**Name of Journal:** *World Journal of Cardiology*

**Manuscript NO:** 72646

**Manuscript Type:** MINIREVIEWS

**Same day discharge after structural heart disease interventions in the era of the coronavirus-19 pandemic and beyond**

Asbeutah AA *et al*. Same day discharge and structural interventions

Abdulaziz A Asbeutah, Muhammad Junaid, Fatima Hassan, Jesus Avila Vega, Nephertiti Efeovbokhan, Rami N Khouzam, Uzoma N Ibebuogu

**Abdulaziz A Asbeutah, Fatima Hassan, Jesus Avila Vega,** Internal Medicine, University of Tennessee Health Science Center, Memphis, TN 38013, United States

**Muhammad Junaid,** Internal Medicine, Forrest City Medical Center, Forrest City, AR 72335, United States

**Nephertiti Efeovbokhan,** Department of Cardiology, NEA Baptist clinic, Jonesboro, AR 72401, United States

**Rami N Khouzam,** Department of Medicine, The University of Tennessee Health Science Center, Memphis, TN 38104, United States

**Uzoma N Ibebuogu,** Department of Cardiology, University of Tennessee Health Science Center, Memphis, TN 38103, United States

**Author contributions:** Asbeutah A, Avila Vega J, Junaid M and Efeobokhan N contributed to the literature review, manuscript drafting, and table generation; Khouzam N and Ibebuogu U critically reviewed the manuscript and provided supervision.

**Corresponding author: Rami N Khouzam, MD, Professor,** Department of Medicine, The University of Tennessee Health Science Center, 956 Court Avenue, Ste. A318D, Memphis, TN 38104, United States. khouzamrami@yahoo.com

**Received:** October 26, 2021

**Revised:** March 14, 2022

**Accepted:** April 21, 2022

**Published online:** May 26, 2022

**Abstract**

With recent advancements in imaging modalities and techniques and increased recognition of the long-term impact of several structural heart disease interventions, the number of procedures has significantly increased. With the increase in procedures, also comes an increase in cost. In view of this, efficient and cost-effective methods to facilitate and manage structural heart disease interventions are a necessity. Same-day discharge (SDD) after invasive cardiac procedures improves resource utilization and patient satisfaction.  SDD in appropriately selected patients has become the standard of care for some invasive cardiac procedures such as percutaneous coronary interventions. This is not the case for the majority of structural heart procedures. With the coronavirus disease 2019 pandemic, safely reducing the duration of time spent within the hospital to prevent unnecessary exposure to pathogens has become a priority. In light of this, it is prudent to assess the feasibility of SDD in several structural heart procedures. In this review we highlight the feasibility of SDD in a carefully selected population, by reviewing and summarizing studies on SDD among patients undergoing left atrial appendage occlusion, patent foramen ovale/atrial septal defect closure, Mitra-clip, and trans-catheter aortic valve replacement procedures.

**Key Words:** Mitra-clip; Transcatheter aortic valve replacement; Same-day discharge; Atrial septal defect; Coronavirus

**©The** **Author(s) 2022.** Published by Baishideng Publishing Group Inc. All rights reserved.

**Citation:** Asbeutah AA, Junaid M, Hassan F, Avila Vega J, Efeovbokhan N, Khouzam RN, Ibebuogu UN. Same day discharge after structural heart disease interventions in the era of the coronavirus-19 pandemic and beyond. *World J Cardiol* 2022; 14(5): 271-281

**URL:** https://www.wjgnet.com/1949-8462/full/v14/i5/271.htm

**DOI:** https://dx.doi.org/10.4330/wjc.v14.i5.271

**Core Tip:** Same-day discharge can safely be done among a highly selected group of patients undergoing structural interventional cardiac procedures.

**INTRODUCTION**

Same-day discharge (SDD) following percutaneous coronary interventions (PCI) in certain patient groups has been shown to have no increased risk of death, re-hospitalization, and has been associated with increased patient satisfaction[1-4]. According to the 2021 American College of Cardiology (ACC) SDD after PCI decision pathway, SDD is defined as a procedure that does not include supervised overnight monitoring in a facility or hospital after an elective procedure[5]. Several prerequisites have been postulated and the ACC consensus pathway provides a checklist that can be used to determine eligibility for SDD in patients undergoing PCI, however, no consensus has been formulated yet for patients undergoing structural interventional heart procedures[5]. Ideally, patients should be identified as candidates suitable for SDD before the procedure, have an uncomplicated procedure and recovery, be able to pick up required medications, be willing to depart on the same day, and have the means to care for themselves or have reliable caregivers to monitor them over the next 24 h. Most patients would be followed up on the same day *via* telephone-health and some are offered next day in-person visits to be assessed by the interventionalist[5,6]. This has now become important especially due to the current coronavirus disease 2019 (COVID-19) pandemic, as initially all elective procedures were recommended to be postponed by several leading health care authorities to prevent unnecessary exposure to patients and health care workers and to conserve personal protective equipment and bed availability. Delays in timely intervention among patients with structural/valvular heart disease place these patients at increased risk for adverse cardiovascular outcomes, including death[7]. A position statement from the ACC/Society for Cardiovascular Angiography and Interventions provides a framework to triage patients in need of structural heart interventions during the COVID-19 pandemic and discusses pre-procedural evaluation by a dedicated “heart team” and procedural indications[7]. In this manuscript, we aim to review and summarize the available literature on the safety of SDD among patients undergoing structural heart interventional procedures including, left atrial appendage occlusion (LAAO), patent foramen ovale (PFO)/atrial septal defect (ASD) closure, Mitra-clip, and Trans-catheter aortic valve replacement (TAVR) procedures.

**SEARCH STRATEGY**

We performed an extensive search of electronic databases including PubMed/Medline, Google Scholar, and ClinicalTrials.gov from inception till October 1st, 2021. We included studies that included structural intervention procedures and included patients who were discharged on the same day of the procedure. Eligible studies were reviewed and information was summarized by all authors.

**LEFT ATRIAL APPENDAGE OCCLUSION DEVICE PROCEDURE**

It was estimated that in the year 2010 around 9 million residents of the European Union were living with Atrial Fibrillation (AF). AF significantly increases the risk of embolic strokes and the postulated primary source of thrombus formation is the left atrial appendage[8]. Current ACC guidelines recommend the option of LAAO for patients with non-valvular AF at high risk for serious bleeding events or who have contraindications for long-term oral anticoagulation to reduce the risk of embolic stroke[9]. Left atrial appendage occlusion can be achieved percutaneously by deploying the WATCHMAN device (Boston Scientific, Marlborough, MA, United States), at the left atrial appendage ostia *via* transseptal puncture using a 12 French sheath *via* trans-femoral venous access. In the PROTECT-AF and the PREVAIL trials, LAAO was found to be non-inferior to warfarin in the prevention of stroke, systemic embolization, and cardiovascular death[10,11].The EWOLUTION study concluded that LAAO led to reduced incidence of stroke and non-procedural bleeding[12].

Traditional practice is to admit patients and observe them overnight after LAAO device procedures and to discharge them after around 24 h. Complications following LAAO procedures typically occur during or within a few hours after the procedure[13],hence certain groups created a clinical pathway for safe SDD after LAAO procedures. There have been four recently published studies with data regarding the feasibility of SDD among patients that underwent LAAO, with the vast majority being with the WATCHMAN device[13-16]. In a single-center, retrospective analysis of 190 successful LAAO device implantation using the WATCHMAN device, Tan *et al*[14] compared 7 and 45 d outcomes among SDD patients compared to non-SDD patients. In their study, 72 patients were discharged on the same day of the procedure compared to 118 patients that required at least one night of observation. In their study, pre-requisites for SDD were being able to ambulate two hours after the procedure to assess vascular integrity, anti-platelet and oral anticoagulant started or on hand, hemodynamic stability, no vascular access site complications, and some patients underwent a trans-thoracic echocardiogram (TTE) before discharge. The primary outcome of the study was a composite of stroke, systemic embolism, bleeding requiring blood transfusion, vascular access site complication, and death. The 7 d and 45 d primary outcomes were met by (1.2% *vs* 5.9% of SDD *vs* non-SDD patients) and (2.8% *vs* 9.3% of SDD *vs* non- SDD patients), respectively, *P* = 0.26 and *P* = 0.14. There was also no difference in re- admission or 45 d peri-device flow > 5 mm between SDD and non-SDD patients[14].

Several other smaller single-center studies reported on the feasibility of SDD among patients undergoing LAAO procedures. In a study by Gilhofer *et al*[13], 24 out of 78 patients were discharged on the same day of the LAAO procedure. Pre-requisites to SDD in their study were lack of significant frailty determined by a local scoring system, good home support, a TTE performed after 5 h of step-down observation revealing no significant pericardial effusion, and agreement to come in again the next morning for a repeat TTE and outpatient evaluation. They reported no significant events in either the SDD or non-SDD group[13]. In an effort to enhance SDD, Marmagkiolis *et al*[15] performed all WATCHMAN procedures under conscious sedation and were able to discharge 112 of their 178 patients within six hours after the procedure. They also required a TTE before discharge without evidence of significant pericardial effusion and a next-day follow-up TTE. They reported no complications in the SDD group.In another retrospective analysis of 177 LAAO procedures in the United Kingdom using various LAAO devices, 78 patients were discharged on the same day. Half of the patients had LAAO with the Amplatzer Cardiac Plug, 41% with the Amulet Occluder, and 2.5% with watchman. They reported that 1.7% of all their procedures suffered major in-hospital complications, hence were not suitable for SDD. They had required all patients to have a TTE on the day of the procedure without evidence of pericardial effusion, available transportation, and completion of the procedure before 4 pm to be considered eligible for SDD. In their study one patient from the SDD group was readmitted within 7 d, however, they concluded that it would have not been prevented by an overnight stay. Of note, all patients were discharged on DAPT for 28 d and then transitioned to SAPT thereafter, consistent with the European expert consensus statement[16,17].

**MITRA-CLIP**

Chronic systolic heart failure eventually leads to left ventricular dilatation and mitral regurgitation (MR) may develop secondary to ventricular remodeling and geometric dislocation of the mitral valve apparatus including the papillary muscles and chordae tendineae, impairing coaptation of the mitral leaflets[18]. In a recent meta-analysis of 45900 patients with secondary mitral regurgitation, secondary mitral regurgitation was associated with an increased risk of heart failure hospitalizations, cardiac mortality, and death[19]. The MITRA-FR study showed no difference in the primary outcome of death from any cause or hospitalization for heart failure (HF) at one year, while the COAPT trial showed a significant reduction in HF hospitalizations and all-cause mortality within 2 years[20,21]. The main reason for the observed differences was attributed to the enrollment in the COAPT trial requiring all patients to be on maximally tolerated guideline-directed medical therapy (GDMT) before enrollment, as compared with the MITRAFR trial[22]. The current 2021 ACC expert consensus HF guidelines recommend that GDMT should be optimized before percutaneous trans-catheter mitral valve repair based on evidence from previous randomized control trials[20,21,23]. The main reason for overnight observation in Mitra-clip procedures is usually to monitor for vascular access complications, as it requires a 24 French sheath introduced *via* the femoral vein, raising concern over possible bleeding complications.

In a single-center retrospective study by Marmagkiolis *et al*[24], 95 patients underwent Trans-catheter mitral valve repair, of which 82 were discharged on the same day of the procedure. In their study, 39 patients had primary MR and 43 had secondary/Functional MR due to heart failure. They included patients with a society of thoracic surgery (STS) score > 8% and deemed unsuitable for surgical mitral valve repair/replacement. The mean age of participants was 80.2 ± 2.5 years, mean EF = 45%, 20% with grade 3 MR, and 80% with grade 4 MR. They had a 100% procedure success rate and all procedures were performed under minimal conscious sedation or monitored anesthesia care and TEE guidance. All patients that had no intra-procedural complications and a stable course during observation for 6-8 h and were able to walk with no vascular access complications were considered for SDD. In their study, all patients underwent a figure of eight suture to the access site and only one patient had suffered from a minor bleeding event according to the valve academic research consortium-2 criteria[24].

In a case report by Chen *et al*[25], they describe an expedited Mitra-clip procedure for an 86-year-old patient with severe MR who was discharged on the same day during the COVID-19 pandemic. His STS risk score was 4.2%, with an EF of 40%, and NYHA III heart failure symptoms. Following the procedure, the patient was observed for four hours, a TTE showed no pericardial effusion, and confirmed the placement of the Mitraclips. The patient was sent home with a 7 d continuous rhythm-monitoring device without any documented arrhythmia and was seen on days 1 and 2 after the procedure *via* telephone-health calls[25]. These prior studies indicate that SDD is reasonable and possible for selected patients undergoing the Mitra-clip procedure without procedural complications and with adequate follow-up.

**TAVR**

Aortic stenosis (AS) is the most common type of valvular heart disease in the United States and is typically caused by calcific degeneration of a tri-leaflet aortic valve or stenosis of a congenital bicuspid aortic valve (AV)[26]. TAVR is an alternative to surgical aortic valve replacement for treating severe AS or Bio-prosthetic AV dysfunction in patients at high or intermediate surgical risk based on the STS score, frailty, and existing comorbidities[27].Recently, the five-year outcomes from the PARTNER trial were published and showed no significant difference in the incidence of death or stroke in patients undergoing TAVR at intermediate surgical risk compared to SAVR[28]. Despite TAVR being a commonly performed interventional procedure in the current era, it does not come without the potential for serious procedural and post- procedural complications. As with any interventional procedure, TAVR has been associated with vascular access complications especially due to the large sheath introduced mainly *via* the femoral artery. Other complications include pericardial effusions and tamponade, peri-procedural stroke, and new conduction abnormalities such as high-grade atrioventricular block (AV) and complete heart block requiring permanent pacemaker (PPM) implantation[28,29]. Hence, the standard practice is to observe patients 24-48 h after the procedure for new or worsening conduction abnormalities[30]. However, with the COVID-19 pandemic and the patient population undergoing TAVR usually being elderly with multiple co-morbidities placing them at higher risk of COVID-19 related complications, several studies sought and reported on SDD following TAVR[6,31,32].

In a case series, three elderly patients with AS underwent TAVR and were discharged home on the same day with 7 d of continuous rhythm monitoring[31]. Authors hypothesized that SDD may be safe after TAVR in a pre-selected cohort of patients with AS and also help reduce the risk of unnecessary COVID-19 transmission, conserve hospital beds, and PPE. Since the authors recognized that the loss of a single patient secondary to preventable complications due to early discharge is a never event, they developed protocols and safety nets for their SDD protocol. They considered patients with no significant comorbidities such as end-stage kidney disease, hemoglobin < 9 mg/dL, NYHA ≥ 3 symptoms, EF < 30%, no significant pericardial effusion, new or worsening AV block, and no vascular access complications able to be discharged on the same day of the procedure after observation for 4-6 h. In order to minimize complications, they performed ultrasound-guided vascular access, performed a TTE immediately after device deployment and 4 h after deployment to detect complications, obtained serial electrocardiogram’s to mainly assess QRS intervals, ambulated patients after 4 h, and performed serial lower extremity pulse checks. In their case series, there were no new conduction abnormalities detected and all patients were followed up on days 1 and 2 post-procedure. They had no deaths or re-admissions within 24 d of the procedure[31].

Rai *et al*[32] reported their experience of SDD based on 6 patients with severe symptomatic AS or bio-prosthetic valve dysfunction and proposed an SDD protocol. Since the major barrier to discharge patients after TAVR is related to new or worsening conduction abnormalities, they hypothesized that having a pre-procedure PPM or discharge with real-time continuous monitoring could allow for safe SDD. In their case series, they included patients that had predictors of next-day discharge after TAVR based on previous analyses[30]. In a recent study, rapid atrial pacing using the temporary pacing wire used for ventricular standstill during TAVR deployment while in the right atrium, had a 99% negative predictive value for pacemaker implantation after TAVR if no Wenckebach phenomenon developed at a heart rate of 120 bpm[33]. Rai *et al*[32] utilized this method in one of their patients and proposed its use prior to SDD in all patients without chronic AF, pre-existing PPM, or pre-existing AV block. Additionally, all patients had pre-procedure and post-procedure ECGs performed and if there was a pre- existing right bundle branch block (RBBB) or new AV conduction disturbances, patients were admitted overnight for observation. Otherwise, if patients had a pre-procedure PPM, unchanged ECG from baseline, and no Wenckebach on rapid atrial pacing, they were considered for SDD after 4 h of observation given lack of vascular access site complications. Despite one of their patients developing Wenckebach at 110 bpm, he was discharged on the same day due to a low positive predictive value of the finding and the lack of other conduction abnormalities noted. All six patients were followed with continuous rhythm monitoring for seven days and followed up in person the next day. Based on their experience, they recommend patients with a baseline RBBB not be considered for SDD, as it is one of the strongest predictors for pacemaker need following TAVR[34], additionally, patients who develop a new left bundle branch block after TAVR should be kept overnight for monitoring. Of note, all 6 patients in their series underwent balloon-expandable valve replacements and these recommendations could not be generalized to patients undergoing TAVR utilizing a self-expandable system, as there has been evidence suggesting higher PPM implantation in these patients[35].

The largest study regarding SDD in TAVR was conducted by Perdoncin *et al*[6], in which they report on 29 consecutive SDD TAVR procedures at their center and compared outcomes to patients who underwent TAVR at their center that were non-SDD, who could have qualified for SDD based on their devised protocol. They considered patients with an EF > 30%, hemoglobin > 10, INR < 2, those who received a contrast load < 3 times the estimated Glomerular Filtration Rate (eGFR), without new or worsening conduction abnormalities, or hemodynamic instability for SDD. The primary outcome was to compare 30 d mortality, PPM implantation, stroke, and cardiovascular-related admissions in SDD patients and non-SDD patients. They compared 29 SDD patients to 128 patients that were non-SDD who currently met their protocol for SDD and were fairly similar with regards to baseline characteristics. Procedural characteristics were similar in both groups and all cases were performed *via* trans-femoral access under conscious sedation. Post-procedure, both groups had no in-hospital complications. At 30 d, there were no deaths, the rate of stroke was 0.6%, and delayed PPM implantation was also 0.6% in both groups combined. They noted a trend towards a higher rate of cardiovascular re-admissions in the non-SDD group compared to the SDD group. One patient in the non-SDD group was re-admitted for high-grade AV block requiring PPM implantation. Of note, both self-expanding and balloon expanding valves were used with a trend towards higher use of self-expanding valves in the SDD group. However, further studies are required to determine the feasibility of the use of self- expanding valves for SDD TAVR procedures given the potential concern of outward sub-annular radial force and risk of delayed conduction changes[36].

Overall, based on the prior studies the main concern for SDD in TAVR is related to new or worsening conduction abnormalities that could arise during or after the procedure. All patients considered being candidates for SDD should be identified early during a ”heart team” multi-disciplinary discussion and deemed suitable based on pre-procedure pre- requisites. All patients with a baseline RBBB, new high-grade AV block after the procedure, new inter-ventricular conduction delay, or Wenckebach on right atrial pacing after valve deployment should be admitted overnight for inpatient observation. If considered for SDD, all patients must be willing to go home, have no vascular access complications after initial observation, have close follow-up arranged, and be sent home with a real-time rhythm monitor to detect arrhythmias. We present a proposed protocol for SDD following TAVR in Figure 1.

**PFO/ASD CLOSURE**

ASDs are one of the most common congenital heart defects found in the general population. Unrepaired ASDs can result in various cardiopulmonary adverse events such as arrhythmias, pulmonary hypertension, and paradoxical embolization. Current adult congenital heart disease guidelines recommend ASD closure in carefully selected patients with hemodynamic instability or clinical consequences resulting from their long- standing intra-cardiac shunting[37]. Additionally, up to 50% of patients with a cryptogenic stroke have been found to have an associated PFO[38]. The first three randomized controlled trials CLOSURE I, PC, and RESPECT failed to show any statistical significance in secondary stroke prevention[39-41]. More recent studies, however, have demonstrated that in carefully selected patients, PFO closure is preferable to medical therapy for secondary stroke prevention of cryptogenic strokes in patients with PFO[42,43]. In a review article published in the Journal of the American College of Cardiology, authors proposed a clinical pathway to aid in the appropriate selection of patients that should undergo PFO closure based on randomized trials showing benefit[38].

The PFO closure procedure is usually done as a day case procedure using one of only two FDA approved devices in the United States; the Gore Cardioform Septal Occluder (W.L. Gore and Associates, Inc, Newark, DE, United States) or the Amplatzer PFO Occluder (Abbott Structural, Santa Clara, CA, United States). The procedure is done under fluoroscopic and echocardiographic guidance in the form of TEE or intracardiac echocardiography (ICE) *via* femoral vein access.

In a single-center, retrospective study of 53 consecutive patients the safety and feasibility of SDD in PFO closure using ICE was evaluated[44]. In this study, a 12 Fr sheath for the occluder device and an 11 Fr sheath for the ICE probe were inserted into the femoral vein using only local anesthetic and light sedation. In this study 5 of the 53 patients were found to not have PFO by ICE. The remaining 48 patients underwent successful PFO closure with the HELEX occluder (GORE, Flagstaff, AZ, *n* = 47) and the Amplatzer device (AGA medical corporation, Golden Valley, MN, *n* = 1). SDD candidates had to ambulate successfully following the procedure and undergo TTE prior to discharge to confirm appropriate device placement. Appropriate device positioning was confirmed on all 48 patients. Only 1 patient failed SDD due to groin hematoma requiring observation overnight and was discharged the following day. No other complications were reported. Patients were scheduled for a three-month TTE follow-up to assess for any residual shunting. At three months follow up, 45/48 (94%) had no residual shunt.

In a nonrandomized, retrospective, single-center observational study Barker *et al*[45] analyzed peri-procedural outcomes of 467 patients undergoing PFO closure. All patients underwent closure with the Amplatzer PFO Occluder; 381 patients underwent fluoroscopy-only occlusion and 86 patients with ICE guidance. ICE guidance was used as a backup modality and limited to complex atrial septal anatomy as seen on TEE. There was no significant difference in periprocedural complications between the fluoroscopy-only and ICE group. SDD occurred in 97.6% of all patients; 98.2% and 95.3% in the fluoroscopy and ICE group respectively (*P* = 0.246). Complete closure was seen in 94.6% of patients at the three-month TTE follow-up. There was no significant difference in death, 30-day readmission, device thrombosis, and stroke/TIA between the fluoroscopy-only and ICE group. As of the writing of this article, the literature review reveals only one prospective case series proposing a SDD clinical pathway for patients undergoing ASD/PFO closure[46]. Prerequisites for SDD following PFO closure in their study includes hemodynamic stability and the ability to ambulate 2 h post- procedure. Patients are permitted to go home 1-hour post mobilization with a 6-month TEE follow-up and 6 months of antithrombotic therapy based on the device placed. In their study of 187 patients that underwent PFO/ASD closure (PFO = 117, ASD = 70); SDD occurred in 99.4% of cases. There were no major complications, and a 6-month TEE revealed no residual shunt in 96% of patients[46].

**FUTURE SCOPE**

Adopting a standardized method for same-day discharges will help reduce adverse events. However, as most of the evidence available to date comes from case series and retrospective studies, there is a need for larger prospective studies to be undertaken to validate the safety of SDD across a greater cohort of patients undergoing structural intervention cardiac procedures, to be reflected in the guidelines, before it becomes the standard of care.

**CONCLUSION**

Same-day discharge appears to be feasible in appropriately selected patients undergoing TAVR, Mitra-clip, LAA, ASD/PFO closure. Safe same-day discharge has the potential to not only reduce hospital costs but also improve patient satisfaction. The availability of a “heart team” consisting of a multi-disciplinary group of providers to identify suitable patients for SDD is prudent. Additionally, only centers with significant volume and experience performing complex structural procedures should consider SDD in their pre-selected suitable patients. We propose an algorithm to facilitate SDD following structural intervention procedures based on the review of available literature (Figure 2, central figure). We also provide a framework checklist to consider when adopting a SDD approach at centers performing structural intervention procedures along with a summary of previous studies with SDD with structural heart procedures (Tables 1 and 2).

**REFERENCES**

1 **Rao SV**, Kaltenbach LA, Weintraub WS, Roe MT, Brindis RG, Rumsfeld JS, Peterson ED. Prevalence and outcomes of same-day discharge after elective percutaneous coronary intervention among older patients. *JAMA* 2011; **306**: 1461-1467 [PMID: 21972308 DOI: 10.1001/jama.2011.1409]

2 **Shroff A**, Kupfer J, Gilchrist IC, Caputo R, Speiser B, Bertrand OF, Pancholy SB, Rao SV. Same-Day Discharge After Percutaneous Coronary Intervention: Current Perspectives and Strategies for Implementation. *JAMA Cardiol* 2016; **1**: 216-223 [PMID: 27437896 DOI: 10.1001/jamacardio.2016.0148]

3 **Kim M**, Muntner P, Sharma S, Choi JW, Stoler RC, Woodward M, Mann DM, Farkouh ME. Assessing patient-reported outcomes and preferences for same-day discharge after percutaneous coronary intervention: results from a pilot randomized, controlled trial. *Circ Cardiovasc Qual Outcomes* 2013; **6**: 186-192 [PMID: 23481528 DOI: 10.1161/CIRCOUTCOMES.111.000069]

4 **Glaser R**, Gertz Z, Matthai WH, Wilensky RL, Weiner M, Kolansky D, Hirshfeld J Jr, Herrmann H. Patient satisfaction is comparable to early discharge versus overnight observation after elective percutaneous coronary intervention. *J Invasive Cardiol* 2009; **21**: 464-467 [PMID: 19726820 DOI: 10.1007/s10840-008-9353-8]

5 **Writing Committee**, Rao SV, Vidovich MI, Gilchrist IC, Gulati R, Gutierrez JA, Hess CN, Kaul P, Martinez SC, Rymer J. 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 [PMID: 33423859 DOI: 10.1016/j.jacc.2020.11.013]

6 **Perdoncin E**, Greenbaum AB, Grubb KJ, Babaliaros VC, Keegan P, Ceretto-Clark B, Wei J, Guyton RA, Paone G, Byku I, Gleason PT, Biven K, Mathew P, Mortorano C, Inci EK, Faaborg-Andersen C, Mitchell R, Devireddy CM. Safety of same-day discharge after uncomplicated, minimalist transcatheter aortic valve replacement in the COVID-19 era. *Catheter Cardiovasc Interv* 2021; **97**: 940-947 [PMID: 33382519 DOI: 10.1002/ccd.29453]

7 **Shah PB**, Welt FGP, Mahmud E, Phillips A, Kleiman NS, Young MN, Sherwood M, Batchelor W, Wang DD, Davidson L, Wyman J, Kadavath S, Szerlip M, Hermiller J, Fullerton D, Anwaruddin S; American College of Cardiology and the Society for Cardiovascular Angiography and Interventions. Triage Considerations for Patients Referred for Structural Heart Disease Intervention During the COVID-19 Pandemic: An ACC/SCAI Position Statement. *JACC Cardiovasc Interv* 2020; **13**: 1484-1488 [PMID: 32250751 DOI: 10.1016/j.jcin.2020.04.001]

8 **Blackshear JL**, Odell JA. Appendage obliteration to reduce stroke in cardiac surgical patients with atrial fibrillation. *Ann Thorac Surg* 1996; **61**: 755-759 [PMID: 8572814 DOI: 10.1016/0003-4975(95)00887-X]

9 **January CT**, Wann LS, Calkins H, Chen LY, Cigarroa JE, Cleveland JC Jr, Ellinor PT, Ezekowitz MD, Field ME, Furie KL, Heidenreich PA, Murray KT, Shea JB, Tracy CM, Yancy CW. 2019 AHA/ACC/HRS Focused Update of the 2014 AHA/ACC/HRS Guideline for the Management of Patients With Atrial Fibrillation: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society in Collaboration With the Society of Thoracic Surgeons. *Circulation* 2019; **140**: e125-e151 [PMID: 30686041 DOI: 10.1161/CIR.0000000000000665]

10 **Holmes DR**, Reddy VY, Turi ZG, Doshi SK, Sievert H, Buchbinder M, Mullin CM, Sick P; PROTECT AF Investigators. Percutaneous closure of the left atrial appendage versus warfarin therapy for prevention of stroke in patients with atrial fibrillation: a randomised non-inferiority trial. *Lancet* 2009; **374**: 534-542 [PMID: 19683639 DOI: 10.1016/S0140-6736(09)61343-X]

11 **Holmes DR Jr**, Kar S, Price MJ, Whisenant B, Sievert H, Doshi SK, Huber K, Reddy VY. Prospective randomized evaluation of the Watchman Left Atrial Appendage Closure device in patients with atrial fibrillation versus long-term warfarin therapy: the PREVAIL trial. *J Am Coll Cardiol* 2014; **64**: 1-12 [PMID: 24998121 DOI: 10.1016/j.jacc.2014.04.029]

12 **Boersma LV**, Schmidt B, Betts TR, Sievert H, Tamburino C, Teiger E, Pokushalov E, Kische S, Schmitz T, Stein KM, Bergmann MW; EWOLUTION investigators. Implant success and safety of left atrial appendage closure with the WATCHMAN device: peri-procedural outcomes from the EWOLUTION registry. *Eur Heart J* 2016; **37**: 2465-2474 [PMID: 26822918 DOI: 10.1093/eurheartj/ehv730]

13 **Gilhofer TS**, Inohara T, Parsa A, Walker M, Uchida N, Tsang M, Saw J. Safety and Feasibility of Same-Day Discharge After Left Atrial Appendage Closure. *Can J Cardiol* 2020; **36**: 945-947 [PMID: 32536375 DOI: 10.1016/j.cjca.2020.02.069]

14 **Tan BE**, Boppana LKT, Abdullah AS, Chuprun D, Shah A, Rao M, Bhatt DL, Depta JP. Safety and Feasibility of Same-Day Discharge After Left Atrial Appendage Closure With the WATCHMAN Device. *Circ Cardiovasc Interv* 2021; **14**: e009669 [PMID: 33423538 DOI: 10.1161/CIRCINTERVENTIONS.120.009669]

15 **Marmagkiolis K**, Ates I, Kose G, Iliescu C, Cilingiroglu M. Effectiveness and safety of same day discharge after left atrial appendage closure under moderate conscious sedation. *Catheter Cardiovasc Interv* 2021; **97**: 912-916 [PMID: 33197110 DOI: 10.1002/ccd.29376]

16 **Williams T**, Alsanjari O, Parker J, Gannaway A, Thomson C, Gomes A, Hildick-Smith D. Day-case percutaneous left atrial appendage occlusion-Safety and efficacy. *Catheter Cardiovasc Interv* 2018; **92**: 1439-1443 [PMID: 30244516 DOI: 10.1002/ccd.27791]

17 **Glikson M**, Wolff R, Hindricks G, Mandrola J, Camm AJ, Lip GYH, Fauchier L, Betts TR, Lewalter T, Saw J, Tzikas A, Sternik L, Nietlispach F, Berti S, Sievert H, Bertog S, Meier B. EHRA/EAPCI expert consensus statement on catheter-based left atrial appendage occlusion - an update. *EuroIntervention* 2020; **15**: 1133-1180 [PMID: 31474583 DOI: 10.4244/EIJY19M08\_01]

18 **Asgar AW**, Mack MJ, Stone GW. Secondary mitral regurgitation in heart failure: pathophysiology, prognosis, and therapeutic considerations. *J Am Coll Cardiol* 2015; **65**: 1231-1248 [PMID: 25814231 DOI: 10.1016/j.jacc.2015.02.009]

19 **Sannino A**, Smith RL 2nd, Schiattarella GG, Trimarco B, Esposito G, Grayburn PA. Survival and Cardiovascular Outcomes of Patients With Secondary Mitral Regurgitation: A Systematic Review and Meta-analysis. *JAMA Cardiol* 2017; **2**: 1130-1139 [PMID: 28877291 DOI: 10.1001/jamacardio.2017.2976]

20 **Obadia JF**, Messika-Zeitoun D, Leurent G, Iung B, Bonnet G, Piriou N, Lefèvre T, Piot C, Rouleau F, Carrié D, Nejjari M, Ohlmann P, Leclercq F, Saint Etienne C, Teiger E, Leroux L, Karam N, Michel N, Gilard M, Donal E, Trochu JN, Cormier B, Armoiry X, Boutitie F, Maucort-Boulch D, Barnel C, Samson G, Guerin P, Vahanian A, Mewton N; MITRA-FR Investigators. Percutaneous Repair or Medical Treatment for Secondary Mitral Regurgitation. *N Engl J Med* 2018; **379**: 2297-2306 [PMID: 30145927 DOI: 10.1056/NEJMoa1805374]

21 **Stone GW**, Lindenfeld J, Abraham WT, Kar S, Lim DS, Mishell JM, Whisenant B, Grayburn PA, Rinaldi M, Kapadia SR, Rajagopal V, Sarembock IJ, Brieke A, Marx SO, Cohen DJ, Weissman NJ, Mack MJ; COAPT Investigators. Transcatheter Mitral-Valve Repair in Patients with Heart Failure. *N Engl J Med* 2018; **379**: 2307-2318 [PMID: 30280640 DOI: 10.1056/NEJMoa1806640]

22 **Pibarot P**, Delgado V, Bax JJ. MITRA-FR vs. COAPT: lessons from two trials with diametrically opposed results. *Eur Heart J Cardiovasc Imaging* 2019; **20**: 620-624 [PMID: 31115470 DOI: 10.1093/ehjci/jez073]

23 **Writing Committee**, Maddox TM, Januzzi JL Jr, Allen LA, Breathett K, Butler J, Davis LL, Fonarow GC, Ibrahim NE, Lindenfeld J, Masoudi FA, Motiwala SR, Oliveros E, Patterson JH, Walsh MN, Wasserman A, Yancy CW, Youmans QR. 2021 Update to the 2017 ACC Expert Consensus Decision Pathway for Optimization of Heart Failure Treatment: Answers to 10 Pivotal Issues About Heart Failure With Reduced Ejection Fraction: A Report of the American College of Cardiology Solution Set Oversight Committee. *J Am Coll Cardiol* 2021; **77**: 772-810 [PMID: 33446410 DOI: 10.1016/j.jacc.2020.11.022]

24 **Marmagkiolis K**, Kilic ID, Ates I, Kose G, Iliescu C, Cilingiroglu M. Feasibility of Same-Day Discharge Approach After Transcatheter Mitral Valve Repair Procedures. *J Invasive Cardiol* 2021; **33**: E123-E126 [PMID: 33443488]

25 **Chen C**, Okoh AK, Stump K, Smith M, Pannebianco C, Sethi A, Lee LY, Russo MJ. Expedited MitraClip: Rapid Evaluation, Treatment, and Discharge in the COVID-19 Era. *Cardiovasc Revasc Med* 2021; **28S**: 54-56 [PMID: 33214052 DOI: 10.1016/j.carrev.2020.11.012]

26 **Maganti K**, Rigolin VH, Sarano ME, Bonow RO. Valvular heart disease: diagnosis and management. *Mayo Clin Proc* 2010; **85**: 483-500 [PMID: 20435842 DOI: 10.4065/mcp.2009.0706]

27 **Nishimura RA**, Otto CM, Bonow RO, Carabello BA, Erwin JP 3rd, Fleisher LA, Jneid H, Mack MJ, McLeod CJ, O'Gara PT, Rigolin VH, Sundt TM 3rd, Thompson A. 2017 AHA/ACC Focused Update of the 2014 AHA/ACC Guideline for the Management of Patients With Valvular Heart Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Circulation* 2017; **135**: e1159-e1195 [PMID: 28298458 DOI: 10.1161/CIR.0000000000000503]

28 **Makkar RR**, Thourani VH, Mack MJ, Kodali SK, Kapadia S, Webb JG, Yoon SH, Trento A, Svensson LG, Herrmann HC, Szeto WY, Miller DC, Satler L, Cohen DJ, Dewey TM, Babaliaros V, Williams MR, Kereiakes DJ, Zajarias A, Greason KL, Whisenant BK, Hodson RW, Brown DL, Fearon WF, Russo MJ, Pibarot P, Hahn RT, Jaber WA, Rogers E, Xu K, Wheeler J, Alu MC, Smith CR, Leon MB; PARTNER 2 Investigators. Five-Year Outcomes of Transcatheter or Surgical Aortic-Valve Replacement. *N Engl J Med* 2020; **382**: 799-809 [PMID: 31995682 DOI: 10.1056/NEJMoa1910555]

29 **Rodés-Cabau J**, Ellenbogen KA, Krahn AD, Latib A, Mack M, Mittal S, Muntané-Carol G, Nazif TM, Sondergaard L, Urena M, Windecker S, Philippon F. Management of Conduction Disturbances Associated With Transcatheter Aortic Valve Replacement: JACC Scientific Expert Panel. *J Am Coll Cardiol* 2019; **74**: 1086-1106 [PMID: 31439219 DOI: 10.1016/j.jacc.2019.07.014]

30 **Kamioka N**, Wells J, Keegan P, Lerakis S, Binongo J, Corrigan F, Condado J, Patel A, Forcillo J, Ogburn L, Dong A, Caughron H, Simone A, Leshnower B, Devireddy C, Mavromatis K, Guyton R, Stewart J, Thourani V, Block PC, Babaliaros V. Predictors and Clinical Outcomes of Next-Day Discharge After Minimalist Transfemoral Transcatheter Aortic Valve Replacement. *JACC Cardiovasc Interv* 2018; **11**: 107-115 [PMID: 29348004 DOI: 10.1016/j.jcin.2017.10.021]

31 **Russo MJ**, Okoh AK, Stump K, Smith M, Erinne I, Johannesen J, Chaudhary A, Chiricolo A, Hakeem A, Lemaire A, Lee LY, Chen C. Safety and Feasibility of Same Day Discharge after Transcatheter Aortic Valve Replacement Post COVID-19. *Struct Heart* 2021; **5**: 182-185 [PMID: 35378799 DOI: 10.1080/24748706.2020.1853861]

32 **Rai D**, Tahir MW, Chowdhury M, Ali H, Buttar R, Abtahian F, Bhatt DL, Depta JP. Transcatheter aortic valve replacement same-day discharge for selected patients: a case series. *Eur Heart J Case Rep* 2021; **5**: ytaa556 [PMID: 33598624 DOI: 10.1093/ehjcr/ytaa556]

33 **Krishnaswamy A**, Sammour Y, Mangieri A, Kadri A, Karrthik A, Banerjee K, Kaur M, Giannini F, Pagliaro B, Ancona M, Pagnesi M, Laricchia A, Weisz G, Lyden M, Bazarbashi N, Gad M, Ahuja K, Mick S, Svensson L, Puri R, Reed G, Rickard J, Colombo A, Kapadia S, Latib A. The Utility of Rapid Atrial Pacing Immediately Post-TAVR to Predict the Need for Pacemaker Implantation. *JACC Cardiovasc Interv* 2020; **13**: 1046-1054 [PMID: 32305392 DOI: 10.1016/j.jcin.2020.01.215]

34 **Mangieri A**, Lanzillo G, Bertoldi L, Jabbour RJ, Regazzoli D, Ancona MB, Tanaka A, Mitomo S, Garducci S, Montalto C, Pagnesi M, Giannini F, Giglio M, Montorfano M, Chieffo A, Rodès-Cabau J, Monaco F, Paglino G, Della Bella P, Colombo A, Latib A. Predictors of Advanced Conduction Disturbances Requiring a Late (≥48 H) Permanent Pacemaker Following Transcatheter Aortic Valve Replacement. *JACC Cardiovasc Interv* 2018; **11**: 1519-1526 [PMID: 30093056 DOI: 10.1016/j.jcin.2018.06.014]

35 **Van Belle E**, Vincent F, Labreuche J, Auffret V, Debry N, Lefèvre T, Eltchaninoff H, Manigold T, Gilard M, Verhoye JP, Himbert D, Koning R, Collet JP, Leprince P, Teiger E, Duhamel A, Cosenza A, Schurtz G, Porouchani S, Lattuca B, Robin E, Coisne A, Modine T, Richardson M, Joly P, Rioufol G, Ghostine S, Bar O, Amabile N, Champagnac D, Ohlmann P, Meneveau N, Lhermusier T, Leroux L, Leclercq F, Gandet T, Pinaud F, Cuisset T, Motreff P, Souteyrand G, Iung B, Folliguet T, Commeau P, Cayla G, Bayet G, Darremont O, Spaulding C, Le Breton H, Delhaye C. Balloon-Expandable Versus Self-Expanding Transcatheter Aortic Valve Replacement: A Propensity-Matched Comparison From the FRANCE-TAVI Registry. *Circulation* 2020; **141**: 243-259 [PMID: 31736356 DOI: 10.1161/CIRCULATIONAHA.119.043785]

36 **Popma JJ**, Deeb GM, Yakubov SJ, Mumtaz M, Gada H, O'Hair D, Bajwa T, Heiser JC, Merhi W, Kleiman NS, Askew J, Sorajja P, Rovin J, Chetcuti SJ, Adams DH, Teirstein PS, Zorn GL 3rd, Forrest JK, Tchétché D, Resar J, Walton A, Piazza N, Ramlawi B, Robinson N, Petrossian G, Gleason TG, Oh JK, Boulware MJ, Qiao H, Mugglin AS, Reardon MJ; Evolut Low Risk Trial Investigators. Transcatheter Aortic-Valve Replacement with a Self-Expanding Valve in Low-Risk Patients. *N Engl J Med* 2019; **380**: 1706-1715 [PMID: 30883053 DOI: 10.1056/NEJMoa1816885]

37 **Stout KK**, Daniels CJ, Aboulhosn JA, Bozkurt B, Broberg CS, Colman JM, Crumb SR, Dearani JA, Fuller S, Gurvitz M, Khairy P, Landzberg MJ, Saidi A, Valente AM, Van Hare GF. 2018 AHA/ACC Guideline for the Management of Adults With Congenital Heart Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Circulation* 2019; **139**: e698-e800 [PMID: 30586767 DOI: 10.1161/CIR.0000000000000603]

38 **Mojadidi MK**, Zaman MO, Elgendy IY, Mahmoud AN, Patel NK, Agarwal N, Tobis JM, Meier B. Cryptogenic Stroke and Patent Foramen Ovale. *J Am Coll Cardiol* 2018; **71**: 1035-1043 [PMID: 29495983 DOI: 10.1016/j.jacc.2017.12.059]

39 **Furlan AJ**, Reisman M, Massaro J, Mauri L, Adams H, Albers GW, Felberg R, Herrmann H, Kar S, Landzberg M, Raizner A, Wechsler L; CLOSURE I Investigators. Closure or medical therapy for cryptogenic stroke with patent foramen ovale. *N Engl J Med* 2012; **366**: 991-999 [PMID: 22417252 DOI: 10.1056/NEJMoa1009639]

40 **Meier B**, Kalesan B, Mattle HP, Khattab AA, Hildick-Smith D, Dudek D, Andersen G, Ibrahim R, Schuler G, Walton AS, Wahl A, Windecker S, Jüni P; PC Trial Investigators. Percutaneous closure of patent foramen ovale in cryptogenic embolism. *N Engl J Med* 2013; **368**: 1083-1091 [PMID: 23514285 DOI: 10.1056/NEJMoa1211716]

41 **Carroll JD**, Saver JL, Thaler DE, Smalling RW, Berry S, MacDonald LA, Marks DS, Tirschwell DL; RESPECT Investigators. Closure of patent foramen ovale versus medical therapy after cryptogenic stroke. *N Engl J Med* 2013; **368**: 1092-1100 [PMID: 23514286 DOI: 10.1056/NEJMoa1301440]

42 **Mas JL**, Derumeaux G, Guillon B, Massardier E, Hosseini H, Mechtouff L, Arquizan C, Béjot Y, Vuillier F, Detante O, Guidoux C, Canaple S, Vaduva C, Dequatre-Ponchelle N, Sibon I, Garnier P, Ferrier A, Timsit S, Robinet-Borgomano E, Sablot D, Lacour JC, Zuber M, Favrole P, Pinel JF, Apoil M, Reiner P, Lefebvre C, Guérin P, Piot C, Rossi R, Dubois-Randé JL, Eicher JC, Meneveau N, Lusson JR, Bertrand B, Schleich JM, Godart F, Thambo JB, Leborgne L, Michel P, Pierard L, Turc G, Barthelet M, Charles-Nelson A, Weimar C, Moulin T, Juliard JM, Chatellier G; CLOSE Investigators. Patent Foramen Ovale Closure or Anticoagulation vs. Antiplatelets after Stroke. *N Engl J Med* 2017; **377**: 1011-1021 [PMID: 28902593 DOI: 10.1056/NEJMoa1705915]

43 **Søndergaard L**, Kasner SE, Rhodes JF, Andersen G, Iversen HK, Nielsen-Kudsk JE, Settergren M, Sjöstrand C, Roine RO, Hildick-Smith D, Spence JD, Thomassen L; Gore REDUCE Clinical Study Investigators. Patent Foramen Ovale Closure or Antiplatelet Therapy for Cryptogenic Stroke. *N Engl J Med* 2017; **377**: 1033-1042 [PMID: 28902580 DOI: 10.1056/NEJMoa1707404]

44 **Ponnuthurai FA**, van Gaal WJ, Burchell A, Mitchell AR, Wilson N, Ormerod OJ. Safety and feasibility of day case patent foramen ovale (PFO) closure facilitated by intracardiac echocardiography. *Int J Cardiol* 2009; **131**: 438-440 [PMID: 18037512 DOI: 10.1016/j.ijcard.2007.07.141]

45 **Barker M**, Muthuppalaniappan AM, Abrahamyan L, Osten MD, Benson LN, Bach Y, Ma J, Abraha N, Horlick E. Periprocedural Outcomes of Fluoroscopy-Guided Patent Foramen Ovale Closure With Selective Use of Intracardiac Echocardiography. *Can J Cardiol* 2020; **36**: 1608-1615 [PMID: 32610094 DOI: 10.1016/j.cjca.2019.12.032]

46 **Barker M**, Sathananthan J, Saw J, Lauck S, Teal P, Fahmy P, Gilhofer T, Parsa A, Alsulaimi A, Hensey M, Alkhodair A, Landes U, Webb J, Wood D. TCT-767 safety and feasibility of same day discharge using the Vancouver PFO/ASD Clinical Pathway. *J Am Coll Cardiol* 2019; **74**:B752 [DOI: 10.1016/j.jacc.2019.08.908]

**Footnotes**

**Conflict-of-interest statement:** There is no conflict of interest associated with any of the senior author or other coauthors contributed their efforts in this manuscript.

**Open-Access:** This article is an open-access article that was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution NonCommercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: https://creativecommons.org/Licenses/by-nc/4.0/

**Provenance and peer review:** Invited article; Externally peer reviewed.

**Peer-review model:** Single blind

**Peer-review started:** October 26, 2021

**First decision:** March 7, 2022

**Article in press:** April 21, 2022

**Specialty type:** Cardiac and cardiovascular systems

**Country/Territory of origin:** United States

**Peer-review report’s scientific quality classification**

Grade A (Excellent): 0

Grade B (Very good): B, B

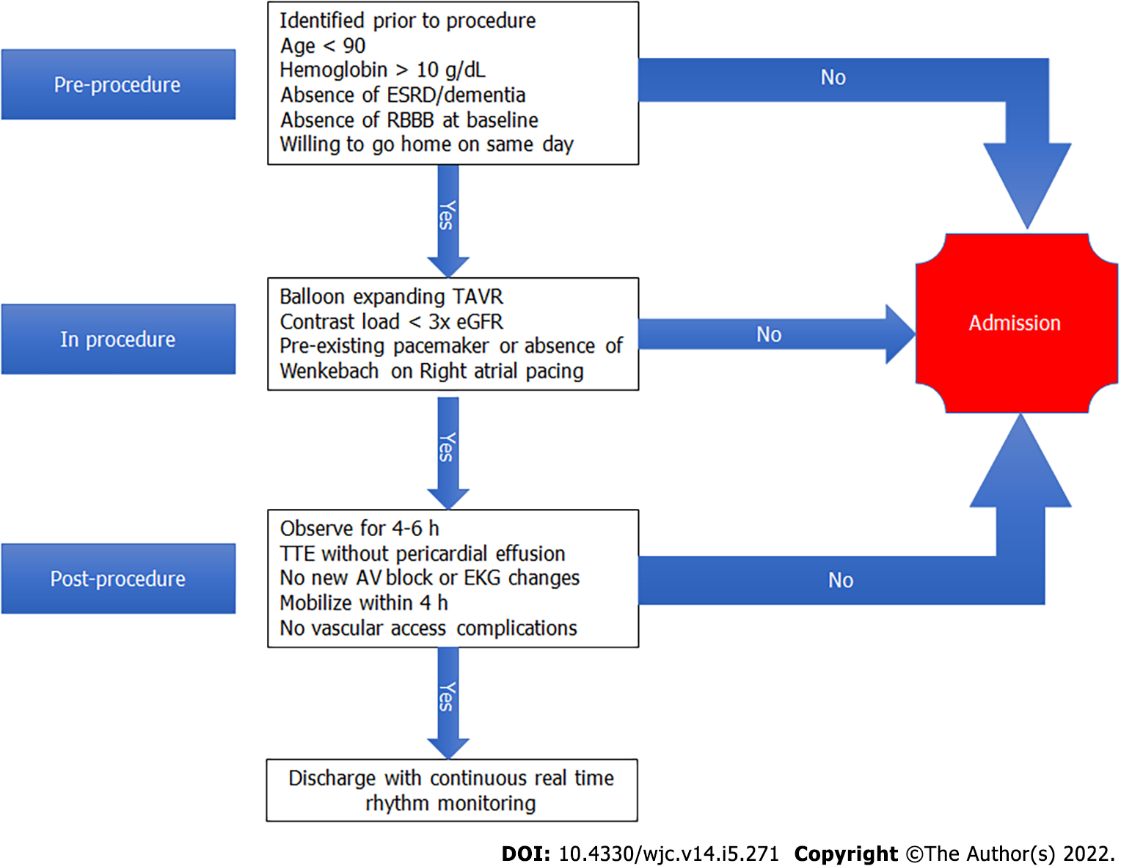
Grade C (Good): 0

Grade D (Fair): 0

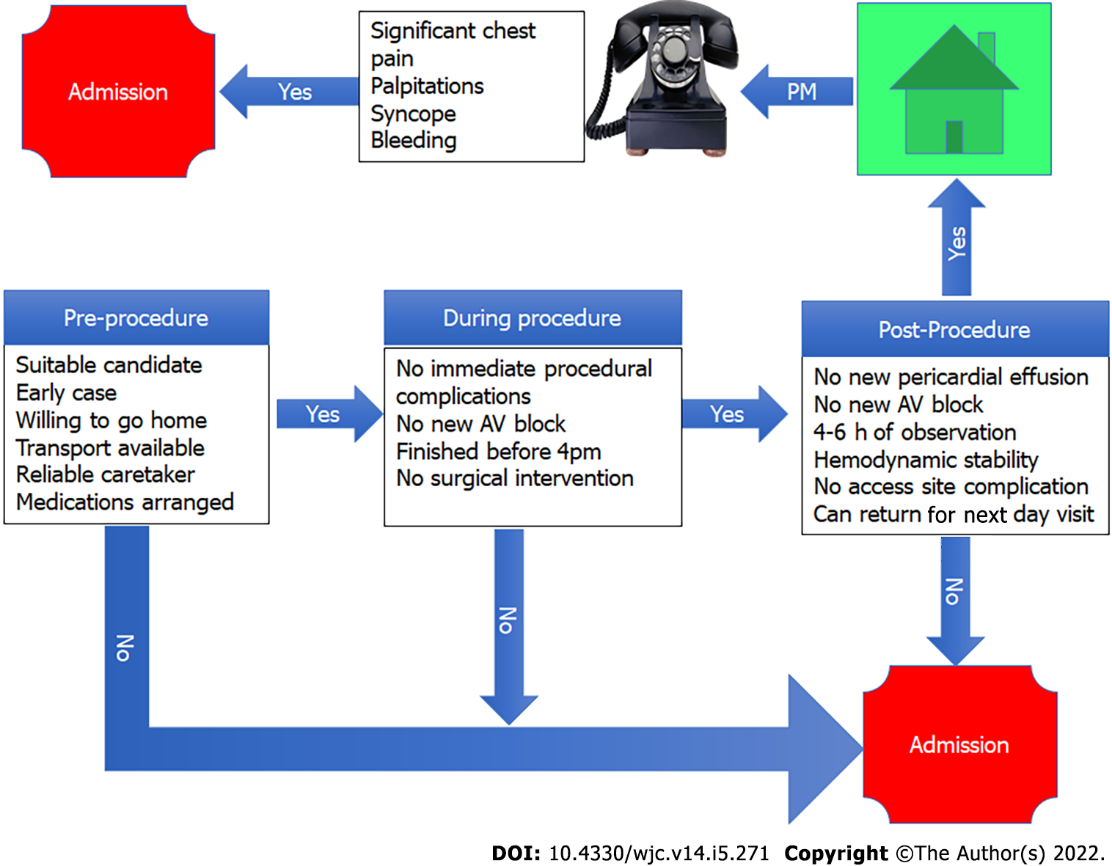
Grade E (Poor): 0

**P-Reviewer:** Naik N, India; Sunder T, India **S-Editor:** Ma YJ **L-Editor:** A **P-Editor:** Ma YJ

**Figure Legends**



**Figure 1 Proposed algorithm for same day discharge for patients undergoing transcatheter aortic valve replacement.** AV: Atrio-ventricular; eGFR: Estimated glomerular filtration rate; EKG: Electrocardiogram; ESRD: End stage renal disease; RBBB: Right bundle branch block; TAVR: Transcatheter aortic valve replacement; TTE: Transthoracic echocardiogram.



**Figure 2 Proposed algorithm for same day discharge for patients undergoing structural interventional procedures.**AV: Atrio-ventricular.

**Table 1 Proposed pre-requisites for same day discharge in structural cardiac procedures**

|  |
| --- |
| ***Pre-procedure*** |
| Administrative buy-in |
| Experienced operator |
| Same day discharge multi-disciplinary team including social workers and nursing |
| Elective procedure |
| Reliable means for follow-up |
| Patient without significant co-morbidities |
| Willing to depart on the same day |
| Adequate social support |
| ***During procedure*** |
| Intra-Procedural monitoring without significant hemodynamic compromise |
| Successful vascular access without immediate complications |
| Successful deployment of device |
| Right atrial pacing for TAVR without wenkebach |
| ***Post-procedure*** |
| Hemodynamic monitoring for 4-6 h without instability |
| Able to mobilize without assistance |
| Vascular access site integrity |
| TTE without significant pericardial effusion |
| No new AV block or inter-ventricular conduction delays |
| Prescriptions arranged |
| Evening phone call from provider |
| Next day in-person follow up for imaging and laboratory investigations |

AV: Atrioventricular; TAVR: Transcatheter aortic valve replacement; TTE: Transthoracic echocardiogram.

**Table 2 Summary of Studies with same day discharges for structural heart disease procedures**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Ref.** | **Year** | **Procedure** | **Same day discharge, *n*** | **Outcome** |
| Gilhofer *et al*[13] | 2020 | LAAO | 24 | No significant difference in overall events between SDD and non SDD |
| Tan *et al*[14] | 2021 | LAAO | 72 | No significant difference in 7 and 45 d outcomes between SDD and non SDD |
| Marmagkiolis *et al*[15] | 2021 | LAAO | 112 | No complications among patients that underwent SDD |
| Williams *et al*[16] | 2018 | LAAO | 78 | 1 patient from the SDD group was readmitted within 7 d |
| Marmagkiolis *et al*[24] | 2021 | Mitra-clip | 82 | No intra-procedure complications, only 1 patient had minor access site hematoma |
| Chen *et al*[25] | 2020 | Mitra-clip | 1 | No post procedure complication |
| Perdoncin *et al*[6] | 2021 | TAVR | 29 | No in hospital complications, no 30 d deaths |
| Russo *et al*[31] | 2020 | TAVR | 3 | No deaths or re-admissions within 24 d of procedure |
| Rai *et al*[32] | 2021 | TAVR | 6 | No immediate complications or events on 7 d rhythm monitor |
| Ponnuthurai *et al*[44] | 2009 | PFO/ASD | 48 | One Patient with groin hematoma immediately after procedure |
| Barker *et al*[45] | 2020 | PFO/ASD | 455 | No significant difference in death, 30 d readmission, device thrombosis, and stroke/TIA |

ASD: Atrial septal defect; LAAO: Left atrial appendage occlusion; PFO: Patent foramen ovale; SDD: Same day discharge; TAVR: Transcatheter aortic valve replacement; TIA: Transient ischemic attack.



Published by **Baishideng Publishing Group Inc**

7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA

**Telephone:** +1-925-3991568

**E-mail:** bpgoffice@wjgnet.com

**Help Desk:** https://www.f6publishing.com/helpdesk

https://www.wjgnet.com



**© 2022 Baishideng Publishing Group Inc. All rights reserved.**