, BIC = 972.3

Explained variance at level 1: (1927.90 -1460.55)/ 1927.90 = 24.24%. Explained variance at level 1: (1385.88-139.02)/1385.88=89.97%.

* Middle cerebral artery plaque vs. basilar artery plaque.

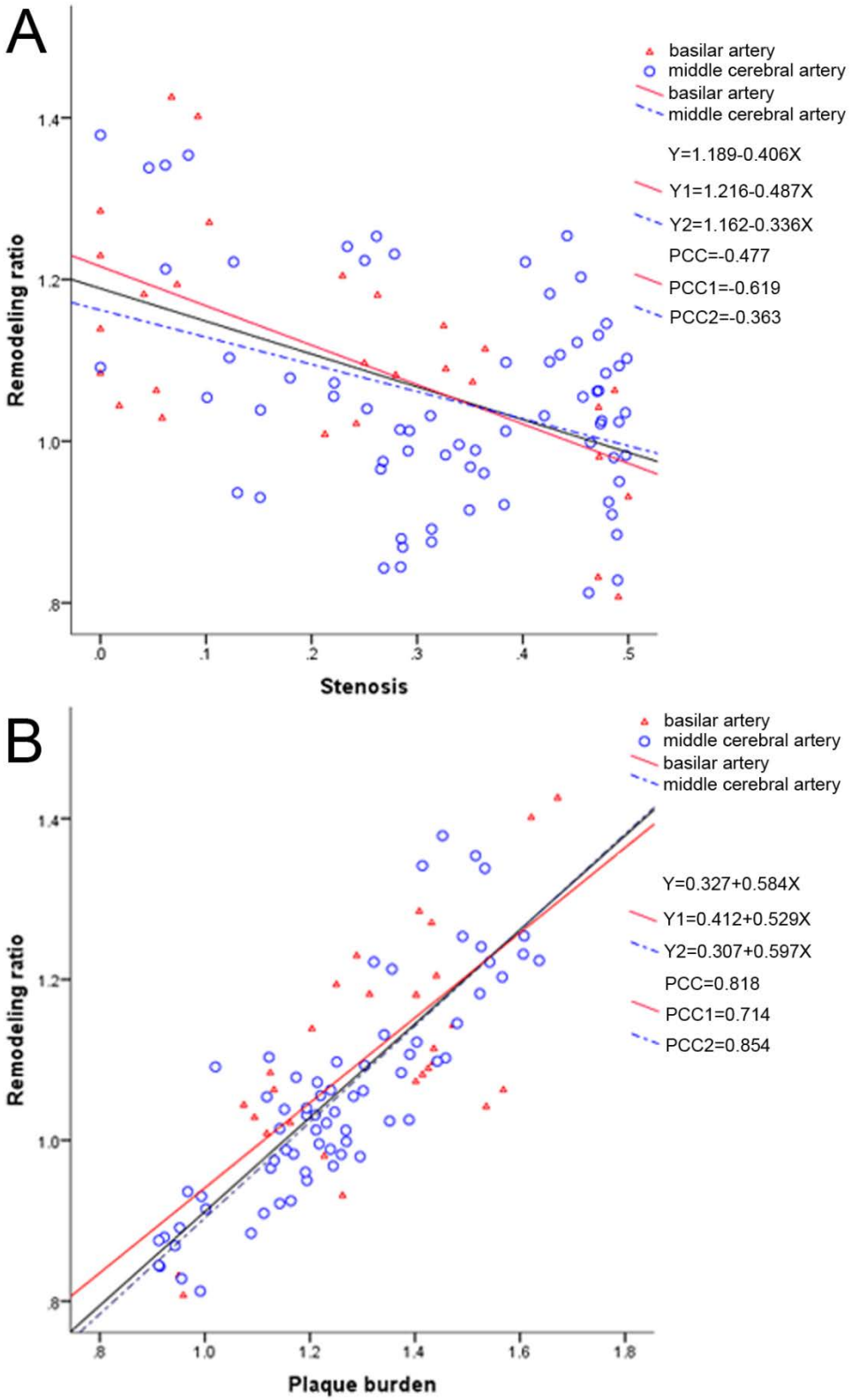
†Reference for symptomatic plaque and indeterminate plaque.

LL, log likelihood; AIC, Akaike's information criterion; AICC, finite sample corrected version of AIC; BIC, Bayesian information criterion; ICC, intra-class correlation coefficient.

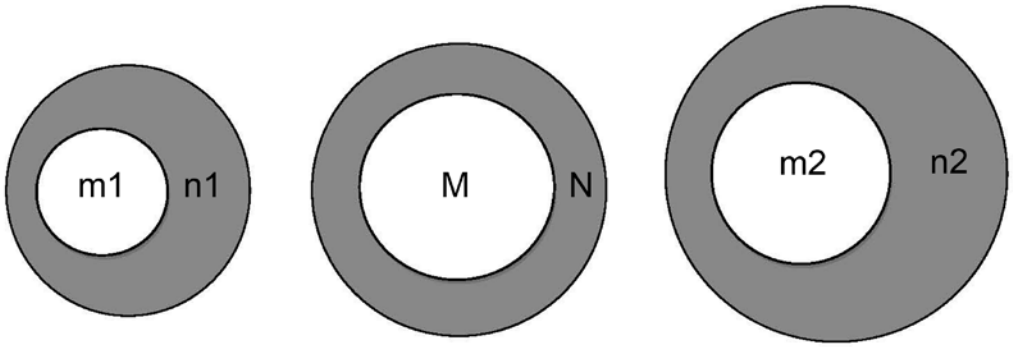
Supplementary Table S8. Additional analysis.

Parameter	Estimate	Std. Error	T value	P value
Remodeling ratio				
Plaque location*	-0.0423	0.0314	-1.35	0.1875
Degree of stenosis	-0.2178	0.0687	-3.17	0.0035
Symptomatic plaque	-0.0116	0.0278	-0.42	0.6819
Indeterminate plaque	-0.0056	0.0397	-0.14	0.8893
Asymptomatic plaque†	0	—	—	—
Eccentricity index				
Plaque location*	0.0252	0.0186	1.35	0.1859
Plaque burden	0.0354	0.0323	1.10	0.2810
Symptomatic plaque	0.0345	0.0154	2.25	0.0372
Indeterminate plaque	-0.0115	0.0219	-0.52	0.6075
Asymptomatic plaque†	0	—	—	—
Plaque range				
Plaque location*	6.2467	10.4012	0.60	0.5526
Plaque burden	61.6742	19.2759	3.20	0.0321
Symptomatic plaque	-23.4035	9.2089	-2.54	0.0205
Indeterminate plaque	-33.2456	12.8160	-2.59	0.0183
Asymptomatic plaque†	0	—	—	—

* Middle cerebral artery plaque vs. basilar artery plaque. † Reference for symptomatic plaque and indeterminate plaque. Ten plaques with ≥ 50% stenosis were included in the final model.



Supplementary Fig. S1. Linear regression for remodeling ratio as a function of stenosis (A) and plaque burden (B). PCC, pearson correlation coefficients.



Stenosis = (M-m)/M

Plaque Burden = n/N

Remodeling Ratio = (m+n)/(M+N) = M/(M+N)-Stenosis×M/(M+N)+(Plaque Burden)×N/(M+N)

Supplementary Fig. S2. The relationships among remodeling ratio, degree of stenosis, and plaque burden.