Higher ABCD^2 Score Predicts Patients Most Likely to Have True Transient Ischemic Attack

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Higher ABCD^2 Score Predicts Patients Most Likely to Have True Transient Ischemic Attack

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Background and Purpose—Some patients diagnosed with transient ischemic attack (TIA) in the emergency department may actually have alternative diagnoses such as seizure, migraine, or other nonvascular spells. The ABCD^2 score has been shown to predict subsequent risk of stroke in patients with TIA diagnosed by emergency physicians, but perhaps high ABCD^2 scores simply separate those patients with true TIA from those with alternative diagnoses. We investigated this hypothesis in a cohort of patients with TIA identified in the emergency department whose records were reviewed by an expert neurologist.

Methods—Among patients diagnosed by emergency physicians with TIA in 16 hospitals in the Kaiser-Permanente Medical Care Plan over a 1-year period ending February 1998 (before publication of prediction rules), an expert neurologist reviewed all records for those in which the diagnosis of TIA was considered questionable by a medical records analyst and determined whether the spell was likely to represent a true TIA. Subsequent strokes within 90 days were identified. ABCD^2 scores were calculated for all patients and 2-sided Cochrane-Armitage trend tests were used to assess subsequent risk of stroke.

Results—Of the 713 patients reviewed by the expert neurologist, 642 (90%) were judged to likely have experienced a true TIA. Ninety-day stroke risk was 24% (95% CI, 20% to 27%) in the group judged to have experienced a true TIA and 1.4% (0% to 7.6%) in the group judged to not have a true TIA ($P<0.0001$). ABCD^2 scores were higher in those judged to have a true TIA compared with others ($P=0.0001$). In the group judged to have a true TIA, 90-day stroke risk increased as ABCD^2 score increased ($P<0.0001$); there was no relationship between ABCD^2 score and stroke risk in those judged unlikely to have had a TIA ($P=0.73$).

Conclusions—Among patients diagnosed by emergency department physicians with TIA, higher ABCD^2 score was associated with a greater likelihood that the diagnosis was confirmed on expert review. The predictive power of the ABCD^2 model is therefore partially explained by identification of those patients likely to have experienced a true TIA, an important aspect of the score when used by nonneurologists. However, higher ABCD^2 scores still remained predictive of 90-day stroke rate in the group of patients judged to have a true TIA by an expert neurologist. (***Stroke.*** **2008;49:3096-3098.**)

Key Words: stroke ■ TIA

Patients with transient ischemic attack (TIA) have a substantial short-term risk of recurrent stroke.[1] Multiple prediction models have been proposed to help clinicians risk-stratify these patients, and the unified ABCD^2 score has been shown to be most predictive of short-term recurrence.[1–3] Use of these prediction models now may have increased importance with recent studies demonstrating that aggressive treatment of TIA can reduce the rate of subsequent stroke.[4,5]

TIA remains a diagnosis primarily based on history, and some patients identified as having TIA may actually have alternative diagnoses that can mimic TIA such as seizure, migraine, or other nonvascular spells. In fact, agreement about the diagnosis of TIA between neurologists reviewing the same cases is mediocre.[6,7] We hypothesized that widely used risk stratification models may, in part, simply be identifying those patients most likely to have true TIA as opposed to these alternative diagnoses. If this were the case, it would follow that those with high scores (and therefore true TIA) would be most likely to have recurrent stroke, and those with low scores (and therefore likely not true TIA) would have lower rates of subsequent stroke because their initial

Table. Distribution of ABCD² Scores and Subsequent Stroke Rates Within 90 Days in Patients Reviewed by the Expert Neurologist

ABCD² Score	All Patients			TIA on Expert Review			Not TIA on Expert Review		
	N*	90-Day Stroke Risk		N*	90-Day Stroke Risk		N*	90-Day Stroke Risk	
		No.	(%)		No.	(%)		No.	(%)
Overall	713	153	(21)	642	152	(24)	71	1	(1)
0	3	0	(0)	3	0	(0)	0	0	(0)
1	19	1	(5)	11	1	(9)	8	0	(0)
2	68	4	(6)	51	3	(6)	17	1	(6)
3	100	7	(7)	83	7	(8)	17	0	(0)
4	182	34	(19)	167	34	(20)	15	0	(0)
5	160	39	(24)	150	39	(26)	10	0	(0)
6	151	55	(36)	147	55	(37)	4	0	(0)
7	30	13	(43)	30	13	(43)	0	0	(0)

*No. of patients with each score.

event was not cerebrovascular in nature. We tested this theory using a cohort of patients diagnosed by emergency physicians, before publication of prediction rules, whose records were reviewed by an expert neurologist.

Methods

All patients diagnosed with TIA in the emergency department of 16 hospitals in the Kaiser-Permanente Medical Care Plan over a 1-year period ending February 1998 (before publication of prediction rules) were included, as previously detailed.[1] The treating emergency department physician assigned the diagnosis of TIA in all of these patients. Patients were followed for subsequent stroke within the 90 days after presentation, and strokes were confirmed by 2 neurologists. A medical records analyst identified all patients in whom the diagnosis of TIA was considered questionable, generally due to a qualifying adjective (eg, "possible TIA" or "rule-out TIA") or due to the vague nature of symptoms. An expert neurologist, blinded to outcome, reviewed the charts of these patients and determined if the spell was likely to represent a true TIA. ABCD² scores were calculated for all patients and 2-sided Cochrane-Armitage trend tests were used to assess subsequent risk of stroke. All statistical calculations were made using SAS (Version 9.1; Cary, NC).

Results

Among 1707 patients in diagnosed by emergency department physicians with TIA, 713 patients with questionable TIA were reviewed by the expert neurologist (42%) and 642 (90%) were judged likely to have experienced a true TIA as opposed to an alternative diagnosis. Alternative diagnoses included syncope (n=22), peripheral vestibulopathy (11), migraine (9), anxiety (9), seizure (5), medication toxicity (5), neuropathy (4), transient global amnesia (2), hypertensive encephalopathy (2), and dementia (2). Distributions of ABCD² scores in the groups and number of patients experiencing subsequent stroke in each group within 90 days are shown in the Table. Overall 90-day stroke risk was 24% (95% CI, 20% to 27%) in the group judged to have experienced a true TIA, and 1.4% (0 to 7.6%) in the group judged not likely to have a true TIA (*P*<0.0001). ABCD² scores were higher among those judged to have had a true TIA on expert review (*P*=0.0001). In the group judged to have had a true TIA, 90-day stroke risk increased as ABCD² score increased (*P*<0.0001); there was no relationship between ABCD² score and stroke risk in those judged unlikely to have had a TIA (*P*=0.73).

Discussion

The ABCD² score can, as intended, identify patients with TIA at highest and lowest risk for recurrent stroke.[3] This study demonstrates that ABCD² scores were higher among patients considered to have had a true TIA on retrospective neurologist review compared with those patients thought to have had an alternative diagnosis. Therefore, the predictive power of the ABCD² model can be partially explained by identification of those patients likely to have experienced a true TIA, an important aspect of the score when used by nonneurologists. Low ABCD² scores, with their resulting low risk of subsequent stroke, may identify those patients less likely to have experienced a true TIA (and more likely to have had an alternative etiology that mimics a focal ischemic event). Higher ABCD² scores still remained predictive of 90-day stroke risk in the group of patients who were judged to have a true TIA by a neurologist, suggesting that the score may still have stratification value in the hands of experts.

This study has a number of limitations, including the fact that not every patient's chart in the cohort was reviewed by the expert neurologist. The overall rate of 90-day stroke (21%) in the reviewed group was higher than the previously published rate of 10.5% in the entire cohort studied,[1] indicating that the patients reviewed were not a representative sample.[1] Another limitation of this study is that the expert review relied on retrospective examination of the medical record. TIA likelihood judgments may have changed if a

neurologist prospectively reviewed each case; however, risk stratification models have been shown to be predictive in cohorts of patients defined in a similar retrospective manner.[3]

Disclosures

None.

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