

Developing a Same-Day Discharge Program

How to identify appropriate patients for safe and efficient discharge.

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Percutaneous coronary intervention (PCI) continues to grow at a steady pace, with more than 1 million PCI procedures performed annually in the United States.¹ Improved technology and sophisticated care processes have allowed physicians and medical centers to achieve these increased volumes while continuing to decrease complications. Traditionally, acute vessel closure, access site complications, and bleeding complicated a reasonable percentage of PCI procedures. The past decade has seen dramatic declines in each of these complications.^{2,3} Despite these observations, in the United States, patients undergoing elective PCI procedures remain in the medical center overnight for observation. Several clinicians and investigators have suggested that this may no longer be necessary for all PCI patients, and many patients are being discharged on the same day as their procedure.

LITERATURE REVIEW

Same-day discharge is not the standard of care in the United States, but there are published reports of successful same-day discharge programs outside of the United States.^{4,5} In 2007, a group of Dutch investigators reported their experience with 800 patients who were randomized to same-day discharge or overnight hospital stay after elective PCI. All of these patients underwent femoral access with manual compression, and the complication rate among

patients who underwent same-day discharge was extremely low (0.3%). The authors concluded that same-day PCI discharge after elective PCI was safe.⁶

In the United States, Jabara and colleagues observed 450 patients after successful transradial (TR) PCI and noted that in an elective PCI population, the incidence of complications after PCI was low. Specifically, no complications occurred between 6 and 24 hours, the time when a same-day PCI discharge patient would be at home (Table 1).⁷

Recognizing that post-PCI risk varies among patient populations, the Society for Cardiovascular Angiography and Interventions published a consensus statement in 2009 defining the length of stay after PCI.⁸ In the document, Chambers et al⁸ reviewed the existing

TABLE 1. INCIDENCE OF COMPLICATIONS AFTER ELECTIVE PCI

Complications	0–6 h	6–24 h	> 24 h
Access site bleeding (minor)	11 (2.4%)	None	None
Access site bleeding (major)	None	None	None
Postprocedure infarction	8 (1.8%)	None	None
Repeat revascularization	4 (0.9%)	None	None
Ventricular tachycardia	1 (0.2%)	None	None
Coronary artery bypass grafting	None	None	1 (0.2%)
Death	None	None	1 (0.2%)
Atrial fibrillation	None	None	1 (0.2%)
Stroke	None	None	1 (0.2%)

Reproduced with permission from Jabara R et al. Am Heart J (2008;156:1141–1146).⁷

TABLE 2. INCIDENCE OF COMPLICATIONS AFTER ELECTIVE PCI

	Inclusions	Exclusions
Clinical	• Stable angina • Asymptomatic but abnormal stress test • Ad hoc PCI planned • Normal LVEF • Preloaded with thienopyridine	• Unstable coronary syndrome • Abnormal renal function (eGFR < 60 mL/min) • Laboratory abnormalities • Insulin-requiring DM • Age > 70 years • Dialysis patient
Comorbidities	• None	• Contrast allergy • PVD • CHF • COPD on medications
Anatomic	• Single-vessel disease	• One-vessel PCI in setting of multivessel disease • LM, proximal LAD, SVG, IMA, or bifurcation PCI
Procedural	• Single-vessel PCI • Single stent (< 28 mm) • Radial, brachial cutdown, or femoral access with successful use of closure device or secure manual compression	• Balloon angioplasty alone • Atherectomy (DCA, rotational) • CTO attempt • Use of GP IIb/IIIa infusion • Need for follow-up labs

Reproduced with permission from Chambers CE et al. *Catheter Cardiovasc Interv* (2009;73:847–858).⁸

Abbreviations: CHF, congestive heart failure; COPD, chronic obstructive pulmonary disease; CTO, chronic total occlusion; DCA, directional coronary atherectomy; DM, diabetes mellitus; eGFR, estimated glomerular filtration rate; GP, glycoprotein; IMA, internal mammary artery; LAD, left anterior descending coronary artery; LM, left main; LVEF, left ventricular ejection fraction; PCI, planned coronary intervention; PVD, peripheral vascular disease; SVG, saphenous vein graft.

clinical data and subsequently defined four levels of care: outpatient, observation, extended observation, and inpatient admission. The outpatient category encompasses the patients who may be amenable for same-day discharge. The proposed criteria were divided into four broad areas (clinical, comorbidities, anatomic, and procedural) that helped to characterize suitable patients for same-day discharge (Table 2).

In 2011, Gilchrist et al reported 100 consecutive patients who were discharged on the same day after undergoing successful PCI during the past 10 years.⁹ They reported complete follow-up and, in their series, no patient experienced a complication. However, the investigators found that 85% of the patients in the series did not meet one or more of the published criteria.

Rao et al reviewed more than 100,000 patients undergoing elective PCI in the United States between 2004 and 2008. The prevalence of same-day PCI discharge was 1.25%. There were no significant differences in death or rehospitalization rates at 2 days or at 30 days between patients who were discharged the same day compared to those who had an overnight stay (Figure 1).¹⁰ The majority of patients who were discharged on the same day as PCI underwent transfemoral access (96.34%) versus those who underwent TR access (3.14%).

Despite same-day discharge gaining popularity at certain centers, the standard of care continues to include an overnight stay for coronary interventions. At the University of Illinois Hospital and Health Sciences System (UIHSS), discharge criteria were developed using existing guidelines and our local needs. These parameters can be adjusted to suit a hospital's individ-

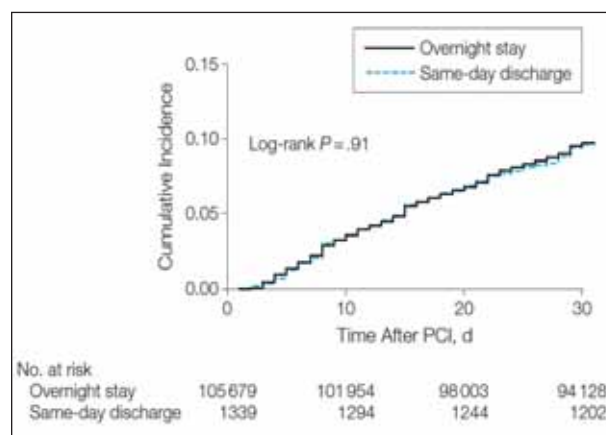


Figure 1. Thirty-day death or rehospitalization rates for same-day discharge patients and overnight stay patients. Reprinted with permission from Rao SV et al. *JAMA* (2011;306:1461–1467).¹⁰

ual concerns or specific requirements. For instance, the same-day PCI discharge program at UIHSS is limited to patients undergoing TR PCI. This article defines the steps an organization can take to develop its own successful same-day PCI discharge program.

PROGRAM DEVELOPMENT PHASE

It is important to establish a firm foundation on which a successful program is dependent. An initial step is to identify the relevant stakeholders and to gain their support. Persons affected by a same-day PCI discharge program include hospital administrators, pharmacists, physicians, nurse practitioners/physician assistants/fellows, support staff, and nurses. Discussion with these individuals allows them the opportunity to share their insight, examine concerns, and ensure the success of the program.

It is essential to identify each group's role in the same-day PCI discharge program and how their responsibilities will change. The cardiac catheterization laboratory staff will assist with screening patients and initiate the process. Their input is essential because patients who qualify will have a different care pathway in the medical center. The postprocedure staff nurses will need to adjust their duties to facilitate the patient's discharge within 8 hours. "Buy in" from cardiology fellows, nurse practitioners, or physician assistants is important because they are in regular contact with the patients throughout the stay, including at discharge. Finally, hospital administration needs to be incorporated so the financial impact of the program can be evaluated. Throughout this phase, it is important to reinforce to the stakeholders that the program is flexible and can be modified.

INCLUSION AND EXCLUSION CRITERIA

Because same-day PCI discharge is not currently the standard of care in the United States, the program should have detailed inclusion and exclusion criteria. Determining the definition of an appropriate patient requires a combination of what is defined in the literature and the individual needs of the

local site. At the UIHSS, patient eligibility falls into three categories: clinical, angiographic, and sociodemographic (Figure 2). The purpose of the inclusion and exclusion criteria is to identify clinically stable patients who are at low risk for complications.

Given the time constraints of our holding area staff, the same-day PCI discharge protocol is only initiated if the case is completed by noon. As a result, it is important that patients who may be eligible for early discharge are among the first procedures of the day. Clinical staff can screen low-risk patients who may be eligible for this program. The cardiologist will determine if the procedure was successful and satisfies the angiographic criteria for same-day discharge. These criteria are based on the patient's perceived bleeding risk and risk of acute vessel closure. The sociodemographic criteria are related to the patient having timely and reliable access to a hospital should an unanticipated complication occur.

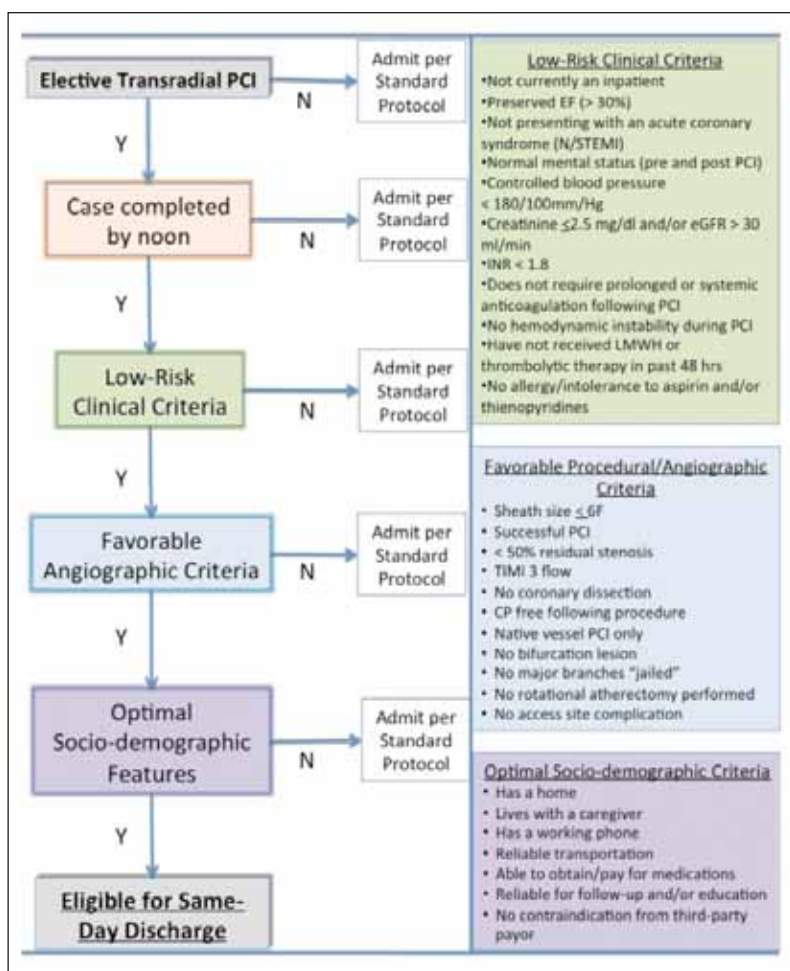


Figure 2. Eligibility criteria for UIHSS same-day discharge after elective PCI program.

ORDER SETS

Once the inclusion and exclusion criteria are reviewed and discussed with the key stakeholders, order sets and flow sheets should be created. Flow sheets prompt staff to remember both clinical and nonclinical details that are important to safely expedite the patient's discharge (Figure 3). Because not all of the staff involved in the patient's flow throughout the day has access to the order sets, the support staff places the flow sheet in the chart before the procedure, and it follows the patient throughout their stay.

The postprocedure order sets are similar to the standard post-PCI order sets in terms of nursing care and education but are distinctive in other aspects. At UIHHSS, cardiac biomarkers are not checked for this program. If the clinician has any suspicion that there will be an elevation in cardiac biomarkers after the procedure, the patient would be excluded from the same-day PCI program. Of note, there are programs that routinely check postprocedure biomarkers to provide further objective evidence of a successful PCI. A second distinction between the overnight order sets and same-day PCI discharge order sets is that an electrocardiography (ECG) order is triggered 4 hours after the procedure. The discharging health care provider can review this ECG before discharge. UIHHSS uses an electronic medical record, so orders are transmitted to the appropriate area immediately after the procedure.

PROGRAM IMPLEMENTATION PHASE

Once these steps are completed, the program is ready for implementation. If a patient is identified as being potentially suitable, notifying the patient before the procedure may be helpful for the patient and his or her caregivers. On the day of admission, the nurse confirms the patient's sociodemographic information and documents two phone numbers. During the procedure, the physician notifies the catheterization lab staff if the patient meets the angiographic inclusion criteria. If the case is completed by noon, the catheterization lab staff notifies the postprocedure nurse that the patient will be going home the same day.

At UIHHSS, only patients undergoing TR PCI are eligible for same-day discharge. After the procedure, the nurse checks the access site to confirm radial artery patency and evaluate for bleeding. If the site is stable, the radial homeostasis device is discontinued between 2 and 3 hours after the procedure. The patient is asked to perform some activities of daily living, such as using the bathroom and self-feeding. At 6 hours after the procedure, the physician or designee reviews the ECG, examines the access site, and evaluates the patient for ischemic symptoms. If no signs of bleeding or ischemia are apparent, the care provider initiates discharge orders.

During discharge education, the nurse reinforces to the patient the importance of adherence to their antiplatelet regimen, and follow-up appointments are

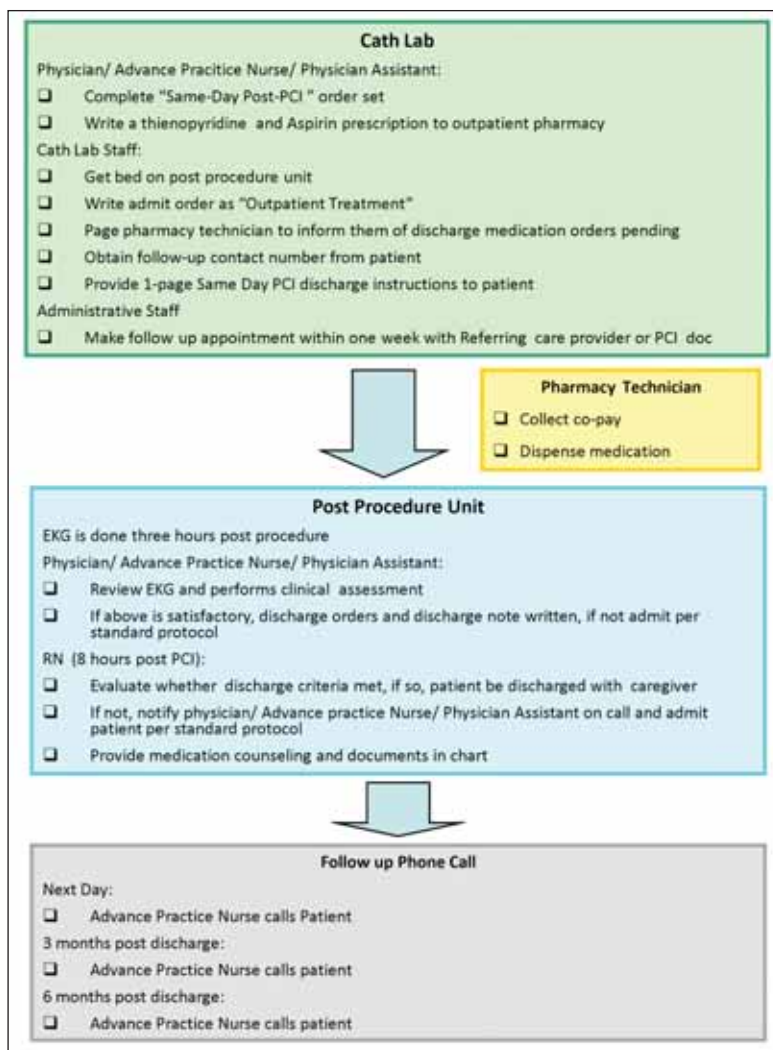


Figure 3. Patient flow sheet for UIHHSS same-day discharge after elective PCI program.

scheduled with a cardiologist for 7 to 10 days after the procedure. If, during any of these discussions, the patient or health care provider does not feel the patient is a good candidate for the same-day PCI discharge program, the patient is given the option to spend the night.

PROGRAM MAINTENANCE PHASE

Follow-up care is an important aspect of the same-day PCI discharge program. A clinician familiar with PCI procedures must contact the patient the next day to verify that complications have not occurred. Specifically, the clinician reviews the patient's cardiac symptoms, bleeding, the status of their access site, and their medications. Confirmation of a follow-up appointment with the patient's physician is another component of the phone call. This conversation should be documented in the medical record. Finally, tracking the outcomes of this program can be useful in documenting and ultimately marketing the successes of the program. Ongoing quality assurance will identify systematic problems that can be addressed.

CONCLUSION

The increased use of TR access during coronary interventions and a consequent decrease in access site complications has given hospitals the opportunity to develop a same-day PCI discharge program. While at our center TR access is a criterion for eligibility, same-day discharge is feasible in a select group of low-risk transfemoral PCI patients meeting similar criteria as described in the protocol. A multidisciplinary approach will allow the program to run smoothly, and clearly defined criteria and treatment protocols will minimize practice variation. Next-day patient follow-up is an integral part of the program and is essential for quality assurance. Same-day discharge for elective PCI can improve patient satisfaction and comfort while simultaneously decreasing resource utilization for the medical system. ■

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