

EDITORIAL COMMENT

## The Sooner the Better?

### The Doctor Knows Best\*

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In this issue of *JACC: Cardiovascular Interventions*, Kotronias et al. (1) report a systematic review and meta-analysis of the available evidence regarding different discharge protocols after transcatheter aortic valve replacement (TAVR). Their study shows that early discharge (ED) is safe in selected patients after uncomplicated TAVR, as can be concluded from the comparable 30-day mortality and permanent pacemaker implantation rates and the lower 30-day readmission rate in the ED group compared with the standard discharge group. We congratulate the investigators on their thorough analysis of the topic of ED, which is becoming more and more relevant with respect to the ongoing less invasive and simplified approach to TAVR. Especially in the elderly and fragile population, performing TAVR in awake patients, enabling rapid mobilization and discharge, is of value to prevent complications such as delirium and infections, but obviously only if safe. The study of Kotronias et al. reassures us of this safety and shows the ability of treating physicians to select patients who can be safely discharged early post-procedurally.

SEE PAGE 1759

Recently presented data from the Society of Thoracic Surgeons/American College of Cardiology TVT (Transcatheter Valve Therapy) Registry (n = 24,285) suggest that the conclusion of Kotronias

et al. (1) regarding mortality may hold true even in the longer term. The results of this registry show a significant association between delayed discharge and higher 1-year all-cause mortality (11.0% vs. 15.6% for the early [ $<72$  h] and delayed [ $>72$  h] discharged patients, respectively;  $p < 0.0001$ ) (2). Both of these analyses show very promising results of “minimalist” TAVR and parallel “minimalist” hospitalization, in the interest of patient-related outcomes and reducing resource utilization.

However, both the meta-analysis if Kotronias et al. (1) and the analyses from the TVT Registry (2) have one concern: the absence of randomization. As the investigators describe clearly, this introduces a strong selection bias. The included studies report widely varying proportions of patients who are discharged early (from 17.5% to 61.1%), using varying local periprocedural protocols. For example, procedural choices such as local or conscious sedation for fully percutaneous access, obviously enabling faster discharge, were applied more often in the ED patients. Furthermore, the investigators describe a difference in the pre-procedural number of pacemakers in favor of the ED group (15.2% vs. 9.8%), which may bias the results as post-procedural conduction disorders are the primary reason for delayed discharge. In case of conduction disorders, patients must be monitored more intensively or must await permanent pacemaker implantation. Last, the inclusion of studies in which predominantly balloon-expandable TAVR prostheses (83% of the included patients) were used could have biased the results, because these prostheses have a lower likelihood for pacemaker requirement than self-expandable prostheses. Hence, the type of prosthesis plays an important role in eligibility for ED.

Thus, as discussed, the absence of randomization introduces a strong selection bias. Moreover, only by

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proper selection can patients be earmarked for ED. The selection is made on the basis of absence of prohibitive complications, conduction disorders requiring longer term monitoring or pacemaker implantation, or other reasons preventing patients from mobilization. And the study by Kotronias et al. (1) provides us with evidence that the selection of ED patients can be done securely and safely.

At this moment, this study provides the TAVR world with the evidence and confidence to further improve and simplify TAVR treatment. To do this, the investigators provide a very useful frame to guide discharge practices after TAVR (their Figure 4). In short, eligibility for the minimalist approach and possible ED are assessed by a multidisciplinary team during screening, after which TAVR is performed preferably via the transfemoral route without general anesthesia or transesophageal echocardiography. If no bleedings, vascular complications, or conduction disorders occur, the selected patients can be safely discharged within 72 h. This is in line with the recommendations made by Barbanti et al. (3) for pre-, peri-, and post-procedural management for safe and ED. They conclude that the adoption of this minimalistic and optimized approach requires the integration of multidisciplinary competences and an extended, dynamic conception of the heart team, which also includes patients' families, referring cardiologists, and general practitioners.

In our opinion, many of the pathways toward minimalist TAVR have already been adopted quite broadly and successfully in the TAVR field, judging from the extremely low 30-day mortality (1.1%) and readmission (7.0%) rates in the cohort described by Kotronias et al. (1). And soon, the expected data from the FAST-TAVI (Feasibility and Safety of Early Discharge After Transfemoral Transcatheter Aortic Valve Implantation) and 3M-TAVR (Multidisciplinary, Multimodality, but Minimalist Approach to Transfemoral Transcatheter Aortic Valve Replacement; NCT02287662) trials, dedicated to study discharge practices after TAVR, will provide us with randomized data regarding the feasibility and safety of ED protocols. The FAST-TAVI trial will identify patient and procedural characteristics that make ED from the hospital a safe and cost-effective treatment strategy (4). The 3M-TAVR trial, of which excellent results were presented at the Transcatheter Cardiovascular

Therapeutics conference last year, will provide data on the supposed pathway and the safety of even earlier, next-day discharge using their Vancouver Multidisciplinary, Multimodality, but Minimalist clinical pathway (5). These studies will help develop evidence-based protocols for ED.

Such protocols will be very useful and widely applied, because the proportion of patients eligible for minimalist TAVR and successful "minimalist" hospitalization will probably expand. In the near future, as the Medtronic Evolut Transcatheter Aortic Valve Replacement in Low Risk Patients (NCT02701283) and the P3 (PARTNER 3; The Safety and Effectiveness of the SAPIEN 3 Transcatheter Heart Valve in Low Risk Patients With Aortic Stenosis; NCT02675114) trials will provide us with data on TAVR treatment in low-risk patients, the indication for TAVR will most likely be incrementally broadened to even lower risk patients. Treating lower risk, younger, and healthier patients will increase the feasibility and use of ED protocols. To prevent unnecessary immobilization and facilitate ED, the MobiTAVI trial (NTR6098) will provide us with information on the safety and feasibility of same day ambulation (within 4 to 6 h after the procedure) later this year. Furthermore, developments in TAVR devices are expected to lower the rate of (vascular) complications and required permanent pacemaker implantation, further enabling ED in a larger proportion of the treated patients. Last, technological developments such as home monitoring of patients at low risk for conduction disturbances may become regular clinical care in the near future.

In conclusion, minimalist TAVR and successive "minimalist" hospitalization based on evidence-based ED protocols are clearly the direction toward further improving patient outcomes and reducing precious health care costs. And as Kotronias et al. (1) show, the combination of extensive clinical experience and a patient-specific approach leads to excellent results, in an era when TAVR is constantly improving. Hence, supported by the available evidence, the doctor still knows best.

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**REFERENCES**

1. Kotronias R, Teitelbaum M, Webb JG, et al. Early versus standard discharge after transcatheter aortic valve replacement: a systematic review and meta-analysis. *J Am Coll Cardiol Intv* 2018;11:1759-71.
2. Wayangankar SA. Length of stay post transfemoral transcatheter aortic valve replacement. Presented at: SCAI 2018; April 27, 2018; San Diego, California.
3. Barbanti M, Gulino S, Costa G, Tamburino C. Optimization and simplification of transcatheter aortic valve implantation therapy. *Expert Rev Cardiovasc Ther* 2018;16:287-96.
4. Barbanti M, Baan J, Spence MS, et al. Feasibility and safety of early discharge after transfemoral transcatheter aortic valve implantation—rationale and design of the FAST-TAVI registry. *BMC Cardiovasc Disord* 2017;17:259.
5. Wood DA. The Vancouver Multidisciplinary, Multimodality, but Minimalist clinical pathway facilitates safe next day discharge home at low, medium and high volume TAVR centres: the 3M TAVR study. Presented at: TCT 2017; October 30, 2017; San Diego, California.

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