



# Emerging Evidence

## Same-Day Discharge After Percutaneous Left Atrial Appendage Occlusion Procedures

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### ABSTRACT

Information is evolving on the safety of same-day discharge (SDD) after left atrial appendage occlusion (LAAO) procedures. This single-centre retrospective study evaluated the feasibility of SDD and reported on the 30-day rehospitalization rate in patients discharged same-day compared with those admitted overnight after LAAO. Key findings of this study included more than 85% of patients with LAAO were safely discharged same-day; the rate of postdischarge rehospitalization was similar in SDD patients and those admitted overnight; and approximately 1 in 10 patients who had LAAO procedures were rehospitalized within 30 days postprocedure.

### RÉSUMÉ

Les informations sur la sécurité de la sortie de l'hôpital le jour même (SHJM) après avoir subi une occlusion de l'appendice auriculaire gauche (OAAG) évoluent constamment. La présente étude rétrospective unicentrique a permis d'évaluer la faisabilité de la SHJM et de rendre compte du taux de réhospitalisation dans les 30 jours des patients SHJM par rapport aux patients hospitalisés jusqu'au lendemain après l'OAAG. Les principales conclusions de cette étude étaient les suivantes : 85 % des patients ayant eu une OAAG ont reçu leur congé de l'hôpital le jour même en toute sécurité; le taux de réhospitalisation après la sortie de l'hôpital étaient similaires entre les patients SHJM et les patients hospitalisés jusqu'au lendemain; environ 1/10 des patients qui avaient eu une OAAG étaient réhospitalisés dans les 30 jours après l'opération.

Percutaneous left atrial appendage occlusion (LAAO) is a nonpharmacologic approach to reduction of stroke in patients with nonvalvular atrial fibrillation (AF). Real world data have suggested a low rate of LAAO procedural complications at approximately 3%.<sup>1</sup> Severe complications, such as procedural stroke and pericardial effusion, are rare (0.08% and 1.3%, respectively) and typically occur immediately or shortly after the procedure is completed.<sup>1</sup> This low frequency of procedural complications coupled with the increasing familiarity of physicians managing LAAO patients has resulted in same-day discharge (SDD) post-LAAO procedure. Data on the safety of SDD after LAAO procedures exist and are evolving,<sup>2-5</sup> with limited data comparing the 30-day outcomes in patients discharged same-day relative to similar patients monitored overnight. In this single-centre retrospective study we report on the feasibility and safety of SDD after LAAO procedure.

### Methods

#### Setting

Sunnybrook Health Sciences Centre (SHSC) is a large regional tertiary cardiac centre in Toronto, Ontario, Canada. The LAAO implantation program began in November 2015, with all patients routinely admitted overnight for monitoring. LAAO procedures were temporarily halted with the onset of the COVID-19 pandemic. Upon resuming LAAO procedures in October 2020, a strategy of SDD for all patients undergoing LAAO procedures was adopted.

#### LAAO procedure

All patients undergoing LAAO procedures were assessed by the implanting physicians and, when necessary, a multidisciplinary team to ensure suitability for the procedure. All oral anticoagulation therapy was interrupted before the procedure. Antiplatelet therapy was continued in the periprocedure period. Intraprocedure heparin to achieve an activated clotting time > 250 seconds was administered to all patients.

Ultrasound was used for femoral venous access. Transeptal access was obtained and a 14-French long sheath was placed in the right femoral vein. All LAAO procedures were performed with general anaesthesia with LAAO device implantation

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See page 559 for disclosure information.

guided by transesophageal echocardiography and fluoroscopy in all patients. The Watchman device (Boston Scientific, Marlborough, MA) was deployed in all patients.

Postprocedure partial reversal of procedural anticoagulation was achieved with administration of protamine. Hemostasis at the vascular access site was obtained with a combination of a figure-of-8 stitch and manual pressure. Transesophageal echocardiography was used to ensure the absence of a pericardial effusion immediately at the end of the procedure.

### Postprocedure follow-up

Postprocedure, all patients were monitored in a telemetry unit. A transthoracic echocardiogram and chest x-ray was performed between 2 and 4 hours postprocedure. Ambulation was encouraged at 4 hours. All patients received postprocedure education and written instructions from a nurse familiar with the procedure. SDD patients were typically discharged 1 to 2 hours after ambulation, whereas patients who were admitted overnight were discharged the following morning, barring any complication further prolonging the length of stay. No specific short-term postdischarge follow-up was arranged; instead, the first follow-up typically occurred after completion of the postprocedural imaging of the LAAO device, which occurred between 3 and 4 months after the LAAO device-implantation procedure. Patients were advised to inform the implanting LAAO physician of complications and, if needed, present to the nearest emergency departments. No patient was lost to follow-up.

### SDD vs non-SDD patients

The demographics, clinical characteristics, procedural details, and clinical outcomes of all patients were determined. Patients who experienced complications during or within 4 hours of completion of the LAAO procedure were excluded from the analysis, as these individuals would not have been deemed appropriate for SDD. Of the remaining cohort, those undergoing SDD were compared with those admitted overnight.

### Statistical analysis

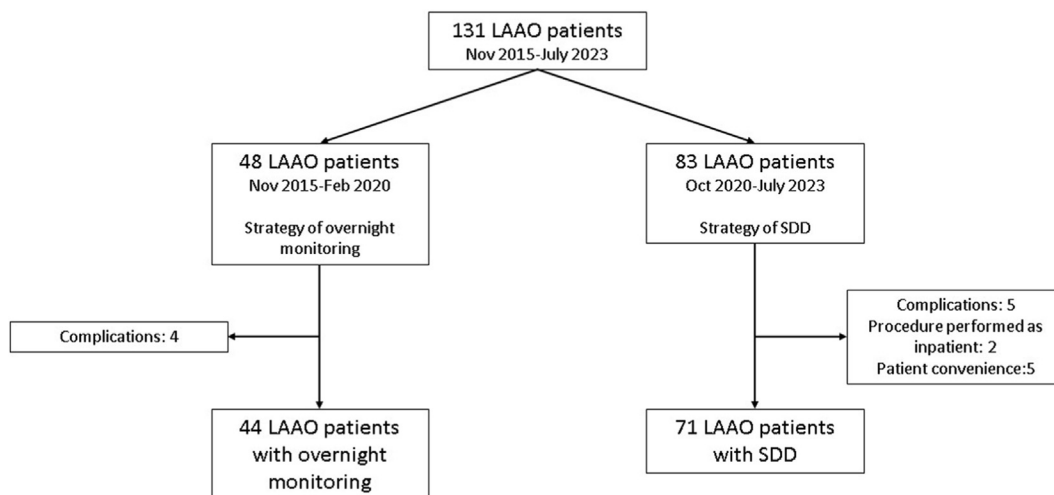
Descriptive statistics including mean and standard deviation (SD) for continuous variables and percentage for categorical variables were reported for SDD and non-SDD patients and compared using the Student's *t*-test and the  $\chi^2$  test, respectively. Statistical analysis was conducted at a significance level of 0.05 for a 2-tailed test using Microsoft Excel (Redmond, Washington, USA) and Graphpad (Graphpad Software, Boston, Massachusetts, USA). Ethics approval was obtained from the Sunnybrook Health Sciences Centre Research Ethics Board (REB). The authors confirm that patient consent is not applicable to this article, as this is a retrospective case report using deidentified data; therefore, the REB did not require consent from the patient.

### Results

A total of 127 patients underwent LAAO procedures at Sunnybrook Health Sciences Centre between November 2015 and July 2023, with 82 undergoing procedures during the time period in which SDD was routine (Fig. 1).

Of the 82 patients in the SDD epoch, 71 were discharged the same day (87%). Reasons for the inability to be discharged same-day included 2 patients undergoing LAAO procedures while admitted for an alternative medical condition, 3 experiencing procedural complications and thus were unable to be discharged, and 6 patients unable to be discharged because of social reasons. Of the 45 patients in the non-SDD epoch, 2 had procedural complications and would not have had the ability to be discharged home same-day.

No difference in clinical characteristics was observed between the SDD and non-SDD groups (Table 1). Procedure times were approximately 35 minutes shorter in the SDD arm vs the non-SDD arm (Table 1;  $P < 0.001$ ). Postprocedure patients in the SDD arm stayed approximately 6 hours and 23 minutes in hospital compared with 23 hours and 37 minutes for those with a non-SDD strategy ( $P < 0.001$ ). In the



**Figure 1.** Flow chart for same-day discharge. LAAO, left atrial appendage occlusion; SDD, same-day discharge.

**Table 1. Clinical and procedural characteristics for SDD and non-SDD patients**

	SDD (n = 71)	Non-SDD (n = 43)	P value
Demographics and clinical characteristics			
Female sex (%)	38	40	0.82
Age (mean ± SD)	75 ± 9	75 ± 8	0.71
Body mass index (mean ± SD)	28 ± 5	28 ± 5	0.82
Congestive heart failure (%)	22	26	0.71
Hypertension (%)	79	77	0.79
Diabetes (%)	44	30	0.15
Myocardial infarction (%)	13	14	0.85
Previous stroke syndrome (%)	42	49	0.49
Obstructive lung disease (%)	25	23	0.80
Previous malignancy (%)	18	28	0.23
Glomerular filtration rate (mL/min; mean ± SD)	59 ± 25	67 ± 25	0.13
Previous gastrointestinal bleed (%)	48	35	0.13
Previous intracranial bleed (%)	30	42	0.18
Other bleeding (%)	28	14	0.08
Cerebral amyloid angiopathy (%)	8	5	0.44
CHA <sub>2</sub> DS <sub>2</sub> -VASc (mean ± SD)	4.3 ± 1.6	4.4 ± 1.5	0.85
HAS-BLED (mean ± SD)	2.6 ± 1.2	2.3 ± 1.0	0.09
Procedural characteristics			
Procedure length (min; [mean ± SD])	148 ± 25	192 ± 56	< 0.001
Dual antiplatelet use post (%)	58	28	0.002
Postprocedure hospital length of stay (min; [mean ± SD])	383 ± 80	1417 ± 355	< 0.001
30-day outcomes			
Rehospitalization	8.5	7.0	0.78

SD, standard deviation; SDD, same-day discharge.

postprocedure period, oral anticoagulation was less frequently used in the SDD group (42% vs 72%;  $P = 0.002$ ).

Complications requiring emergency departments visit or rehospitalization within 30 days postprocedure occurred in 8% ( $n = 9$ ) of the entire cohort and included bleeding ( $n = 5$ ), vascular access-site complications ( $n = 1$ ), heart failure ( $n = 1$ ), hypertension ( $n = 1$ ), and uncontrolled AF ( $n = 1$ ). Of note, the patient who experienced heart failure had a previous history of pulmonary hypertension and subsequently died during the initial rehospitalization of progressive hypoxia. There was no difference in the rate of rehospitalization within 30 days for those in the SDD vs non-SDD group (7.0% vs 8.5%;  $P = 0.73$ ).

## Discussion

Three findings are noteworthy in this single-centre retrospective cohort study. First, when a nonselective approach to SDD is adopted, approximately 85% of patients who have had LAAO procedures may be discharged approximately 6.5 hours after the procedure. Second, almost 1 in 10 LAAO procedure patients are rehospitalized within 30 days postprocedure. Third, the rate of post-discharge hospital complications requiring emergency department visits was similar in patients who have had LAAO procedures with SDD and those admitted for overnight monitoring.

SDD is increasingly being used for cardiac interventions, including coronary interventions and catheter ablation procedures. Our work adds to the evolving evidence that this may also be possible with LAAO procedures. Obvious benefits to SDD include improved patient satisfaction, efficient use of hospital bed resources, and health care savings. Given the increasing number of cardiovascular interventions, SDD may facilitate improved procedural access.

Unlike previously described clinical pathways,<sup>2</sup> our SDD approach was not selective and did not rely on determination of frailty scores or use other tools to assess suitability for discharge: that is, barring immediate in-hospital complications, all patients were considered eligible for SDD regardless of the time of their procedure or presence of specific comorbidities. This approach may be reasonable, as LAAO procedures are typically performed in ambulatory outpatients. Furthermore, this approach may increase the proportion of patients having LAAO procedures who are discharged same-day. Indeed, with this approach, we were able to discharge 85% of LAAO patients, which is substantially higher than previously reported.<sup>2-4</sup>

What is apparent is that complications within 30 days postprocedure occur in approximately 1 in 10 patients after an LAAO procedure, regardless if they are discharged same-day or monitored overnight. Indeed, the rate of 30-day post-LAAO procedure complications in our cohort was similar to that reported in larger population level administrative databases and a recent meta-analysis.<sup>4-6</sup> As LAAO procedures are typically performed in elderly individuals on anticoagulant or antithrombotic therapy, with multiple comorbidities, it is not clear if a further reduction in the rate of postprocedure rehospitalization can be achieved regardless of the time spent in hospital. As rehospitalizations may erode the cost savings associated with SDD, further work to evaluate strategies to minimize rehospitalization post-LAAO is suggested. It is noteworthy that a shift in postprocedure therapy from oral anticoagulation to dual antiplatelet therapy occurred concomitantly with the transition to SDD. Further work to understand the optimal postprocedure antithrombotic therapy is suggested, given the fact that bleeding remains the most common post-procedure complication.

## Limitations

Limitations to this work must be acknowledged, including the fact that these were data from a single experienced centre, the sample size was small, and the work retrospective in nature. The consistency of our findings with population-level data adds credibility to our work. Despite these limitations, these data are important both to new centres initiating LAAO programs and existing centres expanding their programs, as it provides additional reassurance that elderly patients with multiple comorbidities may safely be discharged after LAAO procedures. Given the expected growth in procedural volume and indication for LAAO procedures, ongoing study to assess predictive and preventive factors associated with rehospitalization after LAAO procedures is recommended.

## Conclusions

A high rate of SDD after LAAO procedures is feasible.

## Ethics Statement

The research reported adhered to the ethical guidelines outlined by the Sunnybrook Hospital Research Ethics Board.

## Patient Consent

The authors confirm that patient consent is not applicable to this article, as this is a retrospective case report using deidentified data; therefore, the REB did not require consent from the patient.

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## Disclosures

Dr Singh has received speaker honoraria from Boston Scientific. The other authors have no conflicts of interest to disclose.

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