

# Safety of same-day discharge in patients with left main percutaneous intervention

Omar Abdel-Razek<sup>a,b</sup>, Young Jung<sup>c</sup>, Richard Jung<sup>a,d,e</sup>,  
Stephanie Skanes<sup>f</sup>, Shan Dhaliwal<sup>e</sup>, Cameron Stotts<sup>g</sup>,  
Pietro Di Santo<sup>a,b,d,h</sup>, Cheng Yee Goh<sup>b</sup>, Louis Verreault-Julien<sup>b</sup>,  
Sarah Visintini<sup>i</sup>, Jennifer Bradley<sup>b</sup>, Trevor Simard<sup>a,b,e</sup>, F. Daniel Ramirez<sup>d,e</sup>,  
Juan J. Russo<sup>a</sup>, Michael Froeschl<sup>a</sup>, Marino Labinaz<sup>a</sup> and Benjamin Hibbert<sup>a,b,d,e</sup>

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<sup>a</sup>CAPITAL Research Group, University of Ottawa Heart Institute, Ottawa, <sup>b</sup>Division of Cardiology, University of Ottawa Heart Institute, Ottawa, <sup>c</sup>Department of Health Research Methods, Evidence, and Impact, McMaster University, Hamilton, <sup>d</sup>Vascular Biology and Experimental Medicine Laboratory, University of Ottawa Heart Institute, Ottawa, <sup>e</sup>Department of Cellular and Molecular Medicine, Faculty of Medicine, University of Ottawa, Ottawa, <sup>f</sup>Faculty of Medicine, University of Ottawa, Ottawa, <sup>g</sup>Department of Biochemistry, Microbiology, and

Immunology, Faculty of Medicine, University of Ottawa, Ottawa, <sup>h</sup>School of Epidemiology and Public Health, University of Ottawa, Ottawa and <sup>i</sup>Berkman Library, University of Ottawa Heart Institute, Ottawa, Canada

Correspondence to Benjamin Hibbert, MD, PhD, University of Ottawa Heart Institute, 40 Ruskin Street, H-4238, Ottawa, ON K1Y 4W7, Canada  
Tel: +613 696 7358; e-mail: bhibbert@ottawaheart.ca

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## To the Editors

Percutaneous coronary intervention (PCI) has developed an established role in the therapy of left main coronary artery disease (LM-CAD). Several landmark studies demonstrate comparable outcomes for left main PCI (LM-PCI) when compared to coronary artery bypass grafting (CABG) in patients with low to moderate complexity [1,2]. LM-CAD is seen in 4–6% of patients undergoing angiography and comprises an estimated 5% of all PCIs performed [3].

Same-day discharge (SDD) among patients undergoing PCI in several other settings has been shown to be both well tolerated and cost-effective [4,5]. The utility of SDD among patients undergoing LM-PCI remains incompletely described in the literature. In our retrospective analysis, we examined all patients undergoing elective LM-PCI at our center and compared clinical outcomes between those discharged the same day and those admitted overnight. We further describe the clinical characteristics of patients who should be considered for SDD. This study was approved by the Ottawa Health Science Network Research Ethics Board (OHSN-REB Protocol #20190224-01H) to evaluate clinical outcomes following revascularization.

The primary endpoint was a composite of death, myocardial infarction (MI), and hospitalization at 30 days. Secondary endpoints were each of the individual components of the primary endpoint. Time-to-first event was assessed using Kaplan–Meier (KM) survival analysis. KM event rates were reported at different time points (i.e. at 5,

10, 15, 20, 25 and 30 days after the start of the observation). KM survival curves were produced to visualize time to first composite event in SDD and overnight admission cohorts.

This single-center study examined data on all patients undergoing revascularization between 12 February 2008 and 18 September 2020. A total of 1536 patients were screened for potential inclusion in our study. Overall, 992 patients underwent LM-PCI with 267 discharged the same day and 724 admitted for at minimum one night. One hundred ninety-four patients in the overnight arm underwent PCI for an elective indication. These two groups were used for comparison (Table 1).

Overall, our primary composite outcome of 30-day mortality, 30-day MI and 30-day rehospitalization was significantly lower in the SDD group (odds ratio: 4.3, 95% confidence interval: 1.1–6.0,  $P = 0.002$ ) (Fig. 1a). With regards to each individual component, 30-day mortality in patients undergoing elective PCI was 0% in the SDD group and 3.6% in the overnight (ON) group (Fig. 1b). Overall, 0.0% of patients in the SDD group experienced MI at 30 days compared to 2.6% in the ON group (Fig. 1c). Rates of 30-day rehospitalization were 3.4% and 8.6% in the SDD and ON group, respectively (Fig. 1d).

Nine (3.4%) events occurred in the SDD group necessitating rehospitalization. Of these events, four were bleeding events, one vascular injury, one renal failure and three admissions were related to preexisting valvular dysfunction. Notably, none of these events occurred in the initial 48 h after discharge. Further, only four readmissions were related to postprocedural complications.

This report demonstrates the safety of SDD after LM-PCI in a selected patient population. In our cohort, SDD is not

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Table 1 Baseline demographics and characteristics of the same day discharge vs. overnight stay

Characteristics	All year	
	Same day (N = 267)	Overnight (N = 194)
Patient characteristics		
Age	70.9 ± 10.1 [71]	73.4 ± 10.8 [75]
Male	220 (82.4)	134 (69.1)
Current smoking	53 (19.9)	35 (18.0)
Diabetes (type I and II)	93 (34.8)	66 (34.0)
Type I	1 (0.4)	1 (0.5)
Type II (diet)	4 (1.5)	2 (1.0)
Type II (insulin)	23 (8.6)	21 (10.8)
Type II (oral agents)	58 (21.7)	39 (20.1)
Prior myocardial infarction	113 (42.3)	80 (41.2)
Prior cardiac catheterization	234 (87.6)	156 (80.4)
Prior PCI	114 (42.7)	64 (33.0)
Prior CABG	146 (54.7)	81 (41.8)
Hypertension	197 (73.8)	138 (71.1)
Peripheral artery disease	43 (16.1)	28 (14.4)
Prior CVA	21 (7.9)	15 (7.7)
Dyslipidemia	219 (82.0)	139 (71.6)
Family history of CAD	19 (7.1)	12 (6.2)
AF	31 (11.6)	32 (16.5)
Prior bleeding	8 (3.0)	6 (3.1)
Prior HF	22 (8.2)	33 (17.0)
NYHA class		
1	2 (0.7)	3 (1.5)
2	9 (3.4)	10 (5.2)
3	4 (1.5)	10 (5.2)
4	0 (0.0)	8 (4.1)
5	0 (0.0)	0 (0.0)
LVEF		
<30%	5 (1.9)	21 (10.8)
30–45%	25 (9.4)	31 (16.0)
>45%	31 (11.6)	23 (11.9)
Contrast volume	107.1 ± 134.2 [0]	87.2 ± 159.3 [0]
Creatinine post	54.4 ± 79.2 [59]	113.5 ± 96.6 [91]
HGB	102.5 ± 57.7 [127]	121.5 ± 22.3 [124]
BMI	28.6 ± 5.2 [28]	28.6 ± 7.1 [27]
Lesion		
Ostial	24 (9.0)	20 (10.3)
Mid	6 (2.2)	6 (3.1)
Provisional bifurcation	214 (80.1)	143 (73.7)
Dedicated bifurcation	20 (7.5)	22 (11.3)
Proximal	3 (1.1)	3 (1.5)
Protected LM	138 (51.7)	68 (35.1)
PCI type		
Balloon angioplasty	33 (12.4)	16 (8.2)
Bare metal stent	8 (3.0)	10 (5.2)
First-generation DES	9 (3.4)	18 (9.3)
New generation DES	217 (81.3)	150 (77.3)
Ad hoc PCI	127 (47.6)	75 (38.7)
Access site		
Brachial	2 (0.7)	3 (1.5)
Femoral	138 (51.7)	124 (63.9)
Radial	125 (46.8)	67 (34.5)

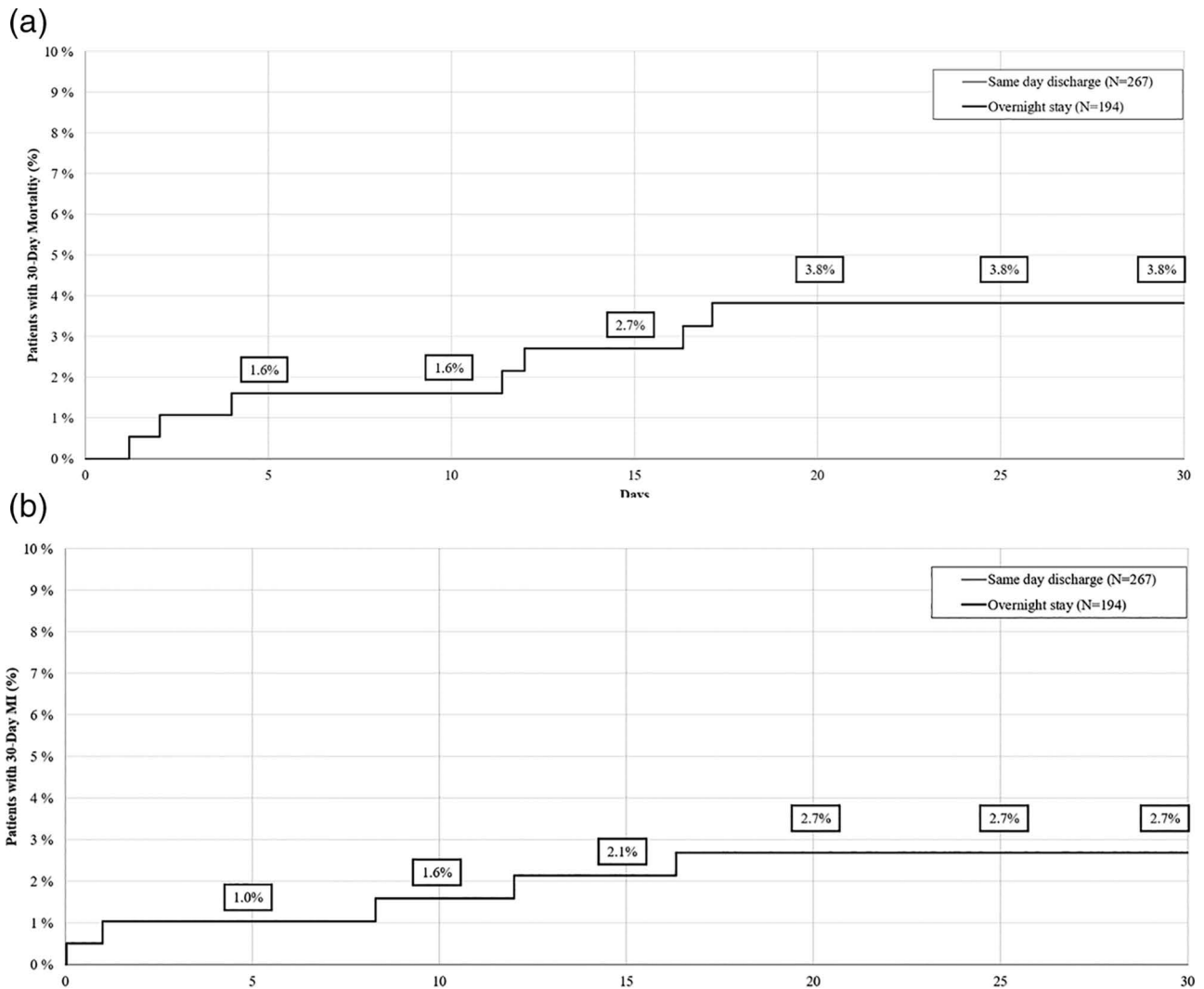
AF, atrial fibrillation; CABG, coronary artery bypass graft; CAD, coronary artery disease; CVA, cerebrovascular accident; DES, drug-eluting stent; HGB: Hemoglobin; LM, left main; LVEF, left ventricular ejection fraction; NYHA, New York Heart Association; PCI, percutaneous coronary intervention.

associated with an increased risk of death, MI or readmission when assessed at 30 days. More specifically, clinician judgment in selecting patients for SDD after LM-PCI is effective in choosing patients at the lowest risk for complications. In the primary data included in this study, patients chosen for SDD after elective LM-PCI were younger, had less renal dysfunction and had less contrast

volume used during their case (Table 1). Given that there were zero deaths in this group, it is improbable that meaningful intervention would change clinical outcomes.

Though limited by the retrospective nature of the analysis and selection bias in which patients were discharged, it does reinforce SDD as a viable option for selected patients following LM-PCI. Readmission rates are low

Fig. 1



(Continued)

with all events occurring after 48 h negating any potential benefit of overnight admission postelective LM-PCI. Patient selection is important in the decision to discharge patients following LM-PCI. Frameworks for SDD after PCI already exist in non-LM-PCI [6]. The results of this study add to the growing global experience with LM-PCI and its safety in a streamlined same-day process.

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**Conflicts of interest**

There are no conflicts of interest.

**References**

1 Serruys PW, Morice MC, Kappetein AP, Colombo A, Holmes DR, Mack MJ, *et al.*; SYNTAX Investigators. Percutaneous coronary intervention versus coronary-artery bypass grafting for severe coronary artery disease. *N Engl J Med* 2009; **360**:961–972.

2 Stone GW, Kappetein AP, Sabik JF, Pocock SJ, Morice MC, Puskas J, *et al.*; EXCEL Trial Investigators. Five-year outcomes after PCI or CABG for left main coronary disease. *N Engl J Med* 2019; **381**:1820–1830.

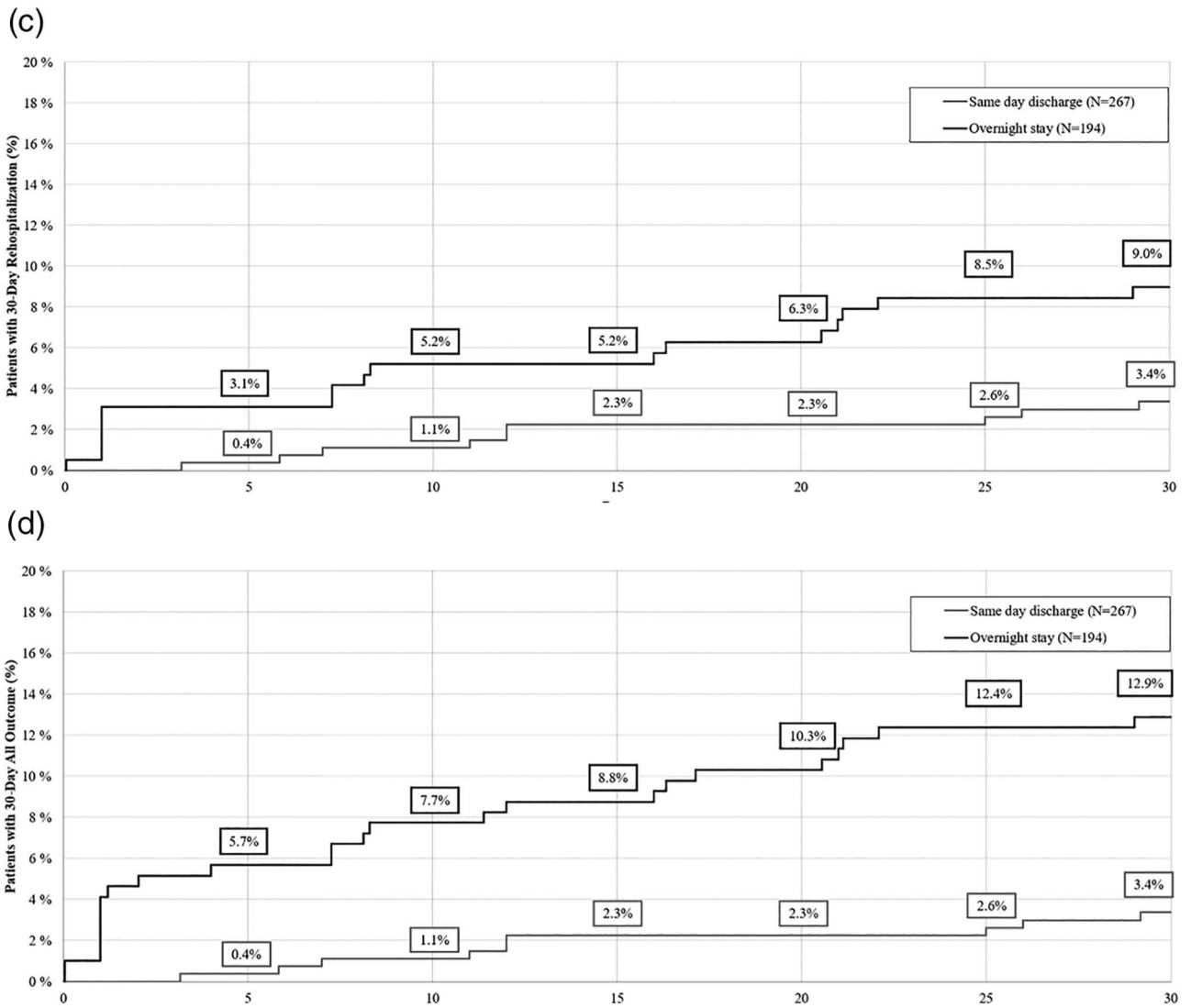
3 Ragosta M, Dee S, Sarembock IJ, Lipson LC, Gimble LW, Powers ER. Prevalence of unfavorable angiographic characteristics for percutaneous intervention in patients with unprotected left main coronary artery disease. *Catheter Cardiovasc Interv* 2006; **68**:357–362.

4 Heyde GS, Koch KT, de Winter RJ, Dijkgraaf MG, Klees MI, Dijkman LM, *et al.* Randomized trial comparing same-day discharge with overnight hospital stay after percutaneous coronary intervention: results of the Elective PCI in Outpatient Study (EPOS). *Circulation* 2007; **115**:2299–2306.

5 Rinfret S, Kennedy WA, Lachaine J, Lemay A, Rodés-Cabau J, Cohen DJ, *et al.* Economic impact of same-day home discharge after uncomplicated transradial percutaneous coronary intervention and bolus-only abciximab regimen. *JACC Cardiovasc Interv* 2010; **3**:1011–1019.

6 Rao SV, Vidovich MI, Gilchrist IC, Gulati R, Gutierrez JA, Hess CN, *et al.*; Writing Committee. 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. *J Am Coll Cardiol* 2021; **77**:811–825.

Fig. 1 (Continued)



Time to event curves same-day discharge vs. overnight hospitalization for the composite primary outcome and individual components. (a) Composite primary outcome; (b) mortality; (c) myocardial infarction; and (d) rehospitalization. Time-to-first event was assessed using Kaplan–Meier (KM) survival analysis. KM event rates were reported at different time points (i.e. at 5, 10, 15, 20, 25 and 30 days after the start of the observation). KM survival curves were produced to visualize time to first composite event in same-day discharge and overnight admission cohorts.