Outcomes of coronary protection with the chimney technique during transcatheter aortic valve implantation: a single-centre experience

Zvonimir Ostojić[1]*, Nino Petroci[2], Hrvoje Jurin[1], Luka Perčin[1], Joško Bulum[1,2]

[1]University Hospital Centre Zagreb, Zagreb, Croatia
[2]University of Zagreb, School of Medicine, Zagreb, Croatia

KEYWORDS: transcatheter aortic valve implantation, coronary artery occlusion, chimney stenting.

CITATION: Cardiol Croat. 2025;20(9-10):235-6. | https://doi.org/10.15836/ccar2025.235

***ADDRESS FOR CORRESPONDENCE:** Zvonimir Ostojić, Klinički bolnički centar Zagreb, Kišpatićeva 12, HR-10000 Zagreb, Croatia. / Phone: +385-91-895-07-02 / E-mail: ostojiczvonimir@gmail.com

ORCID: Zvonimir Ostojić, https://orcid.org/0000-0003-1762-9270 • Nino Petroci, https://orcid.org/0009-0000-4371-4669
Hrvoje Jurin, https://orcid.org/0000-0002-2599-553X • Luka Perčin, https://orcid.org/0000-0003-0497-6871
Joško Bulum, https://orcid.org/0000-0002-1482-6503

Introduction: Transcatheter aortic valve implantation (TAVI) carries a risk of coronary artery occlusion (CAO) in selected patients, particularly those with low coronary ostia. Several methods have been developed to prevent CAO, with chimney stenting being widely adopted due to its simplicity. However, long-term outcomes of this technique are lacking.[1] The aim of this study was to assess outcomes in patients who underwent coronary protection during TAVI using the chimney technique.

Patients and Methods: This was a single-centre retrospective study that included all patients undergoing TAVI with coronary protection using the chimney technique. Patients were stratified into two groups: Group 1 (stent implanted) and Group 2 (no stent implantation). Procedural and clinical data were collected from the hospital's digitalized database. All patients were contacted for follow-up outcome assessment.

Results: Of 810 patients undergoing TAVI, 16 (1.98%) were deemed at high risk for CAO based on pre-TAVI CT. Clinical and procedural data are presented in **Tables 1** and **2**. In all cases, a stent was positioned in the coronary artery at risk before valve deployment. After implantation, coronary artery patency was assessed, and the decision regarding definitive stent implantation was made at that time. This resulted in seven stent implantations (0.86% of all TAVI cases, 43.75% of those at high risk of CAO), comprising Group 1. The mean follow-up was 13.7 ± 7.5 months. One patient (Group 2) was lost to follow-up. There were two deaths, both in Group 1: one due to complications (sepsis) following transapical TAVI, and one non-cardiac death 1.5 years post-procedure. In Group 1, a P2Y12 inhibitor was prescribed for either 3 months (50%) or 6 months (50%). All patients reported clinical improvement, with no reports of chest pain. There were no cases of late CAO or need for percutaneous coronary intervention.

TABLE 1. Clinical characteristics of patients.

	All patients	Group 1 (n=7)	Group 2 (n=9)
Age – mean ± SD	80.6 ± 4	80.6 ± 2.1	80.6 ± 4.9
Female gender – n(%)	14 (87.5)	6 (85.7)	8 (88.9)
Arterial hypertension – n(%)	15 (93.8)	6 (85.7)	9 (100)
Hyperlipidemia – n(%)	12 (75)	6 (85.7)	6 (66.7)
Diabetes mellitus	7 (43.8)	4 (57.1)	3 (33.3)
Chronic renal insufficiency – n(%)	11 (68.8)	6 (85.7)	5 (55.6)
Coronary artery disease – n(%)	10 (62.5)	5 (71.4)	5 (55.6)
Percutaneous coronary intervention – n(%)	0	0	0
Coronary artery bypass graft – n(%)	2 (12.5)	2 (28.6)	0
Peripheral artery disease – n(%)	4 (25)	2 (28.6)	2 (22.2)
Chronic obstructive pulmonary disease – n(%)	1 (6.25)	1 (14.3)	0
Malignancy – n(%)	3 (18.8)	2 (28.6)	1 (11.1)
Oral anticoagulation – n(%)	8 (50)	5 (71.4)	3 (33.3)

RECEIVED:
September 27, 2025
ACCEPTED:
October 6, 2025

TABLE 2. Procedural characteristics.

	All patients	Group 1 (n=7)	Group 2 (n=9)
Transfemoral approach – n(%)	15 (93.8)	6 (85.7)	9 (100)
Valv-in-valve – n(%)	5 (31.3)	3 (42.9)	2 (22.2)
Balloon expanding valve – n(%)	8 (50)	3 (42.9)	5 (55.6)
Valve size - mean ± SD	26 ± 3.3	26.3 ± 4.4	25.8 ± 2.1
Left main coronary artery protection – n (%)	15 (93.8)	6 (85.7)	9 (100)
Coronary artery ostia height - mean ± SD	7.62 ± 1.51	7.46 ± 1.92	7.74 ± 1.03
Stent diameter - mean ± SD	/	3.71 ± 0.52	/
Stent length - mean ± SD	/	35.3 ± 4.3	/

Conclusion: The chimney technique appears to be a safe and effective strategy for the prevention and management of CAO during TAVI. Notably, fewer than 50% of patients in the high-risk group ultimately required stent implantation.

LITERATURE

1. Hsiung I, Spilias N, Bazarbashi N, Ahuja KR, Patel J, Kaur S, et al. Left Main Protection During Transcatheter Aortic Valve Replacement With a Balloon-Expandable Valve. J Soc Cardiovasc Angiogr Interv. 2022 May 4;1(4):100339. https://doi.org/10.1016/j.jscai.2022.100339