Statin Initiation Following Coronary Artery Bypass Grafting*  
Outcome of a Hospital Discharge Protocol  

Ujjaini Khanderia, MS, PharmD; Kevin A. Townsend, PharmD, BCPS; 
Kim Eagle, MD; and Richard Prager, MD, FCCP  

Study objectives: To evaluate the outcome of a hospital discharge statin drug therapy initiation protocol following coronary artery bypass graft (CABG) surgery. Our goal was to measure the percentage of patients receiving statin drugs at hospital discharge and at a post-hospital discharge assessment following the implementation of the statin drug therapy initiation protocol. We also evaluated low-density lipoprotein cholesterol (LDL-C) goal attainment (ie, < 100 mg/dL), safety monitoring, and tolerability of the statin drug.  

Design: Single-center, observational study with a historical control group.  

Setting: University-affiliated health system with a comprehensive heart care program that included a 14-bed cardiac surgery ICU. Approximately 400 CABG procedures are performed annually.  

Patients: Patients who underwent CABG surgery were eligible for inclusion in the study. The exclusion criteria were as follows: contraindications to statin therapy; refusal to take a statin drug; refusal to give informed consent; and age < 18 years.  

Intervention: A protocol was implemented to recommend treatment with a statin drug at hospital discharge in all post-CABG surgery patients if the presurgical LDL-C level was > 100 mg/dL or the patient was receiving a statin prior to hospital admission. The protocol also included a presurgical assessment of lipoprotein levels and hepatic function. All cardiac surgery staff were educated regarding the specifics of the protocol.  

Results: A total of 403 patients were included in the study. The historical control group (202 subjects) and the intervention group (201 subjects) were similar with respect to gender, age, and baseline lipoprotein levels. The follow-up assessment interval was approximately 6 months in both groups. Overall, patients were more likely to receive a statin at hospital discharge in the intervention group compared to the control group (relative risk [RR], 1.6; 95% confidence interval [CI], 1.3 to 2.0). Attainment of the goal for LDL-C level was similar between the intervention and control groups in the overall sample. Patients who were not at their LDL-C goal at baseline were more likely to have a follow-up LDL-C level of < 100 mg/dL in the intervention group (RR, 1.9; 95% CI, 1.0 to 3.5). The rate of liver function assessment was similar in the control and intervention groups. No patients in either group experienced elevations of alanine aminotransferase levels that were more than three times the upper limit of normal, and no cases of muscle toxicity were noted.  

Conclusion: The initiation of therapy with a statin drug at hospital discharge following CABG surgery was associated with increased utilization rates. The LDL-C goal attainment improved in patients who were not at their goal prior to surgery. However, the persistence of medication use declined within 6 months. Statin therapy initiation was well-tolerated in this cohort of patients.  

(CHEST 2005; 127:455–463)  

Key words: clinical protocols; coronary artery bypass; guideline adherence; hydroxymethylglutaryl-coenzyme A reductase inhibitors  

Abbreviations: ALT = alanine aminotransferase; AMI = acute myocardial infarction; CABG = coronary artery bypass graft; CI = confidence interval; CLAS = Cholesterol-Lowering Atherosclerosis Study; HDL-C = high-density lipoprotein cholesterol; LDL-C = LDL cholesterol; LFT = liver function test; RR = relative risk  

Primary and secondary prevention studies have shown that reducing low-density lipoprotein cholesterol (LDL-C) with hydroxymethylglutaryl-coenzyme A reductase inhibitors (ie, statins) decreases the incidence of myocardial infarction and mortality from coronary events.1–5 Two large randomized, controlled trials (the Heart Protection Study6 [20,536 patients] and the Anglo-Scandinavian Car-
Atherosclerosis Study (CLAS)-I demonstrated that LDL-C reduction in patients undergoing CABG surgery inhibits atherosclerotic disease progression, and improves clinical outcomes and survival. The Post Coronary Artery Bypass Graft Trial demonstrated that aggressive lowering of LDL-C levels with lovastatin significantly delayed angiographic progression of atherosclerosis in vein grafts. Over an average 4-year follow-up period, patients who achieved LDL-C levels of <100 mg/dL had disease progression in 29% of saphenous grafts compared with 39% in the group who achieved LDL-C levels of <140 mg/dL (p < 0.001). The rate of repeated revascularization was 29% lower in the aggressive treatment group than in the moderate treatment group (6.5% vs 9.2%, respectively; p = 0.03). The Cholesterol-Lowering Atherosclerosis Study (CLAS)-I demonstrated that patients receiving combined colestipol and niacin therapy over a 2-year period acquired 40% fewer new atherosclerotic lesions (p = 0.04) and 50% fewer new graft closures (p = 0.02) than patients receiving placebo. In CLAS-II, an extension of CLAS-I that included a subgroup of 103 CLAS-I subjects, there were 60% fewer new lesions (p = 0.006), 16% less lesion progression (p = 0.33), and 50% fewer new graft closures (p = 0.20) associated with combination drug treatment.

Despite overwhelming evidence that the use of statin drugs improves clinical outcomes, the underutilization of statins has been well-documented in a wide variety of populations. Some studies have demonstrated that statin initiation during hospitalization for patients with acute coronary events may lead to improved long-term patient adherence and improved clinical outcomes. However, the implementation of this strategy for patients who are undergoing coronary revascularization surgery has not been well-described.

The purpose of our study was to evaluate the outcome of a hospital discharge statin therapy initiation protocol following CABG surgery. Our primary objective was to measure the percentage of patients receiving statins at hospital discharge and at 6 months post-hospital discharge. Secondary objectives were to evaluate LDL-C level goal attainment (ie, <100 mg/dL) and safety monitoring (ie, liver function tests [LFTs]) during this period.

**Materials and Methods**

**Patients and Protocol Implementation**

All patients who had undergone CABG surgery (with or without valve repair) at our university-affiliated teaching hospital between January 1, 2000, and December 31, 2002, were eligible for the study. The criteria for study exclusion were contraindications to statin therapy, refusal to take a statin drug, refusal to give informed consent, and age <18 years. Contraindications for statin therapy were active liver disease, unexplained persistent elevations of serum transaminases (ie, more than three times the upper limit of normal), history of hypersensitivity to the drug, pregnancy, nursing of children, and the potential for significant drug-drug interactions (ie, concomitant use of cyclosporine, gemfibrozil, erythromycin, or ketoconazole). The elevation of serum transaminase levels was defined as alanine aminotransferase (ALT) levels of >135 IU/mL (approximately three times the upper limit of normal for this test at our institution).

Following institutional review board approval, a computerized search of health system databases identified eligible patients. A random sample of patients who had undergone CABG surgery between January 1, 2000, and December 31, 2001 (immediately prior to the implementation of the education and treatment protocol), formed our historical control group. A random sample of patients who had undergone CABG surgery between January 1, 2002, and November 30, 2002, formed our intervention group. The treatment protocol utilized after January 1, 2002 (Fig 1), recommended statin therapy initiation in all post-CABG patients if the following conditions were met: baseline (ie, presurgical)
LDL-C level was > 100 mg/dL; or the patient had been receiving a statin drug prior to hospital admission and there were no contraindications to administering a statin medication. Patients meeting these criteria and surviving to hospital discharge or to follow-up formed our statin-eligible subgroups. Also included in the protocol was a presurgical assessment of lipoprotein levels and hepatic function. All cardiac surgery staff involved in the hospital discharge ordering process were alerted to the protocol verbally and via electronic mail. Our protocol was designed as one-on-one prescriber education provided by a clinical pharmacist working in the cardiac surgery services. Written instructions on statin therapy implementation also were provided to the clinicians. Standardized order sets were not used for statin therapy initiation. Instead, physicians, physician assistants, and nurse clinicians involved in hospital discharge ordering were prompted, when necessary, by the pharmacist to include a statin drug in the hospital discharge orders. The final decision to start statin therapy was made by the patient's surgeon. Standard education for post-CABG surgery patients continued following protocol implementation and included information about the rationale for lipid-lowering therapy, the benefits of medication adherence, and potential adverse effects.

Data Collection and Statistical Analysis

A review of electronic medical records served as our primary data collection method for all patients at hospital discharge and follow-up assessment, and was used to document demographics, surgical information, drug therapy, and all laboratory results. To validate the accuracy of this method, a sample of 39 patients from the intervention group (19%) who had given informed consent were identified, and their primary care physicians were surveyed to confirm medication usage and tolerability during postsurgical follow-up care. Data were entered into standard spreadsheet (Excel 2000; Microsoft; Redmond, WA), and statistical software (SAS, version 8.2; SAS Institute; Cary, NC) was used for further analysis. Sample size requirements were estimated with the assumption that the percentage of patients in the control group receiving statin therapy at hospital discharge would be approximately 45% (based on previous work at our institution), while the goal in the intervention group would be to have at least 70% of post-CABG surgery patients receiving statin therapy at hospital discharge. To detect this 25% change with 90% power (α value, 0.05), approximately 80 patients in each group were required. Categoric data are presented as frequencies and percentages, and are analyzed using x² analysis and the estimates of effect (relative risk [RR]) with 95% confidence intervals (CIs) for unpaired data or the McNemar test for paired data. Continuous data are reported as the mean ± SD and were analyzed using two-sample t tests.

RESULTS

Patient Characteristics

Overall, 403 patients were included in the analysis (control group, 202 patients; intervention group, 201 patients). No differences between the groups were detected with respect to gender, age, and baseline lipoprotein levels. In the control group, a total of seven patients (3%) and nine patients (4%), respectively, died prior to hospital discharge and follow-up assessment. In the intervention group, three patients (1%) and seven patients (3%), respectively, died prior to hospital discharge and follow-up assessment. These patients were not included in our statin-eligible assessment. The intervention group patients were more likely to be receiving a statin drug on hospital admission (Table 1). The mean interval between hospital discharge and follow-up assess-
ment was approximately 6 months in both the control group (191 ± 102 days) and the intervention group (177 ± 92 days; p = 0.40). The distribution of statin prescribing among atorvastatin, simvastatin, pravastatin, and other statin drugs was similar between groups at hospital discharge (p = 0.69) and during outpatient follow-up (p = 0.52).

**Protocol Effect**

The percentage of patients to whom a statin drug was prescribed at hospital discharge and at follow-up in the control and intervention groups is presented in Figure 2. Overall, patients were more likely to receive a statin drug at hospital discharge in the intervention group compared to the control group (RR, 1.6; 95% CI, 1.3 to 2.0). In the statin-eligible subgroup, intervention patients were more likely to receive a statin drug at hospital discharge (RR, 1.4; 95% CI, 1.1 to 1.7). There was a trend for more intervention patients to be receiving a statin drug at follow-up, but this was not statistically significant (RR, 1.2; 95% CI, 0.9 to 1.4). Among all patients in the intervention group, statin therapy was not initiated in 65 patients (32%) [excluding 3 patients who died and 9 patients with unknown statin therapy initiation status]. Patients were eligible for statin therapy initiation in 32 of these 65 patients (49%). Per the study protocol, the remaining 33

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Control Group (n = 202)</th>
<th>Intervention Group (n = 201)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>142 (70)</td>
<td>147 (73)</td>
<td>0.53</td>
</tr>
<tr>
<td>Female</td>
<td>60 (30)</td>
<td>54 (27)</td>
<td></td>
</tr>
<tr>
<td>Age, yr (range)</td>
<td>65 ± 12 (29–90)</td>
<td>65 ± 12 (33–88)</td>
<td>0.93</td>
</tr>
<tr>
<td>Pre-hospital admission statin use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>79 (39)</td>
<td>100 (50)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>No</td>
<td>103 (51)</td>
<td>42 (21)</td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>20 (10)</td>
<td>59 (29)</td>
<td></td>
</tr>
<tr>
<td>Baseline lipoprotein levels, mg/dL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total cholesterol</td>
<td>184 ± 47</td>
<td>187 ± 45</td>
<td>0.54</td>
</tr>
<tr>
<td>LDL-C</td>
<td>102 ± 40</td>
<td>109 ± 35</td>
<td>0.12</td>
</tr>
<tr>
<td>HDL-C</td>
<td>44 ± 19</td>
<td>42 ± 13</td>
<td>0.30</td>
</tr>
<tr>
<td>Triglyceride</td>
<td>200 ± 120</td>
<td>179 ± 119</td>
<td>0.15</td>
</tr>
<tr>
<td>Baseline ALT level, IU/mL</td>
<td>36 ± 24</td>
<td>33 ± 20</td>
<td>0.17</td>
</tr>
</tbody>
</table>

*Values given as No. (%) or mean ± SD, unless otherwise indicated.

![Figure 2. Percentage of patients who were prescribed a statin at hospital discharge and at follow-up.](http://journal.publications.chestnet.org/pdfaccess.ashx?url=/data/journals/chest/22021/)
patients were not eligible for statin therapy initiation due to lack of a baseline ALT assessment (19 patients), a baseline LDL-C level of <100 mg/dL (6 patients), lack of a baseline LDL-C assessment (5 patients), and a baseline ALT level of >45 IU/mL (3 patients). In the control group, the 69 patients who were ineligible for statin therapy included 34 patients with no baseline ALT assessment, 15 patients with a baseline LDL-C level of <100 mg/dL, 10 patients with no baseline LDL-C assessment, and 10 patients with a baseline ALT level of >45 IU/mL.

Attainment of the LDL-C goal (i.e., <100 mg/dL) at follow-up is summarized in Figure 3. There were no significant differences between the intervention and control groups in the overall sample (RR, 1.2; 95% CI, 0.9 to 1.5) or in patients who were discharged from the hospital receiving a statin drug (RR, 1.3; 95% CI, 0.9 to 1.8). However, patients who were not at their LDL-C goal at baseline were more likely to have a follow-up LDL-C level of <100 mg/dL in the intervention group (RR, 1.9; 95% CI, 1.0 to 3.5). Lipoprotein changes across all patients in the control and intervention groups are summarized in Table 2.

Follow-up LFT monitoring occurred in 46% and 48%, respectively, of all patients in the control and intervention groups (p = 0.76). In the subset of patients newly initiated on statin therapy at hospital discharge, LFT monitoring occurred in 52% of control group patients and 38% of intervention group patients (p = 0.43). In the control and intervention groups, the mean ALT levels at follow-up were 34 ± 23 IU/mL and 32 ± 14 IU/mL, respectively, in all patients (p = 0.51). In patients who were newly initiated on statin therapy at hospital discharge, the mean ALT levels at follow-up were 31 ± 11 IU/mL and 47 ± 27 IU/mL, respectively, in the control and intervention groups (p = 0.26). No patients in either group experienced elevations of ALT levels that were more than three times upper limit of normal. No cases of myopathy were identified.

**DISCUSSION**

The post-CABG surgery statin therapy initiation protocol that we have described was associated with a substantial increase in the initiation of statin therapy at hospital discharge following CABG surgery

**Table 2—Lipoprotein Changes (All Patients)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control Group</th>
<th>Intervention Group</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cholesterol</td>
<td>-5% ± 24%</td>
<td>-12% ± 23%</td>
<td>0.12</td>
</tr>
<tr>
<td>(n = 49)</td>
<td>(n = 63)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LDL-C</td>
<td>-10% ± 33%</td>
<td>-13% ± 31%</td>
<td>0.72</td>
</tr>
<tr>
<td>(n = 45)</td>
<td>(n = 62)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HDL-C</td>
<td>12% ± 29%</td>
<td>-2% ± 23%</td>
<td>0.009</td>
</tr>
<tr>
<td>(n = 47)</td>
<td>(n = 62)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trig</td>
<td>16% ± 73%</td>
<td>-7% ± 40%</td>
<td>0.06</td>
</tr>
<tr>
<td>(n = 47)</td>
<td>(n = 61)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Values given as the percentage change measured from baseline (pre-CABG surgery) to the most recent follow-up assessment. See Figure 1 for abbreviation not used in text.

**Figure 3.** LDL-C goal attainment (<100 mg/dL) at follow-up.
from 54% in the control group to 75% in the intervention group (p = 0.001) in statin-eligible patients. Despite the significant improvement, many CABG surgery patients (49%) who did not begin statin therapy at hospital discharge were eligible for therapy. This remaining treatment gap can be largely attributed to the passive nature of our protocol. Previous work at our institution demonstrated that 45% of post-CABG patients were prescribed a statin drug at hospital discharge, while 62% were actually candidates for such therapy based on national guidelines.24 This information prompted a change in standard post-CABG surgery care at our institution. Due to a concern regarding automatic statin initiation in patients who may experience changes in liver function and poor tolerability of oral medications following major surgery, the current protocol was adopted to allow a more conservative approach and to create an opportunity to measure the efficacy and safety of the proposed changes. Future protocol modification will focus on a more proactive approach toward statin therapy initiation. Of note, statin treatment rates decreased to 67% (intervention group) within 6 months following hospital discharge, indicating that reinforcement and education regarding medication adherence also should be included in our protocol.

Previous investigations25,26 also have found infrequent treatment of dyslipidemia in post-CABG surgery patients following hospital discharge. However, newer clinical trial data and recent updates in treatment guidelines have likely led to changes in general practice patterns. This trend was observed in our work. A higher percentage of patients in the intervention group of our study entered the hospital receiving a statin drug compared to the control group. This finding has been reported in similar work by other authors27 and is probably due to a gradual increase in statin use among patients with known vascular disease over time. Since our control group was treated 1 to 2 years earlier, their lower pre-CABG surgery lipid therapy rate may simply reflect regional and national trends. However, within our intervention group, statin use increased from 50% prior to hospital admission to 62% at hospital discharge (p = 0.001 [McNemar test]). In the control group, statin utilization rates were 39% both prior to hospital admission and at hospital discharge.

The attainment of an optimal serum lipoprotein level is another important clinical outcome in this high-risk population. Patients in the intervention group with LDL-C levels of > 100 mg/dL at baseline were more likely to be at their LDL-C goal at their post-hospital discharge follow-up visit than were subjects in the control group (62% vs 33%, respectively; p = 0.031). This is a significant improvement in a high-risk patient group. However, a substantial proportion of patients (38%) remained above their LDL-C goal in our intervention group at 6 months following hospital discharge. In the overall group and in patients who were discharged from the hospital receiving therapy with a statin, LDL-C goal attainment was similar in both the intervention and control groups. The large set of patients (39%) in our control group who were admitted to the hospital while receiving a statin drug contributes to this observation. In fact, 63% of control patients (overall and of those discharged from the hospital receiving a statin drug) were at their LDL-C goal at the follow-up visit. However, our data reflect the beneficial trend that a treatment-initiation protocol can have on LDL-C goal attainment.

There are several potential reasons for patients not reaching their LDL-C goal by the follow-up evaluation. Inadequate communication between clinicians as patients transition from the hospital to the outpatient setting may result in appropriate therapies being discontinued or never initiated. Another potential cause for patients to not reach their goal is clinician’s response to fluctuations in LDL-C levels that occur following CABG surgery. Levels transiently decline following CABG and may remain persistently low for weeks to months.28 Physicians may elect to discontinue statin therapy based on these results, not realizing that lipid concentrations will elevate to pre-CABG surgery levels. Also, suboptimal initial dosing or failure to titrate the dose may contribute to less than optimal LDL-C goal attainment following CABG surgery. Some updates in prescribing recommendations for statin drugs include the use of starting doses adjusted to the patient’s baseline LDL-C level. The planned expansion of our efforts will incorporate these issues into the education and intervention process.

Several authors have reported on the prevalence and benefits of statin therapy initiation during coronary artery disease-related hospitalizations. A brief summary of this literature is found below. Our study is among the first to focus specifically on intervention in patients undergoing CABG surgery.

Muhlestein and colleagues observed 600 patients from a coronary arteriography registry who had angiographically documented coronary artery disease (33% had CABG as initial treatment approach). The prescription of statins during initial hospitalization occurred in 105 patients (18%). Utilization rates at long-term follow-up (ie, ≥ 2 years) were significantly higher in patients to whom a statin drug was prescribed at hospital discharge (77%) compared to those who were not (40%; p < 0.0001). In a report from the National Registry of Myocardial Infarction that included 138,001 patients who had...
been hospitalized with acute myocardial infarction (AMI), Fonarow and coworkers documented that lipid-lowering medications were prescribed in only 31.7% of patients at hospital discharge. Multivariate analysis revealed that, among other significant utilization predictors, patients undergoing CABG surgery were less likely to receive lipid-lowering medication at hospital discharge following their surgery (odds ratio, 0.58; 95% CI, 0.55 to 0.60). Other clinicians have found that the initiation of therapy with a lipid-lowering agent at the time of a percutaneous coronary intervention is a significant predictor of survival and continued medication use at 6 months post-hospital discharge.

The efficacy and safety of treatment protocols designed to proactively initiate lipid-lowering therapy during hospitalization for acute coronary events also has been described. Birchter and colleagues implemented a multidisciplinary protocol that prompted the initiation of lipid-lowering therapy in patients after myocardial infarction and percutaneous transluminal coronary angioplasty at the time of hospital discharge. Utilization rates increased from 40% at baseline to approximately 70% during the 5-month post-hospital discharge period. Substantial increases in baseline serum lipid level assessment and medication counseling also were achieved with their program.

Fonarow and coworkers reported the outcome of a cardiac hospitalization atherosclerosis management program that included the initiation of therapy with a statin, a β-blocker, an angiotensin-converting enzyme inhibitor, and aspirin before hospital discharge in patients with established coronary artery disease (ie, primarily AMI or unstable angina). Following the implementation of the protocol, statin treatment rates at hospital discharge increased from 6 to 86% (p < 0.01). Persistence with statin therapy at 1 year of follow-up increased from 10% before the protocol to 91% following protocol implementation (p < 0.01). Follow-up LDL-C levels were ≤100 mg/dL in 6% and 58%, respectively, of patients before and after protocol initiation (p < 0.001). Of note, this finding is consistent with the rate of LDL-C goal attainment observed in our study (patients with baseline LDL-C level of >100 mg/dL, 62%). Cardiac hospitalization atherosclerosis management program implementation was accompanied by reductions in recurrent myocardial infarction and 1-year mortality.

Lacy and colleagues evaluated a protocol that prompted the initiation of lipid-lowering therapy during hospitalization in patients who had been admitted to the hospital for AMI, percutaneous transluminal coronary angioplasty, or CABG surgery. Following baseline lipid level assessment, treatment was recommended if the LDL-C level was ≥130 mg/dL. During the intervention phase of this study, 19% of patients were admitted to the hospital for CABG surgery. Overall, treatment initiation during hospitalization increased from 17 to 82% following protocol implementation (p < 0.001). Similar to our experience, substantially more patients were admitted to the hospital while receiving lipid-lowering therapy during the postintervention period compared to those in the preintervention cohort. It is also worth noting that patients admitted to the hospital while receiving lipid-lowering therapy were excluded from this study. Based on previous findings at our institution indicating that pre-hospital admission lipid-lowering therapy is often not reinitiated on hospital discharge, these patients should not be overlooked in hospital-based treatment protocols.

Related work at our institution has focused on the utilization of selected therapies in patients who have been admitted to the hospital for confirmed AMI. Mehta and colleagues have described a “guidelines applied in practice” initiative that focuses on optimizing the quality of care using several indicators. These quality indicators were the assessment of LDL-C, the use of aspirin and β-blockers, and the time to reperfusion following hospital admission and the use of aspirin, β-blockers, angiotensin-converting enzyme inhibitors, smoking cessation counseling, dietary counseling, and cholesterol-lowering therapy at hospital discharge. The pilot study was conducted at 10 acute care hospitals in southeast Michigan and included initial presentations to clinicians, guideline summary resource tools, pocket guides for prescribers, assignment of nurse and physician opinion leaders, grand round presentations, and outcomes measurement. With respect to early (ie, hospital admission-related) indicators, significant improvement was observed in the administration of aspirin (81% vs 87%, respectively; p = 0.02) and β-blockers (65% vs 74%, respectively; p = 0.04). For late (ie, hospital discharge-related) indicators, significant improvement was observed with the utilization of aspirin (84% vs 92%, respectively; p = 0.002) and smoking-cessation counseling (53% vs 65%, respectively; p = 0.02). Nonsignificant but favorable trends were observed with the utilization of cholesterol-lowering treatment at hospital discharge. A similar rate of cholesterol-lowering treatment was observed in the guidelines applied in practice initiative and our current cohort of CABG surgery patients following intervention (75%). Based on our findings, the implementation of comprehensive, guideline-based tools for patients undergoing CABG surgery will facilitate similar quality improvement.

With respect to relevant safety and monitoring, only half of our patients who were discharged from the hospital while receiving a statin drug had LFTs
performed within 6 months after hospital discharge. Among patients with ALT levels available, no significant differences in the mean levels were noted between groups, and no patients experienced significant elevations. No cases of muscle-related adverse effects were identified during the study. The limitations of our study include a retrospective, single-site design, a relatively small sample size, and the use of an historical control group. We attempted to minimize the impact of time on our study results by narrowing the interval between the selection of the control group and the intervention group.

CONCLUSION

A protocol prompting the initiation of statin therapy at hospital discharge following CABG surgery is associated with increased utilization rates in eligible patients and improvements in LDL-C goal attainment in patients who were not at the goal prior to surgery. In this cohort, statin therapy initiation appeared to be safe and well-tolerated, as measured by LFTs. No cases of muscle-related adverse effects were identified. Medication persistence declined within 6 months, indicating that additional patient follow-up and reinforcement may be necessary in order to improve long-term adherence. Our own plans are to further standardize the use of β-blockers, angiotensin-converting enzyme inhibitors, statins, and antiplatelet therapy among ideal candidates being discharged from the hospital after CABG surgery.

REFERENCES

23. Adult Treatment Panel III. Executive summary of the third
report of the National Cholesterol Education Program (NCEP) expert panel on detection, evaluation, and treatment of high blood cholesterol in adults. JAMA 2001; 285:2486–2497


