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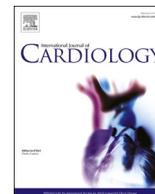
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Editorial

Symptomatic improvement using the New York Heart Association classification as a predictor for survival after transcatheter edge-to-edge repair of the mitral valve

Moderate-to-severe and severe mitral regurgitation (MR), whether functional or degenerative, has been linked to increased risk of heart failure (HF) hospitalizations and mortality [1,2]. Transcatheter edge-to-edge repair (TEER) has emerged as an effective therapy for selected patients who are not deemed to be suitable candidates for surgery [2–4]. The 2020 American College of Cardiology/American Heart Association guidelines recommend TEER for severe degenerative MR among patients with prohibitive or high-risk for surgery who have suitable anatomy for TEER and > 1-year life expectancy (class IIa), as well as for patients with symptomatic cardiomyopathy and severe functional MR despite optimal guideline-directed medical therapy (class IIa) [5]. The European Society of Cardiology 2021 valvular heart disease guidelines assigned TEER a class IIb recommendation for patients with severe degenerative MR and high or prohibitive surgical risk as well as for patients with severe functional MR who are likely to respond favorably to the procedure (class IIa) [6]. However, identifying patients who would benefit from the TEER procedure remains an area of ongoing debates.

There has been growing emphasis on patients-reported outcomes (PROM) as key targets for various cardiovascular interventions. For TEER, improvements in functional capacity, quality of life, and HF symptoms, have been recognized as important clinical goals for the procedure. Prior studies have shown that PROM assessed with various validated questionnaires correlate with survival (Table 1) [7–9]. The Kansas City Cardiomyopathy Questionnaire overall summary score (KCCQ-OS) is a commonly used survey to assess PROM. The KCCQ-12 assesses 4 domains of health status (i.e., physical limitation, symptom frequency, quality of life, and social limitation), which are combined into an overall summary score. Domain scores and the KCCQ-OS score range from 0 to 100 points, with higher scores indicating less symptom burden, better functional status as well as quality of life. An analysis of the COAPT trial demonstrated that symptomatic improvement assessed using the KCCQ-OS at 1-month after TEER was associated with a lower risk of mortality or HF hospitalization at 24-months [7]. Another analysis of >4200 patients from the Transcatheter Valve Therapy registry showed that TEER was associated with an average of ~25 points improvement in the KCCQ-OS score, and that most patients surviving at 1-year continued to show symptomatic improvement [8]. The New York Heart Association (NYHA) class might be a simpler tool to assess PROM. The NYHA classification comprises 4 classes (class I: with no symptoms limiting physical activity while class IV: symptoms with minimal exertion or at rest). However, the NYHA classification has some disadvantages, including interobserver variability across patients and providers,

and might also be potentially affected by non-cardiac causes of dyspnea [8]. In COAPT, TEER improved the quality of life and outcomes across the different NYHA functional classes [9]. However, this might not be generalizable to patients with degenerative MR and those who do not meet the risk profile of COAPT patients (only ~40% of screened patients were randomized).

In that context, the study by Geyer et al. should be viewed [10]. In this retrospective single center observational study, Geyer et al. examined the association between symptomatic improvement using the NYHA classification following TEER and the mid- to long-term outcome among all-comers with moderate-to-severe or severe functional and/or degenerative MR. The analysis included 406 with complete data on NYHA classification at 1-month. Symptomatic improvement at 1-month was documented in 75% of the patients. This represents a higher proportion compared with the prior studies which used the KCCQ (e.g., 58% in COAPT) [7], which could be related to the differences in both tools. Since the KCCQ is a more comprehensive tool, it might capture other relevant variables that are not routinely assessed by the NYHA classification. Consistent with prior analyses [7,8], Geyer et al. showed that symptomatic improvement was associated lower mortality at 1-year, and during a median of 486 days in both the unadjusted and adjusted Cox analyses accounting for age, sex, left ventricular ejection fraction (LVEF) at baseline, coronary artery disease, chronic obstructive pulmonary disease, renal function, baseline tricuspid regurgitation severity, and residual MR-grade at 1-month. The authors found that dyspnea reduction was accompanied with improved survival at 1- and 2-years (89.1 vs 71.2%, $P = 0.001$ and 75.5 vs 58.7%, $P = 0.039$, respectively). This association remained significant irrespective of the MR etiology, whether degenerative or functional [10].

The study by Geyer et al. has several strengths and promising applications. The NYHA classification is a relatively simpler and non-invasive tool, and well-known to physicians compared with KCCQ scores. Accordingly, the assessment of NYHA class post TEER might potentially be a more applicable tool to help physicians in their assessment and may serve as an independent predictor of mid- and long-term prognosis in patients undergoing TEER. The association between the NYHA class and prognosis was observed regardless of the etiology, making this clinical tool practical for both degenerative and functional MR. In addition, the study included a sizeable number of all-comer patients which is more representative of “real-world” patients. Nevertheless, some limitations of the study deserve further considerations. First, this is an observational retrospective study that lacks a control group.

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Table 1

Summary of advantages and disadvantages of NYHA and KCCQ tools as predictors for survival in patients undergoing TEER.

NYHA classification	
Advantages	Disadvantages
Simple tool	Potentially affected by non-cardiac causes of dyspnea
Less time-consuming, 4 classes	Classification could be potentially subjective and may vary between physicians
Known to physicians	
Well-established predictor in other conditions, including heart failure	
KCCQ survey	
Advantages	Disadvantages
Well-established predictor in patients undergoing TEER	More complex tool
Survey is self-reported by the patient	Time-consuming, score out of 100 points Physicians are less familiar with it Not all patients are willing to complete the survey as it is lengthy

Abbreviations: NYHA (New York Heart Association), KCCQ (Kansas City Cardiomyopathy Questionnaire).

However, the study evaluated all-cause mortality as the outcome, which is less susceptible to bias of the intervention. Second, the assessment of the rather subjective NYHA classes was performed by physicians during clinical follow-up. As such, reporting bias could not be excluded. Third, stratification of death causes and long-term follow-up for rehospitalization was not performed. Finally, the findings are driven from a single center analysis, thus limiting its generalizability.

The authors are to be applauded for assessing the role of a simple PROM survey in predicting clinical outcomes after an increasingly utilized complex procedure. Their findings of the association between temporal changes in NYHA and long-term outcomes can aid in the risk stratification of prospective candidates for the procedure and in the life-long management of patients referred for TEER. However, further prospective studies are needed to confirm these findings. This is a reminder to researchers that simplicity may indeed be the ultimate sophistication. While a host of PROM tools are available, identifying the simplest scalable tool that can be used in every day practice is paramount to transform research on PROM from a pure academic exercise to a practical daily solution.

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References

- [1] T. Feldman, E. Foster, D.D. Glower, et al., Percutaneous repair or surgery for mitral regurgitation, *N. Engl. J. Med.* 364 (2011) 1395–1406.
- [2] G.W. Stone, J. Lindenfeld, W.T. Abraham, et al., Transcatheter mitral-valve repair in patients with heart failure, *N. Engl. J. Med.* 379 (2018) 2307–2318.
- [3] A. Sala, O. Alfieri, Percutaneous treatment of mitral valve regurgitation: where do we stand? *Int. J. Cardiol.* 288 (2019) 137–139.
- [4] M.J. Mack, J. Lindenfeld, W.T. Abraham, et al., 3-year outcomes of Transcatheter mitral valve repair in patients with heart failure, *J. Am. Coll. Cardiol.* 77 (2021) 1029–1040.
- [5] C.M. Otto, R.A. Nishimura, R.O. Bonow, et al., 2020 ACC/AHA guideline for the Management of Patients with Valvular Heart Disease: executive summary: a report of the American College of Cardiology/American Heart Association joint committee on clinical practice guidelines, *Circulation* 143 (2021) e35–e71.
- [6] A. Vahanian, F. Beyersdorf, F. Praz, et al., ESC/EACTS guidelines for the management of valvular heart disease, *Eur. J. Cardiothorac. Surg.* 2021 (2021), <https://doi.org/10.1093/ejcts/ezab389>.
- [7] S.V. Arnold, G.W. Stone, M.J. Mack, et al., Health status changes and outcomes in patients with heart failure and mitral regurgitation: COAPT trial, *J. Am. Coll. Cardiol.* 75 (2020) 2099–2106.
- [8] S.V. Arnold, Z. Li, S. Vemulapalli, et al., Association of Transcatheter Mitral Valve Repair with Quality of life outcomes at 30 days and 1 year: analysis of the Transcatheter valve therapy registry, *JAMA Cardiol.* 3 (2018) 1151–1159.
- [9] G. Giustino, J. Lindenfeld, W.T. Abraham, et al., NYHA functional classification and outcomes after Transcatheter mitral valve repair in heart failure: the COAPT trial, *JACC Cardiovasc. Interv.* 13 (2020) 2317–2328.
- [10] M. Geyer, K. Keller, A.R. Tamm, et al., Early symptomatic benefit indicates long-term prognosis after Transcatheter mitral valve edge-to-edge repair in functional and degenerative etiology, *Int. J. Cardiol.* 344 (2021) 141–146.

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