Evaluation of the Patient Health Questionnaire-2 as a Screening Tool for Depression during the Acute Stroke Admission

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Background: The ideal time to screen for poststroke depression remains uncertain. We evaluated the 2-item Patient Health Questionnaire (PHQ-2) as a screening tool for depression during the acute stroke admission by determining the prevalence of positive depression screen during admission and by calculating the level of agreement between positive screens during admission and follow-up. *Methods:* This was a retrospective cohort of adult stroke survivors discharged January to December 2013 with principal discharge diagnosis of acute ischemic stroke or intracerebral hemorrhage. Depression screening was systematically performed during the hospital admission using the PHQ-2. The 9-item Patient Health Questionnaire (PHQ-9), which includes the PHQ-2, was completed by patients at outpatient follow-up. *Results:* The study cohort consisted of 337 patients with mean age of 66.3 years. Median time from admission to PHQ-2 was 3 days (interquartile range 1-4 days). The screen was positive for depression in 4.7% (95% confidence interval 2.7%-7.6%) of patients. Of the 150 patients with PHQ-9 data at outpatient follow up, 19.3% screened positive for depression. In both the inpatient setting and at outpatient follow-up, the prevalence of a positive depression screen was similar between patients with and without a history of depression or antidepressant use. *Conclusions:* Systematic screening for depression using PHQ-2 during hospitalization for acute stroke identified few patients. Most patients with depressive symptoms were identified only at the time of outpatient follow-up. Further study is needed to evaluate the usefulness of other depression screens for stroke patients in the acute hospital setting and the optimal timing for depression screening after stroke. **Key Words:** Stroke—depression—hospital admission—quality improvement.

Introduction

Depression after stroke is common and affects recovery and functional outcome.[1,2] The importance of early recognition and treatment of poststroke depression has been well documented.[3-5] This has led to recommendations for depression screening during the acute stroke admission.[6,7] However, the optimal period for such screening after acute stroke and valid early screening methods have not yet been established. Numerous tools validated for the diagnosis of depression have been used to screen and diagnose poststroke depression in recovery or chronic phase.[8-12] The 9-item Patient Health Questionnaire (PHQ-9),[13] and the ultra-brief 2-item Patient Health Questionnaire (PHQ-2),[14] which consists of the first 2 questions of the

PHQ-9, were both derived from the Primary Care Evaluation of Mental Disorders Patient Health Questionnaire (PHQ)[15] and have been used and validated for screening and diagnosis of depression in various neurologic diseases,[16,17] including stroke.[10-12,18] There are limited data[19] on the usefulness of these screening measures during the acute in-hospital phase of stroke as most studies have only evaluated their use during postacute and subacute phases.[5,10-12,18] We evaluated the use of the PHQ-2 as a screening tool for depression during the acute stroke admission by determining the prevalence of positive depression screen during admission and by calculating the level of agreement between positive screens during admission and follow-up.

Methods

The study was conducted at a single academic medical center. All patients admitted to the stroke service with primary discharge diagnosis of acute ischemic stroke or intracerebral hemorrhage defined using International Classification of Diseases, Ninth Revision, Clinical Modification codes 431, 433.x1, 434.x1, and 436 between January 1, 2013 and December 31, 2013, had PHQ-2 screen completed during the stroke admission, and were discharged alive were included. The diagnosis was confirmed by manual chart review, and patients without stroke, admission of more than 7 days since date of stroke onset, and readmissions were excluded.

All patients admitted to the stroke service were systematically screened for depression by advanced practice providers who administered the PHQ-2 (1. Little interest or pleasure in doing things and 2. Feeling down, depressed, or hopeless). Scores of 3 or greater indicate a positive screen for depression. Depression screening, a requirement by The Joint Commission-sponsored Comprehensive Stroke Center Certification, was considered standard of care and informed consent was not obtained. At outpatient follow-up, a self-administered PHQ-9 is used to screen for depression. A PHQ-9 score of 10 or greater indicates a positive screen for depression.

We manually reviewed the electronic health record and collected information on demographic variables, past medical, psychiatric, and treatment histories, stroke severity as defined by the National Institutes of Health Stroke Scale (NIHSS) at presentation and discharge, disability before stroke and at discharge as defined by the modified Rankin Scale (mRS), PHQ-2 scores, reasons for failure to obtain PHQ-2 scores, length of hospital and intensive care unit (ICU) stay, discharge disposition, date of depression diagnosis, initiation of antidepressant medication, and prescribing physician specialty. PHQ-9 data were obtained from the first outpatient clinical follow-up after stroke hospitalization using the Knowledge Program, a software platform for the systematic electronic collection of patient-reported outcomes at Cleveland Clinic.[20] Patients complete the PHQ-9 and other surveys on tablets at the appointment or through the patient portal (MyChart, Epic Systems) at home before their visit. Proxies may complete the questionnaires in instances where patients are not able to complete the electronic questionnaires themselves. This study was approved by the Cleveland Clinic Institutional Review Board.

Statistical Analysis

We computed the frequency and percentage of patients that had PHQ-2 administered in the acute phase and compared demographic and clinical characteristics of patients stratified by whether or not the patient had the PHQ-2. Continuous variables were summarized by mean and standard deviation, as well as median and range, and Mann–Whitney U tests were performed to determine significant differences between groups. Chi-square tests and, when necessary, Fisher exact tests were used for comparing categorical variables. We computed the percentage of patients with positive screen for depression (PHQ-2 ≥3) during their inpatient stay and positive screen for depression (PHQ-2 ≥3 and PHQ-9 ≥10) at the time of their first outpatient follow-up. For each prevalence estimate, we computed a 95% confidence interval (CI) using the exact binomial method.

Among patients who had data available for both the PHQ-2 during the inpatient stay and the PHQ-9 during the follow-up outpatient visit, we created 2×2 contingency tables for presence or absence of depression and computed the percent of observations where both the inpatient PHQ score and the outpatient PHQ-2 subscore of the PHQ-9 indicated positive evidence for depression or negative evidence for depression. Exact binomial 95% CIs were computed.

We used Cohen's kappa statistic to assess agreement between positive and negative screens at the inpatient and follow-up visits. To assess agreement between the PHQ-2 subscores at inpatient and follow-up outpatient visits, we performed a Bland–Altman analysis.[21]

We also compared the clinical characteristics of patients who had negative PHQ-2 scores at both time points to those who screened negative during the inpatient stay but screened positive during the follow-up outpatient visit using the following variables: admission and discharge NIHSS, discharge mRS, length of ICU stay, and discharge disposition.

Results

A total of 337 patients with acute ischemic stroke or intracerebral hemorrhage met the study criteria and were included in the study cohort (Fig 1). Among the reasons patients did not have PHQ-2 score and were therefore excluded included the following: unable to be assessed due to aphasia (15.7%, n = 83) or mental status in 10 patients