

Distribution of Carotid Arterial Lesions in Chinese Patients With Transient Monocular Blindness

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Background and Purpose—Asian patients with cerebrovascular diseases have more intracranial atherosclerosis and less extracranial carotid artery stenosis compared with white patients. We systemically evaluated the distribution of carotid arterial lesions in Chinese patients with transient monocular blindness (TMB), which was rarely reported.

Methods—We prospectively evaluated 105 consecutive patients with TMB. All of the patients received ocular and physical examinations, blood tests for coagulation function and autoimmune diseases, and ultrasonography of cervical and intracranial arteries. All of the carotid lesions were confirmed by magnetic resonance angiography or cerebral angiography.

Results—Of the 36 (34.3%) patients with significant carotid stenosis ($\geq 50\%$), 16 (15.2%) had extracranial carotid stenosis; 17 (16.2%) had carotid siphon stenosis; and 3 (2.9%) had both. The duration, onset, and patterns of visual loss were not different between patients with and without carotid arterial lesion.

Conclusions—This study signified the importance of carotid siphon stenosis as a probable underlying etiology for TMB in Chinese patients. (*Stroke*. 2006;37:531-533.)

Key Words: carotid arteries ■ Chinese ■ siphon stenosis ■ transient monocular blindness

Atherothrombotic embolism is the most clearly demonstrated mechanism of transient monocular blindness (TMB). The prevalence of ipsilateral extracranial carotid arterial lesion among patients experiencing TMB ranges from 16% to 75%, depending on the patient populations and the methods for detecting carotid lesion.¹⁻⁵ Chinese patients experiencing stroke or transient ischemic attack (TIA) have less extracranial carotid stenosis (ECS) and more intracranial arterial stenosis compared with the Western world.^{6,7} The prevalence of ECS in Asian patients with TMB is rarely reported.⁸ We hypothesized that ipsilateral ECS among Chinese is less common than in the Western world, and stenosis at carotid siphon proximal to the orifice of ophthalmic artery (siphon stenosis, SS) might contribute to TMB in Chinese patients.

Methods

We prospectively studied 105 consecutive patients who had experienced a transient loss of vision in 1 eye that lasted <24 hours. All of the patients had complete physical and neuroophthalmologic examinations within 1 week of their last TMB attack. Clinical characteristics of transient visual loss and medical history were recorded using a standardized questionnaire. The patterns of visual loss were classified into 4 different types (Table), which might imply different underlying pathophysiological changes as reported previously.^{4,9} All of the participants received Duplex ultrasonography of cervical and

retrobulbar vessels and transcranial color-coded sonography using a sonography system (Acuson) with suitable probes by the same sonographer. More than 50% diameter reduction of extracranial and intracranial carotid arteries was diagnosed according to the ultrasound criteria used in our laboratory.¹⁰ These criteria had been validated with the degree of stenosis on cerebral angiography measured by the European Carotid Surgery Trial method. All of the ultrasound-detected carotid lesions were confirmed by 3D, time-of-flight magnetic resonance angiography or cerebral angiography.

Ancillary investigations, including a complete blood-cell count, blood-chemical analyses, partial-thromboplastin time, prothrombin time, erythrocyte sedimentation rate, antinuclear antibody, antiphospholipid antibody, rapid plasma reagin test for syphilis, chest radiography, and electrocardiography were performed in all of the patients. Echocardiogram, computed tomography, or MRI of brain was performed when clinically indicated. Patients were divided into 3 groups (Table) according to the findings of the aforementioned investigations and presumed pathogenesis.

Continuous variables were expressed as mean \pm SD. Categorical variables were presented as frequency and percentage. χ^2 statistics were calculated for categorical variables, and the Fisher exact test was used when individual cell counts were <5 . Comparisons of continuous data among the groups were performed using the Kruskal-Wallis test.

Results

The clinical profiles and characteristics of visual loss of different groups were summarized in Table. Of the 36

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Comparisons of Demographic Characteristics and Clinical Profiles Among All Patients With TMB of Different Etiologies

Variable	ICA-Stenosis (n=36), n (%)	Other Known Causes (n=10), n (%)	Undetermined Cause (n=59), n (%)	<i>P</i> Value
Age, mean±SD	65.3±13.0	65.0±12.3	63.8±14.7	0.915
Sex, M/F	23/13	6/4	35/24	0.905
Diabetes mellitus	9 (25)	1 (10)	4 (7)	0.038
Hypertension	20 (56)	4 (40)	19 (32)	0.080
Coronary artery disease	8 (22)	5 (50)	8 (14)	0.026
Hyperlipidemia	10 (28)	3 (30)	13 (22)	0.756
Previous stroke or TIA	9 (25)	1 (10)	3 (5)	0.016
Smoking	8 (22)	2 (20)	8 (14)	0.256
Body mass index, mean±SD	23.4±4.3	22.1±2.6	25.1±6.2	0.329
History of migraine	5 (14)	0 (0)	13 (22)	0.189
Positive visual phenomena	10 (28)	3 (30)	16 (27)	0.982
Onset, abrupt/gradual	29/7	9/1	51/8	0.659
Duration				0.227
>1 h	6 (17)	2 (20)	5 (8)	
>10 min and ≤1 h	7 (19)	4 (33)	11 (19)	
≤10 min	23 (64)	4 (40)	43 (73)	
Pattern of visual loss				0.110
Altitudinal/lateralized	4 (11)	4 (40)	15 (25)	
Diffuse	19 (53)	4 (40)	29 (49)	
Constricting	3 (8)	0 (0)	1 (2)	
Miscellaneous	4 (11)	2 (20)	2 (3)	
Multiple	6 (17)	0 (0)	12 (20)	

patients (34.3%) with ipsilateral carotid arterial stenosis (ICA-stenosis group), 16 patients (15.2%) had ECS including 1 fibromuscular dysplasia; 17 patients (16.2%) had SS; and 3 patients (2.9%) had both ECS and SS including 1 carotid dissection. Of the 10 patients in the other-known-cause group, TMB attacks were related to embolism of cardiac origin in 7 patients and autoimmune diseases in 3 patients (2 systemic lupus erythematosus and 1 antiphospholipid antibody syndrome). No underlying disease could be identified in the 59 patients (56.2%; undetermined-cause group). Only 3 patients from the ICA-stenosis group had typical retinal claudication.¹¹ Patients with SS had a higher frequency of TMB attack lasting >1 hour compared with patients with ECS (35% versus 0%). Patients with SS had more altitudinal/lateralized (18%) and multiple-pattern (29%) and fewer miscellaneous (0%) types of visual loss compared with patients with ECS (altitudinal/lateralized 0%, multiple-pattern 6%, and miscellaneous 25%).

Discussion

This prospective study demonstrated that about one third of Chinese patients with TMB had significant stenosis over ipsilateral carotid arteries. Our study, by demonstrating SS in 20 of 105 patients (19%), suggested that stenosis at the siphon of internal carotid artery was an important cause of TMB in Chinese patients. Our results were consistent with those from a retrospective 43-patient study in Japan, which showed that

the prevalences of arterial stenosis were 23% for SS (10 patients) and 21% for ECS (9 patients). The prevalence of ECS in our study (17.1%) was lower than that in white populations.^{2,3,5}

In contrast to previous study,^{3,4} altitudinal/lateralized visual loss and an onset speed of seconds did not occur more frequently in our ICA-stenosis group. Positive visual phenomena, which were considered as benign, were not rare in our ICA-stenosis group. Understanding the causes of TMB in Chinese patients might help tailor individualized treatment for our patients. Four of our patients, who had frequent TMB attacks and intracranial arterial lesions, became attack-free after percutaneous angioplasty.

The pathogenesis of TMB remained obscure in 56% of our patients, even after thorough clinical and laboratory investigations. However, occult cardiac or aortic lesions could be missed, because none of our patients received transesophageal echocardiography. The reported percentage of TMB patients without underlying problems were quite variable, ranging from 18% to 81%, depending on the criteria of patient recruitment and the extent of investigations.¹⁻⁵

Summary

Atherothrombotic embolism originated from stenotic lesion over the extracranial carotid artery or carotid siphon may account for TMB attacks in one third of Chinese patients.

Carotid siphon lesions occurred as frequently as extracranial carotid lesions in Chinese TMB patients.

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