Research Report

Acute Ischemic Stroke in Hospitalized Medicare Patients
Evaluation and Treatment

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Background and Purpose—This study describes several quality indicators of care in hospitalized stroke patients in Michigan from 1998 to 1999.

Summary of Report—Median times from admission to head CT/MRI (89.5 minutes) and thrombolysis (113 minutes) exceeded recommended guidelines. Deep venous thrombosis prophylaxis was used in only 13.8% of eligible patients.

Conclusions—Timing for brain imaging and acute ischemic stroke symptom onset need to be better documented, along with more provider education for routine deep venous thrombosis prophylaxis. (Stroke. 2004;35:e22-e23.)

Key Words: Medicare ■ quality of health care ■ stroke, acute

Stroke is the third leading cause of death in the United States and the leading cause of long-term disability.1 This study describes several quality indicators of stroke care in Michigan, developed by the Centers for Medicare and Medicaid Services (CMS)2 based on guidelines published by the American Heart Association.3–6

Methods

All Medicare fee-for-service ischemic stroke (IS) and transient ischemic attack (TIA) discharges in Michigan from July 1998 through June 1999 were reviewed. CMS claims data were used to identify IS/TIA with a principal diagnosis including ICD-9-CM codes of 433 (occlusion and stenosis of precerebral arteries), 434 (occlusion of cerebral arteries), 436 (acute, but ill-defined, cerebrovascular disease), 362.34 (transient arterial occlusion), or 435 (transient cerebral ischemia) excluding 435.2 (subclavian steal syndrome).7 The population consisted of a 30% sample with a 5% over-sample and a maximum of 85 cases per hospital. Patients eligible for this analysis had stroke symptoms including visual, speech, motor, or sensory deficit that persisted for >1 hour and were present on arrival. Acute ischemic stroke (AIS) was a subgroup defined as symptom onset <48 hours prior to arrival.

Six quality indicators were abstracted: (1) Avoidance of sublingual nifedipine in AIS patients was defined as the percentage of patients with a blood pressure >180 mm Hg systolic or 100 mm Hg diastolic who did not receive sublingual nifedipine within 24 hours of arrival. (2) Documentation of time of symptom onset (or interval) was the percentage of cases with physician documentation of time interval since symptom onset, specific date of symptom onset, or specific time of symptom onset. (3) CT or MRI during hospitalization was the percentage of patients who had head CT or MRI (CT/MRI) within 1 day prior to arrival or during their hospitalization among AIS who did not arrive from another acute care facility or were not receiving terminal care. (4) DVT prophylaxis initiated by the second hospital day was the percentage of patients who had DVT prophylaxis (intermittent pneumatic compression [IPC] devices or anticoagulation with warfarin, heparin [low-dose unfractionated (LDU), low-molecular-weight (LMW) or full-dose]) initiated by the second hospital day among AIS patients who were nonambulatory (bed rest, only on bathroom privileges, or only up in a chair) on the second hospital day. Patients receiving terminal care and patients on heparin prior to admission were excluded. (5) Time to initial head CT/MRI was defined in AIS patients who received head CT/MRI 1 day prior to arrival or during stay and had documentation of date and time of arrival and performance of CT/MRI. Patients arriving from another acute care facility or receiving terminal care were excluded. If the CT/MRI was conducted prior to admission, the median time to CT/MRI was defined as “zero.” (6) Time to thrombolytic administration was determined in AIS patients with documentation of date and time of admission and thrombolysis.

Data were collected by CMS’s Clinical Data Abstraction Center through medical record review. Data elements abstracted by trained nurses were compared against a random sample of re-abstracted cases, with 96.6% accuracy across all elements. Analysis was performed using SAS (version 8.2). The frequencies and percentages of cases meeting the criteria for the first 4 indicators, and the median and interquartile ranges for the latter 2 indicators were determined.

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Results
Medical records of 5146 cases were abstracted; 2102 had symptoms that persisted for >1 hour and were present on arrival, and 1659 of these cases had AIS (symptom onset <48 hours prior to arrival). Among the 1659 AIS patients, 836 met criteria for the possible consideration of sublingual nifedipine use. Among these, 812 (97.1%) were not prescribed sublingual nifedipine. Of the 2102 stroke cases, 2010 (95.6%) had physician documentation of symptom onset time or interval. Among 1611 cases “eligible” for head CT/MRI (per definition in Methods), 1579 (98.0%) had either one performed. Among 2102 stroke patients, 477 were nonambulatory on the second hospital day. Of 339 patients “eligible” for DVT prophylaxis (per definition in Methods), 47 (13.8%) received it.

Among patients with AIS, arrival time and the time to earliest CT/MRI were documented in 144 cases. The median time to imaging was 89.5 minutes (25th and 75th percentiles: 55 and 210 minutes, respectively). Limiting the analysis to stroke patients with symptoms beginning within 6 hours of admission (n=37), the median time to imaging was 69.0 minutes. Of 1659 AIS patients, both arrival time and thrombolysis time were documented in 23 cases. The median time from admission to thrombolytic administration was 113 minutes (25th and 75th percentiles: 83 minutes and 146 minutes, respectively). For all these quality indicators, no significant difference was noted between patients coded by ICD-9 as TIA or stroke. Indicators of the AIS subgroup, other than time to CT/MRI, did not show significant differences when limited to patients with symptoms beginning within 6 hours of admission.

Discussion
This study provides insight into the evaluation and management of Michigan Medicare hospitalized AIS patients. The use of sublingual nifedipine has been considered dangerous because of cerebrovascular ischemia and severe hypotension, acute myocardial infarction, conduction disturbances, and death.3,8 In Michigan, the opportunity for improvement was small, but 100% compliance is an important goal. Although stroke symptom onset (or interval) was documented 95.6% of the time, this information is necessary for acute stroke treatment.

Although performance of CT/MRI during hospitalization occurred in 98.0% of patients, the speed of performance was longer than current recommendations.

The median time to initial CT/MRI for AIS was 89.5 minutes. The Brain Attack Coalition recommended that primary stroke centers have the capability of performing imaging studies within 25 minutes of the order being written, along with physicians experienced in reading these studies within 20 minutes of their completion.9 Accelerating patients’ triage to radiology should be assigned higher priority. The median time from admission to thrombolytic administration was 113 minutes, almost twice the recommended 60 minutes from door to treatment.9

DVT and thromboembolism in patients with a paretic or paralyzed leg and the resulting immobility occur in approximately 55% of patients, with as many as 5% of early stroke deaths attributed to pulmonary embolism.10 Pooled results from randomized trials have shown a 56% to 82% relative risk reduction with prophylaxis.10 LDH, LMWH, heparinoids, and IPC are preferred treatments.11 Appropriate DVT prophylaxis was used in only 13.8% of cases in Michigan.

Although this may have been an underestimate because of difficulty deciphering patient immobility from chart review, other studies have demonstrated low rates of prophylaxis. In a study of trauma patients, lack of sufficient use of DVT prophylaxis ranged from 26% to 32%.12 In another study of high-risk hospitalized patients, prophylaxis was used in 32%.13

Factors that may contribute to this low rate include lack of IPC devices and physician reluctance to prescribe anticoagulants because of perceived risk of hemorrhage, cost, or inconvenience. Standardized evaluation of mobility and preprinted orders for IPC devices and/or subcutaneous heparin for nonambulatory patients could positively impact these results.

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