

Tale of 2 Health-care Systems: Disparities in Demographic and Clinical Characteristics between 2 Ischemic Stroke Populations in Los Angeles County

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Background: Individuals who present to the emergency departments of safety-net systems often have poorly controlled risk factors due to lack of primary care. Little is known about potential differences in presenting characteristics, discharge medications, and discharge destinations of patients with acute ischemic stroke (AIS) who present to safety-net settings versus university medical centers (UMCs). *Methods:* Demographic characteristics, medical history, premorbid medication use, stroke severity, discharge medications, and discharge destination were assessed among consecutive admissions for AIS over a 2-year period at a UMC (n = 385) versus 2 university-affiliated safety-net hospitals (SNHs) (n = 346) in Los Angeles County. *Results:* Compared with patients presenting to the UMC, individuals admitted to the SNHs were younger, more frequently male, nonwhite, current smokers, hypertensive, and diabetic; they were less likely to take antithrombotics and statins before admission, and had worse serum lipid and glycemic markers (all $P < .05$). Patients admitted to the UMC trended toward more cardioembolic strokes and had higher stroke severity scores ($P < .0001$). At discharge, patients admitted to the SNHs were more likely to receive antihypertensive medications than do patients admitted to the UMC ($P < .001$), but there were no differences in prescription of antiplatelet medications or statins. *Conclusions:* Individuals with AIS admitted to SNHs in Los Angeles County are younger and have poorer vascular risk factor control than their counterparts at a UMC. Discharge treatment does not vary considerably between systems. Early and more vigorous efforts at primary vascular risk reduction among patients seen at SNHs may be warranted to reduce disparities. **Key Words:** Stroke—safety-net—disparities—risk factors—healthcare.

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Introduction

Los Angeles County is the largest county in the United States, with a population of approximately 10 million people.¹ It is also one of the most racially and ethnically diverse counties in the United States; approximately 7 million minority residents account for nearly three quarters of the population. Nearly half (47.7%) of Angelenos identify themselves as Hispanic or Latinos, 15.3% as Asian, and 9.7% as African American.¹ The Los Angeles County Department of Health Services (LAC-DHS) safety-net system, the second largest safety-net system in the United States, serves approximately 800,000 patients per year; most (90%) are minorities and most are uninsured or underinsured.² Studies have demonstrated that access to care and outcomes of treatment are generally worse in county hospitals than in private hospitals.^{3,4} Disparities have been noted in asthma, appendicitis, peptic ulcer disease, cancer, sepsis, and human immunodeficiency virus,⁵⁻¹⁰ but no study to date has assessed potential differences in stroke. The aim of this study was to identify differences between individuals with acute ischemic stroke (AIS) at a university medical center (UMC) and 2 safety-net hospitals (SNHs) to uncover areas for targeted improvement for AIS prevention and care.

Methods

Patient Population and Setting

Data were collected from October 2007 to June 2009 from 385 patients with AIS consecutively admitted to the University of California-Los Angeles medical center, a UMC located in an upper middle-class neighborhood, and compared with 404 patients admitted to 2 university-affiliated LAC-DHS SNHs, Rancho Los Amigos National Rehabilitation Center (Rancho) and Olive View Medical Center (OVMC). Fifty-eight (7%) of patients admitted to SNHs were excluded because of missing data on admission medications and medical characteristics, leaving 346 patients ($n = 160$ at Rancho and $n = 186$ at OVMC).

Ambulance diversion to primary stroke centers in Los Angeles began in July 2009, after the period of this study. The primary source of admission to the UMC was via transfer from other hospitals for possible endovascular intervention, whereas the primary source of admission to the SNHs was through the emergency departments. Rancho is an acute care and acute rehabilitation hospital, with acute medical or surgical as well as acute rehabilitation beds. We excluded patients admitted for acute rehabilitation. Because Rancho lacks an emergency department, patients were transferred to the Rancho Acute Stroke Unit from the emergency department or wards of a third SNH, Los Angeles County-University of Southern California Hospital, the largest of the 4 LAC-DHS hospitals. Exclusion criteria

for transfer to the Rancho Acute Stroke Unit from the Los Angeles County-University of Southern California emergency department included middle cerebral artery infarction $>2/3$ of territory, pure cerebellar stroke, thrombolytics received within the past 24 hours, and need for intensive care monitoring or neurosurgery. If any of these conditions were present, transfer to Rancho was delayed until the patient was stable. Patients with stroke are admitted to the neurology service at the UMC and Rancho, and to the Medicine service, with neurology consulting, at OVMC. Neurology faculty at all sites followed similar evidence-based protocols for stroke management and secondary stroke prevention.

The sociodemographic variables collected included sex, age, and race or ethnicity. Comorbidities assessed included previous stroke (self-report or medical record), body mass index, hypertension (self-report, medical record, admission antihypertensive agent use, or left ventricular hypertrophy on transthoracic echocardiogram), diabetes mellitus (self-report, medical record, admission oral hypoglycemic agent or insulin use, hemoglobin A1c $>6.5\%$ or random glucose >200 mg/dL), coronary artery disease (self-report, medical record), atrial fibrillation (self-report, medical record), hypercholesterolemia (self-report, medical record, admission cholesterol-lowering medication use, total cholesterol >200 mg/dL, low density lipoprotein [LDL] level >100 mg/dL, or high density lipoprotein [HDL] level <40 mg/dL in men and <50 mg/dL in women), smoking (current or past), illicit drug use (self-report, medical record or positive urine toxicology screening for cocaine, amphetamines, or opiates), abdominal aortic aneurysm (self-report or medical record), and impaired kidney function (defined by self-report, medical record). The following medications were noted before admission and at discharge: antithrombotic medications (aspirin, clopidogrel, extended release dipyridamole/aspirin, warfarin, enoxaparin, dalteparin), statins, fibrates, and antihypertensive medications (including angiotensin-converting enzyme [ACE] inhibitors, angiotensin receptor blockers, thiazide diuretics, beta blockers, and calcium channel blockers). Other variables assessed included admission mode (through emergency department, hospital transfer, or direct admission), stroke severity (National Institutes of Health Stroke Scale score), vital signs, and recurrent stroke while inpatient. Laboratory values at admission included serum glucose, serum LDL, serum HDL, total cholesterol level, triglyceride level, fasting serum homocysteine, hemoglobin A1c, white blood cell count, hemoglobin, hematocrit, creatinine, glomerular filtration rate, and C-reactive protein. Strokes were classified by the modified Trial of Org 10172 in Acute Stroke Treatment criteria (small-vessel disease, large-vessel atherosclerosis, cardioembolic, other, unknown, or >1 possible etiology).¹¹ Discharge destination was noted (home, acute inpatient rehabilitation, hospital transfer, service transfer, skilled nursing facility, hospice, or shelter).

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