National Survey of Canadian Neurologists’ Current Practice for Transient Ischemic Attack and the Need for a Clinical Decision Rule

Jeffrey J. Perry, MD, MSc, CCFP-EM; Marlène Mansour; Michael Sharma, MD, MSc, FRCPC; Cheryl Symington, RN; Jamie Brehaut, PhD; Monica Taljaard, PhD; Ian G. Stiell, MD, MSc, FRCPC

Background and Purpose—Four percent to 10% of patients with transient ischemic attack (TIA) have a stroke or die within 1 week of their diagnosis. This national survey examined Canadian neurologists’ current practice for managing TIA, the need for a clinical decision rule to identify high-risk patients, and the required sensitivity of such a rule.

Methods—We surveyed 650 neurologists registered in a national physician directory. We used a modified Dillman technique with a prenotification letter and up to 5 survey attempts using a mailed letter. Neurologists were asked 33 questions about demographics, current management of adult patients with TIA, if a clinical decision rule is required to identify high-risk patients with TIA for impending stroke/death, and the required sensitivity of this rule.

Results—We had a response rate of 49.8% (324 of 650). Respondents were 78.3% male and had a mean age of 50.3 years. Of respondents, 49.2% (95% CI: 45.3% to 53.1%) reported using an existing clinical tool to risk-stratify patients. Overall, 95.0% (95% CI: 93.3% to 96.7%) reported they would consider using a sensitive, validated clinical decision rule for risk-stratifying patients with TIA. The median required sensitivity of a rule was 92% (interquartile range, 90 to 95).

Conclusions—We found that Canadian neurologists would use a highly sensitive clinical decision rule to risk-stratify patients with TIA. The median required sensitivity of 92% is higher than the high risk category of any existing tool. Our results indicate a clinical decision rule to predict high-risk TIA needs to be more sensitive than the currently available rules. (Stroke. 2010;41:987-991.)

Key Words: decision rule ▪ survey ▪ TIA

Transient ischemic attack (TIA) is a common diagnosis for patients in Canadian emergency departments with an incidence of 68 per 100 000 people.¹ The occurrence of TIA is a marker for the high early risk of stroke. Several studies, including 2 Canadian studies, have found the risk of stroke is 4% to 10% within 7 days of first TIA, reaching 8% to 12% at 90 days.²⁻⁸

Currently, there are no well-established criteria to help physicians determine which patients with TIA are at high risk to have a stroke shortly after diagnosis of TIA. The most recent criteria, the ABCD2 rule, has a sensitivity of 83% for subsequent stroke within 7 days when using the high risk score (score of 6 or 7 out of 7).⁸ It is currently unclear if this sensitivity for subsequent stroke is acceptable to neurologists.

The objectives of this national survey of Canadian neurologists were to (1) examine neurologists’ current practice for risk stratification of individuals with TIA; (2) determine the need for a clinical decision rule; and (3) determine the required sensitivity for a clinical decision rule to identify which emergency department patients with TIA have a stroke within 1 week of their emergency room visit.

Methods

Study Design and Setting
We conducted a self-administered postal mail survey of all neurologists listed in the Canadian Medical Directory.⁹ We used a modified Dillman tailored design method for survey design and administration (presurvey notification and up to 5 survey attempts).¹⁰ This study was coordinated by the Clinical Epidemiology Program of the Ottawa Hospital Research Institute between May 2008 and November 2008 and approved by The Ottawa Hospital Research Ethics Board.

Selection of Participants
All 760 neurologists listed in the Canadian Medical Directory on May 29, 2008, were surveyed. Neurologists returning their surveys who reported that they were not currently practicing neurology or do not see adult patients were excluded.
Survey Content
Survey participants received a 2-page questionnaire consisting of 33 questions. The survey instrument was developed by the authors and revised following the feedback received after pretesting on 10 neurologists.

Survey respondents were asked to indicate their level of agreement with a series of statements regarding their current practice on a 6-point Likert-like scale (strongly disagree, moderately disagree, slightly disagree, slightly agree, moderately agree, and strongly agree). Neurologists were asked demographic questions and about their current management of adult patients with TIA. Participants were asked if they would consider using a highly sensitive and well-validated clinical decision rule in alert emergency department patients with TIA to identify patients at high risk of stroke or vascular death within 7 days and the required sensitivity of such a rule (choices of <80%, 80% to 84%, 85% to 89%, and whole number integers from 90% to 100%).

Survey Administration
All participants received a prenotification letter that described the study and requested their participation. One week later, a second contact included (1) a cover letter describing the study, assuring confidentiality, and providing instructions for completion of the survey; and (2) the survey instrument. Nonresponders were sent a minimum of 4 reminder letters with additional surveys, which were sent at 4- to 5-week intervals. All postal surveys included a business reply preaddressed envelope. No incentives were provided.

Data Collection and Processing
All data were entered into an electronic Excel database (Microsoft Corp, Redmond, Wash). Single data entry was used. Analysis was then performed using SPSS Version 16.0 (SPSS Inc, Chicago, Ill).

Analysis
Our primary outcome measures were (1) the percentage of physicians who would use a clinical decision rule for patients with TIA (yes or no); and (2) the required sensitivity of such a rule (percentage). Secondary outcomes were current practices. Analysis included descriptive statistics together with 95% CIs using the finite population correction for the entire cross-section.

Sample Size Calculation
All neurologists in Canada listed in the directory were surveyed. This choice was made given the relatively small size of the target population and the desire to minimize sampling error and improve generalizability of results to all neurologists in Canada. The sampling frame included 760 neurologists. This is extremely close to the 773 practicing neurologists reported by the Canadian Medical Association report on Canadian physician statistics.11,12 We calculated that with an anticipated response rate of 50% (based on similar surveys administered to emergency physicians), a 95% 2-sided CI around the most conservative estimate for a finite population proportion of 50% would have a margin of error of ±3.6%.

Results
We had a total response rate of 49.8% (324 of 650). The numerator represents all returned surveys, whereas the denominator represents all surveys sent less those returned because surveys were undeliverable (24 surveys) or subjects failed to meet inclusion criteria, that is, not practicing in the adult population (86 surveys; 760 to 110 = 650 in the denominator).

Physician demographic, professional, and practice setting characteristics are summarized in Table 1. Respondents were primarily male and had a mean age of 50.3 years. Almost all neurologists worked at hospitals, most within teaching centers. Virtually all respondents reported having access to CT, the vast majority with 24-hour access.

Results for the series of questions related to their current management of patients with TIA are shown in Table 2. Almost all respondents (91.9%) thought all patients with TIA should be investigated with CT. Just under half (49.2%) of the neurologists surveyed use some existing clinical tool to stratify patients as high risk (95% CI: 45.3% to 53.1%). We asked those reporting using a rule to triage their patients to state with open text which rule they were using; 73 recorded which rule they use, 48 reported that they use the ABCD2 rule, 24 the original ABCD rule, 8 a local guideline, whereas 6 reported seeing all patients with TIA in the emergency department and 1 reported using the California Rule. More than half of the respondents reported having dedicated stroke prevention/management clinics with most patients seen within 1 week of being seen in the emergency department with TIA. The vast majority, 94.9% (95% CI: 93.3% to 96.7%), reported they would consider using a highly sensitive rule to triage patients with TIA.

| Table 1. Neurologist Demographic, Professional, and Practice Characteristics |
|-----------------------------|-------------------|
| Characteristics             | No. of Responses |
| Mean age, years (SD)        | 50.3 (10.4)       |
| Range                       | 29–74             |
| Male                        | 242 (78.3)        |
| Practice setting            |                   |
| Teaching hospital           | 243 (78.6)        |
| Non-teaching hospital       | 52 (16.8)         |
| CT scanner available 24 hours a day | 301 (97.7) |
| Neurology services available for emergency department consultation at their institution | |
| 24 hours a day              | 266 (86.6)        |
| During working hours        | 29 (9.4)          |

<table>
<thead>
<tr>
<th>Table 2. Response to Questions Related to Management of Alert, Neurologically Intact Patients With an Emergency Department (ED) Diagnosis of TIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question</td>
</tr>
<tr>
<td>All such patients with TIA should have a head CT scan while in the ED†</td>
</tr>
<tr>
<td>All such patients with TIA with a normal CT should be seen by a neurologist while in the ED*</td>
</tr>
<tr>
<td>Already use a clinical decision rule to stratify patients with TIA seen in our ED†</td>
</tr>
<tr>
<td>Have a dedicated outpatient stroke prevention/management clinic†</td>
</tr>
<tr>
<td>If stroke clinic in place, are patients seen within 1 week of ED visit? (N=219)†</td>
</tr>
<tr>
<td>Would use a well-validated clinical decision rule to triage patients with TIA†</td>
</tr>
</tbody>
</table>

†Dichotomous yes or no answer.

*Answered “strongly” or “moderately” agree on a 6-point scale from “strongly” agree to “strongly” disagree.
A well-validated clinical decision rule for patients with TIA to determine if they are at high risk of impending stroke.

Table 3 gives the self-reported results of how the responding neurologists manage the patients with TIA "most of the time" or "all of the time" when they see patients within 2 days of TIA onset. Almost all report imaging their patients with CT and order an electrocardiogram, whereas 88.7% have carotid artery Doppler studies performed. Very few report routinely using MRI or angiography (MR or CT) of patient neck vessels. Almost two thirds of respondents order echocardiograms for their patients. Regarding medical management, virtually all patients are put on antiplatelet agents. Approximately half of the respondents reported starting or modifying antihypertensive agents in the emergency department and approximately one third report starting a statin while patients are in the emergency department. The most commonly used antiplatelet agent was aspirin followed by clopidogrel and dipyridamole/aspirin. Almost all patients with TIA are managed as outpatients with just 13.4% (95% CI: 10.8 to 16.0) of physicians routinely admitting their patients. One third of those physicians admitting patients with TIA routinely admit their patients to a monitored bed.

The median required sensitivity for a prospective rule was 92% (interquartile range, 90 to 95). The Figure shows the required sensitivity of any proposed clinical decision rule for identification of patients with TIA who subsequently have a stroke within 1 week as reported by the responding physicians.

Discussion

This survey is the first national study of neurology management practices for emergency department patients with TIA. We found that the majority of Canadian neurologists would consider using a well-validated, sensitive clinical decision rule for patients with TIA to identify high-risk patients for impending stroke. This clinical decision rule would be used by physicians to guide their use of investigations and treatment of patients with TIA. With the median required sensitivity for this rule of 92%, physicians were pragmatic acknowledging that any rule may not be absolutely perfect. It is clear, however, that it must be highly sensitive. Although less than half of all respondents claimed that they used a clinical decision rule, most did not name the rule or identified a local guideline. The most frequently stated formal rule was the ABCD2.

This survey also indicated that neurologists thought that patients with TIA seen in the emergency department required a CT, electrocardiogram, and imaging of the carotid arteries. The American Heart Association recommends that imaging of the head should be performed in all patients with TIA; however, the American Neurological Association has no specific recommendations. The Canadian Best Practice...
Guidelines recommend the use of a risk stratification tool at the point of initial contact and neurovascular imaging of those deemed to be at highest risk of stroke within 24 hours.13,14 We have previously conducted an international survey of emergency physicians 1 year before this survey.15 In this survey, the emergency physician respondents had a median required sensitivity of 97% for stroke within 1 week of their emergency department diagnosis of TIA, which was 5% more than the neurologists in this survey. We suspect that this slightly higher required sensitivity reflects the fact that neurologists see patients who go on to have a stroke after a TIA despite all preventive measures being implemented. The American Heart Association’s recently published guidelines on management of TIA suggest (1) changing the definition of TIA to only those patients with a negative MRI; and (2) admitting all patients with an ABCD2 score of ≥3.16,17 This would result in admission of the majority of patients. This is very different from current practice in Canada. With just 15.5% of neurologists routinely ordering MRI, and only 13.4% routinely admitting patients, these guidelines, if followed, would require a dramatic change in patient management with considerable increases in healthcare costs. A sensitive and valid method of risk stratification would have the potential to select individuals most likely to benefit from hospital admission and intensive investigation.

We believe that this study has several strengths. It is the first survey that determines the required sensitivity of a clinical decision rule for identifying patients with TIA at high risk for an impending stroke in the next 7 days. We surveyed the entire population of neurologists to minimize sampling error. We used a series of up to 5 contacts to maximize our response rates, included a return envelope with prepaid postage, and we pretested our survey with practicing neurologists before finalizing the final survey.

Limitations
We acknowledge that our study has several potential limitations. Our target population was Canadian neurologists practicing on adult patients with stroke/TIA. However, we likely had a small amount of coverage bias (ie, neurologists who are part of our target population who never had a chance to respond) given that not all physicians in the target population may be listed in this directory and we did not include those who had returned surveys for an incorrect address. We attempted to assess this error by crossreferencing our results with the published statistics from the Canadian Medical Association, which identified 773 practicing neurologists in Canada in 2008 with a median age between 45 to 54 years, 76.6% of whom were male.11,12 The age and sex distribution in this population is very similar to that in our sample as is the overall number of neurologists in the country. Hence, although our response rate is relatively low, we believe that the sample is representative of the population.19 Many neurologists are subspecialized, do not treat patients with TIA/stroke, and therefore may not have considered it necessary to complete the survey. This is supported by data in the Canadian Medical Directory; of the 326 nonrespondents, 28 practiced in the pediatric population, 23 subspecialized in epilepsy or electroencephalography, and 15 in movement disorders. Many neurologists had >1 subspecialty. However, the subspecialty was not specified for 205 of the nonrespondents. We did not exclude these subspecialized neurologists before sending out the survey. Our response is similar to previous physician studies that have shown that the average response rate for published physician surveys is 52% to 54%.15,20

There may be some measurement error in the percentage of physicians who state that they would consider using a clinical decision rule for patients with TIA. This measurement error could arise from the use of closed-ended questions skewed to high percentages for the required sensitivity for a clinical decision rule. Future surveys would be improved by simply asking for the participants to insert a number on a blank line for the required sensitivity.

In this study, we did not assess the required specificity. Although many clinical decision rules allow for reduced specificity to achieve a high sensitivity, this may overwhelm some healthcare systems with a common diagnosis such as TIA, which requires a large dedication of resources to investigate the etiology and even to confirm that the event in question truly is of an ischemic basis. Future surveys could assess this issue.

Impact on Clinical Practice
This survey suggests that many physicians are not willing to accept the sensitivity of the high risk score of the ABCD2 rule. Physicians could use a lower cut point, as recently suggested by the American Heart Association, resulting in a greater proportion of patients requiring immediate workup, consultation, and immediate stroke prevention interventions (ie, optimizing blood pressure, carotid revascularization if required, consider a statin, start antplatelet and/or anticoagulation as appropriate).17 However, it is unclear if the Canadian healthcare system can or would be willing to support this increased burden. Physicians in this survey indicated they would use a more sensitive clinical decision rule; however, it is unknown at this point if they would truly incorporate such a clinical decision rule into clinical practice should a more sensitive tool be developed.

Implications for Future Research
Our survey demonstrates the need for a new, more sensitive clinical decision rule for determining high-risk patients with TIA or, at the very least, a prospective validation study of the ABCD2 rule, assessing the ABCD2 rule at different point thresholds to improve the sensitivity of the rule for subsequent short-term stroke. In addition, other research could repeat this study in different countries where current practice patterns differ from Canada.

Conclusion
Our national survey determined that neurologists would use a highly sensitive clinical decision rule to determine which patients are at high risk of stroke or vascular death within 7 days of initial TIA. The median sensitivity of 92% was much higher than that of the most commonly used tool, the ABCD2 rule, which has a sensitivity of only 83% for stroke or death ≤7 days using their high-risk category. These results indicate a clinical decision rule to predict high-risk TIA needs to be more sensitive than those currently available. An improved
clinical decision rule is necessary to meet the sensitivity requirements for subsequent stroke for emergency department patients with TIA.

Acknowledgments

We thank the hundreds of physicians who completed our survey forms. We also thank the following research personnel at the Ottawa Hospital Research Institute: My-Linh Tran, and Angela Marcantonia for their assistance with this project.

Sources of Funding

We acknowledge peer-reviewed funding from the Canadian Stroke Network. We also received internal funding from the Department of Emergency Medicine at the University of Ottawa.

Disclosures

J.J.P. was funded as a Career Scientist by the Ontario Ministry of Health and is now funded by a Canadian Institutes for Health Research New Investigator Award; I.G.S. is a University Health Network. We also received internal funding from the Department of Emergency Medicine at the University of Ottawa.

References

National Survey of Canadian Neurologists' Current Practice for Transient Ischemic Attack and the Need for a Clinical Decision Rule
Jeffrey J. Perry, Marlène Mansour, Michael Sharma, Cheryl Symington, Jamie Brehaut, Monica Taljaard and Ian G. Stiell

Stroke. 2010;41:987-991; originally published online March 11, 2010; doi: 10.1161/STROKEAHA.109.577007
Stroke is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2010 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/41/5/987

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/