Received: 8 February 2021 | Revised: 12 February 2021 | Accepted: 17 February 2021

DOI: 10.1111/echo.15016

Echocardiography WILEY

Percutaneous puncture of an aorto-bifemoral bypass graft and successful closure with MANTA® device in transfemoral TAVR

Martin Geyer MD[1] | Alexander R. Tamm MD[1] | Martin Oberhoffer MD[2] | Felix Kreidel MD[1] | Hazem El Beyrouti MD[2] | Thomas Münzel MD[1] | Ralph Stephan von Bardeleben MD[1]

[1]Department of Cardiology, Cardiology I, University Medical Center Mainz (Johannes Gutenberg-University Mainz), Mainz, Germany

[2]Department for Cardiothoracic and Vascular Surgery, University Medical Center Mainz (Johannes Gutenberg-University Mainz), Mainz, Germany

Correspondence
Martin Geyer, MD, Department of Cardiology, Cardiology I, University Medical Center Mainz, Langenbeckstr. 1, 55131 Mainz, Germany.
Email: martin.geyer@unimedizin-mainz.de

Funding information
Open Access funding enabled and organized by Projekt DEAL; WOA Institution: Johannes Gutenberg Universitat Universitatsmedizin; Blended DEAL: Projekt DEAL

Abstract

Transfemoral aortic valve replacement (TAVR) has become a standard therapeutic option for patients with symptomatic severe aortic stenosis. Special anatomies can pose distinct challenges for vascular access and later closure of the access site, for example, in preoperated patients. Here, we elucidate a case of transfemoral TAVR with vascular access by direct puncture of an aorto-bifemoral bypass graft and illustrate the feasibility of vascular closure by an anchored collagen-plug vascular closure device (Teleflex MANTA®).

KEYWORDS

aortofemoral bypass, interdisciplinary heart team, TAVR, vascular closure device

A 67-year-old gentleman was admitted to our center for symptomatic combined aortic valve disease with leading high-grade stenosis (invasively measured mean gradient of 66 mmHg, 0.7 cm^2 valvular orifice area as estimated by echocardiography according to continuation equation, moderate aortic regurgitation). Due to comorbidities, porcelain aorta, and a Euroscore II of 10.8, the interdisciplinary heart team opted for transcatheter aortic valve replacement (TAVR). Yet, options for vascular access were severely limited because of a history of an aorto-bifemoral bypass grafting (Omniflow II® graft, LeMaitre Vascular, Burlington, USA: biosynthetic composite of ovine collagen and a polyester mesh[1]) as well as the presence of a severe stenosis of both the left subclavian artery and the brachiocephalic trunk. Based on the relevantly increased individual patient's risk profile for a transapical access and open-heart surgery, options for transfemoral approach were thoroughly discussed in our team.

We decided for a direct puncture of the aorto-bifemoral bypass graft by fluroscopic guiding (via distal 4F safety sheath, Figure 1E). After sequential dilatation (14F-selfexpandable sheath), a 23 mm Edwards Sapien3ultra® (Edwards Lifesciences, Irvine, USA) TAVR prosthesis was advanced and implanted within the degenerated native aortic valve with good immediate hemodynamic and echocardiographic result (echocardiography at discharge showing a normal transvalvular mean gradient of 11 mm Hg in normal left ventricular ejection fraction, and no paravalvular leak). Closure of the puncture site within the bypass graft was performed by an 18F MANTA® vascular closure device (Teleflex, Wayne, USA: collagen plug with polymer anchor). Control angiography proved immediate hemostasis under therapeutic anticoagulation and intact bypass flow (Figure 1F) with uncompromised perfusion of the limb.

Efficacy and safety of the MANTA® device for vascular closure of large bore accesses in native vessels has been demonstrated.[2] Up to now, only very few cases have been published on direct puncture of peripheral vascular grafts for TAVR as well as the use of

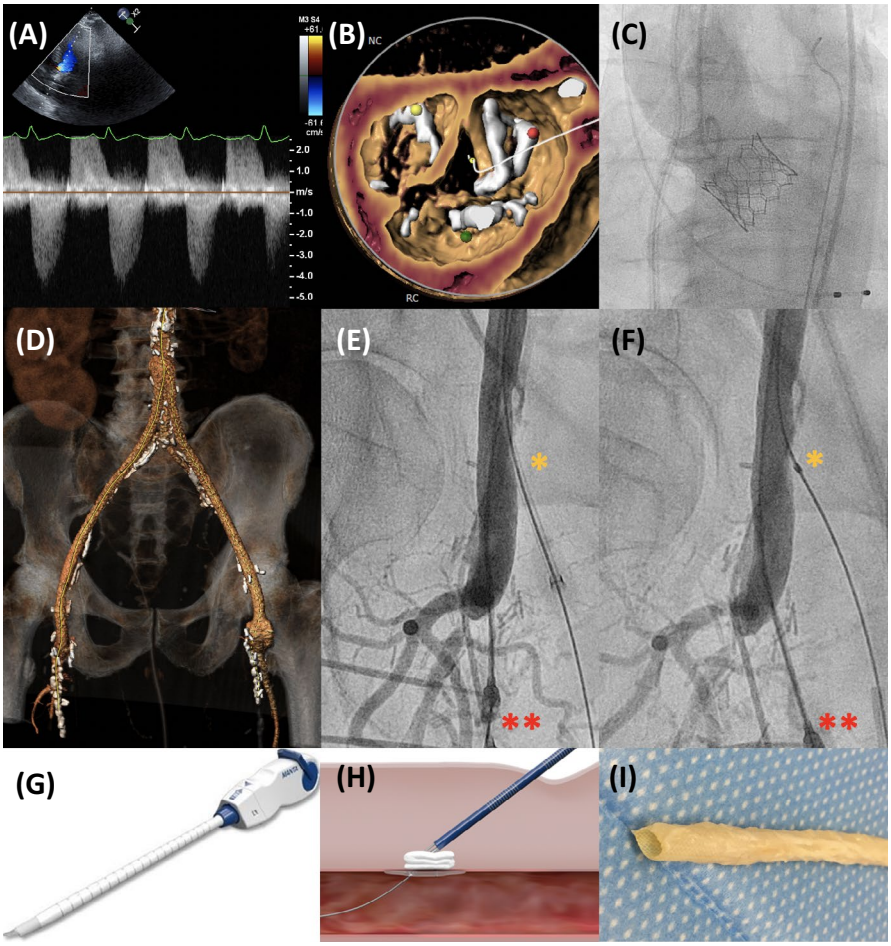

FIGURE 1 TAVR through aorto-bifemoral bypass. A and B, Echocardiography and 3D CT reconstruction, showing combined aortic valve disease with severe stenosis. C, Angiographic result after TAVR. D, 3D-reconstruction from CT scan: aorto-bifemoral bypass and stenotic native vessels. E, Fluoroscopy-guided puncture of bypass (10F-sheath* at main access site for later TAVR, angiography via 4F safety sheath**). F, Fluroscopic result (4F safety sheath**) after vascular closure of the main access by MANTA® Device*. G and H, symbolic images of MANTA® vascular closure device (Image courtesy of Teleflex. ®2021 Teleflex Incorporated. All rights reserved.). I, Omniflow II®-graft (photography)

transcutaneous vascular closure devices.[3] Our report is the first to show that TAVR via direct puncture of bypass grafts as well as later closure are feasible by using the MANTA® closure device.

CONFLICTS OF INTEREST

FK: consultancy and lecture honoraria from Abbott, Cardiac Implants, Edwards Lifesciences. RSvB: consultancy and lecture honoraria from Abbott Structural Heart, Cardiac Dimensions, Edwards Lifesciences outside the contents of the paper. The other authors state that there is no conflict of interest.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analyzed during the current study.

ORCID

Martin Geyer https://orcid.org/0000-0002-9935-8293

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How to cite this article: Geyer M, Tamm AR, Oberhoffer M, et al. Percutaneous puncture of an aorto-bifemoral bypass graft and successful closure with MANTA® device in transfemoral TAVR. *Echocardiography*. 2021;38:506–507. https://doi.org/10.1111/echo.15016