

Practice Variation in Long-term Secondary Stroke Prevention in The Netherlands

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Background: Stroke guidelines emphasize the importance of adequate vascular risk factor assessment and management in transient ischemic attack (TIA) and ischemic stroke patients, but it is not clear how these guidelines are applied in routine clinical practice. The limited data that are available indicate that TIA and ischemic stroke patients often do not receive the recommended interventions. The aim of this study was to investigate practice variations in long-term secondary stroke prevention in The Netherlands. *Methods:* Between June and December 2013, an invitation for a web-based survey was sent to 90 Dutch neurologists with a special interest in stroke neurology. This web-based survey contained questions regarding the organization of outpatient care for TIA and ischemic stroke patients after initial hospital assessment, pharmacologic treatment, and nonpharmacologic strategies for long-term secondary prevention. *Results:* In total, 84 (93%) neurologists completed the survey. Although nearly all respondents reported that they follow-up TIA and ischemic stroke patients after initial hospital assessment, the number of follow-up visits and the follow-up duration were variable. A similar variation was found in treatment targets levels for both blood pressure and low-density lipoprotein cholesterol. Regarding nonpharmacologic strategies for long-term secondary stroke prevention, most respondents inform their TIA and ischemic stroke patients about the importance of smoking cessation. There is considerably less attention for the other lifestyle risk factors. *Conclusions:* We found considerable practice variation in long-term secondary stroke prevention. These variations may have an impact on the risk for stroke recurrence and cardiovascular disease in general. **Key Words:** Stroke—transient ischemic attack—secondary prevention—quality of health care—life style.

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Stroke is a major cause of death and disability worldwide. Evidence from randomized trials and meta-analyses for the effectiveness of long-term secondary prevention strategies after transient ischemic attack (TIA)

and ischemic stroke is compelling. A combination of antithrombotic therapy, blood pressure control, statins, dietary modification, and exercise lowers the risk of recurrent stroke and other future cardiovascular events.¹⁻⁵ The combination of these strategies could result in a cumulative relative risk reduction of 80%.⁶ Therefore, national and international guidelines emphasize the importance of adequate risk factor assessment and management in TIA and ischemic stroke patients, but it is not clear how these guidelines are applied in routine clinical practice.⁷⁻¹⁰ Few studies have focused on the quality of care regarding long-term secondary stroke prevention. The limited data that are available indicate that despite advances in treatment, TIA and ischemic stroke patients often do not receive the recommended interventions.¹¹⁻¹⁴

We hypothesized that considerable variations in long-term secondary stroke prevention may exist among

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neurologists in The Netherlands. We used an online survey to seek the opinion of Dutch neurologists about long-term secondary stroke prevention. The results of this survey can be used to improve future quality of care for these patients.

Methods

We analyzed national and international TIA and ischemic stroke guidelines to identify topics and situations where practice variation, regarding long-term secondary prevention for TIA and ischemic stroke patients, could be expected. An online survey creator (<http://www.enqueteviainternet.nl>) was used to develop a web-based survey, which included multiple choice questions, multi-answer multiple choice questions, and free-text fields for additional comments. This survey was divided into 3 parts. The first part contained questions on how outpatient care for TIA and ischemic stroke patients is organized after initial hospital assessment (Table 1). The second part of the survey consisted of questions about pharmacologic treatment regarding long-term secondary stroke prevention (Table 2). The third part contained questions regarding nonpharmacologic strategies for long-term secondary stroke prevention (Table 3). Between June and December 2013, an e-mail invitation for an anonymous web-based survey was sent to 90 Dutch neurologists with a special interest in stroke neurology, working in 90 different hospitals. Most of them participated in an earlier online survey on variation in clinical practice of intravenous thrombolysis in stroke in The Netherlands.¹⁵ To increase the response rate, a monthly reinvitation was sent.

Results

Ninety neurologists were invited to participate, of whom 84 (93%) completed the survey. Most of the respondents (92%) worked in nonacademic hospitals.

The Organization of Outpatient Care for TIA and Ischemic Stroke Patients

Almost all respondents (98%) reported that they follow-up TIA and ischemic stroke patients after initial hospital assessment. The average number of follow-up visits were variable, ranging from 1 visit in 34 (40%) respondents to 4 visits or more in 2 (2.4%) respondents. The follow-up duration ranged from 0-3 months (62%) to 12 months or more (4.8%). Respondents reported that during follow-up patients are managed by neurologists (76%), neurology residents (15%), physician assistants (31%), and stroke nurses (32%). Table 1 details responses to questions regarding the organization of outpatient care for TIA and ischemic stroke patients.

Twenty-two (26%) respondents stated that the neurologist is primarily responsible for long-term secondary prevention for TIA and ischemic stroke patients after

initial hospital assessment, 36 (43%) reported that the general practitioner is primarily responsible, 6 (7.1%) the physician assistant, 3 (3.6%) the stroke nurse, 1 (1.2%) the internist, and 4 (4.8%) reported that no one is primarily responsible. Regarding who ideally should be responsible for long-term secondary prevention after TIA and ischemic stroke, 42 (50%) respondents answered the general practitioner, 21 (25%) the neurologist, 7 (8.3%) the stroke nurse, 6 (7.1%) the physician assistant, 2 (2.4%) the internist, and 6 (7.1%) preferred a combination of either the neurologist and the general practitioner or the latter and the stroke nurse.

Pharmacological Treatment for Long-term Secondary Stroke Prevention

Overall, 75 (89%) respondents reported that the pharmacologic treatment for TIA and ischemic stroke patients is described in a local protocol. Ten (12%) respondents use clopidogrel monotherapy as first-line antiplatelet agent in secondary stroke prevention, instead of the in The Netherlands-recommended combination of acetylsalicylic acid and dipyridamole (Table 2). Among those respondents who did usually (13%) or sometimes (68%) use clopidogrel in secondary stroke prevention, the most common reason cited were side effects of acetylsalicylic acid or dipyridamole (66%). Other reported reasons included recurrent TIA or ischemic stroke while on acetylsalicylic acid and dipyridamole (20%), acetylsalicylic acid resistance (13%), similarity in efficacy to aspirin and dipyridamole (9.5%), ease of administration (9.5%), and low costs (7.1%). When asked whether they used new oral anticoagulants as long-term secondary stroke prevention for patients with atrial fibrillation during the last year, 21 (25%) respondents reported that they did. Most respondents (83%) stated that they are planning to prescribe new oral anticoagulants in the near future.

Eleven percent of respondents reported that they always initiate antihypertensive therapy for secondary stroke prevention in patients with high blood pressure. On the contrary, 10 (12%) respondents never initiate antihypertensive therapy for secondary stroke prevention. Most respondents usually (33%) or sometimes (44%) initiate antihypertensive therapy for secondary stroke prevention in patients with high blood pressure. The most frequently prescribed antihypertensive agents were angiotensin-converting enzyme inhibitors (71%) and diuretics (63%). Less commonly used antihypertensive agents were calcium channel blockers (26%), angiotensin receptor blockers (17%), and beta blockers (13%). More than one third (38%) of the respondents use 2 antihypertensive agents in fixed dose combinations if indicated. The blood pressure targets reported were variable, 22 (26%) respondents use a target of 140/90 mm Hg or less for all patients, 19 (23%) respondents use a target of 130/80 mm Hg or less for all patients,

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