

Insurance Status and Outcome after Intracerebral Hemorrhage: Findings from Get With The Guidelines-Stroke

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Background: Few studies have examined associations among insurance status, treatment, and outcomes in patients hospitalized for intracerebral hemorrhage (ICH). *Methods:* Through retrospective analyses of the Get With The Guidelines (GWTG)-Stroke database, a national prospective stroke registry, from April 2003 to April 2011, we identified 95,986 nontransferred subjects hospitalized with ICH. Insurance status was categorized as Private/Other, Medicaid, Medicare, or None/Not Documented (ND). Associations between insurance status and in-hospital outcomes and quality of care measures were analyzed using patient- and hospital-specific variables as covariates. *Results:* There were significant differences in age and frequency of comorbid conditions by insurance group. Compliance with evidence-based quality of care indicators varied across all insurance status groups ($P < .0001$) but was generally high. In adjusted analysis with the Private insurance group as reference, the None/ND group most consistently demonstrated higher odds ratios (ORs) for quality of care measures (Dysphagia Screen: OR 1.10, 95% confidence interval [CI] 1.02-1.17, $P = .0096$; Stroke Education: OR 1.16, 95% CI 1.05-1.29, $P = .0042$; and Rehabilitation: OR 1.25, 95% CI 1.08-1.44, $P = .0027$). In-hospital mortality rates were higher for None/ND, Medicaid, and Medicare patients; after risk adjustment, the None/ND group had the highest mortality risk (OR 1.29, 95% CI 1.21-1.38, $P < .0001$). Medicare and Medicaid patients had lower adjusted odds for both independent ambulation at discharge and discharge to home when compared

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of Public Health. D.L.B.—Advisory Board: Medscape Cardiology; Board of Directors: Boston VA Research Institute, Society of Chest Pain Centers; Chair: American Heart Association Get With The Guidelines Science Subcommittee; Honoraria: American College of Cardiology (Editor, Clinical Trials, Cardiosource), Duke Clinical Research Institute (clinical trial steering committees), Slack Publications (Chief Medical Editor, Cardiology Today Intervention), WebMD (Continuing Medical Education (CME) steering committees); research grants: Amarin, AstraZeneca, Bristol-Myers Squibb, Eisai, Ethicon, Medtronic, Sanofi Aventis, The Medicines Company; unfunded research: PLx Pharma, Takeda. G.C.F. is a member of the Get With The Guidelines Steering Committee, receives research support from the National Institutes of Health, and is an employee of the University of California, which holds a patent on retriever devices for stroke.

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with the Private/Other group. *Conclusions:* GWTG-Stroke ICH patients demonstrated differences in mortality, functional status, discharge destination, and quality of care measures associated with insurance status. **Key Words:** Stroke—intracerebral hemorrhage—epidemiology—cerebrovascular disorders—risk factors—health care policy.

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Introduction

Despite recent initiatives, the availability of health insurance continues to be a major factor in health care delivery in the United States.^{1,2} According to a national survey, 46 million Americans were uninsured in 2009,³ and the cost of medical care had risen.⁴ Thus, it is not surprising that health care coverage remains a priority. In fact, health insurance coverage may be an indicator of barriers that impede access to medical services.⁵ Further, lack of insurance has been shown to correlate with worse outcome in a number of disease states.^{2,6-8} However, few studies have assessed whether a patient's insurance status at the time of stroke affects outcomes after intracerebral hemorrhage (ICH).

ICH is a devastating stroke subtype that has shown little improvement in morbidity and mortality over the last 2 decades.⁹ The diagnosis and treatment of ICH in the acute setting require specialized care,¹⁰ and access to this care may significantly modify outcomes.¹¹ Little is known about the relationships between a patient's insurance status, medical treatment, and outcome after hospitalization for ICH. Analysis of a large cohort of patients suffering from ICH may clarify whether potential disparities correlate with insurance status, as has been shown in other areas of medicine.¹² The purpose of this study was to examine associations between a patient's health insurance status (Private insurance, Medicare, Medicaid, or None) and the quality of care delivered and early outcome measures after ICH.

Materials and Methods

The data for our study were generated by the Get With The Guidelines (GWTG)-Stroke program, which has been previously described.¹³ Briefly, participating hospitals used an Internet-based Patient Management Tool (Outcome Sciences, Inc., Cambridge, MA) to enter data, receive decision support, and obtain feedback via on-demand reports of performance on quality measures. Of the 1711 hospitals instructed to record data from consecutive stroke and transient ischemic attack admissions, 1364 chose to record data from consecutive ICH admissions. Case ascertainment was based on clinical findings during hospitalization, or retrospectively, on diagnosis-related groups codes, or both. Eligibility of each case was confirmed at chart review before abstraction.

Trained hospital personnel abstracted data using the Internet-based Patient Management Tool with standard-

ized data definitions and detailed coding instructions. Data included demographics, insurance status, medical history, initial head computerized tomography (CT) findings, in-hospital treatment and events, discharge treatment and counseling, discharge destination, and mortality. Insurance was collected as Private, Health Maintenance Organization, Veterans Administration, Civilian Health and Medical Program of the Uniformed Services (CHAMPUS), and other types of insurance (Private/Other); Medicare; Medicaid; and self-pay, no insurance, or unknown status (None/Not Documented [ND]). Patients with Medicare along with Private/Health Maintenance Organization insurance were classified as Private/Other.¹⁴ Patients with Medicaid and Medicare were classified as Medicaid. "Missing" was defined as the insurance status field on the data collection form was not completed; "ND" was defined as the site attempted to identify the insurance carried by the patient, but no insurance type was documented in the medical record. Because the internet-based system performed checks to ensure that the reported data were complete and internally consistent, data quality was monitored for completeness and accuracy. GWTG-Stroke data quality is high.^{14,15}

Each participating hospital received either human research approval to enroll cases without individual patient consent under the common rule or a waiver of authorization and exemption from subsequent review by their Institutional Review Board. Outcome Sciences, Inc., serves as the data collection and coordination center for GWTG-Stroke. The Duke Clinical Research Institute serves as the data analysis center and has Institutional Review Board approval to analyze the aggregate de-identified data for research purposes.

Patient Population

Of the 1,510,355 admissions from 1520 hospitals that fully participated in the GWTG-Stroke program between April 1, 2003, and March 31, 2011, we excluded non-ICH cases, those missing information on discharge or insurance status, or those transferring to another acute care facility. The final analysis sample is summarized in [Figure 1](#). To assess potential bias from subjects excluded for missing insurance information, we compared those without insurance information to those with insurance information as shown in [Supplemental Table 1](#). The 2 cohorts did not have a large number of clinically relevant differences; however, it should be noted that subjects with the insurance field missing also had a high number

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