Physician assistant home visit program to reduce hospital readmissions

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Objective: A physician assistant home care (PAHC) program providing house calls was initiated to decrease hospital readmission rates. We evaluated the 30-day readmission rates and diagnoses before and during PAHC to identify determinants of readmission and interventions to reduce readmissions.

Methods: Patients who underwent cardiac surgery were evaluated postoperatively for 13 months as pre-PAHC (control group) and 13 months with PAHC. Physician assistants made house calls on days 2 and 5 following hospital discharge for the PAHC group. Both groups were seen in the office postoperatively. We retrospectively reviewed the charts of 26 months of readmissions. Readmission rates for the control and PAHC groups were compared, as were the reasons for readmissions. Readmission diagnoses were categorized as infectious, cardiac, gastrointestinal, vascular, pulmonary, neurologic, and other. Also noted were the interventions made during the home visits.

Results: There were 361 patients (51%) in the control group and 340 patients (49%) in the PAHC group. Overall readmission rate for the control group was 16% (59 patients) and 12% (42 patients) for the PAHC group, a 25% reduction in the rate of readmissions ($P = .161$). The rate of infection-related readmissions was reduced from 44% (26 patients) to 19% (8 patients) ($P = .010$). Home interventions included adjustment of medications (90%), ordering of imaging studies (7%), and administering direct wound care (2%).

Conclusions: The 30-day readmission rate was reduced by 25% in patients receiving PAHC visits. The most common home intervention was medication adjustment, most commonly to diuretic agents, medications for hypoglycemia, and antibiotics. (J Thorac Cardiovasc Surg 2013;145:225-33)

The average length of stay for cardiac surgery patients has decreased over time, but their acuity and comorbiditites have increased, resulting in a high rate of readmission often requiring expensive procedures.[1-3] Many patients recovering from cardiac surgery are elderly; some live alone and may have little or no family support.[4-6] Therefore the early postoperative period presents significant physical and emotional challenges.[4,7] Hannan and colleagues[1] found that in New York State the 5 most common 30-day readmission diagnoses following coronary artery bypass graft (CABG) procedure were postoperative infection (16.9%), heart failure (12.8%), other complications of surgical and medical care (9.8%), cardiac dysrhythmia (6.3%), and angina (4.7%).

A few studies assessing long-term follow-up of patients undergoing CABG procedure who received home intervention showed favorable outcomes.[4,8-10] Lie and colleagues[9] implemented a home-based intervention program that included two 1-hour visits by a trained nurse (with a master's degree) along with psychologic support and education.[9] There is little documentation of physicians or physician assistants (PAs) making home visits. In the field of general surgery, Shapiro and colleagues[11] measured if a surgeon's visit to a patient's home improved medical outcome and concluded that the physician's visit did not seem to influence outcome; however, it strengthened the patient–surgeon relationship. Our physician assistant home care (PAHC) program was implemented to provide house calls to patients recovering from cardiovascular surgery. The primary objective was to study the influence of a PAHC visit in reducing 30-day hospital readmissions following cardiac surgery. The secondary objectives were to compare the readmission diagnoses during the control and PAHC periods to assess the nature and utility of home-based interventions.

MATERIALS AND METHODS

All patients discharged to home following CABG procedure and/or valve repair or replacement and/or aneurysm repair, or other cardiac procedure from August 1, 2009, to September 30, 2011, at Staten Island University Hospital, a 714-bed tertiary care facility, were studied. The control group totaled 361 patients from August 2009 through August 2010, and

PM

Abbreviations and Acronyms
CABG = coronary artery bypass graft
PA   = physician assistant
PAHC = physician assistant home care

the PAHC group totaled 340 patients from September 2010 through September 2011. Patients who died before discharge or were discharged to nursing homes and rehabilitation facilities were excluded. Both groups were seen in the office on postdischarge weeks 2 and 4. The control group was seen at home by standard visiting nurses without any specialty training or expertise in caring for cardiac surgery patients.

The PAHC group was analyzed on an intention-to-treat basis. Hospital-employed cardiothoracic PAs conducted home visits on postdischarge days 2 and 5, with occasional variation due to patient availability and Sundays, on which no house calls were made. The same hospital-based PAs responsible for perioperative and intraoperative care were assigned to make house calls. During a house call, the PA performed a focused physical exam and reviewed the patient's medications. Adjustments were made to the patient's medications, and new medications were prescribed, as necessary. The surgical wounds were examined carefully and all patient concerns were addressed. Prescriptions were written for antibiotics, blood work, or imaging studies when indicated. Arrangements were made if the patient needed to be evaluated as an inpatient. All findings were documented on the PAHC visit form (see Appendix 1).

A registry database of the perioperative record, hospital records, and office and house call charts were reviewed. The database review was approved for research by the Staten Island University Hospital Institutional Review Board, which waived the requirement for informed consent on the condition that the subjects' identities were hidden before analytical procedures were performed.

Readmission diagnoses were grouped into 1 of 7 discrete categories: infectious, cardiac, gastrointestinal, vascular, pulmonary, neurologic, and other. Readmission rates were compared pre-PAHC and during the PAHC program, as were readmission diagnosis categories as a percent of total readmissions. Interventions made during house calls were examined and categorized. Data analysis was performed using SPSS 16.0 software (IBM Corp, Armonk, NY). Baseline characteristics were compared across groups using χ^2, Fisher exact test, and t tests, where appropriate. All tests were 2-tailed. Assuming a rate of refusal or exclusion of 10%, a 2-sided type I error rate of 5% and a power of 90%, we calculated that a sample size of 740 patients was required to permit the detection of a 4% reduction in hospital readmission rate.

RESULTS

From August 2009 to September 2011, 1013 patients underwent cardiovascular surgery, 701 (69%) of whom were discharged directly to their home. The control group, from August 2009 through August 2010, totaled 361 patients (51%) and the PAHC group, from September 2010 through September 2011, totaled 340 patients (49%) with a readmission rate of 16% (59 patients) and 12% (42 patients), respectively, a 25% reduction in the rate of hospital readmission ($P = .161$). Baseline characteristics were comparable in both groups (Table 1). When comparing the number of patients readmitted by postoperative day, the difference between the control and the PAHC groups was most pronounced in the first 2 postoperative weeks (see Figure 1). Readmission categories, as a percent

of total readmissions for the control group and the PAHC group, respectively, were: infectious, 44% and 19% ($P = .010$); cardiac, 20% and 33% ($P = .169$); gastrointestinal, 10% and 19% ($P = .248$); vascular, 5% and 12% ($P = .445$); pulmonary, 5% and 5% ($P = 1.000$); neurologic, 5% and 2% ($P = .639$); and other, 10% and 10% ($P = 1.000$) (Figure 2). Infection-related readmissions, including wound infections (eg, sternal, lower extremity, and thoracoabdominal), pneumonia, and sepsis decreased from 26 patients (44%) to 8 patients (19%) ($P = .010$) (Table 2). The difference between the 2 groups for infectious readmissions was most pronounced during the first 2 weeks (see Figure 3). Table 3 lists the readmission categories as a percentage of each cohort.

Of 340 patients in the PAHC group, 65 (19%) refused PAHC or failed to respond to requests to schedule a house call. Of 275 patients (81%) who received home visits, 173 (63%) were seen twice, 99 (36%) were seen once, and 3 (1%) were seen 3 times for a total of 454 visits, an average of 1.7 visits per patient. Of 42 patients readmitted during the PAHC period, 18 (43%) received 2 visits, 13 (31%) received 1 visit, and 11 (26%) had no visits. A total of 454 house calls to 275 patients prompted a total of 122 interventions (Table 4).

Of 122 interventions documented during house calls, 110 (90%) were medication related (Table 5), including 37 adjustments of diuretic medications (30%), 15 changes to medications for hypoglycemia (12%), 12 prescriptions for antibiotics (10%), 11 prescriptions for stool softeners/laxatives (9%), and 9 adjustments to beta-blocker medications (7%). The remainder of medication interventions were limited to 5 or fewer interventions (4% or less of total interventions) each and included antihypertensive medications, inhalers, analgesic medications, anticoagulant medications, aspirin, steroids, antiarrhythmia medications, antihistamine medications, antitussive medications, hypnotic agents, and proton pump inhibitors. Active wound care interventions were documented in 3 patients (2%). Imaging studies were ordered for 9 patients: 3 (2%) underwent a chest radiograph and 6 (5%) underwent venous duplex exams (Table 2).

Our PAs are employed by the hospital and the home visits were incorporated into their daily schedule. Other than time spent away from the hospital, the only additional cost was travel expenses ($0.55 per mile) incurred while driving to patients' houses, which averaged about $190/month for the volume encountered during the 13-month period.

DISCUSSION

Studies have revealed that social support improves patient health and compliance with recommended treatment and medications.[6,12] Different methods have been described to aid patients undergoing CABG procedure in their recovery at home and improve functionality, adherence to therapy, and recognition of complications.[6,8,11,13-15] Some