JACC: CASE REPORTS VOL. 4, NO. 19, 2022

EDITORIAL COMMENT

TAVR as Rescue Treatment for Prosthetic Heart Valve Endocarditis

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During the past 2 decades, transcatheter aortic valve replacement (TAVR) has transitioned from an innovative concept and from compassionate use treatment to the standard of care for elderly patients with degenerative, calcific aortic valve disease. The intervention and its periprocedural evaluation process matured over time, thus making TAVR a standardized, efficient, and streamlined procedure with predictable success and outcome.

The indications for performing TAVR rather than surgical aortic valve replacement (SAVR) have rapidly evolved. Although TAVR was initially reserved for patients with calcific aortic stenosis, the spectrum of the recommended treatment was expanded to patients with bioprosthetic aortic heart valve failure and, in well-selected cases, to patients with native aortic valve regurgitation. In this issue of *JACC: Case Reports,* Brankovic et al[1] take the spectrum of treatment one step further as they describe the successful treatment of a patient with active endocarditis by using a transcatheter heart valve. In the setting of cardiogenic shock secondary to prosthetic heart valve failure with acute aortic regurgitation related to infective endocarditis, a 73-year-old man with a previous history of bioprosthetic aortic valve replacement 15 years earlier was admitted to the emergency department. After careful evaluation of the acute clinical situation and pre-existing comorbidities, including active and newly diagnosed B-cell lymphoma for which he was receiving ongoing chemotherapy, the patient was considered to be at excessive risk and not eligible for redo SAVR. Instead, the recommendation of the heart team included TAVR as the treatment option of choice following a time window of at least 72 hours after negative blood culture results. Transfemoral valve-in-valve TAVR using the balloon-expandable Edwards Sapien 3 heart valve (Edwards Lifesciences) was performed on hospital day 7, with the patient under general anesthesia; the excellent immediate procedural result subsequently allowed full recovery, with a regimen of prolonged suppressive antibiotic therapy.[1]

The management of patients with infective endocarditis is complex and requires a multidisciplinary approach, including the expertise of infectious disease specialists, cardiologists, and cardiac surgeons to identify patients at specific risk for related morbidity and mortality in a timely manner. Indeed, the complexity of this decision process derives from relevant differences among and wide range within the clinical presentations of affected patients. Although some patients present only with subclinical malaise and nonspecific general weakness, other patients are hospitalized for embolic stroke, systemic embolization, or require immediate intensive care treatment for septic or, as in this case, cardiogenic shock. Furthermore, the pathoanatomical presentation of infective endocarditis is highly heterogeneous and depends on the microorganism involved, as valves may be affected by only minor bacterial colonization, by mobile and floating vegetations, by abscess or fistula formation, or by leaflet or cusp destruction. In patients with prosthetic heart valve disease, an appropriate diagnosis and decision making is even

*Editorials published in *JACC: Case Reports* reflect the views of the author and do not necessarily represent the views of *JACC: Case Reports*.

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The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the Author Center.

ISSN 2666-0849 https://doi.org/10.1016/j.jaccas.2022.07.014

JACC: CASE REPORTS, VOL. 4, NO. 19, 2022
OCTOBER 5, 2022:1311–1313

more difficult, and the management and treatment of patients should be performed in specialized reference centers with a local and experienced endocarditis expert team.[2] Indeed, a distinct differentiation between destructive infective heart valve endocarditis and prosthetic heart valve failure with concomitant septicemia of a different origin can be challenging and requires refined imaging technologies for a definitive diagnosis. Most recently, the endocarditis team was advised by a dedicated algorithm for the diagnosis of prosthetic heart valve endocarditis.[3] Transthoracic echocardiography and, preferentially, transesophageal echocardiography are recommended as first-line imaging technologies in suspected heart valve endocarditis and resulting structural damage. However, when it comes to the assessment of prosthetic heart valves, the sensitivity of these tools for a conclusive evaluation and exclusion of infective endocarditis is lower than that in native valves.[2] Specifically, in cases where conventional imaging findings remain inconclusive, the use of multidetector-row computed tomography (CT) and functional imaging with fluorine-18-fluoro-2-deoxyglucose (FDG) positron emission tomography (PET)/CT is reasonable to aid in the diagnosis of infective endocarditis. The obvious advantage of FDG PET/CT is the capacity to detect inflammatory cells already before morphologic changes occur. This imaging modality may therefore be harnessed to rule out or confirm infective endocarditis when the combination of echocardiography, blood cultures, and the Duke criteria suggests "possible infective endocarditis," without clearly rejecting or confirming the diagnosis.

Similarly, multidetector-row CT and radiolabeled white blood cell single-photon emission CT offer additional diagnostic value when the previous imaging work-up remains inconclusive and for evaluating potential complications of infective endocarditis in case of perivalvular lesions detected during transesophageal echocardiography.[3] As described by Brankovic et al,[1] the acute and rapid clinical deterioration of the patient somehow precluded additional and more sophisticated imaging technology, and the interdisciplinary decision to perform TAVR was mainly driven by clinical parameters.

According to the 2020 joint American College of Cardiology and American Heart Association guideline for the management of patients with valvular heart disease, an optimal therapy for cardiac device-related infective endocarditis includes complete device extraction in combination with a prolonged course of parenteral antibiotic therapy.[4] Incomplete removal and sterilization of affected valvular structures or perivalvular tissues may be the cause of relapsing infections and recurrent endocarditis secondary to deep tissue infection. Therefore, TAVR has not been specifically mentioned for the indication of active infective endocarditis in the U.S. guideline and is also not recommended according to the 2021 Joint European Society of Cardiology and European Association for Cardio-Thoracic Surgery Guideline for the Management of Valvular Heart Disease.[4,5] However, transcatheter heart valve replacement as a bailout strategy and rescue therapy in the short-term setting of confirmed infective endocarditis and cardiogenic shock secondary to severe aortic regurgitation appears to be a plausible option in inoperable patients and may serve as bridge to definitive surgical repair.

As rescue therapy, TAVR should be initiated as early as possible, while multiorgan failure is still reversible, to achieve maximal clinical and prognostic benefit. The right timing is the central challenge of the heart team because sterile blood culture results should be obtained before any procedure to minimize the risk for relapsing infection. Procedural considerations may further include the use of cerebral filter devices as procedural safety measure to minimize the risk of septic cerebral embolism. After successful intervention, frequent monitoring, including prolonged antibiotic treatment, is required, and cardiac radionuclide imaging may help to guide the duration of suppressive antibiotic therapy and monitor treatment success.

Although international guideline recommendations are currently not supporting the treatment of prosthetic heart valve failure secondary to active infective endocarditis with transcatheter heart valve technologies, there may be some space for this bailout strategy in well-selected patients. Whether the success story of this case report needs to be considered as "fortune favors the bold or brave" or whether Brankovic et al[1] opened a new chapter in the success story of TAVR, specific literature needs to advise future guideline recommendations.

FUNDING SUPPORT AND AUTHOR DISCLOSURES

Dr Stortecky has received research grants to the institution from Edwards Lifesciences, Medtronic, Abbott Vascular, Guerbet AG, and Boston Scientific; and is a consultant to Boston Scientific, BTG, and Teleflex. Dr Draxler has reported that he has no relationships relevant to the contents of this paper to disclose.

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KEY WORDS acute heart failure, endocarditis, valve repair