The High Frequency of Guideline-Approved and Guideline-Disapproved Medication Use in Stroke and Transient Ischemic Attack

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Background and Purpose: Administration of evidence-based pharmacotherapy improves stroke outcome while the use of non–evidence-based medications may not be of benefit and leads to unnecessary patient care costs. The aim of our study was to determine the frequency of guideline-approved and guideline-disapproved pharmacotherapy use in acute stroke management in the Czech Republic (CR). *Methods:* Using the ICD-10 codes, 500 stroke and transient ischemic attack (TIA) patients were randomly selected (random selection of 10 hospitals and then 50 patients from each hospital) from the National Registry of Hospitalized Patients for strokes occurring in 2011. Discharge summaries were reviewed for medications prescribed during hospitalization and at discharge. *Results:* Of the 500 requested discharge summaries, 484 were available for review (response rate 97%). Up to 479 (96%) summaries were sufficient for evaluation and of these, 393 were confirmed to have a stroke or TIA diagnosis. Brain imaging (computed tomography or magnetic resonance imaging) was performed in 97% of the 393 cases. Intravenous thrombolysis was administered to 7% of patients with ischemic stroke (rate was 0%-25% in different hospitals). Up to 97% of patients with ischemic events (TIA or ischemic stroke) were treated with antiplatelets or anticoagulants. At least 1 non–evidence-based medication was administered to 28% of the 393 patients (rate was 5%-89% in different hospitals). *Conclusions:* Guideline-disapproved pharmacotherapy is common in stroke and TIA patients in the CR and processes should be put into place to lessen the frequency of their use. The use of guideline-approved medications is also high and should be further promoted. **Key Words:** Stroke—pharmacotherapy—guidelines—evidence-based—cost-effectiveness—Czech Republic.

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Introduction

Many medications have been developed for the treatment of acute ischemic stroke and some of these have been tested in clinical trials.[1] However, only a few have been shown to have benefit in comparison to placebo, such as recombinant tissue plasminogen activator (rt-PA)[2,3] and antiplatelet agents,[4,5] respectively. While rt-PA remains substantially underutilized in clinical practice,[6,7] some unproven strategies are still being used in acute stroke management.[8]

Prescribing non–evidence-based medications is undesirable for many reasons. They are not proven to be effective. The use of evidence-based as compared to non–evidence-based strategies has been shown to be associated with reduced mortality in cardiovascular diseases.[9,10] In addition, adverse outcomes can occur because of potential side effects and/or interaction with other medications. Finally, it represents an unnecessary patient care cost. The amount of excessive patient care costs can be enormous, e.g., in the United States non–evidence-based clopidogrel use may lead to as much as $1.5 billion in unnecessary expenditures annually.[11]

The aim of this study was to determine the proportion of patients receiving evidence-based stroke pharmacotherapy (thrombolytic and antithrombotic therapies) and non–evidence-based pharmacotherapy, and which non–evidence-based medications are used in a representative sample of patients with acute stroke and transient ischemic attack (TIA) in the Czech Republic (CR).

Methods

This is a substudy of a stroke validation study of the National Registry of Hospitalized Patients in the CR. Details have been described comprehensively elsewhere.[12] In short, the validation provided a random sample selected from all hospital admissions in 1 year at national level. Ten hospitals (5 small and 5 large) were randomly selected and then 50 patients from each hospital, admitted during 2011, stratified according to stroke diagnosis (10 cases for each of the following diagnoses: ICD-10 [International Classification of Diseases Tenth Revision] cerebrovascular codes I60 [subarachnoid hemorrhage], I61 [intracerebral hemorrhage], I63 [cerebral infarction], I64 [stroke, not specified], and G45 [transient cerebral ischemic attack, TIA]). In this way, a sample consisting of the same number of patients for each of the stroke and TIA diagnoses was collected. The discharge summaries from hospitalization were reviewed. Only patients with validated stroke or TIA discharge diagnosis were included in this substudy.

In the CR, the discharge summary is typically a comprehensive document that contains (among other items) a complete list of medications administered during the hospitalization and prescribed at the discharge. Patients who did not have a discharge summary of satisfactory quality were excluded from this study.

Every medication noted in the patient discharge summary was recorded and grouped as evidence-based or non–evidence-based. A medication was considered as evidence-based if its use was supported by a Class I or II recommendation in guidelines for early management of stroke patients by the American Heart Association,[13] the European Stroke Organisation,[14] or the Czech Neurological Society guidelines,[15] which were valid in 2011. There has been no change in the most recent guidelines published by American Heart Association,[16] as to which medications are considered evidence-based and non–evidence-based. Non–evidence-based was defined as either the pharmacotherapy not mentioned in guidelines for stroke treatment or pharmacotherapy to which the Class III recommendation applies. The 3 guidelines were similar in terms of which medications were considered to be evidence-based or non–evidence-based.

The reasons for not administering an evidence-based medication were documented.

Statistics

The univariate and multivariate logistic regression analyses were used to assess the relationship between potential predictors and the use of non–evidence-based medications (either during the hospitalization or at discharge). Generalized estimating equation methods were used for this analysis to adjust standard errors of parameter estimates for correlated data of patients within individual hospitals. The odds ratio with 95% confidence limits was estimated and tested by the chi-square test. Variables that showed association with administration of evidence-based versus non–evidence-based medications in the univariate analysis with P value $\leq .1$ were included into the multivariate analysis. Level of statistical significance for final model was set to 5%.

The protocol was approved by the St. Anne's University Hospital Ethics Committee.

Results

Of the 500 randomly selected patients, 484 discharge summaries were received for review (response rate 97%). Of these, 479 (96%) summaries were sufficient for evaluating the medications. Upon initial review of these 479 patients, 397 were considered to have a stroke or TIA diagnosis (ICD-10 codes I60, I61, I63, I64, or G45) and 82 to have noncerebrovascular diagnoses.[12] After additional comprehensive review of all medical records, 4 other patients were excluded because the final diagnosis was transient global amnesia and not TIA. The final sample included 393 patients. The baseline patient characteristics are shown in Table 1.

Of the 10 randomly selected hospitals, 7 were accredited as stroke centers, meaning these were part of the recognized stroke unit network within the CR. One