Supplementary appendix

Definitions

Ischemic stroke

Ischemic stroke was defined by the I63 code using the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) code system, and endovascular recanalization therapy (ERT) was defined by the procedure code M6631 (thrombolytic treatment–cerebral thrombus removal) or M6633 (mechanical thrombolysis) in the Health Insurance Review and Assessment Service (HIRA) Code system. In this process, we wanted to exclude stroke cases that occurred in-hospital or those that occurred peri-procedurally (e.g., acute ischemic stroke [AIS] as a complication after coil embolization of aneurysmal subarachnoid hemorrhage).

Methods

Validity of identifying ERT patients using an administrative database

The numbers of true positive cases (true positive), missing cases (false negative), incorrect cases (false positive), and correctly excluded cases (true negative) were identified. The sensitivity (true positives / [false negatives + true positives]), specificity (true negatives / [false positives + true negatives]), and positive predictive values (true positives / [true positives + false positives]) were calculated.[24]

Patients from each database were matched using the patient's sex, age, admission date, and discharge date. If discrepancies occurred, false negative or false positive was assigned, and true negative notation was assigned to patients who were present in the clinical database but had not undergone the ERT procedure. Pearson's chi-square test and Student's t-test were used to compare the administrative and clinical databases.

Validation of stroke severity index

Because the National Institutes of Health Stroke Scale (NIHSS), an established severity score for AIS were unavailable for all ERT patients of this study, we decided to use the stroke severity index (SSI), the claim data-based severity score after validation. The medical insurance system in Taiwan is similar to that of Korea's, they both utilize fee-for-service, compulsory insurance system, and cover almost everyone in the nation.[31] Hence, we used the same methodology of the Taiwan study in this study. It is known that SSI could be used as the proxy for NIHSS, as they both carry the same weight.[25]

Seven parameters (airway suctioning, bacterial sensitivity test, general ward stay, intensive care unit stay, nasogastric tube, osmotherapy, urinary catheterization) were also selected from the results of the Taiwan study. We agree with the methodology of selecting these seven parameters. We thought that the coefficient values of each seven parameters could be customized to Korean HIRA database, and multiple linear regression from the clinical database performed (Supplementary Table 1).

Risk-adjusted outcome models

The models incorporated patient variables such as demographic characteristics (age and sex) and clinical characteristics (risk factors for ischemic stroke, modified Charlson Comorbidity Index, and the SSI, and hospital variables such as hospital teaching status, geographical location [metropolitan or non-metropolitan], availability of a stroke unit, and hospital ownership [public or private]).[28-30] The SSI was included in the model to consider severity of stroke as a substitute for the NIHSS (Supplementary Table 2).[25,27]

The identification of the hospitals in a "de-identified" administrative database was performed by combining the location information and the relative volume of ERT. Except for the geographical location, the other three hospital parameters were acquired from the official Korean Hospital Association website, Korean Stroke Association website, and each hospital's website.