Iatrogenic perforation of the aortic valve cusp as a complication of percutaneous coronary intervention

Barbara Szlósarczyk1, 2, Konrad Stępień1, 2, Mateusz Podolec1, 2, Bogdan Suder2, 3, Piotr Walczak4, Mateusz Kozioł4, Karol Nowak1, 2, Jarosław Zalewski1, 2, Jadwiga Nessler1, 2, Andrzej Gackowski1, 2

1Department of Coronary Artery Disease and Heart Failure, Institute of Cardiology, Jagiellonian University Medical College, Kraków, Poland
2John Paul II Hospital, Kraków, Poland
3Department of Cardiovascular Surgery and Transplantation, Institute of Cardiology, Jagiellonian University Medical College, Kraków, Poland
4Student Research Group at Department of Coronary Artery Disease and Heart Failure, Jagiellonian University Medical College, Kraków, Poland

Correspondence to:
Andrzej Gackowski, MD, PhD,
Department of Coronary Artery Disease and Heart Failure,
Jagiellonian University Medical College,
Prądnicka 80,
31–202 Kraków, Poland,
phone: +48 12 614 22 18,
e-mail: agackowski@gmail.com
Copyright by the Author(s), 2023
DOI: 10.33963/KP.a2023.0085
Received: January 25, 2023
Accepted: March 19, 2023
Early publication date: March 30, 2023

A 64-year-old obese man, former smoker, was hospitalized for de novo diagnosis of failure. The patient reported increased fatigue and episodes of chest pain and palpitations during physical activity in the past 1–2 years (New York Heart Association [NYHA] classification, class II, Canadian Cardiovascular Society [CCS] classification, class II). Echocardiography revealed decreased left ventricular ejection fraction (LVEF) of 25%–30%, akinesia of the basal and middle segments of the inferior wall, and hypokinesia of the remaining LV segments, without significant valve pathologies. Left coronary artery angiography revealed significant proximal left anterior descending artery (LAD) stenosis. Catheterization of the right coronary artery (RCA) required multiple diagnostic catheters (JL-3.5/6F, JR-4.0/6F, 3DRC/6F, AL 2.0/6F, AL 1.0/6F, AR 1.0/6F), and the RCA injection was subselective. Significant proximal stenosis of the RCA was suspected. RCA intubation was achieved with a DRC/6F catheter, and, finally, instantaneous wave-free pressure ratio (iFR)/fractional flow reserve (FFR) measurements ruled out the significance of RCA stenosis. The LAD was successfully treated with drug-eluting stent (DES) implantation. The patient did not report any symptoms, and no significant cardiac murmur was observed. Medical therapy was optimized, and the patient was discharged on the following day with a scheduled admission in 3 months for re-evaluation and implantable cardioverter-defibrillator (ICD) qualification.

On the next elective admission, the patient reported a significant reduction in previously reported symptoms (NYHA I, CCS I). Diastolic murmur 2/6 was audible and blood pressure was 115/50 mm Hg. There was no fever or other signs of inflammation. C-reactive protein (CRP) was normal. As previously, global left ventricular hypokinesia was visualized on transthoracic echocardiography, however, with an increase in LVEF up to 40% with a simultaneous increase in LV end-diastolic dimension (LVEDD) from 60 to 66 mm (LV end-diastolic volume [LVEDV] from 260 to 310 ml). Moreover, the presence of a previously absent mobile 8 mm subvalvular structure in the left ventricular outflow tract (LVOT) was noted (Figure 1A). It was confirmed by 3D transesophageal echocardiography showing moderate/severe aortic regurgitation due to iatrogenic perforation of the non-coronary cusp (Figure 1B–D). The patient was again presented to Heart Team and qualified for surgical valve replacement, which was successfully performed (Figure 1E, F). The damaged valve was removed and a SJM 25A mechanical aortic valve was implanted. The postoperative course and wound healing were uneventful. The patient was discharged from the hospital in good general condition.

Iatrogenic aortic valve perforation represents a very rare complication of percutaneous coronary intervention. Its approximate prevalence is 0.0001% and only 16 similar cases have been reported in the literature [1]. It must be taken into account when a forceful technique has to be used to intubate the coronary artery. Clinical presentation is mostly acute, and it results from the laceration or perforation of a cusp by the catheter [1]. In our case, the course was almost asymptomatic but
Barbara Szlósarczyk et al., PCI-induced aortic valve perforation

led to progressive dilatation of the left ventricle. The tear of the leaflet may have progressed during the 3 months of follow-up. It was important to differentiate the mechanical cause from infective endocarditis [2]. According to the so-far largest systematic review, aortic valve replacement is the most common treatment [1]. In accordance with the current guidelines, the Heart Team should decide about qualifying patients for an appropriate treatment method for that rare complication [3–5].

**Article information**

**Conflict of interest:** None declared.

**Funding:** None.

**Open access:** This article is available in open access under Creative Common Attribution-Non-Commercial-No Derivatives 4.0 International (CC BY-NC-ND 4.0) license, which allows downloading and sharing articles with others as long as they credit the authors and the publisher, but without permission to change them in any way or use them commercially. For commercial use, please contact the journal office at kardiologiapolska@ptkardio.pl.

**REFERENCES**


