

EDITORIAL COMMENT

# Next-Day Discharge After Transcatheter Aortic Valve Replacement A Goal or a Consequence?\*



Molly Szerlip, MD

**T**rascatheter aortic valve replacement (TAVR) has become the standard of care for patients with severe aortic stenosis and deemed inoperable or high or intermediate risk for surgery. Because this procedure is performed by a percutaneous access, recovery is much easier for the patient, thus leading to a quicker recovery with a consequent decrease in length of hospital stay and in some cases discharge the day following the procedure. This is important not only for the possibility of returning elderly patients to their home environment expeditiously, but also for the economic aspects of these procedures. To facilitate this recovery, a so-called minimalist approach (MA) for performance of the procedure has been established. However, there are multiple definitions as to what exactly this means and there has not been a standardization of this approach. In the strictest sense, some programs define the MA as conscious sedation during the procedure, which is performed in a cath lab on transfemoral (TF) TAVR patients.

SEE PAGE 107

In this issue of *JACC: Cardiovascular Interventions*, Kamioka et al. (1) reviewed their TAVR experience with a goal of defining predictors of next-day discharge (NDD) in patients undergoing TAVR via the TF approach as well as determining the clinical outcomes in these patients. They retrospectively

reviewed 663 consecutive patients who underwent elective TAVR from July 2014 to July 2016. Of these, 360 patients were included in the study, 150 had NDD and 210 did not. All patients had TF TAVR under conscious sedation and local anesthesia with either a SAPIEN XT or Sapien 3 valve (Edwards Lifesciences, Irvine, California). They also all had a pre-procedure 3-dimensional imaging with multidetector computed tomography (MDCT) and had no complications during the procedure. The study had 2 objectives: 1) to identify predictors of NDD in patients undergoing TAVR using their MA; and 2) to compare the 30-day and 1-year composite outcomes of mortality and readmission between NDD and non-NDD patients. They chose as their primary endpoint the composite of mortality and readmission at 1 year and the secondary endpoint as the composite of mortality and readmission at 30 days. The authors found that predictors of NDD included male sex (odds ratio [OR]: 2.02; 95% confidence interval [CI]: 1.28 to 3.18), absence of atrial fibrillation (AF) (OR: 1.62; 95% CI: 1.02 to 2.57), serum creatinine (OR: 0.71; 95% CI: 0.55 to 0.92), and younger age (OR: 0.95; 95% CI: 0.93 to 0.98). They also found that there was no difference in the rate of 30-day death and readmission between NDD and non-NDD (hazard ratio: 0.62; 95% CI: 0.20 to 1.91) but at 1 year mortality and readmission was significantly lower in the NDD group (hazard ratio: 0.47; 95% CI: 0.27 to 0.81).

We applaud the Emory team's leadership in this field. They have been leaders in defining and promoting the MA and to helping us understand how we can safely reduce the length of stay on TAVR patients without reducing the quality of care (2). However, I am not sure that this particular study adds more to the knowledge base in this field than what is already known. There are significant shortcomings of this

\*Editorials published in *JACC: Cardiovascular Interventions* reflect the views of the authors and do not necessarily represent the views of *JACC: Cardiovascular Interventions* or the American College of Cardiology.

From the Department of Interventional Cardiology, the Heart Hospital Baylor Plano, Plano, Texas. Dr. Szerlip has served as a proctor for Edwards Lifesciences and a speaker for Edwards Lifesciences and Medtronic.

**TABLE 1 Minimalist Patient Care Pathway**

|                |   |
|----------------|---|
| Pre-procedure  | Set patient and family expectation for NDD  |
| Intraprocedure | No pulmonary artery catheter<br>No urinary catheter<br>Transthoracic echocardiography<br>Conscious sedation or immediate extubation if GA   |
| Post-procedure | Avoidance of narcotic use<br>Up in chair at 4 h, mobilization at 8 h<br>Early institution of home BP meds except AV nodal blockers<br>Early decision of need for permanent pacemaker<br>Early patient rounding the first post-operative day |

AV = atrioventricular; BP = blood pressure; GA = general anesthesia; NDD = next-day discharge.

study, which may raise more questions than answers. This report studied a highly selective patient population from the overall pool of patients. Patients excluded from the analysis were anyone who had a general anesthetic, a complication, received a self-expanding valve, or did not have a pre-procedure 3-dimensional MDCT. This meant that only 150 patients of the original 663 (23%) patients had NDD after TAVR. The mean Society of Thoracic Surgeons Predicted Risk of Mortality (STS PROM) score of these patients was  $6.6 \pm 3.7\%$ . Three-quarters of the patients were excluded from this study. I do not know if any of the excluded patients had conscious sedation or if they went home the next day. Because of these exclusions it is difficult to know from this study if this treatment is generalizable to a larger TAVR population. Patients with transesophageal echocardiography (TEE) or magnetic resonance imaging were also excluded. TEE and more importantly 3-dimensional TEE as well as cardiac magnetic resonance imaging are acceptable alternatives when MDCT cannot be performed for pre-procedure assessment (3,4).

The study found that male sex, absence of AF, serum creatinine, and age were the main predictors of NDD. Yet all are components of the STS PROM and are major drivers of the risk algorithm. It is therefore of no surprise that these 4 variables have the same receiver-operating characteristic as the STS PROM. It is not clear as to how these predictors from the study add to the STS PROM in predicting who is more likely to go home the next day.

The authors also concluded that there was no difference in 30-day outcomes of death and readmission between NDD and non-NDD patients. That is helpful information, offering reassurance that patient safety is not being compromised. But it is not clear why the authors chose a primary study endpoint of 1-year clinical outcomes (mortality and readmission). One would not expect that whether the patient was discharged the next day or days 2, 3, or 4 following the

procedure that any outcome other than short term would be affected. The 1-year superior outcome for NDD was driven only by a statistically significant reduction in noncardiovascular readmissions of the NDD cohort. This merely reemphasizes that the NDD patients in this study were lower risk rather than that they benefited by NDD.

The minimalist approach is not standardized from center to center. These authors define it as transfemoral under conscious sedation and local anesthesia. We believe that this is an overly narrow definition of the minimalist approach. All aspects of patient care should be minimized as long as it does not adversely affect patient outcomes.

It is our approach that all patients undergoing TAVR should be entered into a minimalist care pathway from the beginning. At every step of care, it is our practice that we should minimize the interventions for each patient. For example, patients undergoing TAVR under general anesthesia can still be extubated in the operating room, enter the same care pathway, and be discharged the next day. We do not know how many patients in this series had general anesthesia and went home the next day as they were excluded from this study. We have also found that most patients can safely undergo TAVR without pulmonary artery catheters, urinary catheters or narcotics—all which are major factors precluding routine NDD. In my experience, elimination of these factors as well as setting NDD expectations with the patient and their family at the time of the initial visit before the procedure and early post-procedure mobilization (within 4 h post-procedure) are major components of a MA care pathway. This approach allows all patients to potentially have a reduced length of stay whether the access route was TF, subclavian, or transapical or aortic. The goal of a MA is to eliminate all the nonessential components of care that encumber recovery without jeopardizing safety. If this is instituted, NDD will become a natural result of care rather than a “goal” in and of itself (Table 1). Each institution should institute its own care pathway including many or most of the components suggested here and not necessarily try to figure out a priori which patients based on baseline characteristics should receive NDD. They should instead minimize the amount of unnecessary care for every patient and as a result their length of stay will decrease and rate of NDD will increase.

**ADDRESS FOR CORRESPONDENCE:** Dr. Molly Szerlip, The Heart Hospital Baylor Plano, Department of Interventional Cardiology, 4716 Alliance Boulevard, Pavilion Two, Suite 340, Plano, Texas 75093. E-mail: [molly.szerlip@baylorhealth.edu](mailto:molly.szerlip@baylorhealth.edu).

---

**REFERENCES**

1. Kamioka N, Wells J, Keegan P, et al. Predictors and clinical outcomes of next-day discharge after minimalist transfemoral transcatheter aortic valve replacement. *J Am Coll Cardiol Interv* 2018;11:107-15.
2. Babaliaros V, Devireddy C, Lerakis S, et al. Comparison of transfemoral transcatheter aortic valve replacement performed in the catheterization laboratory (minimalist approach) versus hybrid operating room (standard approach): outcomes and cost analysis. *J Am Coll Cardiol Interv* 2014;7:898-904.
3. Gopal A, Grayburn PA, Mack M, et al. Non-contrast 3D CMR imaging for aortic valve annulus sizing in TAVR. *J Am Coll Cardiol Img* 2015;8:375-8.
4. Hahn RT. Guidance of transcatheter aortic valve replacement by echocardiography. *Curr Cardiol Rep* 2014;16:442.

---

**KEY WORDS** minimalist approach, next day discharge, TAVR