


CASE REPORT

Another step in transcatheter aortic valve implantation: A challenging transcatheter aortic valve implantation procedure in patient with severe peripheral arterial disease

Vittoria Lodo¹  | Innocenzo Scrocca² | Edoardo M. Zingarelli¹ |
Claudio Pietropaolo³ | Marco Fadde³ | Michelangelo Ferri⁴ | Andrea Gaggiano⁴ |
Gabriella Buono³ | Giuseppe Musumeci² | Paolo Centofanti¹

¹Division of Cardiac Surgery, Center for Valvular Heart Disease, Azienda Ospedaliera Ordine Mauriziano di Torino, Turin, Italy

²Division of Cardiology, Center for Valvular Heart Disease, Azienda Ospedaliera Ordine Mauriziano di Torino, Turin, Italy

³Division of Cardiovascular Anesthesia and Intensive Care, Center for Valvular Heart Disease, Azienda Ospedaliera Ordine Mauriziano, Turin, Italy

⁴Division of Vascular and Endovascular Surgery, Azienda Ospedaliera Ordine Mauriziano di Torino, Turin, Italy

Correspondence

Vittoria Lodo, Azienda Ospedaliera Ordine Mauriziano di Torino, Largo Filippo Turati 6, 10128, Turin, Italy.
Email: vittoria.lodo90@gmail.com

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Abstract

Approximately 25% of patients undergoing transcatheter aortic valve implantation presents significant peripheral arterial disease. The purpose of this case report was to present a feasible approach for transcatheter heart valve in a patient with peripheral arterial disease where the presence of a subclavian stent jutting in the aortic arch made the delivery system passage a challenging procedure.

KEYWORDS

cardiothoracic surgery, cardiovascular disorder

1 | BACKGROUND

Transcatheter aortic valve implantation (TAVI) is a well-recognized treatment option for aortic stenosis in patients with substantial comorbidities.¹ Approximately 25% of patients undergoing TAVI presents significant peripheral arterial disease (PAD) which has been reported as a risk factor for increased procedural complications and worsened clinical outcomes at 1-year

follow-up.² The proper technical planning for a percutaneous procedure should consider and mix cardiac and extracardiac characteristics of the patient, the individual risk of surgery (which is assessed by the judgment of the Heart Team in addition to scores), the feasibility of the TAVI, and local experience.³ Multimodality imaging is essential for the comprehensive evaluation of the patient and for the correct choice of the procedure access.⁴

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2 | CASE REPORT

We report the case of a 77-year-old male patient with symptomatic aortic stenosis. Past medical history includes a prior prostate cancer, chronic obstructive pulmonary disease (COPD), ischemic stroke thrombolysis-treated, and PAD with prior endarterectomy of the left internal carotid and stenting of the left subclavian artery.

On February 2021, he presented to emergency department complaining syncope. Echocardiography showed a 60% ejection fraction and severe aortic stenosis (AVA 0.6 cm/m², mean gradient 53 mmHg). Cardiac catheterization revealed a coronary disease of left anterior descending and right coronary arteries treated with stenting. A double antiplatelet therapy was started.

Due to the substantial comorbidities, the patient was elected for transcatheter heart valve (THV) procedure and referred to our department. Preoperative examinations, to plan the safest approach, included a CT scan showing an extensive and multivascular calcified arterial disease (severely calcified aorta and a mild thrombotic vasculopathy of the abdominal aorta). No significant stenoses were reported. Right common femoral artery caliber was appropriate to a transfemoral approach (mean diameter 6 mm).

However, the most interesting find was the left subclavian stent jutting in the aortic arch (Figure 1), potentially dangerous for a transfemoral access due to the risk of delivery system hindering or dislocation of the stent itself.

Therefore, a left transcarotid access was considered and supra-aortic vessels echo color Doppler ultrasound were performed. Unfortunately, it showed calcification of both common carotid arteries and a 65% right internal carotid stenosis, with a high risk of stroke in case of transcarotid access.

After an accurate evaluation of the CT scan images, the heart team consensus was to attempt THV procedure using a transfemoral access. We have ruled out a transapical approach to avoid mechanical ventilation in a patient with severe COPD. The most challenging aspect of the procedure's planning was how to avoid the subclavian stent dislocation by the delivery system. We decided to stabilize the stent using a 6/30-mm occlusive balloon inserted through the left radial artery and inflated during the passage of the delivery system (Figure 2A) avoiding any stent dislocation (Figure 2B, Video S1). An Edwards Sapien 29 mm (Edwards Lifesciences, Irvine, California) prosthesis was successfully implanted (Figure 3B, Video S2), after balloon predilatation (20/40 mm ZetaMed)



FIGURE 1 CT scan showed the left subclavian stent jutting in the aortic arch potentially dangerous for a transfemoral access due to the risk of delivery system hindering or dislocation of the stent itself

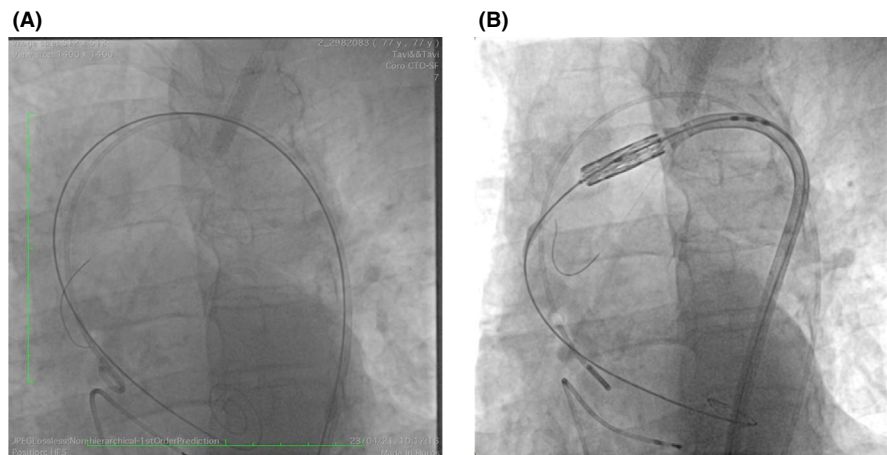


FIGURE 2 (A) 6/30-mm occlusive balloon was inserted through the left radial artery and was inflated during the passage of the delivery system. (B) Stent stabilization during the passage of the delivery system, avoiding any stent dislocation

FIGURE 3 Prosthesis was successfully implanted (B) after balloon predilation (20/40 mm ZetaMed) (A)

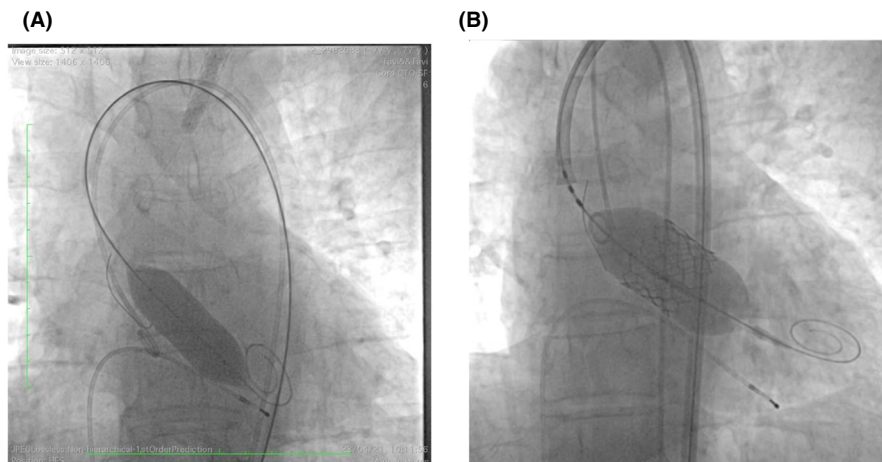


FIGURE 4 Angiographic monitoring showed no intraprosthesis regurgitation and low transvalvular gradient

(Figure 3A) through angiography-guided right femoral access. Angiographic (Figure 4, Video S3) and echocardiographic monitoring showed no intraprosthesis regurgitation and low transvalvular gradient.

The patient recovered in five days, and predischarged echocardiography showed a THV mean gradient of 9 mmHg.

At 5 months of follow-up, the patient presented asymptomatic and in good clinical condition. Echocardiography showed a TVH mean gradient of 10 mmHg.

3 | CONCLUSION

Risk factors for aortic valve stenosis have been shown to be similar to atherosclerosis.⁵ Consequently, coronary

artery disease (CAD) and peripheral vascular artery disease are often found concurrently. The presence of peripheral artery disease not only increases procedural risk but influences also technical approaches. As consequence, an accurate heart team preprocedural evaluation of patients who are candidates for TAVI is mandatory and allows the choice of the best approach for each patient.

The aim of this case report is to present a feasible and safe approach for THV in a patient with severe peripheral artery disease, where a transcarotid access was not possible and the presence of a subclavian stent jutting in the aortic arch made the delivery system passage a challenging procedure.

This is the first case described in literature.

ACKNOWLEDGMENTS

All authors contributed significantly to the content of the article. All authors read and approved the submission of the manuscript.

CONFLICTS OF INTEREST

No relationships with industry.

AUTHOR CONTRIBUTIONS

Vittoria Lodo: was the main author. Innocenzo Scrocca and Edoardo Zingarelli: performed the procedure and contributed to the content of the article. Claudio Pietropaolo: carried out anesthesiological management and contributed to the content of the article. Marco Fadde: contributed to the content of the article. Michelangelo Ferri: involved in preoperative planning. Andrea Gaggiano, Gabriella Buono, Giuseppe Musumeci, and Paolo Centofanti: supervised the article and procedure.

CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

DATA AVAILABILITY STATEMENT

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

ORCID

Vittoria Lodo  <https://orcid.org/0000-0002-9188-2656>

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

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