Supplemental Material

Insights into the Pathogenesis of Cerebral Fusiform Aneurysms: High Resolution - MRI and Computational Analysis.

Table e-1. Technical parameters for HR-MRI acquisition in a 3T Siemens Magnetom Skyra scanner.

Parameter	3D T1 SPACE	T2 SPACE	CE-MRA
TR (msec)	900	3000	3.3
TE (msec)	15	115	1.28
Flip angle	variable	variable	25
Bandwidth (Hz/pixel)	446	618	590
FOV (mm)	200 x 200	256 x 256	223 x 195
Matrix (mm)	320 x 320	256 x 256	252 x 284
Voxel size (mm)	0.6 x 0.6 x 0.6	1 x 1 x 1	0.6 x 0.6 x 0.8
Slice thickness (mm)	0.63	1	0.8
ETL	52	168	0
Acquisition time	6:44	3:48	0:15

CE-MRA: contrast-enhanced MRA; ETL: echo train length; FOV: field of view; TE: echo time; TR: response time.

Table e-2: Univariate and multivariable logistic regression for independent factors influencing aneurysm wall enhancement.

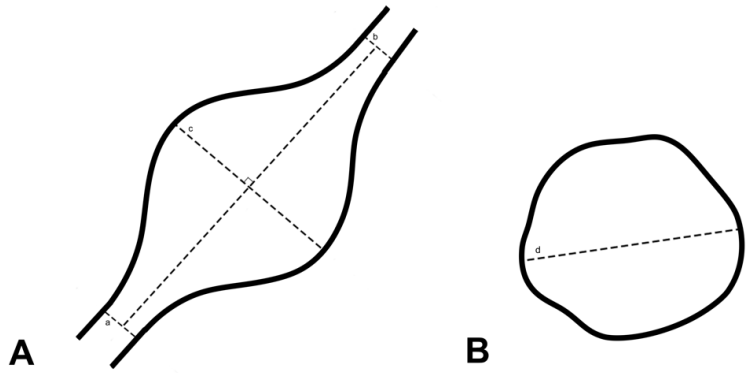
Variable	Univariate		Multivariate	
	OR (95% CI)	P	OR (95% CI)	P
Age	1.02 (0.96-1.09)	0.50	-	-
Sex	1.45 (0.60-3.53)	0.41	-	-
Hypertension	1.18 (0.60-2.35)	0.63	-	-
Hyperlipidemia	0.92 (0.48-1.74)	0.79	-	-
Diabetes	1.26 (0.49-3.25)	0.63	-	-
Smoking	1.82 (0.95-3.51)	**0.07**	1.52 (0.72-3.21)	0.27
Aneurysm Diameter	1.33 (1.18-1.50)	**<0.001**	1.30 (1.15-1.47)	**<0.001**
Aneurysm Type (Fusiform vs Saccular)	3.67 (1.46-9.19)	**0.006**	1.61 (0.52-4.98)	0.41

Table e-3. Baseline characteristics of fusiform aneurysms positive/negative for microhemorrhage.

Variable	Total QSM Data N=10	Positive Microhemorrhage N=5	Negative Microhemorrhage N=5	P
Aneurysm CR (mean ± SD)	0.54 ± 0.25	0.76 ± 0.13	0.32 ± 0.09	**<0.001**
Volume (mean ± SD, mm^3)	1387.0 ± 1909.3	2569.4 ± 2166.9	204.5 ± 107.5	**0.041**
Diameter (mean ± SD, mm)	9.9 ± 6.5	15.1 ± 5.1	4.7 ± 0.76	**0.002**
Enhancing (%)	4 (40)	4 (80.0)	0 (0.0)	**0.010**

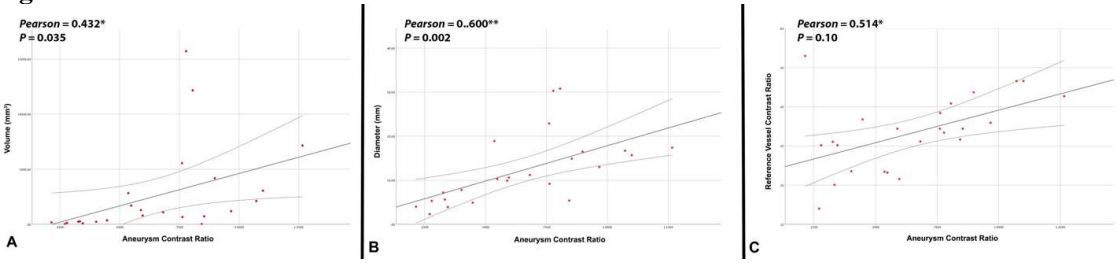
QSM: Quantitative Susceptibility Mapping. Significant *P* values are highlighted in **bold**.

Figure e-1.



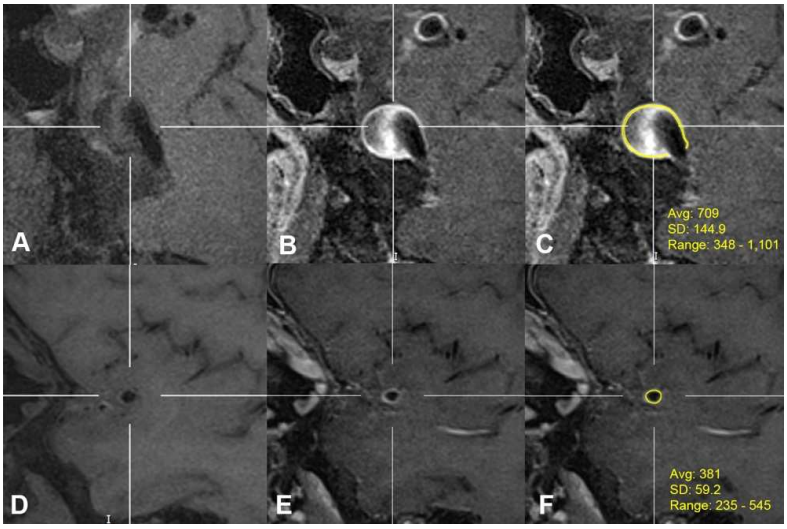
Schematic representation of maximal diameter measurements (c and d) in different views. (**Left**) Aneurysm boundaries were defined by a x 1.5 normal diameter of the parent vessel (a and b) (**Right**) Cross-sectional diameter (d) was measured at the greatest length.

Figure e-2.



Scatter plot showing correlations between the contrast ratio of fusiform aneurysms and (**A**) volume, (**B**) diameter, and (**C**) reference vessel contrast ratio.

Figure e-3.



Sagittal T1-pre MRI showing a large basilar aneurysm (**A**) and an orthogonal view of the MCA (**D**). T1-post MRI shows avid enhancement of the aneurysm **(B**) and MCA (**E**). Region of interest of the aneurysmal wall (**C**) and MCA **(F**) shows average (Avg), standard deviation (SD), and range of signal intensity. Notice the avid enhancement of the aneurysm (CR: 1.1) and of the MCA (CR: 0.98).