Vertebral Artery Occlusive Disease: Data from the angiographically confirmed vertebral artery (ACVAD) disease registry

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BACKGROUND

Vertebral artery occlusive disease (VAOD), although equally prevalent as internal carotid artery occlusive disease, remains understudied. We performed this study to identify basic demographic and clinical characteristics of adult patients with angiographically confirmed VAOD.

METHODS

All patients aged 18 years or older who had angiographically confirmed (using catheter based angiography to ensure diagnostic accuracy) VAOD, defined as stenosis of 50% or greater, were included. The demographic and clinical characteristics (including associated clinical symptoms), and angiographic features including severity and location of stenosis, and collateral pathways were ascertained using pre-defined criteria. The protocol for data collection was approved by local Institutional Review Board and informed consent was waived. All cerebral angiographic procedures were performed by one operator (AIQ). Data from angiographic images; 1) the severity of stenosis; 2) side of stenosis (right or left); 3) location (intracranial which included dural location and extracranial disease); 4) characteristics of lesion (regular or irregular); and 5) presence of collaterals (retrograde filling from contralateral side, or anterograde filling from anastomoses by ipsilateral ascending cervical artery or occipital artery). The severity of intracranial stenosis was measured using the Warfarin-Aspirin Symptomatic Intracranial Disease (WASID) criteria and extracranial stenosis was measured using a previously described method.¹

Table 1. Baseline demographic and clinical characteristics and stroke related data of patients with and without vertebrobasilar insufficiency.

	Symptomatic	Asymptomatic	p-value
Overall number (%)	22	34	
Age	66.7 ± 11.7	65.4 ± 13.2	0.7
Gender			
Men	12 (54.5%)	19 (55.9%)	
Women	10 (45.5%)	15 (44.1%)	0.9
Race/Ethnicity			
Hispanic	3 (13.6%)	1 (2.9%)	0.4
White	17 (77.3%)	30 (88.2%)	
African American	2 (9.1%)	2 (5.9%)	
Headaches			
Migraine	3 (15%)	2 (11.8%)	
Non migraine	2 (10%)	15 (88.2%)	.024
Acute infarct on neuroimaging	9 (40.9%)	0 (0%)	<.0001
Recurrent ischemic symptoms	14 (70.0%)	0	<.0001
Transient ischemic attack	8 (36.4%)	0	<.0001
Ischemic stroke	14 (63.6%)	0	<.0001
Laterality of disease			
Unilateral	13 (59.1%)	31 (91.2%)	.004
Bilateral	9 (40.9%)	3 (8.8%)	
Right vertebral artery involvement			
Intracranial	1 (4.5%)	2 (5.6%)	0.7
Extracranial	10 (47.1%)	15 (44.1%)	
Both	1 (4.5%)	0 (0%)	
Complete occlusion	1 (4.5%)	2 (5.9%)	
Left vertebral artery involvement			
Intracranial	2 (9.1%)	0	.01
Extracranial	8 (36.4%)	17 (50.0%)	
Both	1 (4.5%)	0	
Complete occlusion	6 (27.3%)	4 (19.0%)	
Stenosis severity			
Moderate	4 (18.2%)	17 (50.0%)	
Severe	5 (22.7%)	4 (11.8%)	
Occluded	13 (59.1%)	13 (38.2%)	.04
Percent stenosis (±SD)	88.1 ± 16.5	75.4 ± 20.8	.02
Collaterals			
Retrograde filling from ascending cervical and occipital artery	0	5 (14.7%) [†]	.02
Filling from contralateral vertebral artery	11 (50.0%)	7 (20.6%)	

[†]-3 from ascending cervical; 1 from occipital artery; 1 from both ascending cervical and occipital arteries

RESULTS

A total of 56 patients with VAOD confirmed by cerebral angiography were identified. The mean patient age was 65.4 ±SD 11.7 years; 55.4% were men.

Clinical and imaging characteristics

VAOD was considered symptomatic in 22 (39.3%) of 56 patients; 8 and 14 had transient ischemic attack or ischemic stroke, respectively (Table 1). Recurrent ischemic symptoms were seen in 14 of 22 patients. Of the 56 patients, 9 patients had acute infarction on neuroimaging in vertebral or basilar artery distribution within preceding 3 months. Overall, 45 of the 56 patients with VAOD were using one or more antiplatelet agents. Twenty patients had concurrent diagnosed coronary artery disease. Eight patients underwent angioplasty and/or stent placement.

Angiographic features

Of 56 patients with VAOD, 37.5% were classified as suffering from moderate stenosis (50-69%), 16.1% from severe stenosis (70-99%) and 46.4% from occlusion of at least one vertebral artery. The VAOD was unilateral and bilateral in 44 and 12 patients, respectively. Collateral flow was seen in 23 patients either through anastomoses of distal vertebral artery with ascending cervical artery or occipital artery (n=5) or retrograde filling from contralateral vertebral artery (n=18). Nineteen had stenosis ≥50% or occlusion in the internal carotid artery.

There was a significantly higher frequency of bilateral vertebral artery disease in patients with ischemic symptoms (40.9% versus 8.8%, p=0.004, see Table 1). The severity of stenosis (% with SD) was significantly greater in patients with ischemic symptoms (88.1 ± 16.5 versus 75.4 ± 20.8, p=0.02). The proportion of patients with severe stenosis or occlusion was higher in patients with ischemic symptoms (82% versus 50%, p=.04.) Anterograde filling from anastomoses by ipsilateral ascending cervical artery or occipital artery was more common in patients with ischemic symptoms.

CONCLUSION

Registries such as ACVAD are of unique importance in order to provide better understanding of asymptomatic and symptomatic VAOD and assist in designing future clinical trials.

Reference:

1. Samuels OB, Joseph GJ, Lynn MJ, et al. A standardized method for measuring intracranial arterial stenosis. AJNR American journal of neuroradiology. 2000;21(4):643-6.