RESEARCH

Intervention to Increase the Proportion of Acute Myocardial Infarction or Coronary Artery Bypass Graft Patients Receiving an Order for Aspirin at Hospital Discharge

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ABSTRACT

BACKGROUND: Chronic aspirin therapy is recommended by the American College of Cardiology/American Heart Association (ACC/AHA) following acute myocardial infarction (AMI) and by the Society of Thoracic Surgeons (STS) following coronary artery bypass graft (CABG). Aspirin therapy at discharge following a hospitalization for AMI or CABG is a common pay-for-performance indicator used by third-party payers and was included as a quality measure in the Centers for Medicare & Medicaid Services (CMS)/Premier Hospital Quality Incentive Demonstration initiated in 2003. A formal prescription for aspirin, such as required for other cardiovascular drugs, could serve as a reminder to all health care providers (doctors, nurses, and pharmacists) to include aspirin on a discharge medication list.

OBJECTIVE: To evaluate if an aspirin prescription placed in the patient chart shortly after hospital admission would increase compliance with guidelines for aspirin use at discharge in patients with AMI or CABG.

METHODS: This was a single-center prospective pre-intervention to post-intervention comparison study in a 411-bed hospital. Patients admitted during the 3-month period from July through September 2008 with an AMI or undergoing CABG surgery served as the pre-intervention group, and patients admitted during the 3-month period from January through March 2009 were in the post-intervention group. The intervention included multiple educational sessions with clinical staff, conducted both prior to and during the pilot, and blank pre-printed aspirin prescriptions placed in the charts of patients for whom no contraindication to aspirin was present. The blank prescriptions were then completed by the attending physician (or physician extender), and the discharge nurse used the completed aspirin prescription, with other prescriptions and written orders, as a reference when creating the discharge medication list. The primary outcome measure was the percentage of patients who had aspirin documented on the discharge medication list. Differences in compliance rates in the comparison and pilot periods were assessed using the Pearson chi-square test.

RESULTS: A total of 458 patients were identified with a CABG procedure and/or an admitting diagnosis of AMI; 447 met inclusion criteria, and 11 were excluded (1 patient in each of the groups had a contraindication to aspirin due to bleeding, and 9 died during hospitalization). The intervention was associated with an increase in the proportion of patients with aspirin documented on the discharge medication list, 266 of 269 patients (98.9%) compared with 169 of 178 patients (94.9%, $P=0.012$) in the pre-intervention group. In the subsample of patients with CABG, 54 of 59 (91.5%) patients in the pre-intervention group had aspirin documented on the discharge medication list compared with 100% of 66 patients in the post-intervention group ($P=0.016$). In the subsample of patients with AMI, aspirin was documented in 115 of 119 (96.6%) patients in the pre-intervention group versus 200 of 203 (98.5%) in the post-intervention group ($P=0.263$).

CONCLUSION: A quality improvement initiative that included clinical staff education and placement of aspirin prescriptions in patient charts during the hospital stay was associated with an increase in the proportion of patients who had aspirin documented on the discharge medication list for the overall sample of patients with AMI or CABG and for patients with CABG alone but not for the quality measure for AMI patients.

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Note: This article is the subject of an editorial that appears on pages 360-366 of this issue.

What is already known about this subject

- The goal for aspirin at discharge for clinically eligible patients following hospitalization for acute myocardial infarction (AMI) or coronary artery bypass graft (CABG) has been set at 100% by the American College of Cardiology/American Heart Association (ACC/AHA), the Society of Thoracic Surgeons (STS), and the Centers for Medicare & Medicaid Services (CMS).
- Outcomes data from the ACC/AHA and STS registries and CMS/Premier Demonstration Project show that although most hospitals have been able to achieve this goal, many hospitals remain below the 100% benchmark. For example, data for 116 hospitals reporting in the CMS/Premier Demonstration Project for year 4 through September 30, 2007, show an unweighted mean of 98% of CABG patients with aspirin prescribed at discharge and a range from 90.7% to 100.0%.
- No prior research has evaluated the potential for using aspirin prescriptions as a method for improving compliance with aspirin at discharge following a hospitalization for AMI or CABG.

What this study adds

- In a small study of patients hospitalized for AMI or CABG, education of clinical staff along with a pre-printed aspirin prescription placed in the charts of patients without a contraindication to aspirin therapy was associated with an overall increase in the percentage of patients who had aspirin prescribed on the discharge medication list from 94.9% in the pre-intervention group to 98.9% in the post-intervention group ($P=0.012$). The rate of prescribing aspirin at discharge increased from 91.5% to 100% ($P=0.016$) for patients hospitalized for CABG and did not significantly change for patients hospitalized for AMI (from 96.6% to 98.5%, $P=0.264$).

What this study adds *(continued)*

- This pilot study illustrates a process by which hospitals, through simple logistical changes, can potentially increase compliance with quality performance measures in patients with cardiovascular disease.
- This study represents the first published findings on the routine use of aspirin prescriptions placed in patient charts to improve compliance with "aspirin at discharge" performance measures for patients with AMI or CABG.

Despite advances in prevention and treatment, cardiovascular disease remains the number one cause of death in men and women in the United States.[1] Following a hospital admission for a cardiovascular event, the American College of Cardiology (ACC) and the American Heart Association (AHA) have established performance measures for the acute care and post-discharge management of the acute myocardial infarction (AMI) patient.[2] Chronic low-dose aspirin at discharge after AMI is a Class 1 recommendation (defined as treatment that *should* be performed because benefit greatly outweighs risk) for secondary prevention of recurrent cardiovascular events.[2]

In November 2003, the Centers for Medicare & Medicaid Services (CMS) in collaboration with the Joint Commission published a uniform set of national hospital quality measures to guide improvement in health care.[3] Aspirin prescribed at discharge for post-AMI patients was one of the quality measures, consistent with the ACC/AHA recommendation for chronic aspirin therapy post-discharge in this population.[2] To encourage high-quality care for patients with a variety of diagnoses including AMI, in October 2003 CMS launched the Premier Hospital Quality Incentive Demonstration, a voluntary pay-for-performance pilot project that awards incentive payments to hospitals based on performance on quality measures for each of 5 conditions.[4] Through the first 4 years of the Premier demonstration, payments have totaled $36.5 million for all conditions, and the "composite quality score" for AMI, which includes aspirin at discharge, improved from 87.5% to 96.3%.[4] In an analysis of data originally collected for the Can Rapid Risk stratification of Unstable angina patients Suppress Adverse outcomes with Early implementation of the ACC/AHA guidelines Quality-Improvement initiative (CRUSADE) project, Glickman et al. (2007) found that from 2003 through 2006, adherence scores for aspirin at discharge following AMI improved from 91.1% to 97.1% among Premier participating hospitals (n = 54) and from 92.2% to 95.9% among nonparticipants (n = 446).[5] In addition to CMS, third-party payers have established further incentives for actual performance compliance, a step beyond pay for reporting.[6]

Because coronary artery disease (CAD) is the underlying disease process in patients who require coronary artery bypass graft (CABG) surgery, these patients will also benefit from aspirin therapy. Recommendations promulgated by the Society of Thoracic Surgeons for the care of patients following CABG indicate that because aspirin "provides protection from cardiovascular events in patients with known atherosclerotic heart disease, especially CABG patients," aspirin therapy should be "continued beyond 1 year [following CABG] unless side effects limit therapy."[7]

Previous reports have described improvement in the rates of compliance with several quality indicators for CAD using broad quality enhancement initiatives such as the ACC's Guidelines Applied in Practice (GAP) program, the AHA's Get with the Guidelines program, and the CRUSADE initiative.[8,9,10,11] Vasaiwala et al. (2007) described a moderate increase in nearly all indicators of quality of care for AMI using the ACC's GAP program, with a specific increase in the discharge rate of aspirin from 86.5% in a pre-implementation period from January 1999 through June 2002 to 92.1% in a post-implementation period from July 2002 through December 2004.[8] Similarly, in a study reporting results from the Cooperative Cardiovascular Project, which used peer review organizations, hospital self-measurement tools, and systematic changes, there were improvements in 5 of 8 indicators of quality of care for AMI from a baseline period in 1992 to a post-intervention period in 1995.[12] These improvements included an absolute 16% increase from 61% to 77% in the rate of aspirin recommendations at discharge for participating hospitals compared with a 6% increase from 69% to 75% for nonparticipating hospitals.[12]

Compliance with quality indicators has also been evaluated in the CABG population. A study by Foody et al. (2003) evaluated 37,513 patients hospitalized for AMI for the prescription of aspirin at discharge for the period from April 1998 through March 1999. After adjustment for disease severity, AMI patients who underwent CABG had similar rates of aspirin at discharge compared with those who were treated medically (88.0% vs. 83.2%, $P = 0.288$).[13] In another study, Hiratzka et al. (2007) examined compliance with quality indicators in AMI patients who underwent either PCI or CABG compared with AMI patients who had no intervention performed (n = 119,106). Results in this study showed that compliance with the quality indicator of aspirin at discharge was higher for patients who underwent either PCI (99.4%) or CABG surgery (97.1%) than for patients who had no surgical intervention performed (94.5%, $P < 0.001$).[14]

The present study sought to evaluate if a specific process improvement measure, a "prescription" for over-the-counter (OTC) aspirin, could potentially increase the percentage of patients who had aspirin prescribed on the discharge medication list. The project was undertaken because it was concerning to our institution that we had not achieved 100% compliance with this critical quality indicator.

Methods

This was a prospective study of a 3-month intervention with a historical (pre-intervention) comparison group that was conducted at a 411-bed not-for-profit hospital that serves as a regional referral center for cardiovascular care. The hospital's investigational review board approved the protocol for this study.

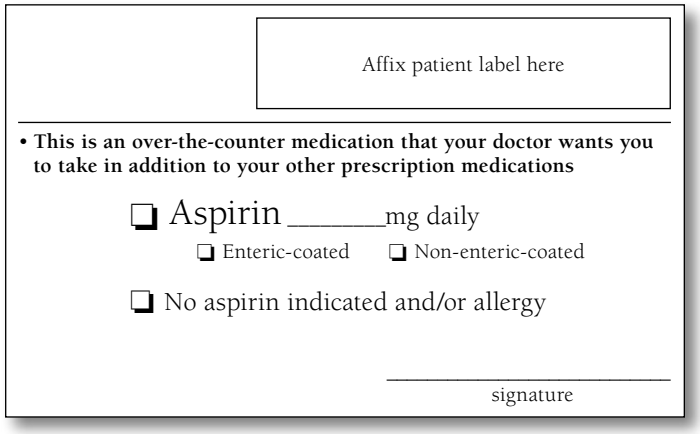
The study population included all patients who were admitted to the hospital for CABG or AMI from July 1, 2008, through September 30, 2008, or from January 1, 2009, through March 31, 2009. Exclusion criteria for both the pre-intervention and post-intervention groups included age younger than 18 years, aspirin allergy, and documented contraindications to aspirin use; these exclusion criteria are used in reporting procedures for both the ACC/AHA and Society for Thoracic Surgeons (STS) databases. Patients who expired during the hospital stay were also excluded from the study. Patients admitted to the hospital for AMI or CABG from July 1, 2008, through September 30, 2008, were used as a pre-intervention group and were retrospectively identified using entries from the database maintained by the hospital for reporting to the ACC/AHA and STS national databases. During the fourth quarter of 2008 (October through December), the clinical staff was educated regarding the pilot intervention, and no patient data were collected. The intervention occurred in the 3-month period from January 1 through March 31, 2009. Patients were prospectively identified for the intervention on a daily basis (see "Implementation" below).

In the study hospital, different care delivery systems are used for AMI and CABG. Most AMI patients are admitted to either the telemetry floor or the coronary care unit (CCU) under the care of a cardiologist from 1 of 3 cardiology services affiliated with the hospital. All 3 cardiology practices have physician assistants who are also responsible for patient care activities. There is no standard AMI discharge order set at this institution. If an AMI patient is admitted to a noncardiology service (e.g., hospitalists, internists), the cardiology service is still typically consulted. CABG patients are under the care of 1 of 3 cardiac surgeons who take responsibility for direct patient care activities with the assistance of a nurse practitioner. In the post-operative period, patients are directly admitted to the cardiovascular surgery intensive care unit (CVICU) and transferred to one wing of the telemetry floor. There is a CABG discharge order set which is used by nurses to prepare the discharge medication list. This order set was used during both the pre-intervention and post-intervention time frames. In both the pre-intervention and post-intervention periods, patients who were admitted to the hospital for AMI and subsequently underwent CABG were counted in both the AMI and CABG groups.

Pre-Intervention Phase

Between October and December 2008, the investigators prepared for the pilot intervention. The first step was to create a draft version of the pre-printed aspirin prescription that would be used in the intervention period for the department of cardiology and the cardiothoracic surgery service to review. Feedback from both services was used to finalize the prescription and a supply of prescriptions was printed for the upcoming intervention period (Figure 1).

FIGURE 1 Aspirin Prescription



Educational sessions (15-minute inservices) were conducted by the study investigators to specifically alert physicians, physician assistants, nurse practitioners, and nurses that aspirin prescriptions would be placed on patient charts of AMI and CABG patients starting January 1, 2009. The educational sessions also conveyed that attending physicians, physician's assistants, or nurse practitioners would be responsible for completing the prescription. Sessions were conducted for the department of cardiology, the cardiothoracic surgery service, and nursing personnel (day and night shifts) on floors and intensive care units who care for AMI and CABG patients. Since patients are frequently discharged following cardiac intervention without return to an inpatient nursing unit, education was also provided to the staff in the cardiac catheterization holding area.

Implementation

Nighttime charge nurses working in several patient care areas, including the medical and surgical telemetry floor, cardiac catheterization holding area, CCU, and CVICU, were recruited for assistance in identifying appropriate pilot patients. On a daily basis, the charge nurses in each respective patient care area would examine the patient census list to identify new AMI and/or CABG patients for the pilot intervention. As an additional aid for the discharge nurses to use with census lists, a pharmacy-generated report indicating all patients with a current aspirin order was printed in each respective patient care area. The nurses used this report to screen the medication administration record and chart of each patient to confirm the aspirin indication. A blank aspirin prescription was placed in

the chart for the attending physician, physician assistant, or nurse practitioner to complete and sign (Figure 1). A colored prescription was used to enhance awareness of this pilot tool. Blank aspirin prescriptions were kept in a central location in each of the nursing care areas for easy access. Once an aspirin prescription was left in the chart, the nurse documented the prescription on the census list and left this list as a reference for the discharge nurse to use the following day so that no more than 1 aspirin prescription would be left for each patient. After the list from the previous day was used as a reference for the new report, the old list was discarded.

All patients in each patient care area were screened on a daily basis, and the goal was to place aspirin prescriptions on appropriate charts within 24 hours of admission. At any time during the hospital stay, attending physicians, physician assistants, or the nurse practitioners would complete the prescription by indicating the desired strength in milligrams (mg) of aspirin, indicate whether the patient should receive an enteric coated preparation, and sign the prescription. The aspirin prescription was then returned to the patient chart as a reference for the discharge nurse when preparing the discharge medication list. The discharge nurse used the aspirin prescription in combination with chart orders and other outpatient prescriptions to generate a discharge medication list for the patient. Both the discharge medication list and the prescriptions were given to each patient at discharge to take home. The presence of aspirin on the discharge medication list was the outcome measure for both the pre-intervention and post-intervention groups. The unit of analysis for the study measure differed from the hospital's standard reporting for ACC/AHA and STS; the standard reporting is in aggregate (population per quarter), whereas data analysis for the present study was done at the patient level.

Quality Control and Post-Intervention Education

Two weeks after study initiation, a random sample of 20 charts was reviewed to confirm that aspirin prescriptions were being placed on patient charts and to identify potential logistical problems related to the placement of prescriptions, such as lack of accessibility. In addition, we wanted to ensure that nurses were receiving the pharmacy-generated reports and were successful in identifying patients in their units for the pilot intervention study. This chart audit was repeated once more approximately half-way through the pilot project.

In the initial quality assurance audit of 20 randomly selected charts performed approximately 2 weeks after implementation of the intervention, only 5 (25%) charts had the aspirin prescription on the chart within 24 hours. Additional inservices were performed by study investigators to ensure that aspirin prescriptions were placed in charts on a timely basis (i.e., earlier in the hospital stay). A subsequent audit of 18 additional charts performed during the sixth week of the intervention showed that educational efforts after the initial audit had improved compliance to 66%. Based on the second audit, re-education in all nursing areas was performed by nurse educators, and aspirin prescriptions were moved to highly visible areas. In addition, sample prescriptions were also posted at these locations to serve as visual reminders.

Data Collection and Analysis

CMS uses a sampling methodology for outcomes measures in the AMI and CABG population. However, national registries such as the ACC and STS require submission of data for all patients in these populations, and sampling is not acceptable. As part of its routine responsibilities, the hospital's Heart and Vascular Center Outcomes Department collects and reports data to national registries for 100% of the patient population. The department provided a spreadsheet with data to the study investigators for data analysis. Data provided for both the pre-intervention and post-intervention groups included age, gender, patient study number, diagnosis of AMI and/or CABG, attending physician, date of admission and discharge, procedural date for CABG, discharge status, contraindications to aspirin (if any), and whether aspirin was documented on the discharge medication list.

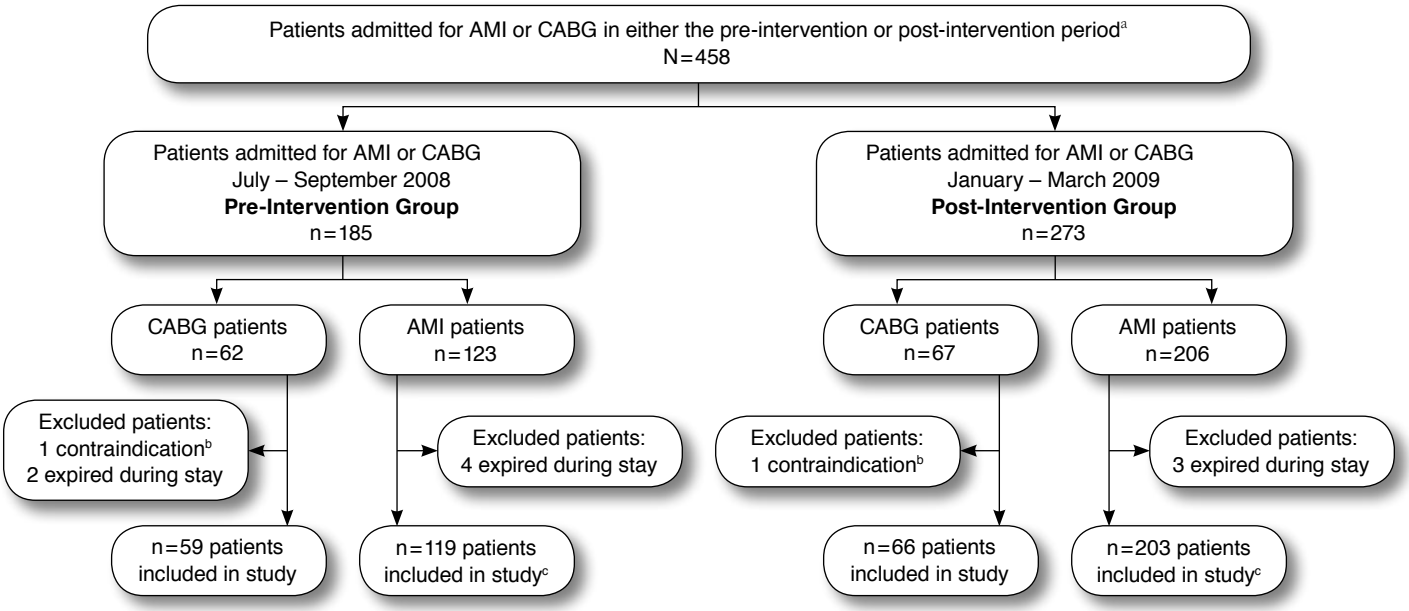
The primary outcome evaluated in this study was the percentage of patients who had aspirin documented on the discharge medication list. Continuous variables were expressed as mean and standard deviation, and categorical variables were expressed as frequencies or percentages. To assess the statistical significance of between-group differences in age and length of stay, respectively, the Student's t-test and Mann-Whitney U test were used. Length of stay is reported as the median and interquartile range. The Pearson chi-square test was used for categorical variables. The statistical analysis was performed using SPSS for Windows version 15.0 (SPSS Inc., Chicago, IL). The a priori statistical significance level was 0.05.

Results

A total of 458 patients were identified with either a CABG procedure and/or an admitting diagnosis of AMI. Data were collected for 447 patients who met inclusion criteria and were retrospectively identified using entries from the databases maintained by the hospital for reporting to the ACC/AHA and STS national databases (Figure 2). Of the 11 patients excluded from the study, 2 patients had a contraindication to aspirin due to bleeding. Nine patients expired during the hospital stay. No patients with an aspirin allergy were noted. Comparing the pre-intervention and post-intervention periods, the percentage of male patients in the AMI sample and patient age in both the overall and AMI samples were statistically different. Other demographic patient characteristics were similar (Table 1).

In the study sample overall, 266 of 269 (98.9%) patients in the post-intervention group had aspirin documented on the

FIGURE 2 Study Flowchart



[a]*Includes all patients aged 18 years or older who were admitted to the hospital for CABG or AMI from July 1, 2008, through September 30, 2008, or from January 1, 2009, through March 31, 2009.*

[b]*Study exclusion criteria were consistent with those used in ACC/AHA and STS reporting.*

[c]*Patients were counted in both the AMI and CABG groups if initial admission was for AMI but subsequent CABG was performed (3 patients pre-intervention, 5 patients post-intervention).*

ACC/AHA = American College of Cardiology/American Heart Association; AMI = acute myocardial infarction; CABG = coronary artery bypass graft; STS = Society of Thoracic Surgeons.

discharge medication list versus 169 of 178 (94.9%) patients in the pre-intervention group ($P = 0.012$; Table 2). There was also a statistically significant difference between the pre-intervention and post-intervention groups in the CABG subsample. In the CABG subsample, 100% of 66 patients in the post-intervention group had aspirin documented on the discharge list versus 54 of 59 (91.5%) patients in the pre-intervention group ($P = 0.016$). In the AMI subsample, 200 of 203 (98.5%) patients in the post-intervention group had aspirin documented on the discharge medication list versus 115 of 119 (96.6%) patients in the pre-intervention group ($P = 0.264$).

Discussion

The ideal time to review medication profiles in detail to assure compliance with recommended guidelines is during the recovery phase following a cardiac event. Studies have documented that ordering medications such as angiotensin-converting enzyme (ACE) inhibitors and beta-blockers at hospital discharge is a strong predictor of use of these drugs for secondary prevention at 1 year after hospital discharge.[15-16] Hospitals are continuously assessing quality of care and looking for methods to ensure compliance with quality measures. Various interventions have been implemented for purposes of quality improvement, and some have been judged as more effective than others.[17] Computerized physician order entry (CPOE) systems are used by many health systems to standardize medication ordering pathways and as a tool for improving compliance with quality measures.[18] Butler et al. (2006) created and implemented disease-specific CPOE pathways for patients hospitalized with congestive heart failure (CHF) and AMI.[18] In the study by Butler et al., the proportions of patients prescribed aspirin, a beta blocker, and an ACE inhibitor at discharge following a hospitalization for AMI did not change significantly from a pre-CPOE period (n = 286) to a post-CPOE period (n = 290). However, "due entirely to better documentation of contraindications in the CPOE period," 100% of clinically eligible AMI patients received discharge prescriptions for the study medications after CPOE implementation.[18]

Riggio et al. (2009) evaluated the effectiveness of a clinical decision support system (CDSS) that used an electronic checklist as a prompt for physicians to create consistent discharge instructions to address quality measures.[19] In this study, investigators compared compliance with quality discharge measures for AMI, including aspirin, beta-blocker, and ACE inhibitor

TABLE 1 Patient Characteristics

Variable	Pre-Intervention Group (n = 178)	Post-Intervention Group (n = 269)	*P* Value[a]
Overall study sample (N = 447)			
Mean [SD] age in years	62.0 [11.9]	64.9 [13.4]	0.021
Male gender n (%)	116 (65.2)	158 (58.7)	0.172
Median [IQR] length of hospital stay in days	6 [6]	5 [5]	0.290
CABG (n = 125)			
Number of patients	59	66	
Mean [SD] age in years	64.1 [12.2]	64.4 [12.0]	0.894
Male gender n (%)	35 (59.3)	45 (68.2)	0.303
Median [IQR] length of hospital stay in days	9 [4]	9 [6]	0.644
AMI patients (n = 322)			
Number of patients	119	203	
Mean [SD] age in years	61.0 [11.7]	65.1 [13.8]	0.007
Male gender n (%)	81 (68.1)	113 (55.7)	0.028
Median [IQR] length of hospital stay in days	5 [2]	5 [2]	0.723

[a]*P value for Pearson chi-square tests (gender) or t-tests (age) or Mann-Whitney U (length of stay) comparing pre-intervention group (July through September 2008) with post-intervention group (January through March 2009).*

AMI = acute myocardial infarction; CABG = coronary artery bypass graft; IQR = interquartile range; SD = standard deviation.

TABLE 2 Patients with Aspirin Documented on the Discharge Medication List[a]

	Pre-Intervention Group (n = 178)	Post-Intervention Group (n = 269)	*P* Value[b]
CABG n (%)	54 (91.5)	66 (100.0)	0.016
AMI n (%)	115 (96.6)	200 (98.5)	0.263
Overall n (%)	169 (94.9)	266 (98.9)	0.012

[a]*Patients who met the inclusion criteria for the study without a contraindication for aspirin due to bleeding.*

[b]*P value for Pearson chi-square tests comparing historical comparison group (July through September 2008) with pilot group (January through March 2009).*

AMI = acute myocardial infarction; CABG = coronary artery bypass graft.

or angiotensin II receptor blocker (ARB) at discharge, before CDSS was implemented compared with the post-CDSS implementation period. Results of this study demonstrated there was a significant increase in the proportion of AMI patients who had ACE inhibitors or ARBs prescribed at discharge when comparing the pre-CDSS time period with the post-CDSS time period (88.1% vs. 100%, respectively; $P = 0.014$). However, because there were high proportions of patients in the pre-intervention period who were discharged with aspirin (97.5%) and beta-blockers (97.9%), the incremental improvement was not statistically significant for aspirin (98.8%, $P = 0.43$) or for beta-blockers (98.7%, $P = 0.78$).

Although several different classes of medications are included in the CMS inpatient quality indicators (e.g., beta blocker at discharge, ACE inhibitor, or ARB for left ventricular systolic dysfunction),[3] the authors of the present study chose to focus on a specific process improvement strategy to target compliance with discharge aspirin. Benchmark performance data include the results from year 4 (through September 30, 2007) for 116 hospitals reporting in the CMS/Premier Quality Incentive Demonstration Project which show an unweighted average of 98% of CABG patients with aspirin prescribed at discharge with a range from 90.7% to 100.0%.[20] We could not find a published study that evaluated the use of a prescription for aspirin to improve compliance with a core quality indicator in the hospital setting.

The present study is a small, promising pilot that describes a novel process improvement initiative for improving one hospital's compliance with the aspirin at discharge quality indicator following a hospitalization for AMI or CABG. We found a statistically significant increase in the percentage of patients who had aspirin documented on the discharge medication list during the post-intervention period overall compared with a pre-intervention period. However, when examined by subgroup, a significant change in the percentage of patients who had aspirin documented on the discharge medication list was observed in only 1 of the 2 subgroups. In post-CABG surgery patients, the post-intervention group attained 100% compliance with the quality indicator, whereas the change in the quality indicator in the AMI group was not statistically significant. One potential explanation is the number of attending physicians, nurse practitioners, and/or physician assistants who are responsible for each patient population. Our cardiac surgery service comprises 3 surgeons and 1 nurse practitioner with primary responsibility for discharge prescriptions. Educational efforts were assured in the smaller group of clinicians managing CABG patients, and this small group allows for more consistency in care provided to patients who receive CABG. There is also a CABG discharge order set including aspirin that was in place during both the pre-intervention and post-intervention time frames. Attending physicians for AMI patients are much more diverse and include cardiologists, internists, and hospitalists. There are potentially 40-50 different health care providers who could write discharge prescriptions for the AMI population, which leads to less consistency in discharge medication instructions. In addition, there is no standard AMI discharge order set. Since the pilot, more aggressive ongoing patient-level assessment of discharge medications for these populations has been implemented at the study hospital.

Limitations

First, because the study employed a pre-to-post design without a contemporaneous control or comparison group, causality cannot be inferred from the study results. The study represents a promising pilot assessment that should be evaluated using a

larger sample size and more rigorous design. Second, because extensive education of nursing staff, physicians, physician assistants, and nurse practitioners was necessary in order to ensure that aspirin prescriptions were placed in charts and completed, we cannot definitively conclude that the increase in compliance percentage was due solely to the aspirin prescription. Because the education regarding the new aspirin prescription intervention could have increased provider awareness of the importance of aspirin in the treatment of AMI and CABG patients, the study's results could be partly attributable to the education itself. Third, we could not verify that every eligible patient chart during the pilot period received the aspirin prescription, although 2 quality assurance audits were performed. Fourth, we reviewed data from pre- and post-intervention groups representing admissions from different seasons of the year, and seasonality affects the number of people admitted for AMI and CABG. For example, rates of admissions for AMI are higher in winter than in summer months.[21] This study could be replicated using the same quarter within 2 subsequent years to minimize seasonal variation.

Conclusions

In this small pilot study of AMI and CABG patients conducted in a single hospital, an intervention consisting of education for relevant hospital staff and placement of prescriptions for aspirin in patient charts during the hospital stay was associated with a small increase in an important quality measure, the proportion of patients who had aspirin documented on the discharge medication list, compared with pre-intervention rates. The intervention was associated with improvement in the quality measure from 92% pre-intervention to 100% post-intervention among CABG patients and with a small and statistically insignificant increase in the quality measure from 97% to 99% among AMI patients. This pilot initiative improved this institution's compliance with 1 of 2 pay-for-performance quality measures.

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DISCLOSURES

There was no external funding for this study. Brackbill, Kline, and Sytsma were primarily responsible for concept and design with the assistance of Call. Kline performed the data collection, and Brackbill performed data interpretation. The manuscript was written and revised primarily by Brackbill, with the assistance of Kline and Sytsma.

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