

EXPERT CONSENSUS DECISION PATHWAY

2021 ACC Expert Consensus Decision Pathway on Same-Day Discharge After Percutaneous Coronary Intervention



A Report of the American College of Cardiology Solution Set Oversight Committee

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PREFACE

The American College of Cardiology (ACC) has a long history of developing documents (e.g., decision pathways, health policy statements, appropriate use criteria) to provide members with guidance on both clinical and nonclinical topics relevant to cardiovascular care. In most circumstances, these documents have been created to complement clinical practice guidelines and to inform clinicians about areas where evidence may be new and evolving or where sufficient data may be more limited. Despite this, numerous care gaps continue to exist, highlighting the need for more streamlined and efficient processes to implement best practices in service to improved patient care.

Central to the ACC's strategic plan is the generation of "actionable knowledge"—a concept that places emphasis on making clinical information easier to consume, share, integrate, and update. To this end, the ACC has evolved from developing isolated documents to developing

integrated "solution sets." Solution sets are groups of closely related activities, policy, mobile applications, decision support, and other tools necessary to transform care and/or improve heart health. Solution sets address key questions facing care teams and attempt to provide practical guidance to be applied at the point of care. They use both established and emerging methods to disseminate information for cardiovascular conditions and their related management. The success of the solution sets rests firmly on their ability to have a measurable impact on the delivery of care. Because solution sets reflect current evidence and ongoing gaps in care, the associated tools will be refined over time to best match changing evidence and member needs.

Expert consensus decision pathways (ECDPs) represent a key component of solution sets. The methodology for ECDPs is grounded in assembling a group of clinical experts to develop content that addresses key questions facing our members across a range of high-value clinical topics (1). This content is used to inform the development of various tools that accelerate real-time use of clinical policy at the point of care. They are not intended to provide a single correct answer; rather, they encourage clinicians to ask questions and consider important factors as they define treatment plans for their patients. Whenever appropriate, ECDPs seek to provide unified articulation of clinical practice guidelines, appropriate use criteria, and other related ACC clinical policy. In some cases, covered topics will be addressed in subsequent clinical practice guidelines as the evidence base evolves. In other cases, these will serve as stand-alone policy.

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Chair, ACC Solution Set Oversight Committee*

1. INTRODUCTION

The evolution of percutaneous coronary intervention (PCI) has led to improved safety and efficacy, with data showing that in the context of a same-day discharge (SDD) clinical pathway, overnight monitoring can be avoided, allowing for SDD in selected patients with no increased rate of death, rehospitalization, or other complications, and with the potential to increase safety (2). However, these data are largely observational, with only small randomized trials supporting SDD, and thus, uncertainty around SDD for PCI remains (3). This ECDP aims to address this uncertainty and provide guidance about the key patient, clinical, and systems factors, such as operational resources, that must be in place to ensure the safety of SDD after PCI.

1.1. Benefits of SDD

Same-day discharge after PCI benefits both patients and facilities. A common misconception is that patients may

experience apprehension of SDD stemming from stress or anxiety about not being monitored after a cardiac procedure. Evidence supports the notion that the majority of patients prefer SDD and the ability to return to the comfort of their home following their PCI. A prospective study of patients undergoing elective PCI randomized to same- or next-day discharge at 2 major U.S. medical centers found that nearly 80% of patients in both cohorts reported high levels of coping, as assessed by the Readiness for Hospital Discharge scale (4). Additionally, a 30-day post-PCI follow-up found that 79% of same-day versus 49% of next-day discharge patients were satisfied with the timing of their discharge. The majority of these patients, including 80% of the SDD group and 68% of the next-day cohort, reported a preference for SDD for future PCI procedures. This preference for SDD after PCI has been confirmed in subsequent studies (5).

The impetus for SDD for PCI reflects not only patient preference and satisfaction, but also safety. In terms of major adverse cardiovascular events, meta-analyses have found no difference between same- and next-day discharge following PCI (6,7). However, data suggest that approximately 8% of hospitalizations are associated with highly undesirable events such as hospital-acquired infections or falls leading to injury (8,9). Furthermore, the inpatient setting is well known to provide an undesirable atmosphere for recovery due to a lack of privacy, frequent interruptions/awakening for examination and/or blood draws, and a plethora of unrelenting noises, leaving patients susceptible to posthospitalization syndromes (10).

From a facilities operations standpoint, SDD for PCI offers several key benefits. Currently, many facilities are unable to meet the admission demands of their emergency departments. These shortcomings are often the result of failure to optimize patient flow on a facilities-wide level. One such example involves the routine use of inpatient beds for post-PCI patients. During times of need for enhanced bed utilization in the cardiovascular services line, this healthcare practice results in a delay of specialized care, illustrating how, within a healthcare system, the failure of an individual component to operate at maximum efficiency can contribute to suboptimal performance of the overall system (11). Opportunities to increase efficiency are important to keep in mind because cardiovascular disease is a leading cause of admission to U.S. hospitals (12). Implementation of SDD for PCI is one way to increase inpatient bed availability.

Lastly, SDD for PCI may offer facilities and/or hospitals an economic advantage. Studies have found SDD for PCI to be associated with a relative reduction of as much as 50% in health system costs (13). These savings stem from the fact that procedures are elective for the majority of patients considered for SDD. Same-day discharge for PCI

also leads to a reduction in supplies and room and board costs, 2 significant areas that drive savings; indeed, SDD for PCI results in savings of a minimum of \$5,000 per case (14). This number was found to increase up to \$7,000 when SDD for PCI occurs in the setting of radial access, in which cost savings accrue through decreases in either vascular complications or the need for the closure devices required with a femoral access approach (15). In sum, it is estimated that the use of SDD in 50% of elective PCIs would result in savings of \$200 million to \$500 million per year for U.S. healthcare systems (3,16). It is important to note that the implementation of an SDD program may require investment from facilities in terms of increased staffing models to accommodate discharges that may occur in the late afternoon or evening.

2. METHODS

This ECDP emerged out of a proposal to the ACC's Task Force on Expert Consensus Decision Pathways (whose tasks are now under the umbrella of the Solution Set Oversight Committee [SSOC]; see the Preface for the definition of this committee). The primary contacts for the proposal, Drs. Sunil V. Rao and Mladen I. Vidovich, became the Chair and Vice Chair of the ECDP, respectively. The Chair and Vice Chair identified an additional 7 members to form a working group (WG). WG members were vetted for relationships with industry (RWI) to ensure that a majority did not have RWI; throughout the writing process, WG members were reminded to report any new relationships that arose.

A kickoff call was held among the WG in October 2018 to explain the goal and process of the ECDP, followed by biweekly calls with the group. During the biweekly calls, the WG reviewed a questionnaire developed by ACC's Implementation Tools team to help ECDP authors determine the optimal scope, format, and clinical content of ACC tools. The WG discussed these questions over several calls and determined the factors that should be considered when deciding if a PCI patient should be recommended for SDD or overnight stay. The WG, in consultation with the ACC's Implementation Tools team, determined that a checklist best fit the needs of this ECDP. The biweekly calls were then used as a format in which to discuss and come to a consensus about the patient- and systems-specific factors that should be considered when determining if SDD is appropriate. These factors were incorporated into the checklist decision tool. The completed checklist was then tested for usability among a group of experts.

Once the checklist was complete, the WG wrote the ECDP on SDD, which presents the rationale and evidence underlying SDD after PCI.

The ACC and the SSOC recognize the importance of avoiding real or perceived RWI or other entities that may affect clinical policy. The ACC maintains a database that tracks all relevant relationships for ACC members and persons who participate in ACC activities, including those involved in the development of ECDPs. ECDPs follow ACC RWI Policy in determining what constitutes a relevant relationship, with additional vetting by the SSOC.

ECDP writing groups must be chaired or co-chaired by an individual with no relevant RWI. Although vice chairs and writing group members may have relevant RWI, they must constitute less than 50% of the writing group. Relevant disclosures for the writing group and external reviewers can be found in [Appendixes 1 and 2](#). To ensure complete transparency, a full list of disclosure information, including relationships not pertinent to this document, is available in a [Supplemental Appendix 1](#). Participants are discouraged from acquiring relevant RWI throughout the writing process.

3. ASSUMPTIONS AND DEFINITIONS

3.1. Assumptions

1. This ECDP on SDD after PCI is applicable to anyone presenting for an elective PCI but is not applicable to patients presenting with ST-elevation myocardial infarction (STEMI) or non-ST-elevation myocardial infarction (NSTEMI). Patients with presentations of STEMI or NSTEMI should be hospitalized ≥ 1 night in the inpatient setting for postprocedural monitoring based on presentation and clinical features, as well as procedure-related considerations. (It should be noted that this tool is applicable to staged procedures performed after the index PCI procedure for patients who initially presented with NSTEMI or STEMI. This includes patients who undergo a staged PCI during the index hospitalization for NSTEMI or STEMI, or patients who are discharged home and return for a planned staged PCI).
2. The focus of this ECDP is the role of SDD in an adult population undergoing elective PCI. The pathway does not address the role of SDD in a pediatric population.
3. This ECDP defines postprocedural processes that should be implemented for successful SDD, including confirmation of the patient's receipt of a P2Y₁₂ inhibitor (P2Y₁₂) prescription, instructions on how to monitor the access site, and confirmation that the patient has appropriate outpatient follow-up scheduled. It is assumed that these discharge instructions will be adapted to conform with the protocols of individual institutions. The format of this ECDP, currently a checklist, may be adapted to fit the needs and processes of individual institutions.
4. This document encourages shared decision-making with the patient about whether to pursue SDD after PCI.
5. This pathway endorses the 2015 ACC/AHA/SCAI Focused Update on Primary Percutaneous Coronary Intervention for Patients With ST-Elevation Myocardial Infarction: An Update of the 2011 ACCF/AHA/SCAI Guideline for Percutaneous Coronary Intervention and the 2013 ACCF/AHA Guideline for the Management of ST-elevation Myocardial Infarction (17,18).
6. The recommendations outlined in this document may be superseded by new evidence.

3.2. Definitions

Additional terms within the checklist are further defined in [Supplemental Table 1](#), "Defining Concepts."

Elective Procedure: We define elective PCI as described in the National Cardiovascular Data Registry CathPCI Registry, which states: "The (PCI) procedure performed on an outpatient basis without significant risk of infarction or death" (19).

Urgent Procedure: When there is concern for ongoing ischemia or infarction, an urgent coronary angiogram +/- PCI would be warranted. "Urgent" procedures are generally defined as those performed in hospitalized patients prior to discharge.

Emergent Procedure: When there is concern for death or hemodynamic compromise, an emergent coronary angiogram +/- PCI would be warranted. Emergent procedures should be performed on patients with inpatient status or in patients for whom postprocedure hospital admission is planned.

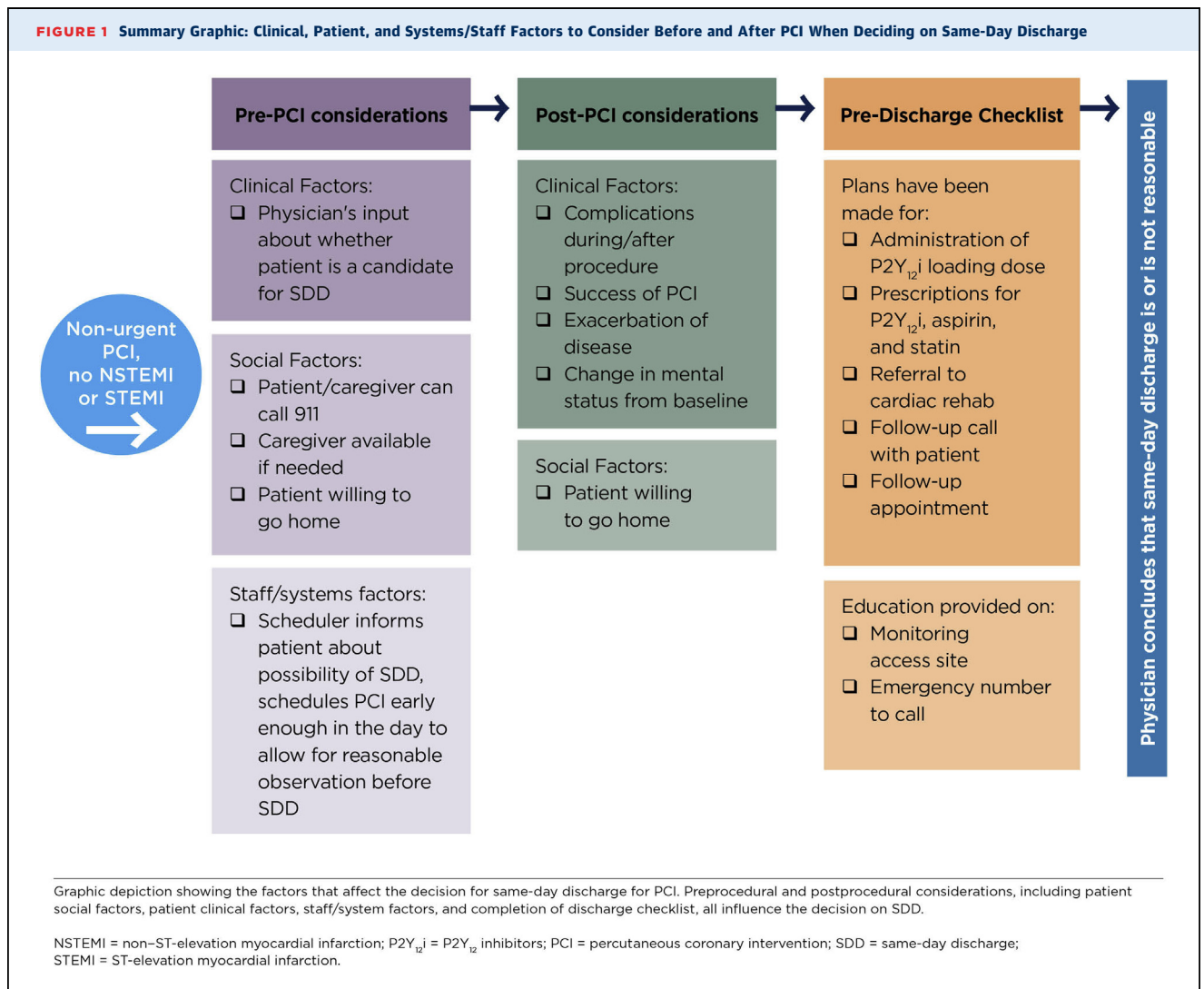
Overnight Stay: A patient may present for a same-day procedure but then be placed on monitoring overnight within the facility and/or hospital. Observation stays are defined as stays that do not extend >24 hours from the time of presentation (20,21).

Same-Day Discharge (SDD): Same-day discharge after PCI is defined as a stay after a PCI procedure that does not include supervised overnight monitoring in the facility and/or hospital. The patient will stay for routine monitoring of variable duration after the procedure, based on factors such as access site and procedural characteristics, but will typically be discharged within 12 hours after arrival at the facility or catheterization laboratory (some monitoring periods may be shorter or longer).

PCI Success: We define PCI success using the National Cardiovascular Data Registry definition: <50% post-stenosis, TIMI 3 flow, and 20% or greater reduction from pre- to post-stenosis (17).

Adequate Caregiver Support: Support from a person who has the ability and willingness to: 1) accompany the patient home or to the caregiver's home; 2) stay with the patient overnight after discharge; 3) access emergency services; and 4) help with the activities of daily living.

4. PATHWAY SUMMARY GRAPHIC



5. DESCRIPTION, RATIONALE, AND IMPLICATION OF PATHWAY

5.1. Overview of the Goal and Uses of the Checklist

The WG determined that a checklist (Table 1) would be the best format for evaluating the factors that inform whether SDD is appropriate after planned or ad hoc PCI. A digital version of the checklist can also be found on ACC.org. The checklist is intended to document both initial patient eligibility before the procedure as well as the absence of subsequent exclusionary criteria during the peri- and post-PCI periods. Ideally, patients suitable for SDD should be identified prior to the procedure and be informed as early as possible of the goal for SDD. This

advance notice may help identify unforeseen barriers to SDD and provide an opportunity to address patients' and caregivers' expectations and concerns. This timeline for patient notification, however, might not be applicable in every institution, and therefore, institutions are expected to adapt the checklist to meet their individual workflow needs.

The following general principles apply to the checklist:

1. It should be underscored that this checklist should not be considered prescriptive but rather a guide to help with decision-making.
2. The checklist offers considerable scope for adaptation to suit individual practice patterns. The workflow of

TABLE 1 Checklist for Consideration of Same-Day Discharge After PCI

Members of the care team complete this checklist to decide whether the patient undergoing PCI is a reasonable candidate for same-day discharge or should be monitored overnight.

The questions below do not need to be answered in order; however, it is recommended that a decision to discharge a patient on the same day as the PCI should be made only after all questions have been answered.

Pre-Procedure Evaluation			
Patient Factors: Clinical	1. Is the patient experiencing anSTEMI or NSTEMI?	<input type="checkbox"/> No ↓	<input type="checkbox"/> Yes ----->
	2. Does any member of the care team feel for any other reason that the patient is not a candidate for same-day discharge?	<input type="checkbox"/> No ↓	<input type="checkbox"/> Yes ----->
Patient Factors: Social	3. Does the patient have adequate caregiver support?*	<input type="checkbox"/> Yes ↓	<input type="checkbox"/> No ----->
	4. Can the patient or caregiver reach 911, if necessary?	<input type="checkbox"/> Yes ↓	<input type="checkbox"/> No ----->
Staff/System Factors	5. Is the patient willing to be discharged the same day (shared decision-making)?	<input type="checkbox"/> Yes ↓	<input type="checkbox"/> No ----->
	6. Is the patient scheduled early enough in the day so that they can be observed for a sufficient amount of time (4-6 hours post-procedure) and discharged at a reasonable time?	<input type="checkbox"/> Yes ↓	<input type="checkbox"/> No ----->
<p>Care Team Action ←</p> <p>Once the procedure is finished, complete the Post-Procedure Evaluation on the next page to confirm same-day discharge.</p>			
<p>Notes (does the clinician want to note anything not captured on the checklist?):</p> <hr/> <hr/> <hr/>			
<p><small>*Caregiver support is defined as support from a person who has the ability and willingness to: 1) accompany the patient home or to the caregiver's home; 2) stay with the patient overnight after discharge; 3) access emergency services; and 4) help with the activities of daily living.</small></p>			

Continued on the next page

individual facility systems will determine when and by whom the checklist will be completed.

3. Although SDD applies to both transradial and transfemoral access, the use of large-bore femoral sheaths (e.g., ≥7-F) might prompt consideration for overnight monitoring, given some concern for the elevated risk of

late bleeding compared with the use of smaller-caliber sheaths.

4. Although the checklist may be initiated before the PCI, a final decision about SDD should only be made after all checklist items have been answered; it is possible that the checklist may not be completed in its entirety until after the procedure.

TABLE 1 Continued

Post-Procedure Evaluation		
7. Did complications occur during the procedure? [†]	<input type="checkbox"/> No ↓	<input type="checkbox"/> Yes ----->
8. Was PCI successful? [‡]	<input type="checkbox"/> Yes ↓	<input type="checkbox"/> No ----->
9. Is the patient experiencing any of the following post-procedure? Stroke, bleed, vascular complications, allergic reaction, unresolved and/or severe chest pain, acute heart failure, persistent ischemic ECG changes, dysrhythmia, or any other unforeseen complications.	<input type="checkbox"/> No ↓	<input type="checkbox"/> Yes ----->
10. Is there an exacerbation of an underlying disease (e.g., heart failure, high blood pressure, diabetes, COPD flare)?	<input type="checkbox"/> No ↓	<input type="checkbox"/> Yes ----->
11. Is the patient's mental status the same as baseline presentation?	<input type="checkbox"/> Yes ↓	<input type="checkbox"/> No ----->
12. Is the patient willing to be discharged the same day (shared decision-making)?	<input type="checkbox"/> Yes ↓	<input type="checkbox"/> No ----->
Proceed to the Pre-Discharge Checklist		

Monitor patient overnight

Pre-Discharge Checklist
<ul style="list-style-type: none"> ___ 1. Confirm that loading dose of P2Y₁₂i has been administered. ___ 2. Confirm patient has received prescriptions for at least 30 days of P2Y₁₂i. ___ 3. Confirm prescription for aspirin and statin. ___ 4. Confirm referral to cardiac rehab. ___ 5. _____ (Name of person responsible for following up with patient) plans on calling patient the day after discharge. ___ 6. The cath lab/postprocedural staff has provided education to patient on how to monitor access site (in-person training, handouts, videos, etc.) and the importance of taking DAPT as prescribed and the specific risks of premature discontinuation. ___ 7. The cath lab/postprocedural staff has provided the patient with an emergency number to call. ___ 8. The cath lab/postprocedural staff has scheduled a follow-up appointment.
↓
Physician concludes that same-day discharge is reasonable
Notes (does the clinician want to note anything not captured on the checklist?):

<p>[†]Examples include persistent slow flow or no flow, compromise of large side branch resulting in chest pain, untreated dissection, perforation, allergic reaction to contrast medium (anaphylaxis).</p> <p>[‡]Success defined using the NCDR definition: <50% post-stenosis, TIMI 3 flow, and 20% or greater reduction from pre- to post-stenosis.</p> <p>COPD = chronic obstructive pulmonary disease; DAPT = dual antiplatelet therapy; ECG = electrocardiogram; NCDR = The National Cardiovascular Data Registry; NSTEMI = non-ST-elevation myocardial infarction; P2Y₁₂i = P2Y₁₂ inhibitors; PCI = percutaneous coronary intervention; TIMI = thrombolysis in myocardial infarction.</p>

The checklist ([Table 1](#)) delineates 3 time periods in which to evaluate whether patients meet eligibility criteria.

5.2. Preprocedure

The preprocedure checklist is divided into 2 main categories: patient clinical factors and patient social factors.

5.2.1. Clinical Factors

The pre-procedure checklist items are intended to guide the clinician to a decision regarding SDD. The first patient factor to consider is whether the patient is experiencing a myocardial infarction. As stated in a previous section, patients with presentations of STEMI or NSTEMI are hospitalized ≥ 1 night in the inpatient setting for postprocedural monitoring based on presentation and clinical features, as well as procedure-related considerations. However, the WG recognizes that clinicians may sometimes make decisions based on a more subjective, overall clinical impression. Therefore, the WG included the question, “Does any member of the care team feel for any other reason that the patient is not a candidate for same-day discharge?” to reinforce the option of recommending overnight monitoring after PCI, even when the checklist suggests the patient is eligible for SDD. Coronary anatomic considerations that preclude SDD are also at the discretion of the procedural team due to the absence of published data on specific lesion types or procedures that do or do not lend themselves to SDD.

The pre-procedure checklist also provides an open notes section that allows clinicians to expand upon their reasoning for SDD or overnight stay. In addition, the open notes section gives clinicians the option of using the checklist to supplement electronic health record (EHR) notes.

5.2.2. Social Factors

During discussion among the WG, consensus emerged that social factors are key in deciding whether SDD after PCI is appropriate; a patient may be deemed clinically fit to go home, but may not have adequate social support (e.g., no caregiver to monitor them for the next 24 hours, or in the case of people without stable residence, no home to which to return).

Both the preprocedure and postprocedure evaluation sections include the question: “Is the patient willing to be discharged the same day?” This question is designed to reinforce patient-centered practices and to ensure that the patient fully understands the possibility of SDD and agrees to leave the hospital and/or the facility the day of the PCI.

Ideally, the patient and caregiver(s) are told about the possibility of SDD at the time the procedure is scheduled; it is recognized that this timing may not always be possible, depending on the workflow of individual institutions.

5.2.3. Staff/System Factors

Importantly, it may be preferable to schedule the procedure for earlier in the day in order to allow a sufficient period of postprocedural monitoring, resumption of baseline preprocedure ambulatory status, and SDD at a reasonable time. A 4- to 6-hour postprocedural period is commonly used at most institutions ([22,23](#)).

All terms in the preprocedure section are explained further in [Supplemental Table 1](#), “Defining Concepts.”

5.3. Postprocedure

The postprocedure checklist focuses on the absence or presence of factors that indicate the patient’s clinical stability, and thus, their eligibility to be considered for SDD. It should be noted that procedural success is only 1 of the factors to be considered here—hospitalization may coincide with other events that warrant an overnight stay, such as exacerbation of underlying disease or change in baseline mental state.

5.4. Predischarge

The care team confirms the absence of postprocedural exclusions, reconfirms completion of all portions of the checklist, and ensures that discharge instructions are communicated to the patient.

The pre-discharge section of the checklist should be completed after it has been determined that the patient meets all of the preprocedure and postprocedure criteria for SDD. The items on the checklist ensure that the patient is leaving the facility with the appropriate instructions for medication and for monitoring the access site. Providing at least 7 days of dual antiplatelet therapy (DAPT) prior to discharge is preferred, when possible, in order to minimize gaps in antiplatelet coverage. A specific person should be designated to contact the patient the day after discharge. The exact content of the discharge educational materials is left to the discretion of individual institutions. Level of activity after SDD, including driving, should follow local protocols.

[Figure 2](#) presents 6 clinical scenarios showing how the checklist may be used to determine whether a patient who had a PCI should be considered for SDD or for overnight monitoring (4 additional scenarios can be found in [Supplemental Figure 1](#)).

FIGURE 2 Six Clinical Scenarios Showing the Rationale for SDD or Overnight Monitoring

Complex Patient, Eligible for SDD

Patient: 86-year-old man, accompanied by his wife.

Medical History: S/p CABG 22 years prior with SVG to OM and IMA to LAD now has angina that prevents him from farming. Patient also has AF treated with aspirin, nitrates, diltiazem, ranolazine, and warfarin.

Investigation: Stress test showed severe lateral-wall ischemia. Dx cath showed graft-dependent LCx and LAD with a degenerated SVG to OM graft that had a bulky, calcified lesion just distal to the ostium.

Management: Using the right radial artery, a 6-F, 0.75 AL was used to engage the SVG. An embolic protection device could not be used due to anatomic considerations. The lesion was treated with a cutting balloon and a 3.5-mm DES with excellent results and persistent TIMI-3 flow. Procedure time was 1 h. Four h later, the patient was ambulating and free of angina.

DECISION: Cath lab staff and/or physician completed the Same-Day Discharge Checklist and physician confirmed that SDD is reasonable.

Post-Procedure Exclusion

Patient: 85-year-old woman, accompanied by husband who has mild dementia.

Medical History: Coronary angiography 8 years prior demonstrated a 90% lesion of the proximal RCA s/p PCI with BMS.

Investigation: Stress test showed severe inferior wall ischemia. Dx cath showed significant ISR of the prior RCA stent.

Management: Using the left radial artery, a 6-F, JR4 guide caused significant radial artery spasm. RFA access was obtained. An excellent angiographic result was obtained with a 3.0 × 15 mm DES. Procedure time was 1.5 h. Post-cath, the patient developed a significant hematoma at the femoral access site and reported pain. The hematoma resolved with additional manual compression.

DECISION: Given issues with social support and access site complications, the cath lab staff and/or physician deemed the patient not a candidate for SDD, according to the Same-Day Discharge Checklist.

Post-Procedure Exclusion

Patient: 75-year-old woman, accompanied by her husband.

Medical History: PAD, hypertension, hyperlipidemia, diabetes mellitus, and ESRD with dialysis 3 times per week. Patient having chest pain with dialysis.

Investigation: Nuclear stress test concerning for anterior wall ischemia. Right radial approach aborted due to tortuosity (fistula in left arm). RFA used as back-up approach. Dx cath showed 90% calcified mid-LAD lesion.

Management: A 6-F left coronary guide catheter was placed into the LM coronary artery. Lesion treated with 4 runs of atherectomy with 1 episode of slow flow. Despite atherectomy, stent delivery was difficult. Patient reported chest pain during procedure. Ultimately, a 3.25 × 28 mm DES was delivered. D2 was lost and could not be rescued. Control of femoral access with sheath pull was difficult and a small hematoma was present.

DECISION: The postprocedure section of the Same-Day Discharge Checklist highlighted procedural complications and postprocedure vascular complications. The patient is deemed not a candidate for SDD.

Post-Procedure Exclusion

Patient: 45-year-old man.

Medical History: Familial hypercholesterolemia and lupus, presents urgently (<24 h) for an angiogram due to unstable angina symptoms as an outpatient.

Management: Radial access and successful stent placement to the mid LAD. However, there was a guide dissection of the LM artery, resulting in chest discomfort, requiring additional stenting of the LM artery into the LAD. The patient was initiated on ticagrelor and 2 h later in the postprocedure room reported dyspnea.

DECISION: The postprocedure section of the Same-Day Discharge Checklist highlighted procedural complications and postprocedure dyspnea. The patient is deemed not a candidate for SDD.

FIGURE 2 Continued**Patient Eligible for SDD**

Patient: 70-year-old woman with polio using arm crutches.

Medical History: Type 2 diabetes, CCS 3 angina on 3 antianginal agents.

Management: Femoral access PCI with successful DES to the LAD. Successful closure of femoral arteriotomy. DAPT had been initiated 2 weeks prior to the procedure, and there are no medicine changes. Her daughter will drive and stay with her through the night. No symptoms in recovery.

DECISION: Cath lab staff and/or physician completed the Same-Day Discharge Checklist and physician confirmed that SDD is reasonable.

Pre-Procedure Exclusion

Patient: 80-year-old widower accompanied by his daughter, who flew in for the day. He wants to stay overnight like his neighbor did.

Medical History: Hypertension well-controlled, physically active. Recently developed chest pain on effort that limited his ADLs.

Investigation: Stress echocardiogram showed extensive anterior wall motion abnormality at a low exercise load. Right radial approach was used but there was significant radial artery spasm with manipulation of diagnostic catheters. A proximal, type-A stenosis of 95% was found in the LAD.

Management: A 6.5-F sheathless guide was passed up the radial artery without further spasm. The lesion was treated with a 2.5-mm balloon, then underwent IVUS to size the vessel to the stent. A 4.0 × 18 mm DES was delivered and post-dilated at 18 ATMS. Repeat IVUS showed full expansion and no overlap into the LM. Procedure was terminated and patient returned to the recovery unit. The radial sheath was removed without incident. The nurse called the man's daughter to let her know that the procedure went well, and she left a message on the daughter's cell phone. The patient was hesitant to be home alone.

DECISION: Overnight stay due to patient preference.

ADLs = activities of daily living; AF = atrial fibrillation; AL = Amplatz left; BMS = bare metal stent; CABG = coronary artery bypass grafting; CCS = Canadian Cardiovascular Score; D2 = second diagonal branch; DAPT = dual antiplatelet therapy; DES = drug-eluting stent; Dx cath = case diagnostic cardiac catheterization; EBU = extra backup; ESRD = end-stage renal disease; h = hour; IMA = internal mammary artery; ISR = in-stent restenosis; IVUS = intravascular ultrasound; LAD = left anterior descending artery; LCX = left circumflex artery; LM = left main; OM = obtuse marginal artery; PAD = peripheral artery disease; PCI = percutaneous coronary intervention; RCA = right coronary artery; RFA = right femoral artery; SDD = same-day discharge; s/p = status post; SVG = saphenous vein graft; TIMI = thrombolysis in myocardial infarction.

6. SYSTEMS/WORKFLOW ISSUES RELATING TO A CHECKLIST FOR SDD AFTER PCI

6.1. Implementing an SDD Protocol Among Members of the Cardiovascular Team

Implementation of safe, effective SDD will be dependent on the identification of specific team members responsible for its delivery. In addition to the outpatient cardiology clinical staff and cardiac catheterization laboratory operational staff, other members of the cardiovascular team, including pharmacists, staff in the preprocedural or postprocedural areas, and those who work in registration, may play the greatest role in implementing the SDD checklist. The SDD checklist should be presented as a tool that addresses multiple facets of the patient care pathway, ensuring safe patient recovery, education, and

follow-up. Ideally, the process of completing the checklist enhances communication between staff and physicians on patient-specific concerns.

6.2. The Importance of Obtaining Buy-In Among Hospital and/or Facility Administration

We encourage physician-champions of SDD to meet with staff administrators to: 1) present the data on PCI safety and utility; and 2) communicate the expectation that staff will complete the checklist and ensure that appropriate patients can undergo a safe SDD. It is recommended that each facility devise a protocol for the SDD that includes all elements from the checklist (24). In addition, meetings with different groups of the team (advanced practice providers/nursing/pharmacy/registration) to discuss their specific roles can help to reduce barriers to

implementation and provide a forum in which experienced staff can offer input into tailoring the checklist around the specific needs of their patient population and institution. For example, SDD candidates who are identified preprocedurally could benefit from earlier procedure times, an effort that requires coordination between the scheduling and administrative team members to ensure adequate time for completion of the procedure and SDD checklist.

6.3. Importance of Emphasizing Post-PCI DAPT

The importance of adequate DAPT involving P2Y₁₂i must be at the forefront of the checklist from a preprocedural and postprocedural vantage. Practice patterns regarding P2Y₁₂i loading and maintenance vary among physicians, with providers initiating P2Y₁₂i either days before the procedure, while in the pre-procedural area, or while in the cardiac catheterization laboratory after defining the coronary anatomy (17). Regardless of the variations in timing, all instances of PCI guideline-directed loading and maintenance of DAPT provide optimum results and decrease the incidence of stent thrombosis. Orders for outpatient loading and maintenance or preprocedural DAPT loading should be confirmed in the EHR and communicated between preprocedural and procedural nursing and then verbally to the patient. Once ordered, the procedural loading should be communicated to postprocedural staff and then administered to the patient. If the P2Y₁₂i is a new medication initiated in the SDD setting, a prescription to the facility's outpatient pharmacy should be expedited so that the medications are in the hands of the patient/responsible caregiver prior to leaving the facility. Additionally, a prescription should also be sent to the patient's preferred outpatient pharmacy.

In addition to the DAPT loading dose, the EHR should also confirm prescriptions for aspirin and statin therapy as well as a referral to cardiac rehabilitation.

6.4. Integration of Checklist Data Into the EHR

With the aid of hospital or facilities informational technology staff, the SDD checklist can be integrated into the patient EHR. For example, certain elements of the checklist, including instructions about medications and follow-up care, would ideally be included within discharge summaries given to patients. Other elements of the checklist may also be added to the clinical discharge summary, for example, from the free notes section. Patient-specific details from these summaries could be used by cardiologists and/or other clinicians during subsequent visits to address patients' ongoing health care needs.

In addition, the SDD checklist provides a means by which facilities may more quickly and accurately account

for safety and efficiency. For example, the checklist can provide information (in the EHR or other database) detailing whether important known safety metrics (e.g., administration of DAPT and discharge instructions) have been met. The checklist can also provide documentation on perhaps more personal aspects of patient care, such as the presence of a reliable individual who can provide transit home and reasonably monitor the access site and overall condition of the patient. The checklist may also provide an opportunity to assess patient satisfaction, an observable metric recorded by many facilities and hospital systems, as well as part of the Hospital Consumer Assessment of Healthcare Providers and Systems survey from the Centers for Medicare and Medicaid Services (25).

7. DISCUSSION AND IMPLICATION OF PATHWAY

PCI has evolved in safety and efficacy such that many patients can leave facilities the same day as the procedure, with retrospective data showing no increase in death or rehospitalization compared with patients who stay for overnight monitoring (2). In addition, SDD is preferred by patients and can increase savings and bed capacity (6,26). However, uncertainty around SDD for PCI remains. This ECDP has aimed to address this uncertainty, providing clinicians with a checklist of clinical, social, and facility/systems factors that indicate whether a patient can be safely considered for SDD. The ideal time to begin the checklist is before the procedure, but depending on the workflow and resources of individual institutions, the checklist may also be started and completed after the procedure. On this note, the WG was careful to create a checklist that can be adapted to meet the needs of individual institutions.

The need for administrative buy-in for SDD and an SDD checklist should not be underemphasized; implementing a protocol around SDD will necessarily require changes in workflow and a clear identification of the cardiovascular team members who will complete the checklist, communicate the possibility of SDD to the patient, and ensure that the patient has the appropriate and relevant discharge information as well as a P2Y₁₂i dose administered along with a prescription. Physician-champions of the checklist and SDD can also communicate the potential of the checklist to enrich EHR data through the open notes section of the tool.

It is the belief of the WG that implementing this checklist, and thus likely widening the pool of patients who can be identified as candidates for safe SDD, will lead to greater patient satisfaction and awareness as well as increased savings within facilities. Implementation of this checklist also provides institutions with an opportunity to carry out quality evaluations as data from the checklist

can be used to inform the evolution of future checklists and protocols in SDD for PCI.

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KEY WORDS ACC Expert Consensus Decision Pathway, percutaneous coronary intervention, same-day discharge

APPENDIX 1. AUTHOR RELATIONSHIPS WITH INDUSTRY AND OTHER ENTITIES (RELEVANT)—2021 ACC EXPERT CONSENSUS DECISION PATHWAY ON SAME-DAY DISCHARGE AFTER PCI

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APPENDIX 3. ABBREVIATIONS

ACC = American College of Cardiology

DAPT = dual antiplatelet therapy

ECDP = Expert Consensus Decision Pathways

EHR = electronic health record

NSTEMI = non-ST-elevation myocardial infarction

P2Y₁₂i = P2Y₁₂ inhibitors

PCI = percutaneous coronary intervention

RWI = relationships with industry

SDD = same-day discharge

STEMI = ST-elevation myocardial infarction

WG = working group