Prevalence of Carotid Stenosis in a High-Risk Caribbean Population

Hilary A. Brown, MD, FACS; Marilyn B. Lawrence-Wright, MD, MS; Sundeep Shah, MBBS, DM; Sara G. Lawrence, BSc; David Gilbert, MBBS, DM; Ivor Crandon, MBBS, FRCS(Ed)

Background and Purpose—The purpose of this study was to determine the prevalence of carotid stenosis among patients presenting to the University Hospital of West Indies (UHWI) Accident and Emergency Department (A&E) with an ischemic stroke or transient ischemic attack (TIA).

Methods—Beginning in August 2006, all patients presenting to the UHWI A&E with an acute stroke or TIA were screened for enrollment. Patients were excluded if they had a hemorrhagic stroke or if informed consent could not be obtained. Demographic and clinical information were collected by chart review and interviewer-administered questionnaires. All participants had noncontrast head computed tomography (CT) and bilateral carotid duplex ultrasounds.

Results—133 patients were enrolled in the study. 90% presented with a stroke and 10% with a TIA. Mean age was 64 years, 52% were male, 96% self-identified as black. 78% had diabetes mellitus or hypertension or both, 27% were current or past smokers. 65.1% had a normal carotid ultrasound, 28.5% had <50% stenosis, 1.6% had 50% to 69% stenosis, 0.8% had ≥70% stenosis to near occlusion, 1.6% had near occlusion and 1.6% total occlusion.

Conclusions—The prevalence of moderate or high-grade carotid stenosis in this high-risk black Caribbean population presenting with an ischemic stroke or a TIA is 5.6%. This is lower than that described in other populations. Further studies are needed to determine the cost-effectiveness of routine screening for carotid stenosis in this population. (Stroke. 2009;40:1892-1893.)

Key Words: cerebrovascular accident ■ carotid stenosis

It is well documented that approximately 30% of patients with ischemic strokes will have carotid stenosis with carotid atheroemboli as the etiology of the cerebral event.1 The prevalence of extracranial carotid stenosis in black populations may be lower.2,3 We sought to determine the prevalence of carotid stenosis in a predominantly black Caribbean population presenting with a stroke or a TIA. Documentation of this prevalence will help to determine the cost-effectiveness of routine carotid screening in our population. Patients with moderate (50% to 70%) or high-grade stenosis (>70%) may benefit from carotid endarterectomy.4

Methods

Approval for this study was obtained from the University of the West Indies Ethics Committee. All patients with strokes or TIs who presented initially to the UHWI A&E were eligible for participation. After informed consent was obtained, demographic information was obtained using an interviewer-administered questionnaire. Clinical presentation and hospital course data were recorded from the medical records. An ischemic stroke was defined as a new neurological defect lasting more than 24 hours with no hemorrhage on head CT. A TIA was defined as a new neurological defect lasting less than 24 hours with no new defect on head CT. All patients had noncontrast head CT within 48 hours of presentation. Each participant also underwent a bilateral carotid duplex ultrasound to evaluate for carotid stenosis. All ultrasounds were done within 5 days of presentation and performed primarily by a single radiologist. Stenosis was graded based on recommendations from The Society of Radiologists in Ultrasound Consensus Conference.5

Data were analyzed using SPSS 12.0. Patient confidentiality was maintained. To be 95% confident of our prevalence estimate with a 0.05 margin of error, a sample size of 139 is needed. This article presents findings in 133 patients.

Results

The mean age of study participants was 63.7±15.3 years (age range 21 to 94 years). 96% self-identified as black and 52% were male. 27% reported a past or current history of smoking and 73% were nonsmokers (see the Table).

The mean blood pressure on presentation was 170/97 (±38/23) mm Hg. 56% of participants presented with a systolic blood pressure >160 mm Hg and 58% with a diastolic blood pressure >90 mm Hg. Median random blood glucose on presentation was 7.7 mmol/L, interquartile range (5.5, 12.5) mmol/L; 38% presented with a random blood glucose >9 mmol/L; 23% of participants did not have their random blood glucose on presentation recorded. 42% of participants had hypertension without diabetes, 3% diabetes...
without hypertension, and 33% both hypertension and diabetes. Cholesterol status was poorly documented.

Stroke was the presenting diagnosis in 90% of participants and 10% presented with a TIA. 24% had a normal head CT, 66% had a head CT scan showing an acute ischemic event. Other findings included small vessel changes (5%), hemorrhagic conversion (1%), and other disease (4%).

Bilateral carotid duplex scans were normal in 65.1% of participants, 28.5% had <50% stenosis, 1.6% had 50% to 69% stenosis, 0.8% had ≥70% stenosis to near occlusion, 1.6% had near occlusion, and 1.6% had total occlusion. One participant (0.8%) had a carotid aneurysm (see the Figure). There was no significant difference in the prevalence of carotid stenosis by gender. We found no cases of unstable plaque.

### Discussion

The prevalence of moderate or high-grade carotid stenosis in this predominantly black Caribbean population presenting with ischemic stroke or TIA is 5.6%. This is lower than that documented in other populations.1–3

There are limitations to our study. This study is observational and we relied primarily on the clinical evaluation documented in routinely recorded medical records, which may introduce some misclassification bias. There may also be some selection bias as over a 3-month period, 57 eligible participants were excluded from the study. Some were patients lost to follow-up after being transferred to another tertiary hospital for management. Others were patients from whom we were unable to obtain informed consent, many of whom were among the sickest patients.

We focused primarily on the degree of extracranial carotid stenosis detected by carotid ultrasonography. We did not measure carotid intima-media thickness. This is an important predictor of cardiovascular risk and is relevant to patient risk stratification. For cost reasons, most participants did not have an echocardiogram; we are therefore unable to definitively exclude a cardiac source of thromboembolism in these participants. However, only 2% were documented to be in atrial fibrillation on presentation.

Carotid duplex ultrasonography was used to assess the degree of carotid stenosis in this study. This modality has a sensitivity of 96% and specificity of 71% for >50% stenosis.6,7 A single radiologist performed the majority of carotid duplex studies; there should therefore be little interobserver variability. In the North American Symptomatic Carotid Endarterectomy Trial, carotid stenosis severity was determined using angiography; caution must therefore be exercised in making recommendations based on our duplex investigations.

In this study, moderate to severe carotid stenosis was found in 5.6% of a predominantly black Caribbean population presenting to a tertiary hospital with a stroke or TIA. This suggests that carotid stenosis is an uncommon but not rare etiology of cerebrovascular events in this population. Further studies are needed to determine the cost-effectiveness of routine carotid screening in this population.

### Disclosures

None.

### References

Prevalence of Carotid Stenosis in a High-Risk Caribbean Population
Hilary A. Brown, Marilyn B. Lawrence-Wright, Sundeep Shah, Sara G. Lawrence, David Gilbert and Ivor Crandon

Stroke. 2009;40:1892-1893; originally published online February 26, 2009;
doi: 10.1161/STROKEAHA.108.535310
Stroke is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2009 American Heart Association, Inc. All rights reserved.
Print ISSN: 0039-2499. Online ISSN: 1524-4628

The online version of this article, along with updated information and services, is located on the
World Wide Web at:
http://stroke.ahajournals.org/content/40/5/1892

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Stroke can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Stroke is online at:
http://stroke.ahajournals.org/subscriptions/