

Emergency Department Length of Stay and Outcome after Ischemic Stroke

Artin Minaeian, MD,* Anand Patel, MD,* Basad Essa, MD,*
Richard P. Goddeau Jr., DO,* Majaz Moonis, MD,* and Nils Henninger, MD*†

Background: Emergency department length of stay (ED-LOS) has been associated with worse outcomes after various medical conditions. However, there is a relative paucity of data for ischemic stroke patients. We sought to determine whether a longer ED-LOS is associated with a poor 90-day outcome after ischemic stroke. *Methods:* This study is a retrospective analysis of a single-center cohort of consecutive ischemic stroke patients (n = 325). Multivariable linear and logistic regression models were constructed to determine factors independently associated with ED-LOS as well as a poor 90-day outcome (modified Rankin Scale [mRS] score >2), respectively. *Results:* The median ED-LOS in the cohort was 5.8 hours. For patients admitted to the inpatient stroke ward (n = 160) versus the neuroscience intensive care unit (NICU; n = 165), the median ED-LOS was 8.2 hours versus 3.7 hours, respectively. On multivariable linear regression, NICU admission ($P < .001$), endovascular stroke therapy ($P = .001$), and thrombolysis ($P = .021$) were inversely associated with the ED-LOS. Evening shift presentation was associated with a longer ED-LOS ($P = .048$). On multivariable logistic regression, a greater admission National Institutes of Health Stroke Scale score ($P < .001$), worse pre-admission mRS score ($P = .001$), hemorrhagic conversion ($P = .041$), and a shorter ED-LOS ($P = .016$) were associated with a poor 90-day outcome. Early initiation of statin therapy ($P = .049$), endovascular stroke therapy ($P = .041$), NICU admission ($P = .029$), and evening shift presentation ($P = .035$) were associated with a good 90-day outcome. *Conclusions:* In contrast to prior studies, a shorter ED-LOS was associated with a worse 90-day functional outcome, possibly reflecting prioritized admission of more severely affected patients who are at high risk of a poor functional outcome. **Key Words:** Ischemic stroke—emergency department—length of stay—functional outcome.

© 2017 National Stroke Association. Published by Elsevier Inc. All rights reserved.

From the *Department of Neurology, University of Massachusetts Medical School, Worcester, Massachusetts; and †Department of Psychiatry, University of Massachusetts Medical School, Worcester, Massachusetts.

Received April 10, 2017; accepted April 28, 2017.

Grant support: Dr. Henninger is supported by grant no. K08NS091499 from the National Institute of Neurological Disorders and Stroke of the National Institutes of Health.

Disclosures: Dr. Henninger is a member of the advisory board for Omniox, Inc. All the other authors have no disclosures.

Author contributions: A.M. and N.H. were involved in the study concept and design. A.M. and A.P. were involved in the acquisition of the data. N.H. conducted the statistical analysis and drafted the manuscript. A.M., B.E., R.P.G., M.M., and N.H. were involved in the interpretation of the data. All authors revised the manuscript for important intellectual content. N.H. was involved in study supervision and coordination.

Address correspondence to Nils Henninger, MD, Departments of Neurology and Psychiatry, University of Massachusetts Medical School, 55 Lake Ave., North Worcester, MA 01655. E-mail: nils.henninger@umassmed.edu.

1052-3057/\$ - see front matter

© 2017 National Stroke Association. Published by Elsevier Inc. All rights reserved.

<http://dx.doi.org/10.1016/j.jstrokecerebrovasdis.2017.04.040>

Introduction

Emergency department (ED) overcrowding is a major public health problem worldwide because it has been shown to adversely affect patient outcomes across a variety of clinical conditions.^{1,2} Although the specific effects of ED crowding on outcome remain to be clarified, an important factor is an increased emergency department length of stay (ED-LOS), particularly among critically ill patients.³

Stroke comprises one of the most frequent neurological emergencies in EDs,⁴ yet there is a surprising paucity of data regarding the association between the ED-LOS and outcome among stroke patients. Results have been conflicting: whereas some studies found an association between ED-LOS and outcome,⁵⁻⁷ others did not.⁸⁻¹⁰ These differences may in part relate to absent differentiation between ischemic and hemorrhagic stroke etiology, subsequent admission to a stroke ward versus an intensive care unit, as well as differences between study settings including a widely varying ED-LOS.⁶⁻⁹

To better understand the impact of the ED-LOS on outcome after ischemic stroke, we conducted a retrospective analysis of a cohort of ischemic stroke patients admitted to a single tertiary care academic stroke center. Our primary goal was to determine whether a longer ED-LOS predicts a poor 90-day functional outcome after adjusting for relevant confounders. Because delayed admission to dedicated stroke wards may reduce adherence to stroke guidelines in ED boarders and may contribute to worse outcomes after stroke,¹¹⁻¹³ we also determined adherence to Get With The Guidelines (GWTG)-Stroke treatment measures and their association with the outcome. In secondary analyses, we sought to determine whether the association of the ED-LOS and outcome differed between patients admitted to the stroke ward versus the neuroscience intensive care unit (NICU).

Methods

Study Population

The present study was reviewed and approved by our institutional review board. We retrospectively analyzed consecutive patients with acute ischemic stroke as shown on brain imaging that were prospectively included in our local stroke registry between January 2013 and December 2013.

The ED-LOS was defined as the time (in minutes) spent in the ED from the time of patient registration in the ED to the arrival on our in-hospital stroke ward or NICU. All patients were evaluated within 5 minutes from ED arrival by a member of the stroke service. Patient demographics, laboratory data, comorbidities, preadmission medications, and stroke etiology (using the Trial of Org 10172 in Acute Stroke Treatment [TOAST] classification) after the completion of the diagnostic evaluation were collected from all patients.¹⁴ National Institutes of Health

Stroke Scale (NIHSS) scores were assessed at the time of presentation by NIHSS-certified members of the stroke team. The modified Rankin Scale (mRS) score was assessed at 90 days by a stroke-trained physician or a stroke study nurse certified in mRS via an in-person or phone interview.^{15,16} We defined academic months as well as 4 academic quarters (3 months each) with the first academic month starting on July 1 and the first academic quarter ranging from July to September 2013 to determine whether the ED-LOS varied over the course of the academic year. To determine whether the time of patient presentation to the ED was associated with the ED-LOS or outcome, we stratified the time to presentation into 7 AM-3 PM, 3-11 PM, and 11 PM to 7 AM shifts, which most closely represented both neurology and ED staff shifts.

We assessed the adherence to the following GWTG achievement and quality measures: early antithrombotics, antithrombotics at discharge, venous thromboembolism prophylaxis, anticoagulation for atrial fibrillation, smoking cessation advice, statin therapy, dysphagia screen, stroke education given, rehabilitation considered, and recombinant tissue plasminogen activator (rtPA) within 60 minutes of arrival by 2 and 3.5 hours, respectively.

We adhered to the Strengthening the Reporting of Observational studies in Epidemiology (STROBE) guidelines (www.strobe-statement.org).

Outcomes

The primary outcome was a good functional outcome (mRS score 0-2) measured at 90 days.

Statistical Analysis

Unless otherwise stated, continuous variables were reported as mean \pm standard deviation or median (interquartile range). Categorical variables were reported as proportions. Normality of data was examined using the Shapiro-Wilk test. Categorical variables were compared using the χ^2 test or the Fisher exact test. The Mann-Whitney *U* test was performed for the analysis of continuous variables. The Spearman rank correlation was used to determine the strength of association between the ED-LOS and clinical variables.

To assess predictors of the ED-LOS, we performed multivariable linear regression including baseline characteristics associated with the ED-LOS in univariable analyses (*P* value for inclusion $<.2$: small-vessel disease, admission NIHSS score, preadmission mRS score, NICU versus stroke ward admission, intravenous rtPA, endovascular stroke therapy, academic quarter, and time of admission). The presence of hemorrhagic transformation, withdrawal of care, and 90-day mRS score were not included in this model as these outcome measures were unknown at the time of ED presentation. To avoid model overfitting, a backward elimination method (likelihood ratio) was used for linear multivariable modeling. The ED-LOS was log

Download English Version:

<https://daneshyari.com/en/article/5574648>

Download Persian Version:

<https://daneshyari.com/article/5574648>

[Daneshyari.com](https://daneshyari.com)