Implementation of a Stroke Registry Is Associated with an Improvement in Stroke Performance Measures in a Tertiary Hospital in Mexico

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Background: Stroke registries provide a simple way for improving patient care, and its use has been associated with a better adherence to the published guidelines. Few Latin American countries had established stroke registries. Our study is the first in Mexico to report the effects of implementing a stroke registry. To determine if the implementation of a systematized registry is associated with an improved adherence to the performance measures. *Methods:* We compared prospective data (August 2008-November 2010) against historical controls (February 2005-July 2008). Our stroke registry (i-Registro Neurovascular) consists of a standardized clinical form that includes demographic and clinical variables (risk factors, medications, neuroimaging, etiology, acute and outpatient treatments, and neurologic scores [National Institutes of Health Stroke Scale and modified Rankin Scale]). We evaluated 9 performance measures suggested by the American Heart Association and the Joint Commission. *Results:* We analyzed the data from 574 patients, 260 from the prospective phase and 314 from historical controls. No significant statistical differences in demographic characteristics or stroke risk factors were found. The implementation of the stroke registry was associated with a statistically significant ($P < .05$) improvement in almost all of the acute performance measures. The composite measure also showed an improvement form 52.6%-68.8% ($P < .001$). *Conclusions:* The implementation of a systematized registry significantly improved our clinical practice. This intervention is a low cost and readily achievable and a viable option for encouraging an increased report of guidelines adherence of other hospitals in Latin America. **Key Words:** Stroke—stroke care—ischemic—database—quality of care.

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Stroke is a leading cause of death and disability in México and Latin America,[1] and represents a major health problem because of the current epidemiologic transition.[2] Cerebrovascular disease has a great impact on health care costs, including medication costs and loss in productivity.[3] Therefore, it is of the utmost importance to develop and implement more effective health management systems for stroke.

Stroke registries, with emphasis on stroke guidelines, have shown to be a simple and cost-effective method to detect deficiencies and improve the quality of patient care. These registries can be used as a checklist for the residents and treating physicians at a university hospital setting and provide the information necessary to guide the diagnostic and therapeutic approaches.[4]

In the United States, the attention to registries and their impact in health care delivery has led to the development of recommendations to standardize and minimize the differences in patient care among hospitals,[5-11] thus, creating a set of performance measures for acute stroke care[12] and programs to monitor adherence to these measures.[13] Participation of hospitals in large stroke registries is associated with better quality indicators[4,14-16]; similar assessments have been carried out in other countries.[17-27] However, there are few registries and stroke care quality assessment reports from Latin American countries, with the exception being the ones carried out by Argentina,[28] Brazil,[29-31] and Chile.[32,33]

In this study, we examined the impact that the implementation of a systematized registry had in our adherence to quality performance measures. These have never been systematically assessed in any Mexican hospital, making this study the first-published report on this topic.

Methods

The prospective ischemic stroke registry began in August 2008, as an epidemiologic data resource named *i-Registro Neurovascular* (iReNe). This study compares data from all the patients admitted since the implementation of iReNe until November 2010, against historic data from patients admitted from February 2005 to July 2008.

The prospective stroke database consists of a standardized clinical form, which is included as part of the patient's medical record. The form is filled by the neurology resident in charge during the patient hospitalization and includes demographic variables, presence of stroke risk factors, history of medication, neuroimaging, stroke etiology, in-patient and discharge treatment, as well as the scores for the National Institutes of Health Stroke Scale and modified Rankin Scale at 3 time points: admission, in hospital stay, and at discharge.

The historical data were collected from medical records by a select group of senior medical students who were carefully trained to assure the accuracy and standardized quality of the information obtained. The retrospective database included the same variables from the prospective phase, and only patients with complete information were included into the statistical analysis.

We evaluated 10 of the performance measures suggested by the American Heart Association and the Joint Commission.[6] These measures included the use of intravenous recombinant tissue plasminogen activator (IV rt-PA) within 3 hours of hospital arrival for eligible patients,[34] antithrombotic medication within 48 hours of admission, deep vein thrombosis (DVT) prophylaxis within 48 hours for nonambulatory patients, antithrombotic medication at discharge, anticoagulation medication at discharge for patients with atrial fibrillation (AF), low-density lipoprotein (LDL) measurement, lipid-lowering agents at discharge for patients with LDL greater than 100 mg/dL, diabetes mellitus management, carotid Doppler ultrasound evaluation, and hospital rehabilitation assessment (Table 1).[12]

The measures reflect the proportion of patients eligible for each treatment; the noneligible patients (patients with documented criteria for precluding treatment) were excluded from the analysis of each measure. Furthermore, a composite measure was included, which indicates the extent to which each measure was provided. This was defined as the ratio of the total number of interventions performed on eligible patients against the total number of possible interventions among eligible patients.

Neurology residents were encouraged to undertake the National Institutes of Health Stroke Scale and the modified Rankin Scale training with the goal of pursuing a certificate of completion. No other interventions were carried out aside from the aforementioned ones.

Statistical Analysis

Analysis was performed using SPSS v21 (IBM Corporation, Armonk, NY). We analyzed the categorical variables with the chi-square test or Fisher exact test considering a P value less than .05 as statistically significant. This study was authorized by the Local Ethics Committee, and all patients signed informed consent for their deidentified records to be included in the database.

Results

Data from a total of 577 patients admitted with ischemic stroke were analyzed. In all, 256 patients for the prospective phase and 321 medical records of the patients admitted during the retrospective period were included in the study. The groups did not show any significant difference in demographic characteristics or risk factors for stroke (Table 2). The mean age was not statistically different between groups, 62.9 ± 15.8 years in the retrospective population and 63.4 ± 14 years in the