Safety and Outcomes of Same-Day Discharge Versus Overnight Observation After Transradial Percutaneous Coronary Intervention: A Retrospective Cohort Study in a Tertiary Hospital in Philippines

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Abstract

INTRODUCTION: Since earlier days of percutaneous coronary intervention (PCI), there has been improvement in several aspects of PCI including use of transradial approach and third-generation drug-eluting stents. Despite data showing its safety, same-day discharge (SDD) PCI has not been widely practiced in our institution and country. At present, there are no published studies from the Philippines showing the safety and outcome of SDD PCI.

OBJECTIVES: The primary objective of this study is to determine and compare the safety and outcomes of SDD versus overnight observation after PCI in The Medical City from 2018 to 2021.

METHODS: This was a retrospective cohort study. The primary endpoint was to describe and compare the clinical profile of patients who underwent same-day versus overnight observation after PCI such as age, sex, comorbidities, indication for coronary angiogram, procedure time, total dye used, stent, and drug-eluting stent used. Incidence of major adverse cardiovascular event, mortality, readmission, and access site complications were also determined at 48 hours and 30 days after PCI.

RESULTS: Ninety-three patients were included in the analysis. Reasons for undergoing PCI were a positive noninvasive stress test (45%), stable angina (40%), coronary artery disease (26%), and heart failure (20%). More single-vessel (60%) than multivessel (40%) PCIs were performed. The most frequently affected coronary artery was the LAD (82%), followed by right coronary artery (32%) and left circumflex artery (30%). Compared with patients who stayed longer after PCI, the SDD group had lower mean (±SD) body mass index (25.10 ± 3.12 vs 28.55 ± 4.95 kg/m^2), less due to a positive noninvasive test (26% vs 51%), more who underwent a single-vessel PCI (78% vs 54%), lower median amount of injected dye (130 vs 188 mL), shorter median procedural time (74 vs 101.5 minutes), and greater use of sirolimus-eluting stent (22% vs 3%). No adverse outcome of interest was noted in any patient up to 30 days after hospital discharge.

CONCLUSION: No adverse outcome was noted with SDD PCI. Larger, prospective, randomized comparative studies are needed to ascertain its safety before recommending SDD PCI routinely.

KEYWORDS: left anterior descending artery, left circumflex artery, percutaneous coronary intervention, right coronary artery, same-day discharge

INTRODUCTION

Can same-day discharge (SDD) percutaneous coronary intervention (PCI) be safely done in the local setting? In patients with significant coronary artery disease, PCI is the primary and most used method of revascularization. In the Philippine setting, it has been routine practice to admit patients who underwent PCI for observation and discharge them the next day if there are no periprocedural complications.

Advancements in techniques, equipment, and pharmacology in PCI have made it much safer, making it feasible to reduce the length of stay after the procedure such as discharge within 24 hours. Furthermore, evolving to SDD PCI set up for appropriate cases will benefit patients, caregivers, medical centers, and payers.[1] Despite the data showing its safety, SDD PCI has not been widely practiced in our institution and country.

There was a need to answer the question of what clinical profile is suitable for SDD PCI and its corresponding outcome in our setting. In this study, we determined and compared the safety and outcomes at 48 hours and 30 days of SDD PCI and standard PCI in The Medical City from 2018 to 2021. We also described and compared the clinical profile between the two groups.

METHODOLOGY

Population and Sample

Adults older than 18 years, who had successful PCI in the cardiac catheterization laboratory of The Medical City, Ortigas Avenue, Pasig City, Philippines, were included in this study; those who had emergency scheduled PCI, ST-elevation myocardial infarction, or non–ST-elevation myocardial infarction (within 30 days) who underwent balloon angioplasty or staged PCI or were on maintenance dialysis were excluded. There are no available preprocedural serum creatinine levels on record and chart review. The study protocol was submitted and approved by The Medical City Institutional Review Board.

Methods

Data were collected initially from our cardiac catheterization laboratory procedural logbook, in which those who were scheduled for emergency procedure were automatically excluded. Data of successful PCI cases from 2018 to 2021 were retrieved using our laboratory SIEMENS Sensis Patient Explorer Version: VC12M information system database (Siemens Medical Solutions). Clinical profile history, indication for PCI, procedural time, total dye used, vessel involved and stented, drug-eluting stent used, and primary interventional cardiologist details were obtained. Successful PCI was defined as successful if the following factors were satisfied: less than 50% poststenosis, TIMI (Thrombolysis in Myocardial Infarction) 3 flow, and 20% or greater reduction from prestenosis to poststenosis.

The sample was separated into two groups: (1) SDD PCI group and (2) overnight observation group. Procedural consent was acquired from the patients prior to coronary angiogram and PCIs. In the SDD PCI group, most of the sample presented to our institution as outpatient scheduled walk-in patients for the procedure and then discharged on the same day postprocedure after staying approximately 4 to 6 hours in the catheterization laboratory. In contrast, patients in the overnight observation after PCI group were either admitted initially as outpatient scheduled walk-in or admitted a day prior. In this group, those who came in as outpatients were subsequently admitted after PCI, and those who were already admitted prior were brought back to their room for an overnight monitoring.

Follow-up data regarding unplanned hospitalization, mortality, major adverse cardiovascular event, acute myocardial infarction, access site bleeding, and hematoma at 48 hours and 30 days postprocedure were obtained through their respective primary interventional cardiologist clinic records. Additional data were retrieved for those who were admitted post-PCI using the institution ORION management information system. Cases wherein no single follow-up record in 30 days after PCI was obtained were excluded from the final analysis. Exclusion criteria include emergency scheduled PCI, staged PCI, acute coronary syndrome ST-elevation myocardial infarction and non–ST-elevation myocardial infarction (within 30 days), patients who underwent balloon angioplasty only, and patients who were on dialysis.

Analysis

Descriptive statistics was used to summarize the general and clinical characteristics of the patients. Frequency and proportion were reported for categorical variables. Shapiro-Wilk test was used to determine the normality distribution, whereas Levene test was used to test the homogeneity of variance of continuous variables. Continuous quantitative data that met the normality assumption were summarized using mean and standard deviation, whereas those that did not were described using median and range. Binomial proportion and the corresponding 95% confidence interval of adverse outcome of interest was reported.

Continuous variables that satisfied the normality assumption but violated the homogeneity of variance were compared using Welch test. The nonparametric Mann-Whitney U test was used for non-Gaussian variables. Categorical variables were compared using a χ^2 test. If the expected percentages in the cells are less than 5%, Fisher exact test was used.

Null hypothesis was rejected at the 0.05 α level of significance. STATA version 15.0 (StataCorp SE, College Station, Texas) was used for data analysis.

RESULTS

Ninety-three patients were included in the analysis (Table 1). These comprised 82 male and 11 female patients with an overall mean (±SD) age of 60 ± 10 years. Their major comorbid diseases were hypertension (87%) and diabetes (41%). Reasons for undergoing PCI were a positive noninvasive stress test (45%), stable angina (40%), coronary artery disease (26%),

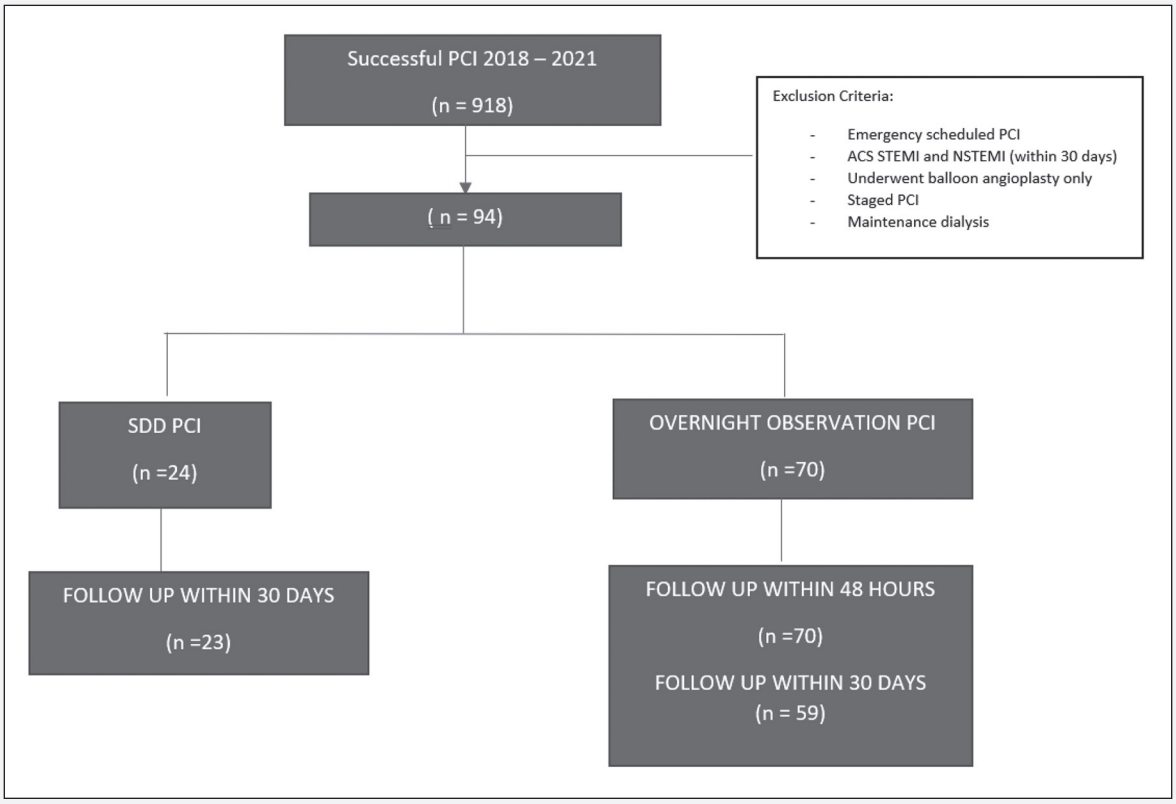

Figure 1. Methodology
Abbreviations: ACS=acute coronary syndrome; PCI=percutaneous coronary intervention; NSTEMI=non–ST-elevation myocardial infarction; STEMI=ST-elevation myocardial infarction.

and heart failure (20%). The most frequently affected coronary artery was the left anterior descending artery (82%), followed by the right coronary artery (32%) and left circumflex artery (30%).

More single-vessel (60%) than multivessel (40%) PCIs were performed. An everolimus-eluting (78%), zotarolimus-eluting (14%), or sirolimus-eluting (8%) stent was placed, with Synergy (39%) and Xience (27%) being the most utilized brands of stent system.

Compared with patients who stayed longer after PCI, the SDD group had a lower mean (±SD) body mass index (25.10 ± 3.12 vs 28.55 ± 4.95 kg/m^2), less with a positive noninvasive stress test (26% vs 51%), more who underwent single-vessel PCI (78% vs 54%), lower median amount of injected dye (130 vs 188 mL), shorter median procedural time (74 vs 101.5 minutes), and greater usage of sirolimus-eluting stent (22% vs 3%). No adverse outcome of interest was noted in any patient up to 30 days after hospital discharge.

DISCUSSION

The clinical profiles of subjects who underwent SDD PCI versus overnight-stay PCI were almost similar in this study. Apparently, PCI of patients who had findings of a single-vessel lesion in this study gave more confidence to interventionists to allow SDD PCI. This could be due to complexity and possible worse outcome associated with multivessel PCI. Nevertheless, both single-vessel and multivessel PCIs were included in both groups and resulted to no adverse outcome in this study. Our outcome is similar to the study by Jabara et al,[8] wherein no adverse outcome occurred between 6 and 24 hours. Furthermore, those observed before 6 hours would have prevented early discharge, and those occurring after 24 hours would have been unaffected by routine next-day discharge. A positive noninvasive stress test is the most common indication for PCI in this study and significantly more in overnight-stay PCI as compared with SDD. Unfortunately, other factors associated with this indication such as additional diagnostic workup or blood tests done prior to PCI were not further investigated.

Recently, the American College of Cardiology released the 2021 Expert Consensus Decision Pathway on SDD after PCI; it includes system workflow involving a checklist for SDD after PCI.[2] In our setting, system workflow for SDD is not yet in place, resulting in independent operator preference for either SDD or overnight observation after PCI. The inconsistencies were also due to lack of research on SDD and its applicability in the Philippine setting. Moreover, there were only small randomized trials on SDD, and most were observational studies.[1,6] In the meta-analysis on SDD after PCI by Brayton et al,[7] the majority of patients in both cohorts underwent PCI due to stable angina, which is similar in this study. In a large cohort study on SDD

Table 1. Characteristics of Patients Who Underwent SDD and Overnight Observation After PCI

	All (n = 93)	Same day (n = 23)	Overnight Observation (n = 70)	*P*
	Mean ± SD, Median (Range), or Frequency (%)			
Age, y	60.12 10.26	58.78 11.00	60.56 10.04	0.475*
30–39	3 (3.23)	2 (8.7)	1 (1.43)	
40–49	8 (8.6)	2 (8.7)	6 (8.57)	
50–59	38 (40.86)	9 (39.13)	29 (41.43)	
60–69	26 (27.96)	7 (30.43)	19 (27.14)	
70–79	14 (15.05)	1 (4.35)	13 (18.57)	
80	4 (4.3)	2 (8.7)	2 (2.86)	
Sex				0.999†
Male	82 (88.17)	20 (86.96)	62 (88.57)	
Female	11 (11.83)	3 (13.04)	8 (11.43)	
Height, cm	165.66 8.63	161.83 7.99	166.91 8.52	0.013*
Weight, kg	72 (43.9–127)	66 (54–102)	79 (43.9–127)	<0.001‡
BMI, kg/m^2	27.70 4.79	25.10 3.12	28.55 4.95	<0.001§
Comorbidities				
Hypertension	81 (87.1)	19 (82.61)	62 (88.57)	0.483†
Diabetes	38 (40.86)	7 (30.43)	31 (44.29)	0.241
Cancer	1 (1.08)	1 (4.35)	0 (0)	0.247†
COPD	1 (1.08)	1 (4.35)	0 (0)	0.247†
Dyslipidemia	8 (8.6)	1 (4.35)	7 (10)	0.674†
CKD	2 (2.15)	0 (0)	2 (2.86)	0.999†
Smoking	3 (3.23)	3 (13.04)	0 (0)	0.014†
Indication for PCI				
Stable angina	37 (39.78)	10 (43.48)	27 (38.57)	0.677
Heart failure	19 (20.43)	8 (34.78)	11 (15.71)	<0.072†
CAD¶	24 (25.81)	6 (26.09)	18 (25.71)	0.972
Positive noninvasive test#	42 (45.16)	6 (26.09)	36 (51.43)	0.034
Vessels involved				0.042
Single vessel	56 (60.22)	18 (78.26)	38 (54.29)	
Multivessel	37 (39.78)	5 (21.74)	32 (45.71)	
Stented artery				
LAD	77 (82.8)	16 (69.57)	61 (87.14)	0.064†
LCX	28 (30.11)	6 (26.09)	22 (31.43)	0.628
RCA	30 (32.26)	6 (26.09)	24 (34.29)	0.466

(continuation of Table 1)

	All (n = 93)	Same day (n = 23)	Overnight Observation (n = 70)	*P*
	Mean ± SD, Median (Range), or Frequency (%)			
Brand of stent				0.011†
Promus	12 (12.9)	3 (13.04)	9 (12.86)	
Resolute	13 (13.98)	2 (8.7)	11 (15.71)	
Supraflex	3 (3.23)	2 (8.7)	1 (1.43)	
Synergy	36 (38.71)	4 (17.39)	32 (45.71)	
Terumo Ultimaster	4 (4.3)	3 (13.04)	1 (1.43)	
Xience	25 (26.88)	9 (39.13)	16 (22.86)	
Drug eluting				0.016†
Everolimus	73 (78.49)	16 (69.57)	57 (81.43)	
Sirolimus	7 (7.53)	5 (21.74)	2 (2.86)	
Zotarolimus	13 (13.98)	2 (8.7)	11 (15.71)	
Total dye used, mL	150 (40–588)	130 (80–250)	188 (40–588)	0.001‡
Procedure time, min	91 (16–360)	74 (47–168)	101.5 (16–360)	0.040‡

BMI=body mass index; CABG=coronary artery bypass graft surgery; CAD=coronary artery disease; CCTA=coronary computed tomography angiography; CKD=chronic kidney disease; COPD=chronic obstructive pulmonary disease; LAD=left anterior descending artery; LCX=left circumflex artery; PCI=percutaneous coronary intervention; RCA=right coronary artery; SDD=same-day discharge.
*Independent t test. †Fisher exact test. ‡Mann-Whitney U test. §Levene test. ‖χ^2 Test.
¶Includes previous CABG, previous PCI, known coronary artery disease with CCTA, or previous coronary angiogram.
#Includes treadmill stress test, exercise stress echocardiography, dobutamine stress echocardiography, and nuclear stress imaging,
P-values in boldface <0.05.

PCI in Canada, 20.2% of SDD group had a previous PCI,[3] near similar to that in our study in which 26% had previous revascularization through either coronary artery bypass graft or PCI. This consistent population candidate indication for elective PCI emphasized careful selection of patients prior to implementation of a routine SDD PCI strategy.[2]

Choosing between transradial and transfemoral approach may not influence the safety of SDD after PCI.[1] However, there is a trend towards transradial approach in most SDD PCI groups in different studies.[3] Similar to this study, PCI on the left anterior descending artery or multivessel disease is also amenable to SDD after PCI.[4]

Death, myocardial infarction, and target lesion revascularization can reach up to 2.28% and 2.94%, with major bleeding and vascular complications reaching up to 4.30% and 2.36% for SDD and overnight observation PCI, respectively.[7] In contrast, this study showed no adverse outcome following both SDD and overnight stay after PCI. Likely reasons are the extensive selection bias, operator bias, and nonrandomization of the study. Technical reasons such as shorter procedure time and lower dye used are also factors in the SDD after PCI group.

Application of periprocedural system workflow and checklists, with incorporation of appropriate patient selection based on this study, seems to improve safety of SDD after PCI in the local setting. We recommend more randomized and prospective clinical trials in the local setting for routine SDD after PCI. We also recommend inclusion of other baseline parameters such as serum creatinine and hemoglobin levels in future studies.

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