EDITORIAL COMMENT

Measuring Quality of Outpatient Cardiovascular Care*

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Accurately measuring the quality of cardiovascular care and attempting to determine the sources of quality deficits are difficult challenges, particularly in the outpatient setting. Clinical trials have documented the benefits of warfarin in atrial fibrillation, angiotensin-converting enzyme (ACE) inhibitors in systolic heart failure, and aspirin and beta-adrenergic blocking agents in myocardial infarction, and these treatments have been adopted into clinical guidelines (1–4). Despite the strong clinical evidence supporting the uses of these treatments, numerous reports have shown that their use is lower than ideal, although increasing with time (5–12). Prior studies have suggested that utilization of these drugs remains particularly low among patients cared for by noncardiovascular specialists (13–17). These potential gaps in quality have caused the Centers for Medicare and Medicaid Services (formerly the Health Care Financing Administration) to include these clinical conditions in the group of conditions targeted for quality improvement. Additionally, some third-party payers (i.e., Blue Cross Blue Shield) have selected these clinical practice domains to measure performance in an effort to provide incentive to optimize care. However, in the absence of prospective case review, determining the ideal rate of use of these medications in the outpatient clinical setting can be hampered by incomplete access to clinical information needed to determine if particular patients are truly candidates for the therapy.

In this issue of the Journal, Stafford et al. (18) describe trends of prescribing patterns in the U.S. from 1990 to 2001 for patients seen in the outpatient setting with diagnosis codes of atrial fibrillation, heart failure, and coronary artery disease. The authors analyzed two ongoing national surveys of office-based physicians’ prescribing patterns in the use of recommended therapies for key cardiac conditions, the National Ambulatory Medical Care Surveys (NAMCS) and the National Disease and Therapeutic Index (NDTI). Both datasets demonstrate steady increases in the use of these recommended medications over the 12-year time period.

Remarkable increases were observed, in particular, with warfarin use in atrial fibrillation (increasing from 12% in 1990 to 58% in 2001), beta-blocker use in coronary artery disease (increasing from 19% in 1990 to 39% in 2001), and aspirin use in coronary artery disease (increasing from 15% in 1990 to 37% in 2001). More modest increases were observed for ACE inhibitor use in congestive heart failure, as rates increased from 24% in 1990 to 39% in 2001. The authors comment that, although steady increases have occurred over the study period, the strength of data supporting these therapies is sufficient that more rapid adoption of their use would have been expected. The gradual increase in usage indicates that practitioners are slowly heeding the message. The authors offer several explanations for this slow rate of diffusion including lack of awareness of some physicians, overemphasis on relative contraindications, and lack of sufficient time in the outpatient clinical encounter to address preventative treatments.

Investigators have also attempted to identify opportunities for quality improvement by studying the variances in core quality measures. In this issue of the Journal, Ansari et al. (19) report on the care of patients with new-onset heart failure in the outpatient setting of a large managed care health system based on the level of cardiologist participation. In this study 198 patients whose care included a cardiologist were compared with 205 patients who were treated by a primary care physician. The patients treated by a cardiologist were more likely to receive care consistent with clinical guidelines. In the cardiology treated patients, 94% underwent an evaluation of left ventricular function, whereas only 74% of the primary care treated patients had this measurement. In patients with a documented low ejection fraction (≤45%), cardiologists prescribed patients ACE inhibitors to 91%, while primary care physicians prescribed this in 71% (both significantly higher than the rate of ACE inhibitor use reported by Stafford et al. [18]). More remarkable was the difference in beta-blocker use (cardiologists, 38%; primary care physicians, 21%). Quality differences were also demonstrated with respect to beta-blocker and lipid-lowering therapy for coronary artery disease, and warfarin use in atrial fibrillation. Additionally, patients treated by a cardiologist were much more likely to be evaluated for the presence of ischemic heart disease, the most common reversible cause of heart failure. Ansari et al. (19) further described the predictors of hospitalization and/or death in these patients. While cardiology participation in care was not a univariate predictor of hospitalization, death, or the combination, with multivariable analysis, it was found to be an independent predictor of death and/or cardiovascular hospitalization (hazard ratio, 0.62, 0.4 to 0.9; p = 0.02). Not surprisingly, a low left ventricular ejection fraction was also a strong predictor.

Efforts to measure quality of cardiovascular care using retrospective surveys may systematically underestimate adherence to guideline recommendations. In the case of the

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NAMCS dataset, physicians were constrained to reporting only five medications in 1990 to 1996, and six in 1997 to 1999. Many patients may take in excess of five or six medications, particularly those with heart failure, and the medications of interest may be omitted from the data form. Additionally, contraindications to medications are not fully attributed in either survey. In NAMCS, mechanisms were instituted to exclude patients with additional diagnoses that represent contraindications for medications under consideration. For example, warfarin use for atrial fibrillation was not required for patients with peptic ulcer disease, gastritis, duodenitis, alcoholism, gait abnormalities, ataxia, Alzheimer’s or other dementia, cerebral hemorrhage, seizure disorder, benign or malignant central nervous system tumors, and renal insufficiency. Determination of the presence or absence of these comorbidities was dependent on accurate completion of encounter forms detailing clinical interactions. It is likely that many existing contraindications are missed using this strategy. In the NDTI, contraindications to specific medications were not considered and, as a result, many patients with clear contraindications to medications remain in the denominator. Specific factors for each clinical condition must also be considered.

Let us focus more precisely on each condition, starting with stroke. While the annual stroke risk for patients with atrial fibrillation not receiving anticoagulation is approximately 3% to 5% (20,21), estimating the risk of stroke is a crucial factor in the decision to provide anticoagulation therapy to individual patients with atrial fibrillation. The American College of Cardiology/American Heart Association/European Society of Cardiology atrial fibrillation practice guideline recommends aspirin in lieu of warfarin for all patients <75 years of age with lone atrial fibrillation and for patients >60 years of age with heart disease but no specific risk factors for stroke. It is believed that patients with annual stroke risk <2% on aspirin do not benefit substantially from oral anticoagulation with warfarin. Opinion is particularly divided about anticoagulation for those at intermediate risk for stroke (3% to 5% per year). Some advocate routinely providing anticoagulation to patients with stroke risk in this range, whereas others favor selective anticoagulation of those at intermediate risk, with weight given to individual bleeding risks and patient preferences (3).

Patients with a limited history of atrial fibrillation do not necessarily require life-long oral anticoagulation. For example, oral anticoagulation is recommended for patients with postoperative atrial fibrillation due to the relatively high risk of stroke in this setting. However, after the postoperative healing is complete and the increased sympathetic tone of the postoperative state has resolved, the risk of recurrent atrial fibrillation is reduced, and warfarin treatment may be discontinued. Similarly, patients with atrial-fibrillation-associated thyrotoxicosis should be treated with oral anticoagulation, but once an euthyroid state is restored and atrial fibrillation has been absent for six months, the physician may choose to stop the warfarin treatment. Physicians are well aware that anticoagulation increases the frequency and severity of major extracranial and intracranial hemorrhage. The major atrial fibrillation trials excluded patients considered at high risk of bleeding. It is unclear whether the relatively low rates of major hemorrhage in the trials also apply to patients with atrial fibrillation in general clinical practice, who are often older than 75 years and may be more likely to harbor comorbidities that increase bleeding risk.

To assess if warfarin is underused in the treatment of patients with atrial fibrillation, Weisbold et al. (20) conducted a cross-sectional study of 1,289 patients with atrial fibrillation at a tertiary care Veteran’s Administration hospital. While 65% (844) of the patients had filled at least one warfarin prescription, of the remaining 445, 19 had died, 5 had inadequate medical records, 54 had received warfarin elsewhere, 160 had no documentation of atrial fibrillation, 53 had only a remote history of atrial fibrillation, 49 had only transient atrial fibrillation, 72 had documented contraindications to warfarin, and 17 refused warfarin therapy. Of the 1,289 study patients with atrial fibrillation, only 16 (1.2%) were not receiving warfarin therapy and had no identifiable justification, perhaps suggesting a very limited provider knowledge deficit or, alternatively, imperfect documentation.

Let us consider key treatments for coronary heart disease in the report by Stafford et al. (18). For both aspirin and beta-blockers in coronary artery disease, there were substantial increases in use noted between 1990 and 2001, but levels remained below the 40% point in this analysis. While it is possible that physicians may not be aware of the evidence supporting the use of these medications, systematic errors likely played a role in the low rates of usage reported. Because aspirin does not require a prescription, it may be more likely to be omitted from the medications listed on the survey data forms. Additionally, contraindications to aspirin use (allergy, gastritis, peptic ulcer disease, cerebral hemorrhage, iron deficiency anemia) may not be fully accounted for in these series. Although the use of beta-blockers in the setting of myocardial infarction and acute coronary syndromes is well established, the level of evidence supporting use of beta-blockers in chronic coronary artery disease is less solid (1). Furthermore, physicians may not treat patients with beta-blockers because of preexisting bronchospasm, bradycardia, hypotension, or peripheral vascular disease. Patients may also be reluctant to accept beta-blocker treatment in the setting of mood disorders or sexual dysfunction.

Other studies of the treatment of patients with coronary disease have shown far higher rates of use of aspirin and beta-blockers than those reported by Stafford et al. (18). Jollis et al. (16) reported that a series of Medicare patients with myocardial infarction treated in 1992 were treated with aspirin at rates of 74% (family practitioners), 79% (general internists), and 85% (cardiologists). The use of beta-blockers by family practitioners, general internists, and cardiologists in this analysis was reported lower, at 35%,
40%, and 52%, respectively. Although Stafford et al. (18) and others have documented steady increases in aspirin and beta-blocker use for coronary artery disease, it is likely that the substantial differences between the percentages Jollis reported from 1992 and those in this issue of the Journal are due to fundamental differences in study design.

The use of ACE inhibitors in heart failure is recommended for all patients with left ventricular ejection fraction <40% (4). While ACE inhibitors may be useful in the treatment of patients with heart failure and preserved left ventricular systolic function, particularly in the presence of hypertension, coronary artery disease, and diabetes, no large clinical trial evidence exists to base a broad-based recommendation for the use of ACE inhibitors in all patients with heart failure. The heart failure data from the NAMCS and NDTI surveys do not distinguish between systolic heart failure and heart failure with preserved systolic function. Most large studies suggest that approximately one-third of patients with heart failure in the absence of significant valvular disease have preserved left ventricular systolic dysfunction and are believed to have an abnormality of ventricular relaxation. We suspect that inclusion of these patients in the denominator of treated heart failure patients leads to a significant underestimation of the use of ACE inhibitors among appropriate patients.

Analysis of the NAMCS dataset excluded heart failure patients with hyperkalemia. Neither the NAMCS nor the NDTI survey accounted for prior intolerance to ACE inhibitors due to angioedema, cough, or renal dysfunction. Also, patients with symptomatic hypotension, bilateral renal artery stenosis, and severe aortic stenosis were not excluded from these analyses. Prior investigators, taking these various factors into account, have shown that ACE inhibitor use in systolic heart failure is in excess of 80%, even in the elderly population (22). Thus, the real room for improvement is probably much less than Stafford et al. (18) suggest. Although we would like to believe we could reach 100% compliance with ACE inhibitor use for systolic heart failure, imperfections of the paper medical record and abstraction method make this level of adherence unlikely. For these and other reasons, some experts have suggested that it may not be possible to increase the measured rate of ACE inhibitor use >85% (23).

Whether the differences between the care of patients treated by primary care providers or cardiovascular specialists are "real" or due to systematic differences in study design is unclear. While cardiologists may be quick to accept the results of Ansari et al. (19), one must first recognize the important differences in the two study groups. Patients treated by a cardiologist were younger, were more likely to be male, and were more likely to have coronary artery disease. Patients of cardiologists had lower ejection fractions and were more likely to have atrial fibrillation, but were less likely to have diabetes or chronic obstructive pulmonary disease. Patients of cardiologists appear to have had more overt heart failure, thus leading to referral to a specialist and making the diagnosis and treatment plan clearer.

Also, differences in the populations that were not assessed by the study may have existed and might explain the lower rate of adverse clinical outcomes seen with the cardiologist treated patients. Certainly, the relatively greater age of the primary care treated patients would help explain some of this difference. Medical comorbidities seen more frequently in the primary care treated patients suggest that these patients may have been more fragile and may have been perceived to be less likely to benefit from specialty care. Known predictors of prognosis such as serum sodium, heart rate, blood pressure, QRS interval, and peak oxygen consumption were not addressed in this study (24).

Delivering the highest quality of care for patients with cardiovascular disease is necessary to achieve the best possible clinical outcomes. Determination of the quality of care requires measurable indicators that provide a meaningful yardstick to gauge the merit of clinical care. Practitioners and investigators must realize that performance measures can be accurately measured only if there is adequate disclosure of attributes of the patient population so that indications and contraindications are easily assessed. Unfortunately, clinical trials often exclude higher risk patients, and, thus, the relative merits and risks of therapies may be unknown. Furthermore, the degree to which medical records allow true confidence regarding indications and contraindications is highly variable. We must move forward in the science of measuring and improving clinical care. It is believed that better standardization of care encounters, use of electronic records, and incorporation of guideline-based reminders will represent the next steps in the development of systems that help us provide evidence-based care and, at the same time, identify opportunities where we can improve.

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