Clinical Correlates and Drug Treatment of Residents With Stroke in Long-Term Care

Brian J. Quilliam, PhD; Kate L. Lapane, PhD

Background and Purpose—Stroke incidence increases with age, and stroke survivors often require nursing home placement. Characteristics of these residents and factors associated with the secondary drug prevention of stroke in nursing homes have yet to be explored.

Methods—We used a population-based data set of all nursing home residents in 5 states (1992 to 1995). We identified 53,829 (20.4%) with a diagnosis of stroke on the Minimum Data Set assessment. We considered aspirin, dipyridamole, ticlopidine, or warfarin alone or in combination as secondary drug prevention. We used logistic regression modeling to identify independent predictors of drug treatment.

Results—Sixty-seven percent of stroke survivors were not receiving drug therapy for stroke prevention. Among those treated, most received aspirin alone (16%) or warfarin alone (10%). Independent predictors of drug treatment included comorbid conditions (eg, hypertension, atrial fibrillation, depression, Alzheimer’s disease, dementia, gastrointestinal bleeding, and peptic ulcer disease). Those over the age of 85 years were less likely to be treated than those 65 to 74 years of age (odds ratio [OR], 0.86; 95% confidence interval [CI], 0.82 to 0.91); black residents were less likely to be treated than whites (OR, 0.80; 95% CI, 0.75 to 0.85); and those with severe cognitive (OR, 0.63; 95% CI, 0.60 to 0.67) or physical impairment (OR, 0.69; 95% CI, 0.64 to 0.75) were also less likely to receive drug treatment.

Conclusions—Stroke is highly prevalent in long-term care. Despite the increased risk of subsequent stroke in the elderly, many are not being treated. The choice to treat or not to treat may be influenced by age, comorbidity, race/ethnicity, and cognitive or physical functioning. (Stroke. 2001;32:1385-1393.)

Key Words: anticoagulants & cerebrovascular accident & nursing homes & platelet aggregation inhibitors

Stroke is one of the most prevalent conditions in the United States. One-half million Americans have a stroke each year, of whom 350,000 survive.1 The prevalence of stroke has been increasing since the late 1980s, owing to both an increasing elderly population and decreases in stroke mortality.2 Despite the decrease in stroke-related mortality rates, stroke remains the third leading cause of death among Americans.2 Aggregated lifetime direct and indirect costs of first stroke within the US population exceed $40 billion annually.3

The incidence of stroke increases with age4,5 with evidence of a worsening prognosis as well.6 Stroke ranks among the leading causes of hospitalization among elderly Americans.7 Moreover, survivors often require post–acute institutional or ambulatory rehabilitative care in the 6 months after stroke.8 As a leading cause of disability, stroke survivors often require more nursing home days than do persons without stroke of the same sex and similar age in the 5 years after that stroke.9

Large-scale randomized clinical trials have demonstrated the efficacy of antiplatelet agents and the anticoagulant warfarin in the secondary prevention of stroke.10–15 Nonethe-

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less, these trials have greatly underrepresented both the oldest-old and women.11–13,15 Some clinical trials11,12,14,15 and observational studies16 have demonstrated an increased incidence of bleeding episodes of the gastrointestinal tract or elsewhere among patients using these agents. Physicians may be reluctant to prescribe these medications to frail, older persons because of the increased potential for adverse drug events.

Despite the epidemiologic relevance of stroke management, few studies have evaluated the management of stroke in the “oldest-old.” Issues such as comorbidity, polypharmacy, and cognitive loss, pertinent to the treatment of stroke patients, remain poorly explored. Because stroke survivors often require nursing home placement in the months or years after their stroke,8 describing the characteristics of this population is warranted. We conducted a cross-sectional study of residents with stroke living in long-term care by using the Systematic Assessment of Geriatric drug use via Epidemiology (SAGE) database. We sought to describe residents’ clinical and functional characteristics and to characterize pharmacological stroke prevention regimens.
Subjects and Methods

We derived our study sample from the SAGE database. In 1987, Congress mandated that all Medicare/Medicaid–certified nursing facilities in the United States perform uniform, comprehensive assessments of all residents as a means to improve care planning. The Health Care Financing Administration (HCFA) developed a standardized tool, which includes the Minimum Data Set (MDS), a care assessment component.

The MDS includes items to describe cognitive function, physical functioning, continence, psychosocial well-being, mood state, disease diagnoses, health conditions, communication/hearing problems, nutritional status, oral/dental status, skin condition, special treatments, and medication use. The reliability of the MDS items and two summary scales that have been created, the Activities of Daily Living (ADL) and Cognitive Performance (CPS) scales, has been documented. Physical function was measured by a 5-item, 6-level scale based on dependency (dressing, eating, toileting, bathing, locomotion, transferring, and incontinence), with limitations defined as mild (0 to 1 activities impaired), moderate (2 to 3 activities impaired), or severe (4 to 5 activities impaired). The CPS provided a measure of cognitive impairment and was categorized as mild (0 to 1), moderate (2 to 3), or severe impairment (4 to 6), corresponding to the Mini Mental State Examination values of 23 to 24, 12 to 17, and 1 to 6, respectively.

Study Sample

Between 1992 to 1995, there were 389,499 unique residents represented in the SAGE database. We restricted our sample to residents at least 65 years of age (n=353,817) because most were eligible for Medicare. We successfully cross-linked 264,404 to the HCFA Health Insurance Skeleton Write-off file; a match was required because information contained within the file provides a means to identify hospital claims for Medicare recipients. Of these residents, 53,829 (20.4%) had a diagnosis of stroke reported on initial MDS assessment. Although it does not differentiate between hemorrhagic and ischemic stroke, the MDS diagnosis of stroke is based on a physician’s interpretation of the resident’s medical history as presented by physical examination, the medical record, and hospital discharge documentation, if available. Because factors associated with treatment may vary depending on the time since stroke, we also identified residents with a recent hospitalization (6 months) for ischemic stroke (ICD-9 434–436; n=12,122).

Drug Classification

Nursing home staff recorded the National Drug Code for up to 18 drugs taken within the 7 days preceding the MDS assessment. The MDS drug inventory has been shown to be both consistent and reliable. The reliability of the MDS items and two summary scales that have been created, the Activities of Daily Living (ADL) and Cognitive Performance (CPS) scales, has been documented. Physical function was measured by a 5-item, 6-level scale based on dependency (dressing, eating, toileting, bathing, locomotion, transferring, and incontinence), with limitations defined as mild (0 to 1 activities impaired), moderate (2 to 3 activities impaired), or severe (4 to 5 activities impaired). The CPS provided a measure of cognitive impairment and was categorized as mild (0 to 1), moderate (2 to 3), or severe impairment (4 to 6), corresponding to the Mini Mental State Examination values of 23 to 24, 12 to 17, and 1 to 6, respectively.

We considered agents used for the prevention of stroke to be standing orders for the antiplatelet agents aspirin, dipyridamole, or ticlopidine (MediSpan codes 6410 to 6420, 3220, and 8515, respectively) and the anticoagulant warfarin (MediSpan code 8320). We excluded 902 residents, for whom information on medications received was not available, from all analyses of drug treatment. Clopidogrel became available in the United States in 1997, after the study period. With the exception of residents taking both aspirin and dipyridamole, residents taking 2 or more of these agents were considered to be receiving combination therapy.

TABLE 1. Characteristics of Nursing Home Residents With Stroke Living in Long-Term Care Stratified by Age Category

<table>
<thead>
<tr>
<th>Age Category, y</th>
<th>65–74 (n=11,202)</th>
<th>75–84 (n=23,160)</th>
<th>≥85 (n=19,467)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>53.9</td>
<td>64.2</td>
<td>76.6</td>
</tr>
<tr>
<td>Race/ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian/Alaskan Native</td>
<td>1.7</td>
<td>1.7</td>
<td>1.2</td>
</tr>
<tr>
<td>Asian</td>
<td>1.4</td>
<td>1.1</td>
<td>0.7</td>
</tr>
<tr>
<td>Black (Non-Hispanic)</td>
<td>19.9</td>
<td>10.9</td>
<td>8.1</td>
</tr>
<tr>
<td>Hispanic</td>
<td>3.5</td>
<td>1.9</td>
<td>1.3</td>
</tr>
<tr>
<td>White (Non-Hispanic)</td>
<td>73.6</td>
<td>84.5</td>
<td>88.7</td>
</tr>
<tr>
<td>Admitted from</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home</td>
<td>11.4</td>
<td>14.2</td>
<td>16.7</td>
</tr>
<tr>
<td>Hospital</td>
<td>77.3</td>
<td>74.6</td>
<td>71.5</td>
</tr>
<tr>
<td>Physical function limitations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>38.7</td>
<td>37.6</td>
<td>33.4</td>
</tr>
<tr>
<td>Dependent</td>
<td>54.7</td>
<td>56.2</td>
<td>60.6</td>
</tr>
<tr>
<td>Cognitive impairment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate impairments</td>
<td>32.2</td>
<td>35.8</td>
<td>35.3</td>
</tr>
<tr>
<td>Severe impairments</td>
<td>29.1</td>
<td>32.4</td>
<td>39.2</td>
</tr>
<tr>
<td>Speech therapy*</td>
<td>12.7</td>
<td>9.4</td>
<td>6.2</td>
</tr>
<tr>
<td>Occupational therapy*</td>
<td>31.3</td>
<td>27.0</td>
<td>19.3</td>
</tr>
<tr>
<td>Physical Therapy*</td>
<td>45.4</td>
<td>43.1</td>
<td>35.1</td>
</tr>
<tr>
<td>Comatose</td>
<td>0.8</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>Daily tobacco Use</td>
<td>13.5</td>
<td>7.1</td>
<td>3.3</td>
</tr>
<tr>
<td>Weekly alcohol use</td>
<td>8.1</td>
<td>5.5</td>
<td>3.9</td>
</tr>
</tbody>
</table>

Values are shown as percentages.

*At least 10 minutes of therapy, at least 1 day in the previous week.
Analytic Approach
Using a cross-sectional study design, we compared the distributions of sociodemographic and clinical characteristics of antiplatelet and anticoagulant users to nonusers. A logistic regression determined predictors of treatment (use of any antiplatelet or anticoagulant versus no treatment). We considered independent risk factors for ischemic stroke as potential factors that may influence pharmacological treatment. Based on previous research, stroke is independently associated with diabetes, hypertension, hypotension, atrial fibrillation, carotid stenosis, coronary heart disease, dementia, congestive heart failure, and TIA. For conditions not included on the MDS, we used HCFA inpatient claims data to define variables of interest. These were history of peptic ulcer disease (ICD-9 531 to 534), gastrointestinal bleeds (ICD-9 578 and 569.3), transient ischemic attacks (ICD-9 435), and atrial fibrillation (ICD-9 427.3). The odds ratios (OR) and 95% confidence intervals (CI) derived from the model provided estimates of effect simultaneously adjusted for other factors in the model.

Results
Table 1 presents the demographic characteristics of residents with stroke stratified by age category (65 to 74, 75 to 84, and 85 years of age). More than 50% of the sample were women, with nearly 77% in the over-85-years age category. The majority of residents were non-Hispanic white (range, 73.6% to 88.7%). The highest percentage of black residents in our sample fell into the 65- to 74-year-old category. Most residents were admitted to the nursing home from the hospital, with 72% of those over age 85, 75% of those ages 75 to 84, and 77% of those 65 to 74 years of age. The percentage of stroke survivors who were comatose did not differ across age groups, with 1% of all stroke survivors classified as such across all age categories. The greatest percentage of residents with severe physical (as measured by the ADL scale) and cognitive (as measured by the CPS scale) impairment were in the over-age-85-years category (60.6% and 39.2%, respectively). Younger stroke survivors (65 to 74 years of age) had higher percentages of speech, occupational, and physical therapies (10 minutes at least once in the previous 7 days) at 12.7%, 31.3%, and 45.4%, respectively. Age was inversely related to prevalence of weekly alcohol and tobacco use, with the lowest percentages of weekly alcohol and tobacco use among those at least 85 years of age at 3.3% and 3.9%, respectively. The highest use was in those 65 to 74 years of age, with 8.1% reporting at least weekly alcohol use and 13.5% reporting weekly tobacco use.

Table 2 details comorbid conditions stratified by age category. Several important differences are evident when comparing coexisting disease states across age groups. The prevalence of diagnoses of heart failure, coronary artery disease, atrial fibrillation, and dementia all increased with increasing age. This trend was reversed for hypertension and diabetes.

Two thirds of our sample did not receive any antiplatelet drugs or warfarin. Receipt of antiplatelet or anticoagulant medication was inversely related to age such that the highest percentage of untreated individuals falls into the 85-years-and-over category (see Figure 1). In the 85-plus category, 70.8% of women and 67.8% of men were not treated. Among both men and women of all age categories, aspirin was the most frequently prescribed agent and warfarin the second most common agent. Although age appears to affect the decision to use any antiplatelet or anticoagulant treatment in an individual, Figure 1 shows that the choice of agent is less influenced by age once the decision to treat has been made for all antiplatelet agents. For warfarin, it appears that advanced age influences the decision to treat with that agent, such that persons over age 85 years received warfarin therapy less often.

Table 3 presents the demographic characteristics of residents with stroke stratified by age category (65 to 74, 75 to 84, and 85 years of age). More than 50% of the sample were women, with nearly 77% in the over-85-years age category. The majority of residents were non-Hispanic white (range, 73.6% to 88.7%). The highest percentage of black residents in our sample fell into the 65- to 74-year-old category. Most residents were admitted to the nursing home from the hospital, with 72% of those over age 85, 75% of those ages 75 to 84, and 77% of those 65 to 74 years of age. The percentage of stroke survivors who were comatose did not differ across age groups, with <1% of all stroke survivors classified as such across all age categories. The greatest percentage of residents with severe physical (as measured by the ADL scale) and cognitive (as measured by the CPS scale) impairment were in the over-age-85-years category (60.6% and 39.2%, respectively). Younger stroke survivors (65 to 74 years of age) had higher percentages of speech, occupational, and physical therapies (10 minutes at least once in the previous 7 days) at 12.7%, 31.3%, and 45.4%, respectively. Age was inversely related to prevalence of weekly alcohol and tobacco use, with the lowest percentages of weekly alcohol and tobacco use among those at least 85 years of age at 3.3% and 3.9%, respectively. The highest use was in those 65 to 74 years of age, with 8.1% reporting at least weekly alcohol use and 13.5% reporting weekly tobacco use.

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Results of multivariable modeling are presented in Table 3. Persons over the age of 85 years were 14% less likely to have
been treated with an antiplatelet or anticoagulant agent as compared with those residents 65 to 74 years of age (OR, 0.86; 95% CI, 0.82 to 0.91). Black stroke survivors were also less likely to have received treatment relative to non-Hispanic white residents (OR, 0.80; 95% CI, 0.75 to 0.85). Persons dependent in ADL were also less likely to have received drug treatment as compared with those with no physical limitations. Persons with atrial fibrillation, hypertension, coronary artery disease, peripheral vascular disease, and depression were all more likely to have been treated with antiocoagulants and antiplatelet agents as compared with stroke survivors without these clinical characteristics. Conversely, persons with severe physical limitations, Alzheimer’s disease, dementia, or a history of GI bleeding or PUD were less likely to be treated than those without such comorbid conditions.

Figure 2 shows percentages of persons treated (with any antiplatelet or anticoagulant agent) stratified by both recent hospitalization for ischemic stroke, treatment rates approximated 50%. Few studies have quantified the prevalence of under-treatment of stroke in either the nursing home or the community-dwelling older population of stroke survivors. Petty et al30 found in a community-based sample of stroke survivors in Rochester, Minnesota, that 26.9% of their sample (including persons with incident ischemic strokes, TIA, or amaurosis fugax) were not being treated with aspirin, warfarin, or heparin. Treatment with aspirin (for the 65-year-old patient) has been estimated to be only $200 per quality-adjusted life-year.39 Although our estimate of nontreatment may be overstated, our findings are somewhat surprising because the elderly nursing home population represents a “captive” audience in a setting where monitoring by trained clinical staff is possible on a daily basis, low-cost treatment options exist, and there is a high risk of subsequent stroke.

It is estimated that 47 000 (9.4%) new strokes annually are associated with cases of atrial fibrillation.40 The American Heart Association guidelines for stroke prevention recommend the use of warfarin in all persons with atrial fibrillation without contraindication and aspirin in persons who are not candidates for warfarin therapy.41 Analyses of 10 127 (19.1%) nursing home residents with atrial fibrillation and known drug treatment revealed that 54.4% of these persons were not treated with any antiplatelet or anticoagulant drug, 26.6% received warfarin, and 14.2% received aspirin alone. This is consistent with previous studies characterizing the lack of treatment in persons with atrial fibrillation. Perez et al42 reported in 1999 that only 42% of persons with atrial fibrillation in their study identified as being at moderate to high risk for stroke were being treated with aspirin or warfarin. Similarly, Gordian and Mustin43 found that only 65% of persons hospitalized for atrial fibrillation without a
contraindication were discharged with an order for warfarin. Furthermore, only 16% of those not treated with warfarin received aspirin at discharge. Sparks and colleagues\(^4^4\) reported much lower percentages of warfarin use in persons with atrial fibrillation without contraindication at 38%. They also found that among those not prescribed warfarin, only 37% were taking aspirin. We do not have detailed clinical information on contraindications to warfarin or severity of stroke and were unable to determine the prevalence of use among residents with no contraindications.

In our sample, the prevalence of atrial fibrillation increased with age, but the use of warfarin decreased with advancing age. These observed trends might reflect the challenges facing physicians when treating clinically complex patients. Despite its proven efficacy for stroke prevention associated with atrial fibrillation,\(^4^5\)\(^–\)\(^4^9\) warfarin can increase the risk of bleeding and requires frequent laboratory monitoring to assess both efficacy and toxicity. Even with careful prescribing and monitoring, changes in the resident’s clinical condition (eg, changes in liver function, addition of other medications) can influence warfarin’s toxic effects. Physicians may be hindered from prescribing warfarin because of the perceived inability to adequately monitor high-risk patients. Kutner et al\(^5^0\) reported that physicians were reluctant to prescribe warfarin to their patients residing in the community. Although patients living in long-term care represent a captive population, Monette et al\(^5^1\) and Gurwitz et al\(^5^2\) found similar physician concerns within this setting. Pharmacist-run anticoagulant clinics have been shown to positively influence efficient warfarin monitoring in the outpatient setting.\(^5^3\)\(^–\)\(^5^5\) Similar programs instituted in the nursing home setting may be beneficial and may decrease physicians’ reluctance to

### Figure 2

Percentage treated with any antiplatelet or anticoagulant agents stratified by age and recent hospitalization for ischemic stroke.
prescribe warfarin for stroke prevention among persons with atrial fibrillation.

We found that increasing age was inversely related to the use of stroke prevention drug agents. Age is directly related to incidence of stroke, such that older persons are at greatest risk of having a stroke.4,5 Previous studies have shown that the risk of adverse drug events, such as the incidence of GI bleeding,56,57 increase with age. However, whether or not risk of treatment exceeds benefit is less clear. Although advanced age may require increased monitoring of drug therapy, to our knowledge, there is no biological reason that age alone should prevent treatment. Similarly, we found that persons with severe cognitive and physical impairments were less likely to be treated. Nevertheless, the effects of age and severe cognitive and physical impairment remained after controlling for the presence of other clinical conditions that may alter a physician’s decision to treat. Age and cognitive and physical decline may be representative of issues confronting physicians when deciding whether the benefits of treatment outweigh the risks.

Being of black race/ethnicity was also associated with a decreased likelihood of treatment within our sample. Black residents were 20% less likely to have been treated with antiplatelet or anticoagulant therapy, despite the facts that blacks are at increased risk for stroke.58 These associations were persistent in those with a recent hospitalization for ischemic stroke. Previous findings have demonstrated undertreatment of other conditions within this oft-neglected population, including hypertension,59 Parkinson’s disease,60 and cancer pain.61 Furthermore, previous studies identified racial differences in prevalence and detection of stroke.58,62,63 Because we are unaware of any physiological reasons justifying differential treatment by race/ethnicity, we are concerned that more disturbing hypotheses may be warranted. We did not have any information on educational level, income, or occupation; therefore it was not possible for us to evaluate the effect of race/ethnicity within the context of socioeconomic position. Evaluating whether or not these disparities are a function of facility level phenomenon was beyond the scope of the current study. Further research is needed to elucidate the effect of race/ethnicity within a social context on the decision to treat or not treat elderly stroke survivors.

Certain methodological issues in our study need to be addressed. The MDS data used for our analyses are cross-sectional in nature and only provide a snapshot into the lives of stroke survivors in the nursing home. Also, trained nursing home staff collect the data contained within the MDS for administrative purposes. Yet, the data have previously been shown to be both valid and reliable.21,28 The MDS stroke diagnosis does not differentiate between hemorrhagic and ischemic strokes. Yet, ischemic strokes account for >90% of all strokes.63–66 Analyses describing demographic and clinical

| TABLE 4. Predictors of Receipt of Any Antiplatelet or anticoagulant Therapy Among Those With Recent Hospitalization for Ischemic Stroke* |
|---------------------------------|----------------|----------------|----------------|----------------|
| Characteristic                  | User (n=5784) | Nonusers (n=6338) | Adjusted† | 95% Confidence Interval |
| Age, y                          |               |                 |               |                 |
| 75–84                           | 2704          | 2789            | 0.96         | (0.87–1.06)     |
| 85+                             | 1787          | 2284            | 0.80         | (0.72–0.89)     |
| Female sex                      | 3778          | 4270            | 0.92         | (0.85–0.99)     |
| Race/ethnicity                  |               |                 |               |                 |
| Black                           | 556           | 771             | 0.91         | (0.80–1.02)     |
| Other‡                          | 271           | 246             | 1.28         | (1.07–1.54)     |
| Physical function limitations   |               |                 |               |                 |
| Moderate                        | 2733          | 2122            | 0.97         | (0.81–1.16)     |
| Dependent                       | 2654          | 3879            | 0.62         | (0.52–0.74)     |
| Cognitive impairment            |               |                 |               |                 |
| Moderate                        | 2113          | 2131            | 0.85         | (0.77–0.93)     |
| Severe                          | 1429          | 2379            | 0.61         | (0.55–0.68)     |
| Atrial fibrillation             | 2022          | 1684            | 1.67         | (1.54–1.81)     |
| Hypertension                    | 3358          | 3416            | 1.16         | (1.08–1.25)     |
| Coronary artery disease         | 1359          | 1438            | 1.04         | (0.95–1.14)     |
| Peripheral vascular disease     | 426           | 427             | 1.07         | (0.92–1.23)     |
| Alzheimer’s disease             | 124           | 219             | 0.72         | (0.57–0.90)     |
| Non-Alzheimer’s dementia        | 984           | 1348            | 0.91         | (0.83–1.01)     |
| Depression                      | 692           | 630             | 1.16         | (1.03–1.30)     |
| History of gastrointestinal bleed | 213          | 446             | 0.51         | (0.43–0.61)     |
| Peptic ulcer                    | 214           | 396             | 0.58         | (0.48–0.69)     |

*Excludes 356 residents for whom drug information was not collected.
†Adjusted for all factors listed in the table.
‡Includes American Indian, Alaskan Native, and Asian.
characteristics of our sample are relevant to both diagnoses. A hemorrhagic stroke, however, may be a contraindication for receiving antiplatelet or anticoagulant therapy. As such, our analyses describing treatment patterns may be influenced by misclassification. It is unlikely that the 67% of residents not receiving antiplatelet or anticoagulant therapy had hemorrhagic strokes. Additionally, the trends observed in the entire sample were mirrored in a subsample with confirmation of ischemic stroke.

Because stroke is the leading factor for nursing home placement and a resource-intensive condition, understanding the characteristics and treatment patterns of stroke survivors living in long-term care is important. Our findings indicate that clinical and demographic characteristics of stroke survivors may influence treatment decisions. Most evident from our data were the effects of black race, severe cognitive or functional impairment, and a history of comorbid conditions such as hypertension, atrial fibrillation, Alzheimer’s disease, dementia, depression, and history of PUD and GI bleeding. Further research to better understand outcomes related to these treatment patterns is warranted.

Acknowledgments

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References


The study by Quilliam and Lapane examines the impact of evidenced-based guidelines on secondary stroke prevention in the nursing home population. The American Heart Association recommends that every patient who has experienced an atherothrombotic stroke or transient ischemic attack and has no contraindication should receive an antiplatelet agent regularly to reduce the risk of recurrent stroke and other vascular events. They also strongly recommend long-term oral anticoagulation for prevention of stroke in atrial fibrillation patients who have suffered a recent cardioembolic stroke or transient ischemic attack. A number of community- and hospital-based studies observed discrepancies between “best practice” as defined by these guidelines and current levels of treatment with antiplatelet drugs and/or anticoagulation after stroke. While some of these studies observed that the likelihood of treatment among persons residing in or discharged to a nursing home was especially low, data on the prevalence of and characteristics associated with treatment in the nursing home population were largely unavailable before the study of Quilliam and Lapane. Using the SAGE database, these authors obtained information on all residents of Medicare/Medicaid-certified nursing homes in 5 states. They observed that two thirds of residents with a history of stroke had no evidence of pharmacological treatment for secondary stroke prevention. Factors associated with increased likelihood of nontreatment included gastrointestinal bleeding, peptic ulcer disease, advanced age, and severe cognitive or physical impairment. In the full sample, there was a disconcerting association between nontreatment and black race/ethnicity. Because provider-level characteristics...
were not included in their analysis, the extent to which the finding reflected different treatment patterns in nursing homes with large black populations could not be determined. The association was less apparent in the subset of 12 122 persons recently hospitalized for ischemic stroke.

Quilliam and Lapane recognized that nontreatment is not synonymous with undertreatment. Contraindications contributed to the decision not to treat, as evidenced by the low likelihood of treatment for persons with gastrointestinal bleeding and peptic ulcer disease. Other contraindications (eg, patient or family wishes, history of treatment intolerance, and medical conditions not considered in the analysis) also likely contributed to physicians’ decisions not to initiate or continue treatment. But it is unlikely that contraindications account for the large gap between recommended and observed levels of treatment that were observed. It is also unlikely that lack of awareness is a sole contributor. Evidence of treatment benefit was substantial and widely disseminated in the literature well before the study period of 1992 to 1995. Demonstration of the safety and efficacy of treatment in the very elderly population has been more recent, however, and levels of treatment among nursing home residents may increase as these findings are more widely recognized. A 1997 survey of the knowledge and attitudes of long-term care practitioners regarding pharmacological treatment for stroke prevention reinforces the need for increased awareness of existing data on the risks and benefits for elderly individuals. It also reveals inadequacies of existing data for informing treatment decisions. The survey showed that uncertainty is an important factor in the decision not to treat. This uncertainty is not unrealistic, given the number and complexity of conditions, with the concomitant risk of drug interactions and adverse drug events, that characterize many nursing home residents. Uncertainty regarding treatment decisions is not limited to risks; there is also uncertainty regarding benefits. Much of the evidence regarding use of anticoagulation and antiplatelet agents after stroke is based on nondisabling ischemic stroke of recent duration. Evidence of benefit for persons with severe disabling stroke, temporally distant stroke, or history of multiple strokes is much more limited. There is also need for data on the risks and benefits of secondary stroke prevention for persons with severe physical and cognitive disability. The low likelihood of treatment for persons with these conditions found by Quilliam and Lapane has been observed in other studies. The association with dementia is disconcerting in light of some limited evidence suggesting that treatment of demented patients may be beneficial. The association with severe dementia also highlights a need for discussion of the relationship between treatment, prognosis, and quality of life. Potential strategies for reducing the gap between current and “best” practice include targeted education, improved systems of care (eg, anticoagulation clinics and comprehensive hospital discharge planning), and additional research to refine future guidelines.

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