Limited Efficacy of a Long-term Secondary Prevention Program in Ischemic Stroke and Transient Ischemic Attack Patients

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Background: Few studies have focused on the quality of care with regard to long-term secondary prevention after transient ischemic attack (TIA) or ischemic stroke. The aim of this study was 2-fold: (1) to determine if ischemic stroke and TIA patients are motivated for a long-term secondary prevention program after hospital discharge and (2) to study the effect of this program on the attainment of guideline-recommended secondary prevention targets. *Methods:* A single-center, cohort study of ischemic stroke and TIA patients. The number of visits to the long-term secondary prevention program and the number of patients whom achieved the composite end point of optimal medical therapy at their last visit to our outpatient clinic were assessed. *Results:* Of the 237 included ischemic stroke and TIA patients, only 164 (69%) visited the long-term secondary prevention program at least once. Of these patients, 37% reached the primary end point of optimal medical treatment at their last visit to our outpatient clinic. We found a significant increase in secondary prevention target attainment for the primary outcome of optimal medical treatment and its individual components. *Conclusions:* Despite our systematic approach to care for patients after ischemic stroke or TIA, we observed that 31% of our patients did not visit our outpatient clinic for the long-term secondary prevention program at all. In addition, the long-term secondary prevention program alone, consisting of regular follow-up visits and a medication treatment algorithm, was not sufficient to reach guideline-recommended treatment targets in most of our ischemic stroke and TIA patients. **Key Words:** Stroke—transient ischemic attack—secondary prevention—quality of health care.

Introduction

Stroke is a major cause of death and disability worldwide. Ischemic stroke and transient ischemic attack (TIA) patients have a high risk of recurrent stroke, myocardial infarction, and death from vascular causes.[1,2] Management of ischemic stroke and TIA patients should therefore not only aim to reduce future stroke but cardiovascular disease in general. Evidence for the effectiveness of secondary prevention strategies after ischemic stroke and TIA is overwhelming. A combination of antithrombotic therapy, such as the combination of aspirin and dipyridamol or clopidogrel, blood pressure control, statins, dietary modification, and exercise, lowers the risk of recurrent stroke and other future cardiovascular events.[3-6] The combination of these strategies applied to survivors of an ischemic

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stroke is estimated to result in a cumulative relative risk reduction of recurrent vascular events of approximately 80%, with a number needed to treat of 5.[7] Because of this compelling evidence, national and international guidelines emphasize the importance of adequate risk factor assessment and management in ischemic stroke and TIA patients.[8,9] However, these guidelines lack additional information on who should provide long-term secondary prevention in these patients and on how to reach treatment targets in routine clinical practice. Few studies have focused on the quality of care with regard to long-term secondary prevention after TIA or ischemic stroke. The limited data available indicate that despite advances in treatment, patients after ischemic stroke or TIA often do not receive the recommended interventions.[10-13] In our clinic, a secondary care hospital in Amsterdam, it was common practice that ischemic stroke and TIA patients were invited to visit a long-term secondary prevention program. The aim of this study was 2-fold: (1) to determine if ischemic stroke and TIA patients were motivated for a long-term secondary prevention program after hospital discharge and (2) to study the effect of this program on the attainment of guideline-recommended secondary prevention targets.

Methods

In our hospital, it was a common practice that all ischemic stroke and TIA patients were offered a 1-year long-term secondary prevention program after initial hospitalization. We conducted a retrospective cohort study by identifying all ischemic stroke or TIA patients admitted to the Sint Lucas Andreas Hospital in Amsterdam from April 2008 to April 2009. Patient's demographic and clinical data, cardiovascular risk factors, and follow-up duration were collected through medical record review. In addition, we collected data on medication use, blood pressure, and low-density lipoprotein cholesterol (LDL-C) from baseline (at discharge after initial hospitalization) and from the last visit to our outpatient based long-term secondary prevention program. Patients were excluded in the case of death during the initial hospitalization. Patients were also excluded when baseline data could not be retrieved (ie, missing values for cardiovascular risk factors, medication use, blood pressure, or LDL-C).

Long-term Secondary Prevention Program

This 1-year program consisted of follow-up visits to our outpatient clinic at 4 weeks, 3 months, 6 months, 9 months, and 12 months after the index event. During these sessions, modifiable vascular risk factors were identified, and tailored advice was given regarding the treatment of these risk factors. For this purpose, participating nurses, neurology residents, and neurologists used a medication treatment algorithm to lower blood pressure and LDL-C levels with pharmacologic therapy. This medication treatment algorithm was documented in a protocol and distributed to all participating physicians and nurses.

Outcome Measures

To determine if ischemic stroke and TIA patients were motivated for a long-term secondary prevention program and to study the effect of this program on the attainment of guideline-recommended secondary prevention targets, we chose the number of visits to the long-term secondary prevention program and the number of patients who achieved the composite end point of optimal medical therapy at their last visit to this program as primary outcomes. Optimal medical therapy was defined as the combination of the use of prescribed antithrombotic therapy (antiplatelet agents or oral anticoagulants) and achievement of both blood pressure (<140/90 mm Hg) and LDL-C (<2.5 mmol/L, <100 mg/dL) targets. Secondary outcome measures were the three individual components of the composite end point of optimal medical therapy, the percentage of patients using cholesterol-lowering medication, and the percentage of patients using antihypertensive medication at their last visit to the long-term secondary prevention program.

Statistical Analysis

All statistical analyses were carried out using IBM SPSS statistics (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp). Dichotomous data are described as numbers and percentages, and continuous data are presented as means with standard deviations. For non-normal distributed outcomes, we reverted to median values and interquartile range (IQR). For continuous data, the paired sample *t* test was used to evaluate the difference between baseline data and data from the last visit to the long-term secondary prevention program. The McNemar test was used for the outcome measures with a dichotomous outcome. For the comparison of groups at baseline, we performed the independent-sample *t* test for continuous data and χ^2 analyses for categorical data. A probability *P* value of less than .05 was considered significant.

Results

Patients

Between April 2008 and April 2009, we identified 318 ischemic stroke and TIA patients. Of these, 15 patients died during initial hospitalization and were therefore not included in this study. Another 66 patients were excluded from analysis because of incomplete baseline data.

Compared with the 237 patients who where included in the final analysis, in this group of excluded patients,