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Secondary Prevention after Ischemic Stroke or Transient Ischemic Attack

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ABSTRACT

BACKGROUND: Patients with stroke or transient ischemic attack are at increased risk of recurrent stroke. Transient ischemic attack is a harbinger for stroke merely hours to days after the initial transient ischemic attack. There is thus a narrow window of opportunity to initiate evidence-based therapies for secondary prevention of stroke. Our objective was to assess hospital adherence at discharge to secondary prevention measures after transient ischemic attack or ischemic stroke.

METHODS: Observational study of patients in the Get With The Guidelines-Stroke registry from 2007 to 2011. Patients were divided into 2 cohorts based on presentation: transient ischemic attack versus ischemic stroke. Adherence to evidence-based secondary prevention and other quality measures were assessed.

RESULTS: Among the 858,835 patients with transient ischemic attack or ischemic stroke, 259,319 (30%) patients presented with a transient ischemic attack and 599,516 (70%) patients presented with an ischemic stroke. After adjusting for patient and hospital characteristics, adherence to secondary prevention measures was consistently lower for the transient ischemic attack cohort (vs ischemic stroke cohort), who had lower odds of being discharged on antithrombotics (odds ratio [OR] 0.63; 95% confidence interval [CI], 0.59-0.66; P <.0001), anticoagulants for atrial fibrillation (OR 0.65; 95% CI, 0.61-0.68; P <.0001), lipid-lowering medication for LDL >100 mg/dL (OR 0.52; 95% CI, 0.50-0.54; P <.0001), intensive statin therapy (OR 0.74; 95% CI, 0.72-0.76; P <.0001), LDL cholesterol measurement (OR 0.66; 95% CI, 0.64-0.68; P <.0001), smoking cessation counseling (OR 0.83; 95% CI, 0.78-0.89; P <.0001), stroke education (OR 0.71; 95% CI, 0.69-0.73; P <.0001), or weight loss recommendations (OR 0.88; 95% CI, 0.85-0.90; P <.0001). The adherence to evidence-based therapies increased significantly (P <.0001) over time (2007-2011) for both the cohorts, but the increasing trend was consistently lower for patients who presented with transient ischemic attack.

CONCLUSIONS: In patients surviving an ischemic stroke or transient ischemic attack, adherence to evidence-based secondary prevention discharge measures were consistently less for patients with transient ischemic attack, thus representing a missed opportunity at instituting preventive measures to reduce the risk of recurrent stroke.

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Transient ischemic attack is a harbinger for stroke, with a 90-day stroke rate of ~11% and with a recurrent transient ischemic attack rate of ~13%.[1-3] In addition, approximately one quarter of ischemic strokes are preceded by a transient ischemic attack, often merely hours or days before the ischemic stroke.[2] There is thus a narrow time window for prevention of ischemic stroke after a transient ischemic attack.[2] In addition to the increased risk of ischemic stroke, patients with transient ischemic attack have an increased risk of major adverse cardiovascular events (~22% at 1 year),[4-7] with the risk of adverse cardiovascular events similar to that of patients with documented ischemic stroke.[5]

Randomized trials have shown that aggressive secondary prevention measures after an ischemic stroke or a transient ischemic attack can substantially reduce the risk of recurrent ischemic stroke. The American Heart Association/ American Stroke Association (AHA/ASA) guidelines for the secondary prevention of stroke emphasize aggressive secondary prevention measures after either a stroke or transient ischemic attack, not only to reduce recurrent stroke, but also to reduce related cardiovascular morbidity and mortality.[8,9] The narrow time window for preventive measures after a transient ischemic attack dictates that aggressive secondary prevention strategies must be employed at the time of discharge during index admission for transient ischemic attack. However, whether this is followed in clinical practice is not well characterized. In this study, using data from the Get With The Guidelines-Stroke registry, we aimed to assess the adherence to secondary prevention measures at hospital discharge after transient ischemic attack or ischemic stroke; compare rates of adherence for patients with transient ischemic attack and ischemic stroke; and evaluate temporal trends during the study period from 2007 to 2011.

METHODS

Get With The Guidelines-Stroke (GWTG-Stroke) Program

The GWTG-Stroke program is a voluntary quality improvement program across the US, which collects information on stroke admission. The methods of the GWTG-Stroke program have been described previously.[10-12] Briefly, for each hospitalization for stroke or transient ischemic attack, information on patient demographics, medical history, in-hospital diagnostic work-up, treatment, discharge medications, counseling, and disposition were

collected using an Internet-based patient management tool (Outcome; Quintiles, Durham, NC). A validation study showed excellent reliability of the data collected in GWTG-Stroke.[13] In addition, hospital characteristics including academic/nonacademic status, annual stroke volume, and geographic regions were obtained from the American Hospital Association database. The institutional review boards at the participating center determined that the study was exempt and hence, no individual patient consent was required.[10]

> **CLINICAL SIGNIFICANCE**
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> - Transient ischemic attack (TIA) is a harbinger for stroke, with an increased risk of stroke merely hours to days after the initial TIA, leaving a narrow window of opportunity to initiate evidence-based therapies for secondary prevention of stroke.
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> - Among the 858,835 patients with TIA or ischemic stroke, we found that adherence to evidence-based secondary prevention discharge measures were consistently less for patients with TIA, thus representing a missed opportunity at instituting preventive measures to reduce the risk of recurrent stroke.

Patient Selection and Study Cohort

For the purpose of this analysis, patients in the GWTG-Stroke registry with a diagnosis of transient ischemic attack or ischemic stroke were included. Transient ischemic attack was defined as symptoms that were present at the time of hospital arrival, lasting <24 hours, with no alternative diagnosis. Patients with symptoms lasting <24 hours but with radiographic evidence of ischemic injury, or those with symptoms lasting >24 hours, were classified as ischemic stroke.[14] Patients were grouped into 2 cohorts: transient ischemic attack and ischemic stroke. The study period was from January 1, 2007 to October 3, 2011.

Patients were excluded if: 1) they were enrolled at sites with missing data on >25% of patients; 2) they were admitted to the hospital without at least one transient ischemic attack; 3) they were transfer-in and -outs; 4) they had an in-hospital stroke; 5) their discharge destination was missing or they left against medical advice, died in the hospital, or were discharged to hospice (Figure 1).

Secondary Prevention and Other Quality-of-care Measures

The outcome measure of interest was adherence to secondary prevention measures at hospital discharge. This included performance measures and other quality measures. The discharge performance measures included: 1) antithrombotic medications at discharge, including antiplatelet agents (aspirin, aspirin/dipyridamole, ticlopidine, clopidogrel) and anticoagulants (heparin and warfarin); 2) anticoagulation (warfarin, heparin, or other anticoagulants) for atrial fibrillation (paroxysmal or persistent); 3) lipid-lowering agents for patients with low-density lipoprotein cholesterol (LDL) >100 mg/dL; 4) smoking cessation counseling provided at or before discharge for current smokers; 5) stroke education; and 6) weight loss education for patients with a body mass index >25. The other quality