

Natural history of unruptured fusiform vertebrobasilar aneurysms.

Michael Robert Levitt MD; David S. Xu MD; M. Yashar S. Kalani MD, PhD; Isaac Josh Abecassis; Ryan Morton MD; John D. Nerva MD; Leonardo Rangel-Castilla MD; Louis J. Kim MD; Felipe Albuquerque MD; Cameron G. McDougall MD
Barrow Neurological Institute, Phoenix, AZ; University of Washington, Seattle WA; University at Buffalo, Buffalo, NY



Introduction

The treatment of unruptured fusiform aneurysms of the vertebrobasilar system is challenging with a high morbidity and mortality rate. However, the natural history and surgical outcome of these lesions is not well-characterized.

Figure 1



Methods

Three tertiary cerebrovascular referral centers retrospectively reviewed the records of patients with unruptured fusiform aneurysms of the intracranial vertebrobasilar system. Aneurysms of the basilar bifurcation and all saccular aneurysms were excluded. Patient presentation, angiographic and MRI characteristics, clinical course and outcome at either most recent medical follow-up or after surgical or endovascular treatment (if performed) were recorded.

Results

Fifty-one aneurysms were identified in the study period. Patient and aneurysm characteristics are shown in Tables 1 and 2.

Forty-two patients had at least one month of clinical follow-up (mean, 46.3 months; range, 1 month – 17.3 years). Four patients died within 14 days of presentation (two from aneurysmal rupture and two from brainstem infarction). One aneurysm ruptured after ten years of follow-up.

Symptom progression was seen in 50% and was not related to initial aneurysm diameter, brainstem edema or compression on MRI (Figure 1), infarction, anticoagulation or antiplatelet treatment. Sixteen patients (38%) underwent intervention (11 surgical, four endovascular and one combined) due to either symptomatic or radiographic progression. Worse outcome was seen in 81% in the intervention group compared to 31% in the nonsurgical group; perioperative mortality was 12.5%.

In both univariate and multivariate analyses (Table 3), worsening functional outcome or death was significantly associated with brainstem compression symptoms and surgical intervention.

Table 1: Patient Characteristics

Age	58.5 ± 13.6
Gender (M:F)	1.7:1
Presentation	%
Unsteady gait	31
Headache	27
Cranial neuropathy	23
Lateralizing signs	10
Incidental	12

Table 2: Aneurysm Characteristics

Maximum diameter (mm)	15.8 ± 9.1
Radiographic factor	%
Aneurysmal thrombus	50
Brainstem compression	42
Brainstem infarction	25

Table 3: Multivariate Analysis for mRS Progression or Death

	p-value	Odds Ratio	95% Confidence Interval	
			Lower	Upper
Brainstem symptoms	0.006	39.6	2.9	542.5
Intervention	0.019	39.6	1.8	858.8
Brainstem compression on MRI	0.641	0.5	0.0	7.8
Aneurysmal thrombus	0.410	2.5	0.3	21.5
Anticoagulation	0.141	11.3	0.4	287.2

Conclusions

Unruptured fusiform vertebrobasilar aneurysms are often associated with symptomatic progression but rarely rupture in follow-up. Progressive brainstem compression and surgical intervention are associated with worsening functional outcome and death.