

Introduction: Role of the Hospitalist in Secondary Stroke Prevention Care

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Stroke is a prevalent and often devastating condition that is likely to affect a growing proportion of the United States population in the coming decades. Individuals who have experienced a stroke or transient ischemic attack are at elevated risk for recurrent events, which are frequently more severe. Therefore, secondary prevention has become the focus of much clinical research and widespread initiatives to deliver evidence-based care. Hospitalists are in a unique position to contribute substantially to these efforts. The 4 articles in this supplement are a call to action for hospital-based physicians. They are based on the conclusions of a panel of hospitalists, neurohospitalists, vascular neurologists, and neurointensivists who met for a roundtable discussion in March 2007. This, the first of the 4 articles, discusses the opportunity for hospitalists to take a leadership role in creating stroke systems of care that integrate secondary stroke prevention with inpatient treatment of acute stroke. The articles that follow will summarize the consensus of roundtable participants on stroke care best practices and their implementation. *Journal of Hospital Medicine* 2008;3(4 Suppl): S1–S5. © 2008 Society of Hospital Medicine.

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Each year in the United States 700,000 individuals experience a stroke—500,000 of them for the first time. Despite advances in stroke prevention, this number has increased dramatically over the last quarter century.¹ Between 1979 and 2004, the annual number of hospital discharges with stroke as a primary diagnosis swelled to 906,000, a 21% increase over the rate in 1979.¹ In the next 10–15 years, this number is predicted to double in parallel with a doubling of the number of Americans older than age 65 years. Mortality from stroke is projected to increase faster than the overall US population.² In addition, the prevalence of diabetes, a major ischemic stroke risk factor, is increasing at an alarming rate.¹ A second major risk factor, hypertension, also occurs more frequently in older people and thus is expected to increase in prevalence over the next few decades.^{1,3} Blacks, Hispanics, and Mexican Americans, growing segments of the US population, are disproportionately affected by stroke.¹

The impact of stroke extends far beyond the initial episode. Stroke is a leading cause of long-term disability in the United States.¹ Total estimated cost for stroke care in 2007 is \$62.7 billion. Prevention is the key to reducing the grave personal and societal burden of this condition.

Efforts to prevent the approximately 200,000 recurrent strokes that occur each year are critical. Stroke itself is a harbinger of

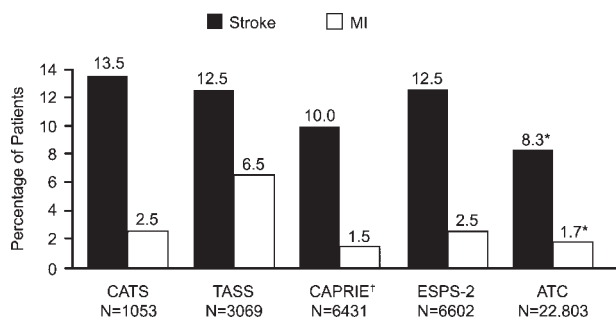


FIGURE 1. Recurrence of events in antiplatelet trials in transient ischemic attack (TIA) and ischemic stroke patients (*nonfatal events only; †stroke patient subgroup only; ATC, Antithrombotic Trialists' Collaboration; CAPRIE, Clopidogrel Versus Aspirin in Patients at Risk of Ischemic Events; CATS, Canadian American Ticlopidine Study; ESPS-2, Second European Stroke Prevention Study; MI, myocardial infarction; TASS, Ticlopidine Aspirin Stroke Study; TIA, transient ischemic attack). Adapted with permission from Albers GW. *Neurology*. 2000;54:1022–1028.⁵ Additional data obtained from Antithrombotic Trialists' Collaboration. *BMJ*. 2002;324:71–86.⁶

future stroke, and secondary strokes are frequently more severe and disabling.⁴ Numerous studies have found that among stroke patients, recurrent stroke is the most likely secondary cardiovascular event, particularly in the first few months following the index event (only in the first 3 months, however; then death from cardiac disease becomes more important; Fig. 1).^{5,6} Transient ischemic attack (TIA), once considered a relatively benign event, is now recognized as a significant risk factor for stroke.^{7,8} A recent study suggests that 1 in 10 TIA patients will have a stroke in the 90 days after the event, and 24% of those strokes will occur within 48 hours.⁸ Moreover, improved imaging techniques have revealed that even patients with resolution of symptoms within 1 hour may have evidence of infarction.^{9,10} The longer the duration of symptoms, the greater the probability of infarction detectable with magnetic resonance imaging.^{9,10} Because the greatest risk of recurrent stroke occurs within hours of the first event, secondary prevention must be initiated as soon as possible after diagnosis.¹¹

MANAGEMENT OF ACUTE STROKE BY HOSPITALISTS

Stroke care is a rapidly evolving field in which expeditious and careful inpatient care significantly affects outcome. Hospitalists are in a unique position to improve acute stroke care and initiate sec-

ondary stroke prevention in several ways. First, there is a shortage of neurologists to care for patients with stroke. In one survey of Medicare data from 1991, prior to the widespread presence of hospitalists, only 1 in 9 stroke patients (11%) had a neurologist as the attending physician.¹² At that time, there were only 3.25 nonfederal patient care neurologists per 100,000 population. Although the ratio may have improved somewhat in the intervening years (there were an estimated 5.3 self-reported neurologists per 100,000 population as of 2005),¹³ the limited number of neurologists combined with the increasing incidence of stroke is expected to reduce the fraction of stroke patients having a neurologist involved in their care. Because neurology practices tend to be concentrated in urban areas, the shortage is likely to affect nonurban areas to a greater degree. The number of hospitalists, currently estimated to be 20,000 in the United States, is projected to reach 30,000 by 2010.¹⁴ In the simplest terms, hospitalists are the logical choice to fill the need for physicians to manage inpatient stroke.

Perhaps the most compelling reason for hospitalists to be involved in the care of stroke patients is clinical: patients with stroke frequently have multiple comorbid conditions that affect outcomes and are not within the traditional purview of neurology. A retrospective analysis of data from 1802 patients seen in a geriatric practice revealed that 56% of patients with stroke also had coronary artery disease, and 28% had peripheral arterial disease.¹⁵ In addition, the major risk factors for stroke—diabetes and hypertension—would be expected to be prevalent in this population. Timely and effective management can improve secondary stroke prevention as well as prevent exacerbation of existing conditions.

A recent report compared outcomes in 44,099 patients following stroke according to physician specialty.¹⁶ Although patients treated by neurologists alone had a 10% lower risk of 30-day mortality compared with those treated by generalists (family practice physicians, general practitioners, or internists) despite having more severe stroke, collaborative care reduced that risk an additional 6%.¹⁶ The risk of rehospitalization for infections and aspiration pneumonia within 30 days was 12% lower for those treated by neurologists. However, these patients had a significant, 17% increased relative risk of rehospitalization for coronary heart disease (95% confidence interval [CI], 1.02–1.34).¹⁶

Comanagement of stroke patients by hospitalists and neurologists is likely to become more common over time, as proposed by Likosky and Amin.¹⁷ Although studies have not specifically compared outcomes in patients with stroke who have been treated by hospitalists versus other types of physicians, implementation of hospitalist services has been associated with improved short-term mortality and rehospitalization rates compared with traditional care.^{18–20} Approximately 85% of hospitalists are trained in internal medicine.²¹ In addition, they have skill sets focusing on the specialized needs of inpatients. As hospitalists assume a greater role in the management of stroke, research into the benefits of collaborative care can be explored.

Finally, hospitalists are ideally positioned to champion the use of standardized protocols for secondary stroke prevention at their institutions. Results from 4 pilot prototypes of the Paul Coverdell National Acute Stroke Registry showed that a minority of acute stroke patients are treated according to established guidelines.²² The 4 prototype registries were in Georgia, Massachusetts, Michigan, and Ohio. The percentage of relevant patient populations that had lipid profiles assessed ranged between 28% and 34%. For smoking-cessation education, the range was between 17% and 34%. Anticoagulant prescribing for relevant populations at discharge ranged from 64% to 90%, and antithrombotic prescribing ranged from 88% to 98%.²²

The use of protocols that initiate secondary prevention of cerebrovascular and cardiovascular events has been demonstrated to improve patient adherence to evidence-based treatment after discharge.^{23–28} The Preventing Recurrence of Thromboembolic Events Through Coordinated Treatment (PROTECT) program was designed to integrate secondary stroke prevention measures into the standard stroke care provided during acute hospitalization (Table 1).²⁶ Use of appropriate antithrombotic medication was achieved in 100% of cases. Use of statins, angiotensin-converting enzyme inhibitors or angiotensin receptor blockers, and thiazide diuretics improved significantly during the first year of implementation ($P < .001$). Patient education in all 4 of the areas established was carried out in 100% of patients prior to discharge.²⁶ Tools for establishing similar hospital-based secondary prevention programs are presently available from the University of California at Los Angeles PROTECT Program and other programs.

TABLE 1
Preventing Recurrence of Thromboembolic Events Through Coordinated Treatment (PROTECT) Program Goals

Initiation and maintenance of appropriate:
1. Antithrombotic therapy
2. Statin therapy
3. Angiotensin-converting enzyme or angiotensin receptor blocker therapy
4. Thiazide diuretic therapy
5. Smoking-cessation advice and referral to a formal cessation program
6. American Heart Association diet
7. Exercise counseling
8. Stroke education, including knowledge of stroke warning signs and need to call 911 in the event of a cerebrovascular event, as well as awareness of individual's own risk factors

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An essential part of any effort to develop standardized treatment procedures must include a plan to minimize any discontinuity of care after discharge. Standardized procedures need to be implemented to ensure communication of discharge summaries to outpatient clinicians in a timely and complete fashion. Only 19% of 226 outpatient physicians responding to a recent survey were satisfied or very satisfied with the timeliness of discharge summaries they received for their patients.²⁹ Approximately one third of respondents reported that most of their patients ($\geq 60\%$) were seen for their follow-up outpatient visit before discharge summaries had been received. Only about one third (32%) of the respondents were satisfied or very satisfied with the summary content. Forty-one percent believed that at least 1 of their patients hospitalized in the previous 6 months had experienced an adverse event that could have been prevented with improved transfer of discharge information.²⁹

Development of electronic discharge summaries is an obvious alternative to conventional paper versions. This area has received less attention than others that more directly affect patient care. As the primary inpatient physicians, hospitalists can effectively implement improvements in communication among hospital staff and outpatient health care providers.

SUMMARY

This supplement is a call to action for hospitalists based on a roundtable discussion conducted in March 2007. Participants included hospitalists, neurohospitalists, vascular neurologists, and neurointensivists. The objectives of the meeting were

to review the clinical data supporting current practice guidelines for secondary prevention of noncardioembolic ischemic stroke, to develop best-practice recommendations for hospitalist-based care of stroke inpatients, and finally to recommend improvements in transfer of information to outpatient health care providers.

The consensus of the participants is reported in the following 3 articles. The first, "Evidence-based Medicine: Review of Guidelines and Trials in Prevention of Secondary Stroke," includes an overview of the pathophysiology of stroke and TIA and reviews the clinical data supporting current treatment guidelines. Several case studies illustrating challenging or difficult aspects of secondary stroke prevention are presented in the second article, "Secondary Prevention of Ischemic Stroke: Challenging Patient Scenarios." These cases focus on commonly encountered difficulties for which there may not be clear evidence or consensus. In the final article, "Systems Approach to Standardization of Care in the Secondary Prevention of Noncardioembolic Ischemic Stroke," the best-practices recommendations developed at the roundtable are presented. The role of the hospitalist in long-term prevention strategies and the effective transfer of care to outpatient providers are discussed.

As the hospitalist movement grows, hospital-based physicians need to identify opportunities to use their unique skills. By taking the lead in improving processes that result in better patient outcomes, hospitalists can ensure that the value of this nascent field will continue to gain recognition in the broader, sometimes skeptical medical community. We sincerely hope that you agree that integrating secondary prevention into inpatient acute stroke care is just such an opportunity. Furthermore, we hope the information we have provided will be useful to you in your hospital-based practice.

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