Percutaneous bail-out in severe acute mitral regurgitation: when surgery is not an option

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This editorial refers to ‘A case report of transcatheter mitral valve repair in patient with severe acute mitral regurgitation, cardiogenic shock and left atrial appendage thrombus as a rescue therapy. Facing all enemies at once!’ by N.S. Alachar et al.

Functional mitral regurgitation (FMR) worsens heart failure (HF) prognosis, fuels HF progression, and causes an excess mortality. Percutaneous edge-to-edge repair has been proven effective and safe in patients with severe functional mitral regurgitation (MR) at high surgical risk. Beneficial effects in this patient population include reduction in the rate of HF hospitalizations, and improvement in survival, quality of life, and functional capacity. Conversely, patients with acute MR, either ischaemic or disruption of different parts of the mitral valve apparatus, may require urgent revascularization with concomitant repair or replacement. However, certain scenarios may complicate or preclude surgical procedures, such as a poor clinical state resulting in prohibitive surgical risk. Here, a comprehensive evaluation by the multidisciplinary heart team is essential to ponder further therapeutic options.

In this issue of European Heart Journal—Case reports, Alachar et al. report a case of transcatheter edge-to-edge mitral valve repair (TMVR) in combination with the Sentinel cerebral protection device as a rescue therapy. Facing all enemies at once!’

Another important aspect of this case is the use of cerebral protection devices. The Sentinel dual-filter protection device has been shown to be associated with a significantly lower rate of peri-procedural stroke compared with unprotected procedures. Potential sources of cerebral embolism during transcatheter aortic valve replacement include mitral annulus calcification, thrombotic material from either the LAA or devices, clip dislocation, and atrial, valvular or ventricular damage. Reported rates of in-hospital stroke during TMVR range from 0.2 to 1.2%, but certainly the occurrence of stroke will be much more likely in the presence of cardiac arrest due to ventricular tachycardia, rendering mitral valve surgery not a feasible option according to the local heart team. Therefore, the authors performed successful TMVR with concomitant use of a cerebral protection device as a rescue therapy. The patient was discharged from the intensive care unit haemodynamically stable and without neurological deficits 2 days after the procedure.

Documented experience with TMVR in acute MR is scarce and mainly limited to small case series. However, when treating FMR in the setting of acute ischaemia revascularization represents the first therapeutic target. If haemodynamic instability driven by severe FMR persists despite coronary revascularization, the valvular lesion should be treated next. In this specific case, coronary intervention was deemed futile due to the presence of transmural scar detected by CMR further highlighting the significance of multi-modality imaging in valvular heart disease. Furthermore, in the context of the current guidelines, surgery remains the gold standard for treating acute MR in the setting of myocardial infarction.

In conclusion, the authors report a case of TMVR in acute MR with concomitant repair or replacement as a rescue therapy. Shared decision-making enforced by the heart team is indispensable in these cases.
LAA thrombus, such as seen in this case. As for now, the use of CPD is not part of procedural routine in TMVR. However, it undoubtedly represents a highly valuable tool specifically considering the increasing numbers of mitral valve-in-valve, valve-in-ring, and valve-in-MAC interventions with a high risk of cerebral embolism.

In conclusion, the present case is a valuable demonstration that outside the box thinking enabled physicians to safely guide a challenging patient through a plethora of potentially life-threatening conditions. In this acute setting, TMVR may serve as a rescue option for patients deemed inoperable after careful heart team discussion. Cerebral protection with the Sentinel device prevented embolic stroke in this patient, who had no other therapeutic option.

**Lead author biography**

Dr. Nitsche started his PhD postgraduate studies in the work group of Prof. Dr. Mascherbauer at the Division of Cardiology of the Medical University of Vienna. Main areas of research are valvular heart disease, in particular aortic stenosis and mitral regurgitation, and multimodality imaging, including cardiac magnetic resonance, echocardiography, and nuclear imaging. His research yielded multiple publications as a first author in high-ranked cardiology journals. For his work “Prevalence and Outcomes of Concomitant Aortic Stenosis and Cardiac Amyloidosis” which originated from an Austrian-UK collaboration and which was published in the “Journal of the American College of Cardiology” he received the publication award of the Austrian Society of Cardiology in 2021.

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**References**

1. Gollasch G, Bartko PE, Pavo N, Neuhold S, Wurm R, Mascherbauer J et al. Refining the prognostic impact of functional mitral regurgitation in chronic heart failure. Eur Heart J 2018;39:39–46.
2. Stone GW, Lindenfeld JA, Abraham WT, Kar S, Lim DS, Mishell JM et al. Transcatheter mitral-valve repair in patients with heart failure. N Engl J Med 2018;379:2307–2318.
3. Mack Mj, Lindenfeld J, Ann, Abraham WT, Kar S, Lim DS, Mishell JM et al. 3-year outcomes of transcatheter mitral valve repair in patients with heart failure. J Am Coll Cardiol 2021;77:1029–1040.
4. Goldstein D, Moskwitza AJ, Gelijnis AC, Alawadi G, Parides M, Perrault LP et al. Two-year outcomes of surgical treatment of severe ischemic mitral regurgitation. N Engl J Med 2016;374:344–353.
5. Baumgartner H, Falk V, De Bonis M, Hamm C, Holm PJ, et al.; ESC Scientific Document Group. 2017 ESC/EACTS Guidelines for the management of valvular heart disease. Eur Heart J 2017;38:2739–2791.
6. Otto CM, Nishimura RA, Bonow RO et al. 2020 ACC/AHA guideline for the management of patients with valvular heart disease: a report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. Circulation 2021;143:e72–e227.
7. Alchar NS, Autschbach R, Almalla M. A case report of transcatheter mitral valve repair in patient with severe acute mitral regurgitation, cardiogenic shock and left atrial appendage thrombus as a rescue therapy. Facing all enemies at once! Eur Heart J Case Reports 2021.
8. Estévez-Loureiro R, Arzamendia D, Freixa X, Cardenal R, Carrasco-Chinchilla F, Serrador-Frutos A; et al; Spanish Working Group on MitraClip. Percutaneous mitral valve repair for acute mitral regurgitation after an acute myocardial infarction. J Am Coll Cardiol 2015;66:91–92.
9. Adzano M, Currelo S, Chiaro E, Fiorina C, Chizzola G, Magatelli M et al. Percutaneous edge-to-edge mitral valve repair for the treatment of acute mitral regurgitation complicating myocardial infarction: a single centre experience. Int J Cardiol 2017;234:53–57.
10. Seeger J, Kapada SR, Kodali S, Linke A, Wöhle J, Hausug S et al. Rate of peri-procedural stroke observed with cerebral embolic protection during transcatheter aortic valve replacement: a patient-level propensitymatched analysis. Eur Heart J 2019;40:1334–1340.
11. Pagnesi M, Regazzoli D, Ancona MB, Mangieri A, Lanzillo G, Giannini F et al. Cerebral embolic risk during transcatheter mitral valve interventions: an unaddressed and unmet clinical need? JACC Cardiovasc Interv 2018;11:517–528.