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EDITORIAL COMMENT

Same-Day Discharge After Percutaneous Coronary Intervention

Are We Ready?*

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With advances in technology and accumulating expertise over the past several decades, many invasive procedures traditionally performed in an inpatient setting are now being performed in the ambulatory arena. This transition has been catalyzed by improvements in procedural safety, pressures to reduce cost, and patient preference to avoid overnight hospitalization. Within the field of cardiology, however, this transition has not included percutaneous coronary intervention (PCI). In a 2010 report from the Agency for Healthcare Research and Quality, over 50% of cholecystectomies, 70% of transurethral prostatectomies, and 90% of hernia repairs were being performed in the ambulatory setting, compared with only 6.8% of PCIs (1). With approximately 1 million PCIs performed in the United States each year, the length-of-stay post-procedure has significant implications for patients and for our healthcare system as a whole and is deserving of intense examination.

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Since its advent in the 1970s, PCI has become unequivocally safer and recovery easier, with declining rates of periprocedural myocardial infarction, target vessel closure, and vascular complications. Changes in technique and technology contributing to these improvements include the use of stents, smaller-sized guiding catheters (5-F, 6-F), improved antithrombotic strategies (bivalirudin, $P2Y_{12}$ receptor inhibitors), the use of femoral artery closure devices, and use of radial access. Recent National Cardiovascular Data Registry (NCDR) data analyses have revealed an unadjusted in-hospital mortality of 0.2% for all elective PCIs, with even lower 48-h complication rates for elective PCI for stable angina (mortality of 0.02%, vascular complication rate of 0.25%, and bleeding rate of 0.41%) (2,3). Studies and anecdotal experience suggest that when these infrequent complications do occur, they occur within 6 h of the end of the procedure (4). However, despite the low risk, most patients are still being observed in the hospital, at least overnight, with only 1.25% of elective PCIs discharged the same day (3). The slow change in the practice of coronary intervention relative to current trends in medical practice might relate to residual concerns over safety and medicolegal risk, the unrecognized cost benefit of same-day discharge, and an under-appreciation of the potential for increased patient satisfaction related to avoiding an overnight stay in the hospital.

In this issue of *JACC: Cardiovascular Interventions*, an important systematic review and meta-analysis of published data on same-day discharge authored by Abdelaal et al. (5) addresses these safety concerns. After an extensive search of published data, Abdelaal et al. found 5 randomized and 8 observational studies comparing same-day discharge with overnight observation with respect to patient outcomes. All but 1 of the studies were relatively small and conducted in a single centers. In the meta-analysis of the randomized studies (n = 2,039), patients discharged same-day had similar rates of major adverse cardiovascular events, repeat hospitalizations, and overall complications as the patients who were observed overnight. The meta-analyses of the observational studies (n = 109,791) and the combination of the randomized and observational studies confirmed a lack of impact of same-day discharge on outcomes, even when the single large 107,000-patient study was censored from the analysis. The heterogeneity in the patients, procedural characteristics, and definitions of complications among the various studies as well as the lack of an analysis based on individual subject-level data are limitations of the meta-analysis. However, this publication provides the best compilation of evidence to date with regard to the safety same-day discharge in PCI.

Some notable characteristics of the patients included in the studies of same-day discharge thus far include: 1) most had stable angina or low risk-ACS (acute coronary syndrome); 2) they did not have significant comorbidities (congestive heart failure, renal insufficiency, coagulopathy, and so on); 3) they predominantly underwent single-vessel PCI and did not have intra-procedural complications (vessel closure, poor reflow, persistent edge dissection, and so on); 4) most received unfractionated heparin as anticoagulation; 5) their procedures were performed both transradially and transfemorally; 6) they were observed from 4 to 8 h post-procedure before discharge; and 7) 10% to 20% of the patients selected for same-day discharge were converted to extended overnight observation because of peri-procedural or post-procedural issues.

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These features could be used to select patients for same-day discharge and are consistent with the Society of Cardiovascular Angiography and Interventions recommendations (6). Other criteria that should be considered when selecting appropriate patients for same-day discharge include adequate patient social support and access to routine and urgent follow-up. Using these selection criteria could result in up to 30% of PCI patients (depending on the patient population and operator practices) being eligible for same-day discharge. Some studies have suggested higher-risk patients undergoing PCI might also be discharged the same day, including patients with non–ST-segment elevation myocardial infarction (7).

The benefits of same-day discharge lie in the potential to reduce procedural cost, increase hospital efficiency, and improve patient satisfaction. On the basis of a cost of $65/h for post-procedural care, same-day discharge could save approximately $1,000/PCI (8). However, perhaps more important than direct cost savings is that same-day discharge could potentially open up beds for other inpatient admissions in hospitals operating at near maximal capacity. Same-day discharge has also been shown to be rated higher in patient satisfaction surveys than overnight stay (9).

Of course, same-day discharge does not simply mean an earlier "may go" order. It requires pre- and post-procedure triage, emergency contingency planning, and follow-up planning. Pre-procedure triage is necessary to allow the patient to consider the logistics of transportation and social support. Post-procedure triage is necessary to ensure patient safety and requires a thorough evaluation of the patient before discharge, including coronary artery patency (history, electrocardiogram, cardiac enzymes), and access site integrity (physical exam, ambulation test). Providing the patient with a 24-h phone number to call with questions and problems and the location of the nearest emergency room is useful. Furthermore, telephone follow-up the next day by trained nursing staff is optimal. Finally, disease and treatment education should not be overlooked.

In the spirit of the patient-centered and value-based care principles guiding healthcare policy in the United States today, it is time for same-day discharge to move beyond small-scale trials. Ideally, a large-scale, randomized trial similar to the C-PORT-E (Cardiovascular Patient Outcomes Research Team Elective Angioplasty) study would be performed (10). Such a study could be funded with the cost-savings associated with same-day discharge, and data collection could be facilitated by catheterization laboratory registries, such as the National Cardiovascular Data Registry or the Department of Veterans Affairs Cardiovascular Assessment, Reporting, and Tracking System for Cath Labs (CART-CL). Meanwhile, on the basis of the currently available data, high-volume PCI centers with critical needs could reasonably develop same-day discharge programs, with the careful monitoring and publication of their outcomes. These types of efforts would facilitate the controlled dissemination of same-day discharge after PCI while simultaneously promoting the refinement of its implementation.

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