Patients With Transient Ischemic Attack With ABCD² <4 Can Have Similar 90-Day Stroke Risk as Patients With Transient Ischemic Attack With ABCD² ≥4

Pierre Amarenco, MD; Julien Labreuche, BST; Philippa C. Lavallée, MD

Background and Purpose—It is unclear whether patients with transient ischemic attack with an ABCD² score <4 can be safely evaluated within the following week as recommended by some national guidelines rather than in emergency.

Methods—A total of 1679 patients in the SOS-TIA prospective cohort had a definite or possible transient ischemic attack and had complete information on ABCD² score components. They were evaluated and treated as soon as possible in a transient ischemic attack clinic with round-the-clock access, 87% of them within 24 hours of the first call to medical attention. Criteria for emergency treatment were internal carotid or intracranial artery stenosis ≥50% or major cardiac source of embolism.

Results—Primary end point was stroke at 90 days. The 90-day stroke rate (number of events/number of patients) was 3.4% (24/701) in patients with ABCD² score ≥4, 3.9% (7/180) in patients with ABCD² score <4 and criteria for emergency treatment, and 0.4% (3/798) in patients with ABCD² score <4 and no criteria for emergency treatment (P for between-group comparison <0.0001).

Conclusions—When possible, patients with transient ischemic attack should be evaluated without delay regardless of ABCD² score because some with lower scores have treatable causes associated with higher short-term risks of stroke. (Stroke. 2012;43:00-00.)

Key Words: emergency medical services transient ischemic attack

ABCD² score has been proposed for triaging patients with transient ischemic attack (TIA), particularly in the medical community, as a prehospital tool.1 In July 2008, the National Institute for Clinical Excellence recommended that patients with ABCD² score ≥4 be immediately assessed for underlying disease within 24 hours of first call to medical attention and that those with an ABCD² score <4 can be evaluated within the following week.2 This was based on the fact that in patients with an ABCD² score <4 the 90-day stroke risk was much lower than the risk of those with an ABCD² score ≥4.1 TIA clinics have now implemented this rule and reported their results.3

In the SOS-TIA cohort, we have however reported that 1 patient in 5 with a TIA and an ABCD² score <4 had a major finding that needs immediate medical decision-making (ie, symptomatic ipsilateral carotid stenosis, severe intracranial stenosis, atrial fibrillation, or other cardiac source of embolism).4 We now report in the SOS-TIA cohort the 90-day stroke risk according to ABCD² score below and ≥4 stratified on major clinical findings with criteria for immediate medical decision-making.

Materials and Methods

Cohort

Patients were included in the SOS-TIA registry consecutively from January 2003. Detailed material and methods have been previously reported.4,5 In the present report we have updated the cohort to December 2008 with a 3-month follow-up. The primary end point was stroke at 90 days from symptom onset.

Data Analysis

Patients were divided into 3 key subgroups: patients with ABCD² ≥4 versus patients with ABCD² <4 and no criteria for emergency treatment versus patients with ABCD² <4 and criteria for emergency treatment (defined by presence of symptomatic internal carotid stenosis ≥50% or symptomatic intracranial stenosis ≥50% or a major cardiac source of embolism as defined by ASCO classification Grade 1—mitral stenosis; prosthetic heart valve; myocardial infarction within the past 4 weeks; mural thrombus in left cavities; left ventricular aneurysm; any documented history or permanent transient atrial fibrillation or flutter...
with or without spontaneous echo contrast or left atrial thrombus; sick sinus syndrome; dilated cardiomyopathy; ejection fraction <35%; endocarditis; intracardiac mass; patent foramen ovale in situ thrombosis; patent foramen ovale plus concomitant pulmonary embolism or deep vein thrombosis preceding the brain infarction. The risk of stroke was determined as the percentage of patients with this event during the 90-day period. The risk of stroke was compared between the key subgroups using the Fisher exact test. Because a significant difference was found, post hoc pairwise comparisons were done using patients with ABCD² ≥ 4 as a reference group. Statistical testing was done at the 2-tailed α level of 0.05. Data were analyzed with the SAS software package, Version 9.1 (SAS Institute, Cary, NC).

Results
Among the 2398 patients seen at the TIA clinic between January 2003 and December 2008, 1713 had a definite or possible TIA and had complete information on ABCD² score components. Of these, 1679 have 90-day follow-up information and were included in the present analysis.

The mean age (SD) was 64 (16) years and 52% were men. Hypertension (history of treated hypertension or admission blood pressure values ≥ 140/90 mm Hg) was present in 68%, dyslipidemia (history of treated dyslipidemia or admission low-density lipoprotein cholesterol ≥ 160 mg/dL) in 41%, diabetes (medical history) in 11%, and current smoking in 21%. Seven hundred one patients (42%) had an ABCD² score ≥ 4 and 377 (22%) had at least 1 criteria for emergency treatment, defined as the presence of symptomatic internal carotid artery stenosis ≥ 50% (n = 157), symptomatic intracranial stenosis ≥ 50% (n = 85), or a major cardiac source of embolism (n = 169). Criteria for emergency treatment was found in 18% (n = 180) of patients with an ABCD² score < 4 and in 28% of patients with an ABCD² score ≥ 4 (n = 197).

Stroke occurred in 34 patients at 90 days; 3 were fatal. Four nonstroke deaths also occurred within 90 days of presentation at the TIA clinic (all had an ABCD² score ≥ 4). According to the key subgroups, the 90-day stroke rate (number of events/number of patients) was 3.4% (24/701) in patients with ABCD² score ≥ 4, 3.9% (7/180) in patients with ABCD² score < 4 and criteria for emergency treatment and 0.4% (3/798) in patients with ABCD² score < 4 and no criteria for emergency treatment (Figure; \( P \) for between-group comparison <0.0001). Using patients with ABCD² score ≥ 4 as a reference group, the 90-day stroke rate was significantly lower in patients with ABCD² score < 4 and no criteria for emergency treatment (\( P < 0.0001 \)) but was similar in patients with ABCD² score < 4 and criteria for emergency treatment (\( P = 0.82 \)). Exploring the 90-day stroke rate in patients with ABCD² score ≥ 4, those with criteria of emergency treatment had a risk of 4.6% (9/197) and those without such criteria had a risk of 3% (15/504). When the 4 nonstroke deaths were included in 90-day outcome, the 90-day rate in patients with ABCD² score ≥ 4 was 4.0% and remained not different from that in patients with ABCD² score < 4 and criteria for emergency treatment (\( P = 1.00 \)). Similar results were found in sensitivity analysis restricted to the patients seen within 24 hours of symptom onset (Figure).

Discussion
We found that among patients with TIA with an ABCD² score < 4, those having symptomatic internal carotid artery origin or intracranial artery stenosis >50% or a major cardiac source of embolism (1 patients in 5 having an ABCD² score < 4) had a 90-day stroke risk similar to patients with TIA with an ABCD² score ≥ 4. Therefore, there should be no delay to complete investigations in these patients. We believe the National Institute for Clinical Excellence criteria should be revised not to recommend that patients with an ABCD² score < 4 be evaluated within the next week.

There are 2 different uses of the ABCD² score. One is a prehospital triage tool that can be viewed as a “surrogate” for investigations to predict the risk in countries or places where emergent evaluation (within hours after the TIA onset or the first call to medical attention) is not possible. However, when TIA clinics are available, triage based on actual findings of immediate investigations should be preferred.

Some use ABCD² score after complete initial evaluation as a triage tool to determine who should be observed in hospital ≥ 24 hours, which is probably a safer use of the ABCD² score that has to be evaluated. We could then recommend that, when possible, all patients with TIA be evaluated as early as possible within 24 hours of first call to medical attention regardless of ABCD² score to detect all patients needing immediate medical decision-making and that among the remaining patients, those with an ABCD² score ≥ 4 can be observed in hospital ≥ 24 hours,
a strategy that has also to be evaluated against immediate discharge.

**Sources of Funding**

Supported by the SOS-ATTAQUE CEREBARALE Association (a not-for-profit stroke survivor and research organization).

**Disclosures**

None.

**References**


Patients With Transient Ischemic Attack With ABCD² <4 Can Have Similar 90-Day Stroke Risk as Patients With Transient Ischemic Attack With ABCD² ≥4

Pierre Amarenco, Julien Labreuche and Philippa C. Lavallée

Stroke. published online December 8, 2011;
Stroke is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2011 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/early/2011/12/08/STROKEAHA.111.636506

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/