Same-Day Discharge After Elective Uncomplicated Percutaneous Coronary Interventions

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Over the past several decades, there have been remarkable advancements in percutaneous coronary interventions (PCIs), including improvements in stent technology, use of radial access, femoral artery vascular closure devices, and more effective periprocedural antithrombotic strategies. With these advances, the rates of periprocedural complication for PCI have dramatically improved, with recent data showing <1.5% rates of major bleeding at 72 hours and <1% rates of in-hospital mortality and acute kidney injury.[1] As PCI safety has improved, it has been shown that some safety precautions, such as mandatory on-site cardiac surgery for elective PCI, are no longer necessary.[2] Over the past several years, the routine practice of overnight inpatient observation of patients with stable ischemic heart disease who have undergone an uncomplicated PCI has also been called into question.

Several trials have evaluated the safety of same-day discharge (SDD) PCI in patients who had an otherwise uncomplicated procedural course. The EASY (Early Discharge After Transradial Stenting of Coronary Arteries) randomized trial of patients undergoing transradial PCI failed to show a difference in major adverse cardiovascular events or major bleeding between SDD and overnight observation at 30 days.[3] The EPOS (Elective PCI in Outpatient Study) randomized study of patients who underwent transfemoral access elective PCI found similar results.[4] There have been a multitude of observational studies and meta-analyses with similar findings.[1,5–8] In addition, studies have shown that SDD PCI is cost-effective and has the potential to save healthcare systems millions of dollars per year in unnecessary overnight observation costs.[6,9–11] Patient satisfaction is also higher for SDD PCI compared with staying overnight.[12] Despite these consistent findings, the rate of SDD PCI remains low, with the United States having among the lowest rates of SDD PCI at ≈6%.[1,6] Several factors may explain the low rate of SDD PCI adoption, with patient safety being of greatest concern.[13] In addition, concerns related to a patient's access to postprocedural care should a complication arise after he/she has been discharged home are also worth noting.

In this issue of the *Journal of the American Heart Association* (*JAHA*), Madan et al describe the overall rate of SDD PCI in Ontario, Canada; the temporal trend in adopting SDD PCI; and the safety of this practice.[14] These authors evaluated data from >35 000 patients from 2008 to 2016 at 17 centers who underwent elective PCI for stable ischemic heart disease. Their first major finding was that despite the average 30% SDD PCI rate in the overall population, there was tremendous center-to-center variation in SDD PCI rates. Over half the centers in their study had <15% SDD PCI rates, whereas a handful had well over 75% SDD PCI rates. Although the data are not explicitly provided in this article, the authors note that the difference in PCI volumes, their urban or rural location, or the size of the hospital did not explain the variation seen in SDD PCI rates. Second, the authors show that SDD PCI and overnight observation had comparably low 30-day and 1-year rates of death, rehospitalization for acute coronary syndrome, and all-cause hospitalization. As a whole, these were patients with single-vessel disease, with no history of congestive heart failure, with normal renal function, and without significant noncardiac comorbidities. This study adds to the existing body of literature demonstrating the safety of SDD in patients undergoing uncomplicated elective PCI.

A major strength of this article is the use propensity score matching to show the lack of meaningful clinical benefit for keeping patients for overnight observation who otherwise could have been discharged the same day. It would be interesting to study the clinical course and patient characteristics of the 5000 patients who were kept for >1 night for observation and, thus, excluded from the final analysis. This could have further refined our ability to identify high-risk patients. Another limitation of the study was the lack of data on major access site complications, including bleeding. However, the authors did show similar rates of all-cause

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hospitalization at 30 days between the 2 groups, implying that access site complications requiring readmission were likely not significantly different between the 2 groups. This is in line with prior studies, which have demonstrated that most complications occur within the first 6 hours after PCI.[15,16]

It is difficult to reconcile the mounting evidence demonstrating the safety of SDD PCI in elective, stable patients with ischemic heart disease and the low rate of SDD PCI in eligible patients. This study, as well as those from US medical centers, indicates that the rate of SDD PCI is highly dependent on the PCI performing hospital.[6] It is possible that some centers have created a protocol to not only standardize SDD PCI in eligible patients, but also have the necessary infrastructure and staff to monitor patients for 6 hours after PCI when they are at highest risk of a procedural complication.[15,16] In addition, centers with high rates of SDD PCI have also created postdischarge support systems that ensure prompt outpatient follow-up and easy patient access to a member of the catheterization team if an adverse event arises once the patient is home.

Several steps can be taken to promote the use of SDD PCI and harness the potential benefits associated with lower costs and higher patient satisfaction. First, a dedicated, well-staffed postprocedural area with patient monitoring capabilities needs to be in place for patients to be observed for the recommended 6 hours after PCI.[1] Use of vascular closure devices and early ambulation after transfemoral access should be encouraged after 4 hours as it has been previously found to be safe in uncomplicated cases.[17] Second, operators should be encouraged to use risk prediction tools to identify good candidates both before the start of the case and after completion on the basis of how well the patient tolerated the procedure, technical success, or any unforeseen periprocedural complications. The Society for Cardiovascular Angiography and Interventions recently issued an expert consensus document outlining favorable patient, procedural, and institutional characteristics for an expedited SDD PCI.[1] A recent study went further and outlined the successful implementation of a risk stratification method for identifying possible SDD in patients undergoing elective PCI before the start of the case.[5] These investigators used a decision aid based largely on the American College of Cardiology's National Cardiovascular Data Registry risk models to predict a patient's risk of bleeding, mortality, and acute kidney injury before the start of the procedure. This guided their bleeding avoidance strategies (including radial access or femoral closure device use) as well as safe contrast limits. After the implementation of this workflow, the use of SDD PCI increased from <10% in 2013 to almost 80% in 2015, with no difference in short-term mortality, bleeding, or acute kidney injury. This translated to an average cost saving of $7300 per case and >$1.8 million annually.[5] Third, patients receiving SDD PCI need to have easy access to catheterization laboratory staff to address any unforeseen postprocedure events that may arise once they are home. These include bleeding, cardiac symptoms, lack of access to recommended post-PCI antithrombotic agents, or inability to follow up. Finally, the safety and level of evidence for SDD PCI in select patients must be better incorporated into national guidelines, given the data available in this space. With these systems in place, operators may feel more confident in SDD PCI from a patient safety and a medicolegal standpoint.

Patient safety has always been and will continue to be of highest priority when operators decide between discharging patients undergoing elective low-risk PCI the same day as their procedure or admitting them for an overnight observation. This study by Madan et al adds important evidence supporting SDD PCI as a safe and cost-effective practice in appropriately selected patients.[14] Widespread adoption of SDD PCI will likely translate to systemic cost savings and greater patient satisfaction and hopefully prevent overuse of inpatient hospital beds reserved for higher-acuity patients who may be waiting for admission.

Disclosures

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