Bioprosthetic Aortic Scallop Intentional Laceration to prevent Iatrogenic Coronary Artery obstruction (BASILICA) in valve-in-valve Transcatheter Aortic Valve Implantation (ViV-TAVI): First experience in Poland

Szymon Jędrzejczyk, Bartosz Rymuza, Piotr Ścisło, Kajetan Grodecki, Ewa Pędzich-Placha, Marcin Grabowski, Janusz Kochman, Zenon Huczek

1st Chair and Department of Cardiology, Medical University of Warsaw, Warszawa, Poland

Correspondence to:
Szymon Jędrzejczyk, MD,
1st Chair and Department of Cardiology,
Medical University of Warsaw,
Banacha 1A,
02–097 Warszawa, Poland,
phone: +48 22 599 29 58,
e-mail:
szymon.jedrzejczyk@wum.edu.pl

DOI: 10.33963/KP.a2022.0227

Received:
July 3, 2022

Accepted:
September 8, 2022

Early publication date:
September 26, 2022

Valve-in-valve Transcatheter Aortic Valve Implantation (ViV-TAVI) is an established treatment option for surgical bioprosthetic valve deterioration. Despite being less invasive than redo surgery, it may be accompanied by a risk of coronary obstruction, an uncommon but usually life-threatening adverse event [1, 2]. Traditional approaches to avoid coronary obstruction include intubation of the coronary ostium at risk with a guidewire or stent; however, rescue interventions are often unsuccessful and may lead to stent deformation, thrombosis, and ischemic complications. Unfortunately, emergency surgery is also a high-mortality procedure [3]. The novel Bioprosthetic Aortic Scallop Intentional Laceration to prevent Iatrogenic Coronary Artery obstruction (BASILICA) technique may be considered as an alternative approach, which prevents coronary artery obstruction by splitting targeted leaflets in two and maintaining the blood flow through a gap in the lacerated leaflet [4].

Herein we present a case of a 70-year-old man with exacerbation of chronic heart failure (New York Heath Association class III) caused by severe aortic regurgitation (AI ERO, 0.72 cm^2; AI volume 107 ml, Vmax 3.9 m/s. PG mean/max 30/62 mm Hg, AVA VTI 1.2 cm^2, reversed flow in the ascending aorta 21 cm/s) of failed 23 mm Trifecta GT (St. Jude Medical, St. Paul, MN, US), a stented valve with externally mounted bovine pericardial leaflets potentially interfering with the left main coronary artery ostium. Preoperative computed tomography showed a low take-off of the left coronary artery (4.9 mm, top at 10.9 mm), left coronary leaflet measuring 12.2 mm, virtual valve-to-coronary (VTC) distance of 3.2 mm, virtual valve-to-sinotubular junction (VTSTJ) distance of 1.7 mm, the annulus diameter of 18.2 mm, the sinus of Valsalva height of 12.8 mm. Taking into consideration numerous aggravating comorbidities (including chronic coronary artery syndrome [CCS] in CCS2 class and history of the left internal mammary artery (LIMA) in the left anterior descending (LAD) coronary artery bypass grafting), worsening clinical symptoms, high operative risk (EuroSCORE II 18.5%), and high risk of left main coronary artery obstruction, the Heart Team qualified the patient for 26 mm Evolut R (Medtronic, Minneapolis, MN, US) ViV-TAVI with BASILICA procedure to protect the perfusion area of the circumflex artery.

The procedure was performed under general anesthesia with the right ventricular pacing lead placed through the right internal jugular vein. The Sentinel™ Cerebral Protection System (Claret Medical, Santa Rosa, CA, US) was positioned in the brachiocephalic trunk and left carotid artery to reduce the embolic risk of catheter manipulations and leaflet laceration debris. A BASILICA snare was positioned in the left ventricular outflow tract, and the transversal catheter was positioned and aimed in fluoroscopic side and midline projections to perform a puncture of the left coronary leaflet. The leaflet was punctured using 50 W electrosurgical energy, subsequently, the wire was snared and externalized. Then, after

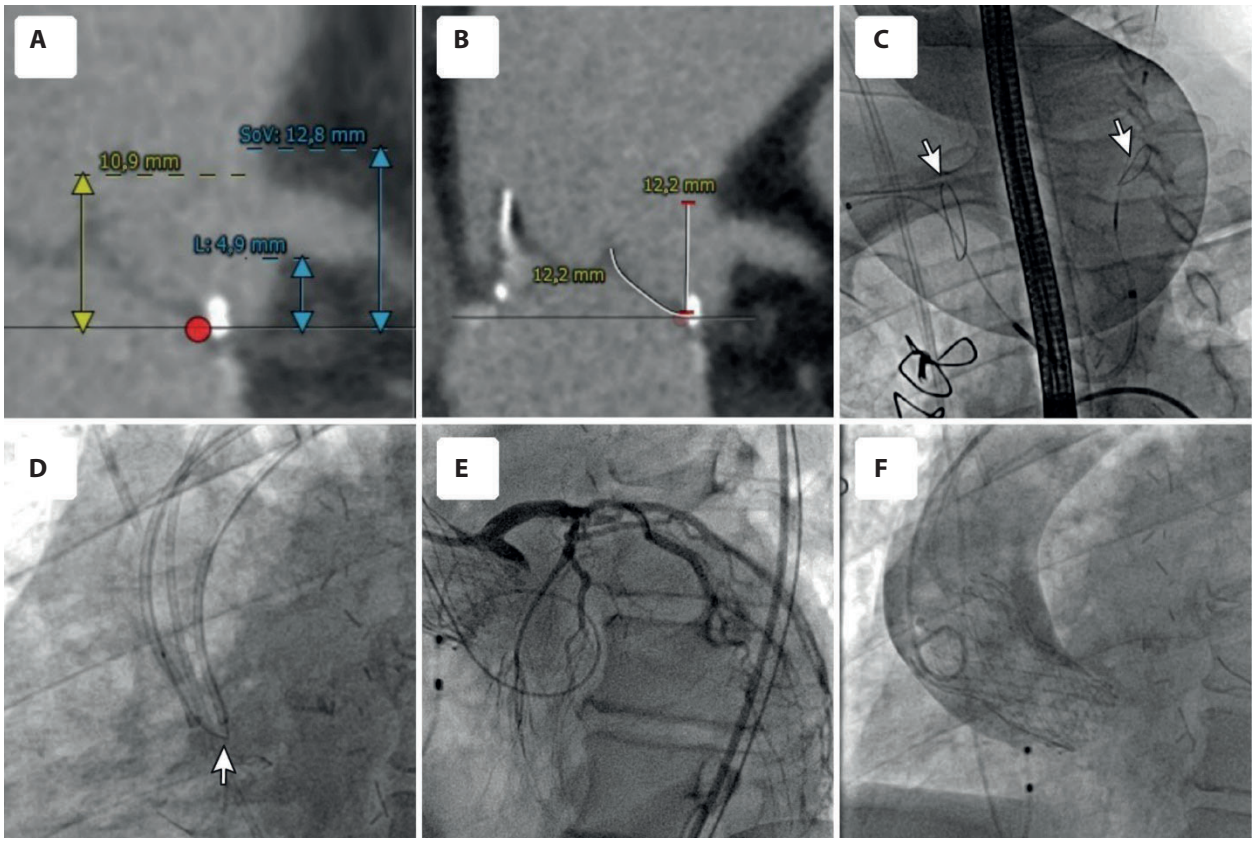

Figure 1. A. Preoperative computed tomography measurements of the left coronary artery and sinus of Valsalva. **B.** Preoperative computed tomography measurements of the left coronary leaflet. **C.** Successful implantation of the Sentinel™ Cerebral Protection System in the brachiocephalic trunk and left carotid artery (the arrows). **D.** V-shaped wire passing through the left coronary leaflet and ready to lacerate (the arrows). **E.** Postoperative angiography showing preserved blood flow to the left coronary artery. **F.** Angiography after effective valve-in-valve transcatheter aortic valve implantation of 26 mm Evolut R into failed 23 mm Trifecta GT

achieving V-shape at the leaflet level, 50W electrosurgical energy was applied again, and the whole system was pulled to lacerate the targeted leaflet. Next, successful ViV-TAVI with self-expandable 26 mm Evolut R was performed, and subsequent angiography showed undisturbed blood flow to the left coronary artery. Postoperative echocardiography showed good hemodynamic results and correct function of the implanted bioprosthesis. The BASILICA procedure is a novel and challenging technique that requires numerous steps to complete, hence it should ideally be performed by experienced operators in high-volume centers or under the supervision of an experienced proctor [5]. It is a feasible and often only way of treatment for specific patients with unfavorable coronary artery anatomy and need for transcatheter aortic valve implantation. Specifically designed devices for leaflet laceration are necessary to simplify this approach and make it more available.

Supplementary material

Supplementary material is available at https://journals.viamedica.pl/kardiologia_polska.

Article information

Conflict of interest: JK is a proctor for Abbott, and ZH is a proctor for Medtronic and Abbott. Other authors declare no conflict of interest.

Funding: None.

REFERENCES

1. Dvir D, Khan J, Kornowski R, et al. Novel strategies in aortic valve-in-valve therapy including bioprosthetic valve fracture and BASILICA. EuroIntervention. 2018; 14(AB): AB74–AB82, doi: 10.4244/EIJ-D-18-00667, indexed in Pubmed: 30158098.
2. Hameed I, Ahmed A, Ullah N, et al. Valve-in-Valve Transcatheter Aortic Valve Replacement: A Review of Procedural Details, Safety, and Clinical Implications. Cardiol Rev. 2020; 28(6): 291–294, doi: 10.1097/CRD.0000000000000318, indexed in Pubmed: 32947481.
3. Lederman RJ, Babaliaros VC, Rogers T, et al. Preventing Coronary Obstruction During Transcatheter Aortic Valve Replacement: From Computed Tomography to BASILICA. JACC Cardiovasc Interv. 2019; 12(13): 1197–1216, doi: 10.1016/j.jcin.2019.04.052, indexed in Pubmed: 31272666.
4. Protasiewicz M, Kosowski M, Onisk G, et al. Bioprosthetic Aortic Scallop Intentional Laceration to prevent Iatrogenic Coronary Artery obstruction (BASILICA): the first experience in Poland. Kardiol Pol. 2021; 79(10): 1149–1150, doi: 10.33963/KP.a2021.0069, indexed in Pubmed: 34292560.
5. Ściborski K, Telichowski A, Mak M, et al. The next step in transcatheter aortic valve implantation: Transcatheter aortic valve replacement (TAVR) with BASILICA in a patient with a degenerated self-expanding transcatheter heart valve. Kardiol Pol. 2022; 80(2): 233–234, doi: 10.33963/KP.a2021.0193, indexed in Pubmed: 34970987.