Fusiform Aneurysms are Associated with Aortic Root Dilatation in Patients with Subarachnoid Hemorrhage

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Patient characteristics in 151 patients with ruptured intracranial aneurysms

Characteristics (n=151)	
Mean age ± SD (range)	56 ± 12.9 (17-86)
Female (%)	115/151 (76%)
Mean body surface area (m^2)	1.86 ± 0.3 (1.3-2.7)
Smoking (%)	59/124 (48%)
Hypertension (%)	78/151 (52%)
Hyperlipidemia (%)	33/151 (22%)
Coronary artery disease (%)	11/151 (7%)
Fusiform type (%)	9/151 (6%)
Posterior circulation location (%)*	20/151 (14%)
Mean size aneurysm (mm)**	6.8 ± 4.1 (1.0-26.0)
Multiple aneurysms (%)	29/151 (19%)
Aortic root diameter (cm)	3.07 ± 0.4 (2.2-4.6)

*Anterior circulation location includes anterior communicating artery, posterior communicating artery, middle cerebral artery, paraclinoid internal carotid artery, internal carotid artery bifurcation, and anterior choroidal artery, while posterior circulation location includes basilar tip, posterior inferior cerebellar artery and vertebral artery** mean size of the largest aneurysm including unruptured aneurysms.

References

[1] Shin YW, Jung KH, Kim JM, Cho YD, Lee ST, Chu K, Kim M, Lee SK, Han MH, Roh JK. Echocardiographic evidence of innate aortopathy in the human intracranial aneurysm. PLoS One. 2014 Jun 25;9(6):e100569. doi: 10.1371/journal.pone.0100569. eCollection 2014. PubMed PMID: 24964197; PubMed Central PMCID: PMC4070985.

Introduction

Aortic root dimension (ARD), an echocardiographic marker of aortopathy, has recently been associated with intracranial aneurysm (IA) eccentricity, suggesting a common underlying pathophysiology between IA and aortopathy [1]. Our goal is to identify specific intracranial aneurysm related parameters that independently correlate with ARD in patients with subarachnoid hemorrhage.

Methods

Clinical and aneurysm-related parameters obtained from 151 patients with ruptured intracranial aneurysms, and who also underwent echocardiography, were examined. Univariate and multivariate analysis were performed to determine correlation of these parameters with ARD.

Results

151 patients who were evaluated from 2008 to 2013 were analyzed. Multivariate linear regression revealed that male gender and fusiform aneurysms were correlated with higher ARD ($p<0.001$ and $p= 0.041$, respectively) after adjustment for other morphological and clinical variables.

Conclusions

Fusiform aneurysms are correlated with larger ARD than saccular aneurysms, indicating a shared pathophysiological mechanism with aortopathy.

Multivariate linear regression describing the association between ARD (cm) and patient and aneurysm characteristics

	Multivariate		
Predictor	**Coefficient**	**95% C.I.**	**P- value**
Age	0.0003	-0.006 - 0.007	0.919
Female	-0.4296	-0.608 - -0.251	**6.19×10^{-6}**
Body surface area (m^2)	0.2711	-0.065 - 0.607	0.113
Smoking	0.0381	-0.109 - 0.185	0.607
Hypertension	-0.0106	-0.162 - 0.140	0.889
Hyper-lipidemia	0.1351	-0.051 - 0.321	0.153
Coronary artery disease	0.0683	-0.251 - 0.387	0.672
Fusiform type	0.4247	0.017 - 0.833	**0.041**
Posterior circulation location*	-0.0440	-0.266 - 0.178	0.696
Maximum size**	-0.0020	-0.021 - 0.017	0.835
Multiple aneurysms	-0.0890	-0.264 - 0.086	0.315

* Anterior circulation location includes anterior communicating artery, posterior communicating artery, middle cerebral artery, paraclinoid internal carotid artery, internal carotid artery bifurcation, and anterior choroidal artery, while posterior circulation location includes basilar tip, posterior inferior cerebellar artery and vertebral artery
** Size of the largest aneurysm including unruptured aneurysms.