Supplementary Methods

Study population

We initially screened 52,213 patients with ischemic stroke from a large dataset by linking the Clinical Research Center for Stroke (CRCS) registry and the Health Insurance Review and Assessment Service administrative claims database with clinical data collected from patients with acute ischemic stroke within 7 days following the onset of stroke symptoms from 2007 to 2014.[1-3] The exclusion criteria for evaluating risk factors and medication information before index stroke using the linked dataset were as follows: (1) patients who were registered before January 2008 (n=4,756); (2) those with inaccurate claim data on prescribed drug information and those with inaccurate vascular risk factors according to the International Classification of Disease, Tenth Revision (ICD-10) due to censored claim data after index stroke (n=4,578).[1-4] Finally, we included 42,879 patients to evaluate clinical factors associated with uncontrolled risk factors.

Baseline characteristics and clinical information

We collected details on baseline characteristics, including demographic data (age and sex) and vascular risk factors such as hypertension (HT), diabetes mellitus (DM), dyslipidemia, coronary artery disease (CAD), atrial fibrillation (AF), history of smoking, and history of stroke/transient ischemic stroke from the linked data. The history of risk factors, such as HT, DM, and dyslipidemia, was defined as the use of antihypertensive, antidiabetic, and antidyslipidemic medications, respectively, with associated ICD-10 codes assigned within 1 year before ischemic stroke, according to the linked claims data. The history of risk factors, AF and CAD, was determined using ICD-10 codes in claims data within 1 year before the ischemic stroke. The following clinical information on ischemic stroke: severity, mechanism, prestroke functional status, history of smoking, education years, and reperfusion therapy, including intravenous thrombolysis and endovascular recanalization therapy, were obtained from the CRCS registry of linked data. Stroke mechanisms were classified into five categories according to the Trial of Org 10172 in Acute Stroke Treatment criteria as follows: (1) large artery atherosclerosis, (2) small vessel occlusion, (3) cardioembolism, (4) other determined etiology, and (5) undetermined etiology, as previously described.[5] Stroke severity was assessed using the National Institutes of Health Stroke Scale (NIHSS) at admission and discharge. The included patients were divided into the following two age groups: (1) 45 years or younger (≤45 years) and (2) over 45 years (>45 years) for further comparison of risk factors according to age.[6,7] Patients newly diagnosed with HT or DM were defined as the use of antihypertensive or antidiabetic medications according to the ICD-10 codes of HT[8] and DM[9] after index ischemic stroke. For an accurate comparison, we defined the "non-hypertensive group" or "non-diabetic group" as patients with ICD-10 codes of HT or DM without prior claim records under these codes or prescription records of antihypertensives or antidiabetic medications before index ischemic stroke (1,605 [3.7%] patients with ICD-10 codes of HT without prescription of antihypertensives before index stroke among patients with HT; 1,076 [2.5%] patients with ICD-10 codes of DM without prescription of antidiabetic medications among those with DM). Furthermore, newly diagnosed AF was defined as patients with ICD codes of AF after index ischemic stroke. We also defined the "non-AF group" as patients whose diagnoses using ICD codes of AF were confirmed only before stroke (427 [1.0%] patients with ICD-10 codes of AF before index ischemic stroke). We evaluated the proportion of patients with newly identified major vascular risk factors, such as HT, DM in all stroke subtypes, and AF in cardioembolic stroke after index stroke and assessed clinical factors that influence uncontrolled vascular risk factors. We defined uncontrolled vascular risk factors based on the presence or absence of prescription information on risk factors at the time of the index stroke. We did not analyze the percentage of patients with dyslipidemia. The presence of dyslipidemia was defined as the use of antidyslipidemic medications. However, 34,339 (80.1%) patients were treated with antidyslipidemic drugs after index stroke, regardless of total cholesterol or low-density lipoprotein. We believed that this working definition of dyslipidemia could overestimate the true prevalence of dyslipidemia and chose not to include dyslipidemia in the analysis.

Statistical analysis

Baseline characteristics are presented as numbers (%). Continuous variables with normal distributions are presented as mean±standard deviation, and other variables that were not normally distributed are presented as medians (interquartile range). We used absolute standardized differences (ASDs) to compare baseline characteristics. ASD analysis was performed because it is expected to be more informative than *P*-values for large linked datasets. For all variables, ASDs less than 0.1 represent small standardized differences.[10,11] We performed multiple logistic regression to evaluate the relationship between clinical factors and newly diagnosed risk factors for ischemic stroke among patients using all statistically significant covariates and important clinical covariates associated with risk factors. In multivariable analyses, a two-tailed *P*-val-

ue of less than 0.05 was considered statistically significant. All statistical analyses were conducted by professional medical statisticians (J.S. Lee and J.S. Yoon) using SAS version 9.4 (SAS Institute Inc., Cary, NC, USA).

Supplementary Results

When comparing baseline characteristics between patients with known risk factors and those with newly identified risk factors after index stroke, those with newly diagnosed risk factors were significantly younger (Supplementary Tables 1-3). Patients with newly identified HT and DM were less likely to have other vascular risk factors (Supplementary Tables 1 and 2). Furthermore, the proportion of patients with good functional status before stroke was significantly higher among patients with newly identified HT (Supplementary Table 1). Patients with newly identified HT and AF were more likely to have higher educational levels than those with known HT or AF (Supplementary Tables 1 and 2). However, there were no differences in educational levels between patients with and without known DM (Supplementary Table 2). Among diabetic patients, newly diagnosed patients were more likely to be treated with reperfusion therapy than those previously diagnosed (Supplementary Table 2). However, newly diagnosed diabetic patients had significantly higher initial and discharge NIHSS scores (Supplementary Table 2), while stroke severity was similar between hypertensive and AF patients (Supplementary Table 3).

Supplementary References

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