

# A Fatal Case of Endocarditis on CoreValve ReValving System Caused by *Enterococcus faecium* Complicated by Iatrogenic Pancytopenia and Subacute Disseminated Intravascular Coagulation

Giovanni Cimmino, Giovanni Ciccarelli, Marco Golino, Chiara D'Amico, Paolo Golino

Department of CardioThoracic and Respiratory Sciences, Second University of Naples, AORN Sant'Anna and San Sebastiano Hospital, Caserta, Italy

During the past few years, a new and attractive approach - transcatheter aortic valve implantation (TAVI) - has been developed for patients who are symptomatic of aortic stenosis and, due to the high expected operative risk, would not be otherwise treated. Unfortunately, TAVI can result in endocarditis of the percutaneously implanted valve that may present atypically and cause delays in diagnosis and treatment. Herein, the case is

described of a 79-year-old female affected by endocarditis on aortic valve percutaneously implanted caused by *Enterococcus faecium*, complicated by iatrogenic pancytopenia and subacute disseminated intravascular coagulation, that proved fatal at six months after TAVI.

The Journal of Heart Valve Disease 2015;24:130-132

Aortic valve stenosis (AS) is the second most common indication for adult heart surgery in the USA (1). Without surgical correction, symptomatic severe AS is associated with a high morbidity and dismal survival (1). Moreover, elderly patients plagued with symptomatic severe AS are often precluded from surgical options (2). During the past few years, a new and attractive operative approach has been developed that is based on transcatheter aortic valve implantation (TAVI), and which represents a new option for all symptomatic patients that, due the high expected operative risk, would not otherwise be treated. Unfortunately, prosthetic valve endocarditis is a frequent complication of the TAVI procedure and is associated with a poor prognosis (3). The few cases reported to date have indicated that a presentation of endocarditis on a percutaneously implanted valve may be atypical, and this has caused a delay in the diagnosis and treatment of the condition (4). The patients' management is also complicated by their comorbidities, and surgical treatment may not always be feasible, leading to a significant morbidity and mortality. Here, the case is described of a 79-year-old female who, after TAVI, suffered prosthetic valve

endocarditis caused by *Enterococcus faecium*; the condition was complicated by iatrogenic pancytopenia and subacute disseminated intravascular coagulation (DIC), and proved fatal at six months after the valve implantation.

## Case report

The patient was admitted to the authors' institution in June 2012 with progressive dyspnea, low-grade fever, mild stupor and a transient loss of consciousness on the evening before hospitalization. The associated risk factors were hypertension, anemia, chronic kidney disease, permanent atrial fibrillation and left bundle branch block, in addition to AS for which she had undergone transcatheter replacement with the CoreValve ReValving system six months previously at another institution. Transthoracic echocardiography (TTE) performed at admission showed a left ventricular depression with an estimated ejection fraction (EF) of 40%, likely vegetation of the CoreValve, severe aortic regurgitation, pulmonary hypertension (60 mmHg), and periprosthetic mitral leak. In order to better quantify the valve pathology, transesophageal echocardiography was performed which showed mild-moderate aortic regurgitation, prosthetic cusp thickening, a large vegetation that was adherent to the prosthesis cusps and extended into the ascending aorta, mitral annulus calcification which

---

Address for correspondence:  
Dr. Giovanni Cimmino, Division of Cardiology, Second University of Naples, c/o San Sebastiano Hospital, via Tescione, 1, 81100 Caserta, Italy  
e-mail: giovanni.cimmino@unina2.it/giovincimmino76@yahoo.it

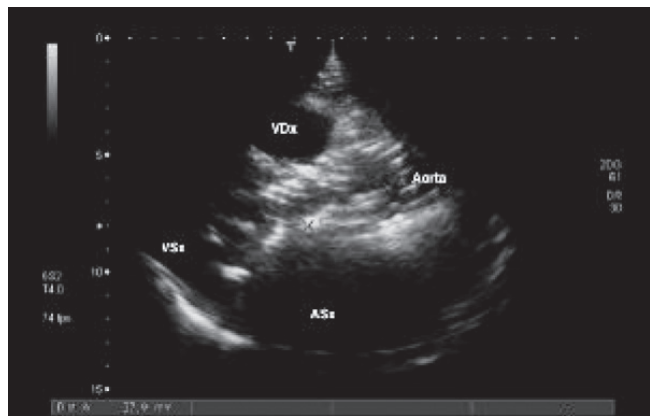


Figure 1: Transthoracic echocardiography, showing the size of the vegetation.

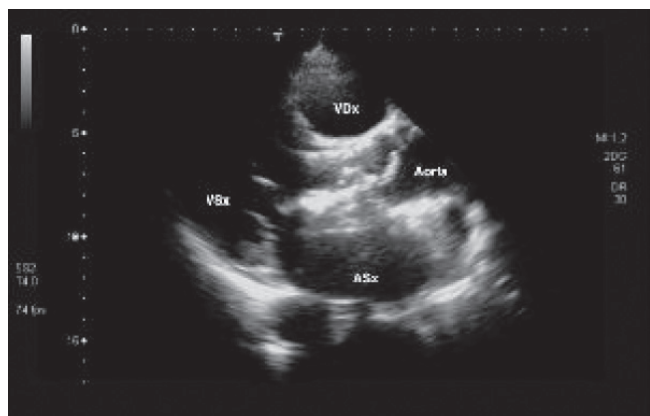


Figure 2: Transthoracic echocardiography, showing the filamentous vegetation adherent to the cusps of the prosthesis, fluctuating in the ascending aorta.

was responsible for severe mitral regurgitation, a mild reduction in ventricular function (EF 50%), a mild periprosthetic leak directed towards the mitral anterior extreme, and pulmonary hypertension (62 mmHg) (Fig. 1). While awaiting the results of the blood culture, antibiotic therapy with levofloxacin 500 mg and daptomycin 350 mg was administered empirically. Low-molecular-weight heparin (enoxaparin sodium; 12,000 IU/day) was also administered.

The blood culture detected *E. faecium*, a Gram-positive, spherical bacterium that is a known human pathogen and causes nosocomial bacteremia, surgical wound infection, endocarditis, and urinary tract infections (3). Thus, the antibiotic therapy was replaced with teicoplanin 600 mg + linezolid 600 mg twice daily.

Although, a few days later the patient showed a moderate improvement, there was a progressive decrease in inflammatory markers and apyrexia. However, at 20 days after admission a scattered petechia and subcutaneous hematoma appeared, especially in the left arm. Blood tests revealed the presence of pancytopenia that was most likely

iatrogenic and required the transfusion of red blood cells and platelet concentrates. Subsequently, the teicoplanin/linezolid-based antibiotic regimen was halted and sodium ampicillin (8 g) + ceftriaxone (2 g) were administered.

The anticoagulant therapy was also discontinued, and a new TTE was performed which showed an increase in the size of the formation on the posterior cusp (37 mm), with hypoechoic proliferation in the terminal region, fluctuating into the ascending aorta (Fig. 2). The filamentous portion of the anterior cusp was not observed. In the meantime, there was an apparent worsening of the patient's clinical condition, with metabolic acidosis, increased D-dimer levels, decreased antithrombin, as well as extensions of the prothrombin time and partial thromboplastin time, suggestive of subacute DIC.

A second red blood cell transfusion was performed, but surgical treatment was excluded by the cardiac surgeons due to the severity of the patient's clinical conditions (EuroSCORE = 21). Because of hypernatremia, a further variation of antibiotic therapy was established, replacing sodium ampicillin with vancomycin; however, the patient's clinical condition worsened progressively and she died at 30 days after the initial hospitalization.

## Discussion

Currently, little is known regarding the true incidence of endocarditis after TAVI, with the condition having been described only anecdotally to date. At present, the only available data have been derived from local registries or multicenters, and have shown an incidence of transcatheter prosthetic valve endocarditis (TPVE) similar to that after surgical aortic valve replacement, estimated at between three and 10 episodes per 100,000 patient-years (3). In particular, studies PARTNER cohort A and B have demonstrated, respectively, an annual incidence of endocarditis of 0.6% and 1.1% (5). In contrast, a multicenter registry evaluating the outcomes of patients who underwent implantation of the CoreValve ReValving system showed an annual incidence of 0.8% (6).

The diagnosis and management of TPVE has proved very difficult due to the non-specificity of the clinical presentation and a lack of protocols. Indeed, the latest guidelines do not describe well-defined criteria in this regard. Although, during the early stages after implantation, fever is a common occurrence, in most cases this does not constitute an alarm as it simply reflects the expression of an inflammatory response or transient infection involving other organs. A suspicion of endocarditis, however, should be noted when the fever is prolonged and associated with changes in

murmur, a worsening of aortic regurgitation, and if there is evidence of bacteremia in the blood cultures (7). Whilst antibiotic prophylaxis has been significantly reduced in the current guidelines (3), it should be considered for high-risk procedures in high-risk patients, such as those with prosthetic heart valves or prosthetic material used for valve repair, or in patients with previous endocarditis or congenital heart disease (8). A general rule for preventing endocarditis in patients at risk (i.e., all patients with valvular heart disease) is to employ a good oral hygiene and aseptic measures during catheter manipulation or any invasive procedure (8).

It has been noted that in a few cases, a successful surgical removal of the implanted valve (Edwards and CoreValve) has been reported (9,10). In the present case, surgical removal of the prosthetic valve was excluded due to the patient's clinical condition and the presence of several comorbidities, and consequently medical therapy was the only approach that was feasible.

Based on this report, and despite TPVE being a rare event, it should be reasonable to perform all diagnostic investigations in every case of suspected endocarditis, in order to implement an appropriate treatment as early as possible. The findings of the present case, and also of others reported previously in the literature, indicate a clear need for further studies involving greater numbers of patients in order to highlight the best therapeutic strategy against endocarditis encountered after the percutaneous implantation of a prosthetic valve.

#### Acknowledgements

These studies were supported by a grant from the Italian Ministry for Education, University and Research (PRIN 2009).

#### References

1. Nkomo VT, Gardin JM, Skelton TN, Gottdiener JS, Scott CG, Enriquez-Sarano M. Burden of valvular heart diseases: A population-based study. *Lancet* 2006;368:1005-1011
2. Iung B, Cachier A, Baron G, et al. Decision-making in elderly patients with severe aortic stenosis: Why are so many denied surgery? *Eur Heart J* 2005;26:2714-2720
3. Habib G, Hoen B, Tornos P, et al. Guidelines on the prevention, diagnosis, and treatment of infective endocarditis (new version 2009): The Task Force on the Prevention, Diagnosis, and Treatment of Infective Endocarditis of the European Society of Cardiology (ESC). Endorsed by the European Society of Clinical Microbiology and Infectious Diseases (ESCMID) and the International Society of Chemotherapy (ISC) for Infection and Cancer. *Eur Heart J* 2009;30:2369-2413
4. Gotzmann M, Muggé A. Fatal prosthetic valve endocarditis of the CoreValve ReValving system. *Clin Res Cardiol* 2011;100:715-717
5. Smith CR, Leon MB, Mack MJ, et al. Transcatheter versus surgical aortic-valve replacement in high-risk patients. *N Engl J Med* 2011;364:2187-2198
6. Buellesfeld L, Gerckens U, Schuler G, et al. 2-year follow-up of patients undergoing transcatheter aortic valve implantation using a self-expanding valve prosthesis. *J Am Coll Cardiol* 2011;57:1650-1657
7. Eisen A, Shapira Y, Sagie A, Kornowski R. Infective endocarditis in the transcatheter aortic valve replacement era: Comprehensive review of a rare complication. *Clin Cardiol* 2012;35:E1-E5
8. Joint Task Force on the Management of Valvular Heart Disease of the European Society of Cardiology et al. Guidelines on the management of valvular heart disease (version 2012). *Eur Heart J* 2012;33:2451-2496
9. Castiglioni A, Pozzoli A, Maisano F, Alfieri O. Endocarditis after transfemoral aortic valve implantation in a patient with Osler-Weber-Rendu syndrome. *Interact Cardiovasc Thorac Surg* 2012;15:553-554
10. Thyregod HG, Lund JT, Engstrom T, Steinbruchel DA. Transcatheter aortic valve prosthesis surgically replaced 4 months after implantation. *Eur J Cardiothorac Surg* 2010;37:494-496