

Coronary Risk in Transcatheter Aortic Valve Replacement, Overview of Data, Challenges, and Best Practices



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KEYWORDS

• TAVR • Coronary occlusion • Chimney technique • BASILICA • ShortCut

KEY POINTS

- Coronary artery occlusion is a fatal complication during transcatheter aortic valve replacement (TAVR).
- Predictive factors of this complication are described in many studies.
- Techniques of prevention are also described and evolving with time.

INTRODUCTION

Degenerative aortic stenosis (AS) remains the most frequent valvular disease, leading to surgical or interventional treatment in Europe and North America, with an increasing prevalence due to the aging of the population.¹ According to Ox VALVE population cohort study (D'Arcy and colleagues), which enrolled 2500 patients aged 65 years or older, clinically significant undiagnosed AS was identified in 6.4%, to which was added 4.9% of preexisting valve disease, for a total prevalence of 11.3%.^{2,3} By extrapolating these results, this prevalence is expected to double by 2050.

Transcatheter aortic valve replacement (TAVR) is a breakthrough in the management of patients with severe calcified AS. The first implantation in humans in 2002 by Professor Cribier's team thus marked a turning point in interventional cardiology, allowing treatment of AS in elderly patients, with comorbidities, for whom interventional management was not performed.⁴ The use of TAVR has increased rapidly over the past decade particularly due to

improvements in percutaneous aortic valve prostheses, delivery systems, and good clinical outcomes. Several randomized studies have reported noninferiority or even superiority of TAVR compared with surgical aortic valve replacement, especially in patients with high or intermediate surgical risk^{5,6} and recently in low-risk patients as showed in the PARTNER 3 (Placement of Aortic Transcatheter Valves) and Evolut Low Risk trials.^{7,8}

TAVR has emerged as a promising solution for individuals who have experienced the failure of a surgical valve.⁹ In cases where a previously implanted surgical aortic valve deteriorates or malfunctions, TAVR provides an alternative approach to address the issue. Recent studies, including a comprehensive meta-analysis, have shed light on the effectiveness of valve-in-valve (ViV) TAVR in comparison to redo aortic valve replacement in such scenarios.¹⁰ Moreover, in degenerated percutaneously implanted valve, redo-TAVR seems to be safe for patients presenting with early and late valve dysfunction.¹¹

Although the clinical outcome of TAVR is improving and procedural complications are

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decreasing, iatrogenic coronary occlusion after valve deployment remains a major concern.

This complication is relatively rare in current practice, especially in native valve tight AS where its incidence is less than 1%^{12,13}; however, the risk increases in patients with degenerated bioprosthetic surgical aortic valves (ViV procedures) to reach 2.3% with a 30-day mortality rate of 50%.^{14,15}

DEFINITION OF CORONARY OCCLUSION ACCORDING TO VARC-2

According to VARC-2 criteria (Valve Academic Research Consortium-2),¹⁶ coronary occlusion following TAVR is defined as angiographic or echocardiographic evidence of an ostial coronary occlusion, either by the TAVR prosthesis itself, native valve leaflets, calcifications, or dissection, occurring during or after the TAVR procedure.

It usually occurs within seconds or minutes after valve deployment,¹⁴ but it can also occur later, in the days or weeks after the procedure. This type of delayed coronary occlusion has been described in the literature and is defined by three criteria¹⁷:

1. Obstruction of the left main (LM) or right coronary artery (RCA) occurring after successful TAVR procedure.
2. Diagnosis is made by angiography, surgery, or autopsy at the time of the event.
3. Occlusion is not solely related to the progression of preexisting coronary artery disease or in-stent restenosis.

MECHANISM OF CORONARY OCCLUSION AFTER TRANSCATHETER AORTIC VALVE REPLACEMENT

Coronary occlusion often occurs after displacement of one of the calcified leaflets from the native or bioprosthetic valve to the ostium of the affected coronary artery with either direct obstruction of coronary flow or due to contact of the displaced leaflet with the sinotubular junction (STJ), indirectly causing reduced coronary flow by sealing the Valsalva sinuses.¹⁸ A study showcased that the primary underlying mechanism of coronary obstruction in ViV procedures involves the repositioning of the malfunctioning leaflet. There were no instances of coronary obstruction linked to the struts of the implanted transcatheter valve frame or its cuff/leaflets, as highlighted in the study.¹⁵

In addition, as indicated by previous smaller studies on ViV procedures,¹⁹ this complication tended to occur more frequently in cases involving stentless bioprosthesis or internally

stented ones (eg, Mitroflow, Sorin, Arvada, CO, USA; Trifecta, St. Jude Medical, St Paul, MN, USA), which accounted for up to 80% of the cases of obstruction.¹⁵ In the case of externally mounted bioprostheses, the relatively extended leaflets outside the stent, when compared with internally mounted leaflets, could potentially contribute to the higher incidence of coronary obstruction.²⁰ Furthermore, stentless bioprostheses have typically a supra-annular position, leading to a shorter distance between the coronary ostia and the valve leaflets; this, combined with the absence of stent posts, might facilitate the interaction between the prosthetic leaflet and the coronary ostia.¹⁵

PREDICTIVE FACTORS OF CORONARY OCCLUSION

The main predictive factors of coronary obstruction are related to the patient aortic root anatomy.

A low position of the coronary ostia with respect to the aortic annulus has been highlighted as one of the most important factors contributing to this complication, and it has been suggested that a coronary ostia height cut-off less than 10 mm increases the risk of coronary obstruction during TAVR.^{21,22}

The severity of valve calcification and, especially, the presence of bulky calcium nodules on the left or right aortic leaflets have also been suggested as important predictive factors for coronary obstruction after TAVR. A recent study indicates that a culprit leaflet calcium volume exceeding 600 mm³, associated with a cusp height greater than that of the coronary height, might serve as a significant predictive factor for obstruction.²³

A narrow sinus of Valsalva is a risk factor for coronary occlusion, and studies have shown that a diameter less than 30 mm is associated with an increased risk of occlusion.¹⁴

Moreover, the use of balloon-expandable valve is associated with an elevated risk of coronary occlusion (0.81% in patients treated with a balloon expandable valve vs 0.34% among those treated with a self-expandable valve).²⁴

The TAVR-ViV procedure is also associated with an increased risk of coronary occlusion 2.3% versus less than 1% in native aortic valves,^{14,19,25} as mentioned earlier. Studies define the presence of certain surgically implanted valves (stentless or stented bioprostheses with externally mounted leaflets (eg, Trifecta, Mitroflow) as potential risk factors for this complication.⁶⁻⁸

The main predisposing factor in ViV procedures is the proximity of a coronary ostium to the anticipated final position of the displaced bioprosthetic leaflets after the new transcatheter heart valve (THV) implantation, calculated by the virtual THV to coronary distance (VTC). This is a CT-obtained predictor of the proximity of the coronary ostia to the anticipated final position of the displaced bioprosthetic leaflets after THV implantation.²⁶ According to the Vancouver protocol, the coronary obstruction risk is described as follows:

- VTC < 4 mm: high risk
- 4 < VTC < 6 mm: borderline risk
- VTC > 6 mm: low risk

Another study validates the Vancouver protocol risk stratification and defines a cutoff of VTC less than 4 mm. Ninety percent of patients with VTC less than 4 mm had a coronary occlusion during a TAVR-ViV procedure.¹⁵

Other factors may play a role in increasing the risk of coronary occlusion, such as female gender. The study done by Ribeiro and colleagues showed that women represent approximately 50% of patients treated with TAVR and the vast majority (>80%) of patients with coronary occlusion after TAVR.¹⁴

The association between female gender and coronary occlusion may be due to anatomic differences between genders, such as Valsalva sinus dimensions and coronary height.

Recently novel techniques to prevent coronary artery occlusion (CAO) have emerged, such as the BASILICA, which is a new approach to prevent the CAO in TAVR-ViV procedures. To facilitate decision-making, a new classification is described—the VIVID classification—taking into consideration the aortic root and valvular anatomy to define patients at risk who would benefit from prevention techniques.

A study reviewed the VIVID classification in a prospective registry and showed that coronary obstruction was rare even in patients with high-risk anatomy (VIVID type IIB, IIIB, or IIIC) even in the absence of coronary protection.²⁷ The VIVID classification is a useful instrument to sensitize operators on coronary obstruction in a particular subset of patients planned for TAVR-ViV and to identify anatomic factors that warrant coronary protection.

VIVID CLASSIFICATION

- Type I²⁰ anatomy involves a failed valve leaflet that extends completely below the plane of the coronary ostia, resulting

in an almost negligible risk of coronary obstruction. In such cases, the BASILICA procedure is not necessary, and conventional TAVI can be safely carried out.

- In type II²⁰ anatomy, the malfunctioning valve leaflet might extend above a portion of the coronary ostium but does not approach the level of the STJ. Within type II, when the sinus possesses a substantial capacity, it could potentially accommodate the deflected failed valve leaflet without impeding blood flow to the coronary artery, thereby yielding a low risk of obstruction (type IIA). Conversely, if the sinuses are effaced (with a VTC distance <4 mm) (type IIB), it is advisable to consider BASILICA. In rare cases where the failed valve leaflet deflects minimally below the STJ level, it is crucial to measure the diagonal and vertical distances between the highest and most lateral leaflet deflection toward the STJ. When distance is short (<2.5–3.5 mm), BASILICA intervention should be considered.
- Type III²⁰ anatomy embodies the most intricate configuration, wherein the malfunctioning valve leaflet can extend either above the plane of the STJ or dip just beneath it, very closely (<2 mm). Many cases involving surgical valves with type III anatomy could be prone to coronary obstruction. In situations where the VTC is less than 4 mm (type IIIB), BASILICA is recommended. If the VTC is 4 mm or more, an evaluation is necessary to determine if obstruction might occur in the inflow to the sinus (at the STJ level). In cases where the VTSTJ distance adequately permits diastolic flow to the coronary arteries (type IIIA), conventional TAVI can be performed with minimal risk of obstruction. Presently, there is not a scientifically derived threshold to define what might be considered too narrow a VTSTJ. This cutoff will likely rely on the size of the post-TAVI STJ residual nonobstructed crescent area and the magnitude of the coronary blood supply. When the VTSTJ distance is limited (type IIIC), considering BASILICA is recommended. A VTSTJ distance less than 2.5 mm is generally considered high risk in type III anatomy, whereas a VTSTJ ranging from 2.5 to 3.5 mm is seen as a borderline condition.

PREVENTION AND TREATMENT OF CORONARY OCCLUSION IN TRANSCATHETER AORTIC VALVE REPLACEMENT

The main contemporary approach to avoid TAVR-induced coronary obstruction is careful patient selection using computed tomography (CT). The standard treatment of severe AS is surgical aortic valve replacement, which may be unsuitable for high-risk patients. In the first series of cases of transfemoral TAVR published in 2006, coronary artery obstruction was the cause of one of two deaths.²⁸

Initially, no criteria for high-risk coronary obstruction was described, thus treatment of such cases was done after the complication had occurred. In this acute setting, conversion to surgical AVR is an option with a very high mortality rate of approximately 50%.¹⁴

In other cases, percutaneous management to restore blood flow into the coronary arteries was achieved, by using a snare or an oversized balloon inflated in the THV to pull it back into the ascending aorta. Surgical AVR is then performed to treat the aortic valve.

In contemporary practice, many techniques have been developed to prevent or treat coronary obstruction following TAVR either on native valves, surgical bioprosthesis, or TAVR valves, with different success and mortality rates.

RESCUE PERCUTANEOUS CORONARY INTERVENTION AND CORONARY ARTERY BYPASS GRAFT

Rescue percutaneous coronary intervention (PCI) of the obstructed coronary artery was done since the early time of TAVR procedure. In one systematic review of 24 cases of coronary obstruction,²⁵ PCI was attempted in 23 patients (95.8%) and was successful in all but two (91.3%). The diagnosis was made by coronary angiography in all patients but one (post-mortem). At least one stent was implanted at the coronary ostia in 20 patients. Significant compression of the stent requiring the implantation of a second stent occurred in three patients, whereas conversion to open heart surgery was required in two patients. There was two unsuccessful PCI that lead to the death of two patients. Hospital mortality rate was 8.3%, and all patients who had successful PCI survived and were discharged from the hospital.

Another study¹⁴ showed that PCI was the preferred strategy for the treatment of coronary obstruction following TAVR. Most importantly, coronary intervention was feasible (attempted

in 75% of the patients) and had a success rate of 81.8%. However, urgent coronary artery bypass graft (CABG) or mechanical hemodynamic support (mainly cardiopulmonary bypass) were needed in 14% and 36% of patients, respectively, underlining the importance of performing these procedures in highly experienced centers with cardiac surgery facilities. These results differ from a previously published systematic review, including small case series and case reports, where PCI was attempted in 96% of the patients and was successful in 91% of them.²⁵ In these cases, mortality rate was high after successful PCI (22%) or CABG (50%) and increased to 100% in case of unsuccessful PCI. Although these results suggest that PCI as a first attempt for coronary revascularization is a reasonable strategy, it also highlights the importance of both urgent coronary flow restoration by PCI and strategy modification (cardiopulmonary bypass, CABG) if coronary flow is not successfully restored within a few minutes.

Fig. 1 demonstrates a case of coronary occlusion by left sinus sequestration treated by a rescue PCI and drug-eluting stent (DES) implantation in the LM that extends above the TAVI leaflets.

CORONARY ARTERY PROTECTION AND CHIMNEY TECHNIQUE

Chimney stenting technique was originally reported in endovascular aneurysm repair procedures in case of obstruction of renal or mesenteric vessels and has now been adopted as an important bailout technique during TAVR.

Prevention of CAO after TAVR using this technique was described in many case reports and case series. There are 2 important studies evaluating the feasibility and safety of this strategy.^{29,30} A stepwise description of the technique is demonstrated in **Fig. 2**.

The chimney technique usually requires an additional arterial access for the engagement of a guide catheter into the coronary artery at risk. Ideally, Judkins left/right or EBU guiding catheters are used because they can be more easily maneuvered into the aorta during THV deployment and can be repositioned toward the coronary ostium once the THV is deployed. The coronary guiding catheter should be engaged, followed by the delivery of a coronary 0.014" guidewire distally into the selected vessel, with proper heparinization (activated clotting time >250 s). A deflated coronary balloon or, preferably, a DES with robust radial force should be positioned in the distal segment

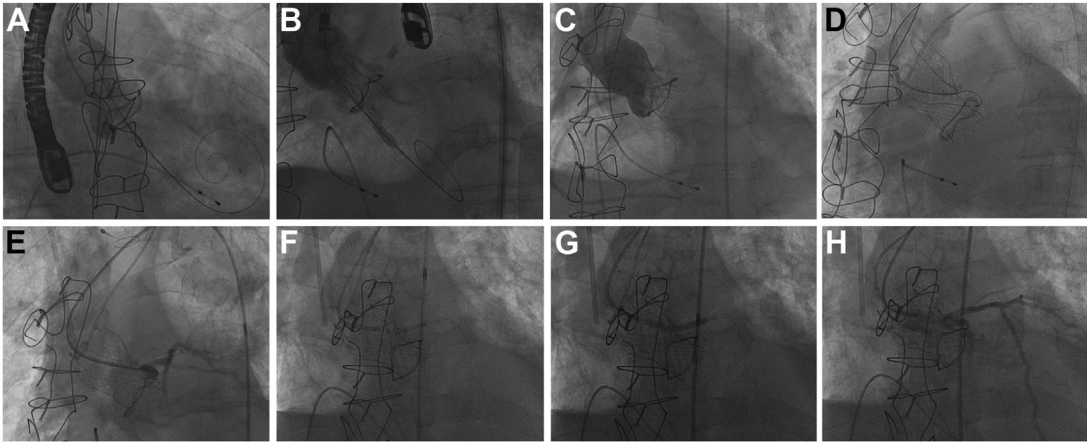


Fig. 1. Rescue PCI of LM. (A) Initial aortography. (B) Evolut R 26 mm (Medtronic, Minneapolis, MN) implantation. (C) Aortography after valve deployment showing left sinus sequestration with LM occlusion. (D) Wiring of the left Valsalva sinus then the LM. (E) Engagement of the LM with guiding catheter. (F) LM ballooning. (G) LM stenting with DES that extends above the TAVI leaflets. (H) Final result with patent LM.

of the target vessel before initiating valve deployment; this prepares it for potential emergent or planned utilization subsequent to the TAVI procedure. The guiding catheter is then retracted into the ascending aorta. If a confirmed or impending CAO arises (eg, evidence of leaflet tissue directly facing the coronary ostium, with or without reduced coronary flow due to the presence of the protection KIT), the positioned stent can be easily retracted and deployed. The DES diameter should be selected according to the preprocedural CT analysis or angiographic assessment. The length of the DES should be adequately long to ensure it can anchor within the proximal portion of the

coronary artery and extend beyond the anticipated site of obstruction. If CAO might occur due to displacement of bulky leaflet tissue, the length of the DES should be adapted to extend beyond these obstructive leaflets. Conversely, if the CAO is expected to result from the closure of the entire sinus as a result of contact between the THV frame and the sinotubular junction, the DES should extend above the sinotubular junction. The primary issue with this technique is that coronary access afterward will be challenging.

The results of the chimney registry study³⁰ revealed that chimney stenting is rarely required in contemporary practice, accounting for only

CENTRAL ILLUSTRATION: Chimney Stenting Procedural Steps

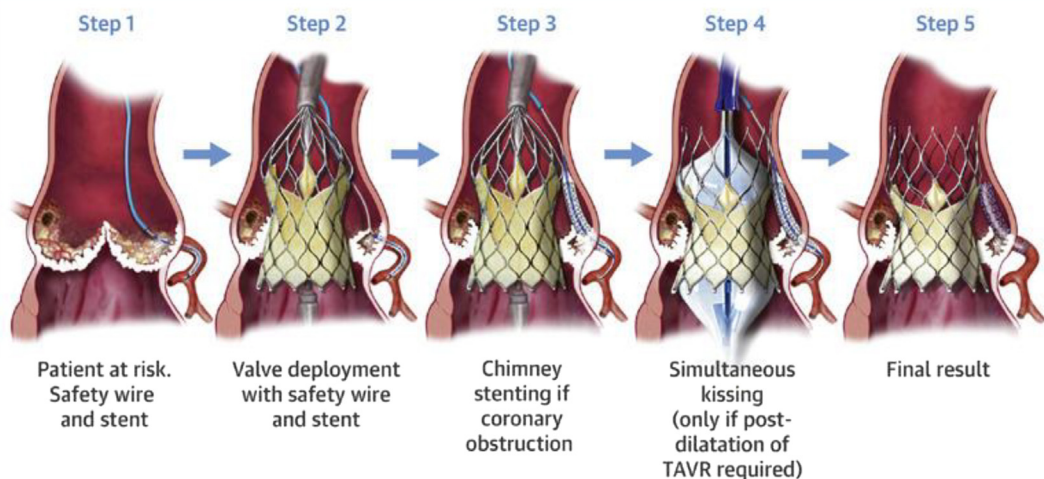


Fig. 2. Steps of chimney technique. (Mercanti, F. et al. *J Am Coll Cardiol Interv.* 2020;13(6):751-61.)

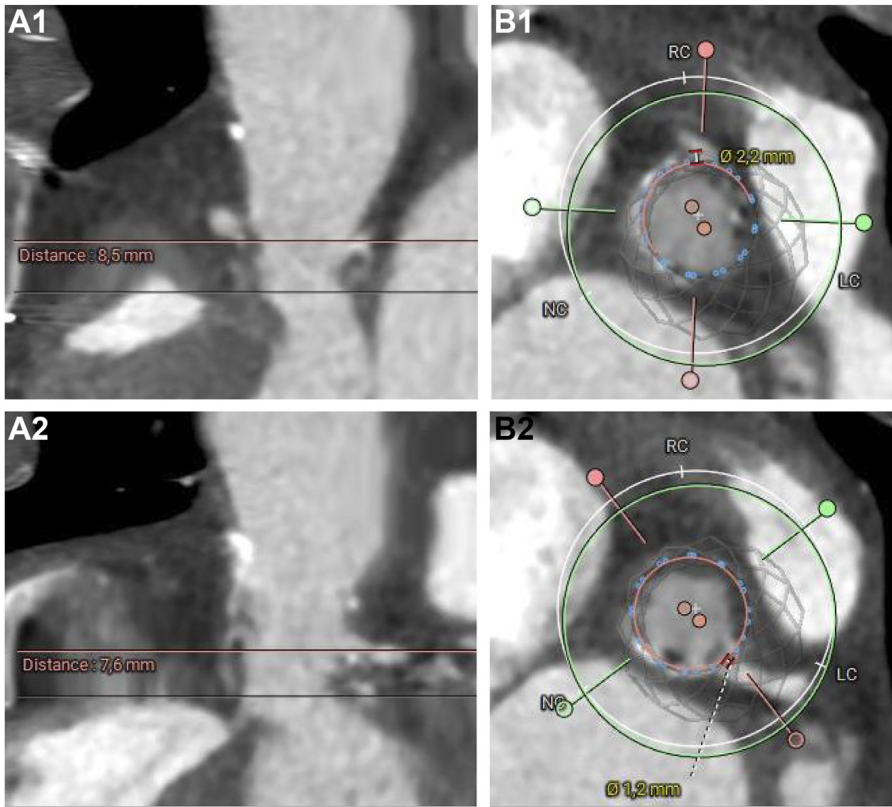


Fig. 3. Pre-TAVI cardiac CT scan of a degenerated stentless bioprosthesis with high risk of bilateral coronary occlusion. (A) Stretched longitudinal view showing the low takeoff of the RCA (8.5 mm) (A1) and LM (7.6 mm) (A2). (B) Transverse view with TAVI valve simulation (Evolut R 23 mm Medtronic, blue dashed circle) showing short VTC of both RCA (2.2 mm) (B1), and LM (1.2 mm) (B2).

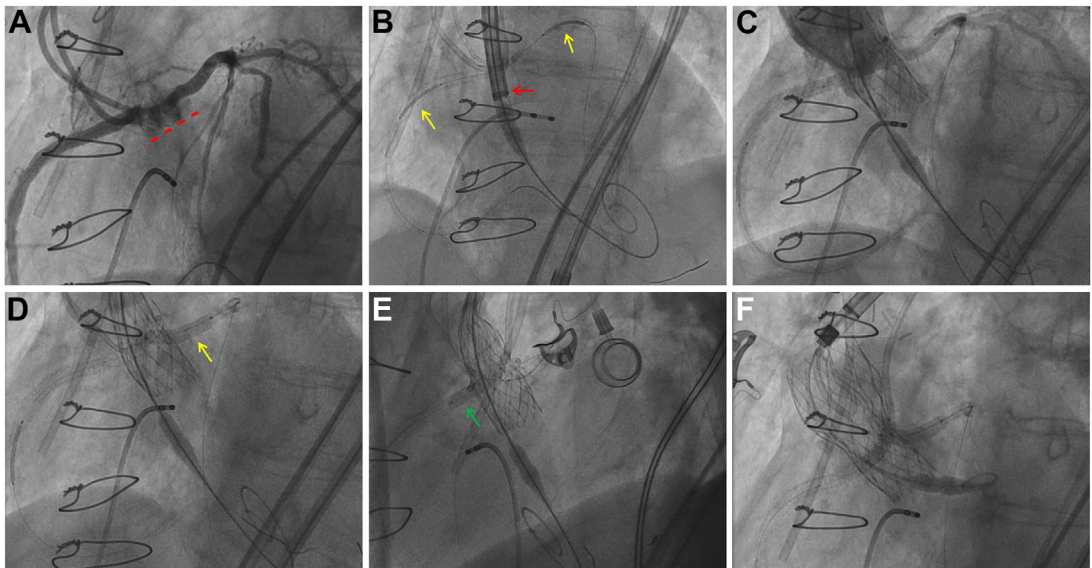


Fig. 4. Double chimney technique steps. (A) Coronary angiogram showing short coronary to aortic annulus (dashed red line) distances. (B) Stents in parking position (yellow arrows) and valve positioning (red arrow). (C) Aortography at 75% of the deployment to check valve depth, showing both coronary ostia at risk. (D) LM stent deployment (yellow arrow). (E) RCA stent deployment (green arrow). (F) Valve release with simultaneous kissing balloon inflation in the coronary ostia.

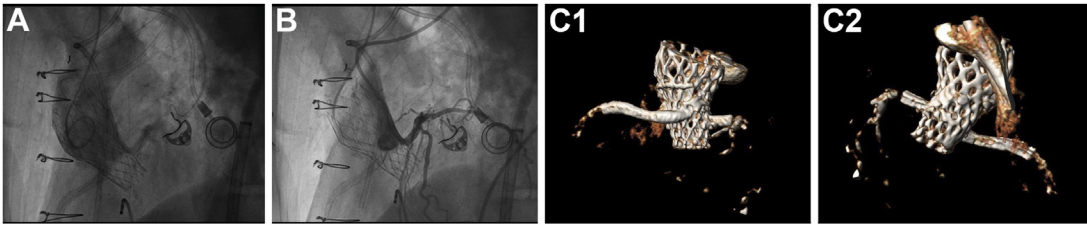


Fig. 5. TAVI with double chimney technique result. (A) Aortic angiography showing good valve position without aortic regurgitation and perfect coronary patency. (B) Selective LM injection. (C) 3D CT scan reconstruction showing the relation between the valve and both chimney stents in RCA (C1) and LM (C2).

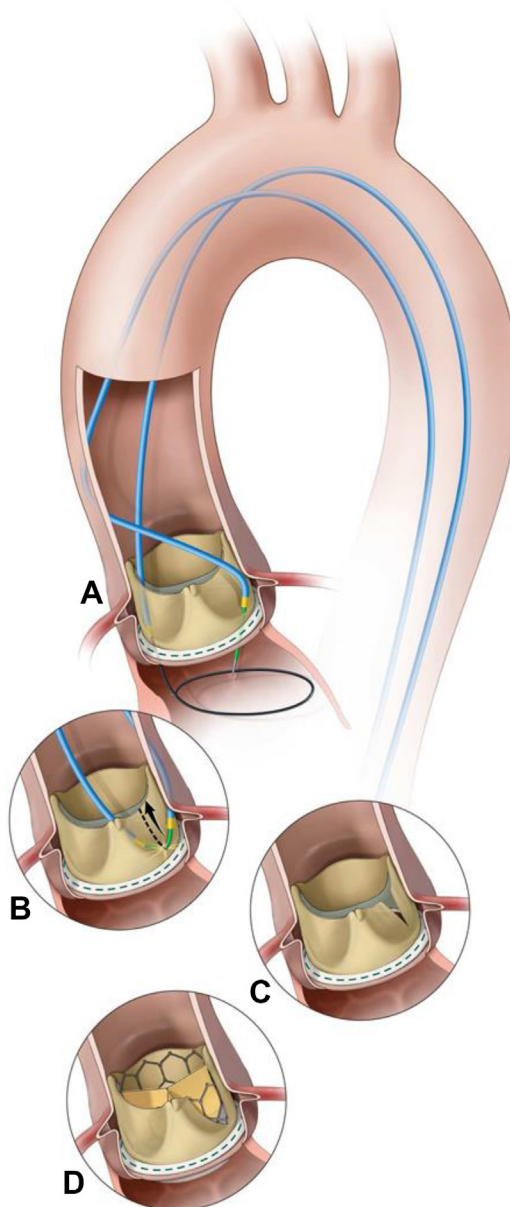


Fig. 6. BASILICA technique description. (Jaffar M. Khan et al., Transcatheter Laceration of Aortic Leaflets to Prevent Coronary Obstruction During Transcatheter Aortic Valve Replacement: Concept to First-in-Human, *JACC: Cardiovascular Interventions*, 11 (7), 2018, 677-689, <https://doi.org/10.1016/j.jcin.2018.01.247>.)

0.5% of all cases; this is despite the fact that in most of the cases (93%), one or more classic anatomic risk factors for CAO were present. Nevertheless, upfront coronary protection is an important strategy, facilitating rapid restoration of coronary flow, and is associated with lower risk of cardiogenic shock, myocardial infarction, and death. Furthermore, clinical outcome data suggest that chimney stenting is an effective bailout strategy for treating impending CAO or established CAO. However, there are lingering concerns about late stent failure, with a rate of 3.5% observed at 1 year.

Figs. 3–5 demonstrate a case of a patient at high risk of LM and RCA occlusion after TAVR, treated with preventive chimney stenting of both coronary arteries.

BASILICA TECHNIQUE

The BASILICA (bioprosthetic or native aortic scallop intentional laceration to prevent iatrogenic coronary artery obstruction during TAVR) was described *in vitro* and *in vivo* in 2018 by Khan and colleagues,³¹ and the concept was based on the LAMPOON technique used before to lacerate the anterior mitral leaflet to prevent left ventricular outflow tract obstruction during transcatheter mitral valve replacement.

The target leaflet or leaflets are selected based on the coronary artery at risk of obstruction. Fluoroscopic projection angles for the target aortic leaflets are analyzed on cardiac CT. Two guiding catheters are used per target leaflet. For single leaflet or solo BASILICA, no additional vascular access is required beyond the two sheaths already required for TAVR deployment and angiography. For double leaflet or doppio BASILICA, the sheath used for angiography is upsized to 12 to 14 French (Fr), allowing for the accommodation of two side-by-side 6- to 8-Fr catheters. The guiding catheters are positioned on either side of the aortic leaflet, with a traversal guidewire (Astato XS 20, Asahi, Japan) and a snare (Amplatz Goose Neck, AGA Medical Corporation, MN, USA) in the aortic

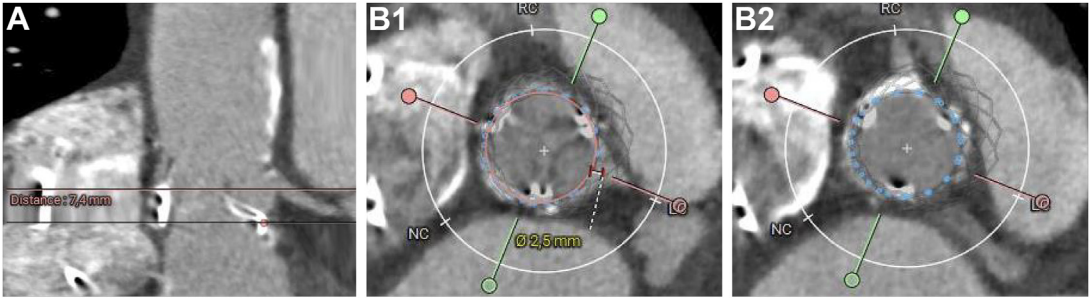


Fig. 7. Pre-TAVI cardiac CT scan of a degenerated stented bioprosthesis with high risk of LM occlusion. (A) Stretched longitudinal view showing the low takeoff of the LM (7.4 mm). (B) Transverse view with TAVI valve simulation (Evolut R 26 mm Medtronic, blue dashed circle) showing a short LM VTC (2.5 mm) (B1) and VTS (0 mm) (B2).

root and the left ventricular outflow tract, respectively (Fig. 6A). The guidewire is insulated in a microcatheter (Piggyback Wire Converter, Teleflex, Wayne, Pennsylvania, USA) to confine the electrical current to its tip and is electrified using a radiofrequency generator, enabling it to perforate the base of the target leaflet (see Fig. 6A). The guidewire is snared in the left ventricular outflow tract and externalized to form a loop through the leaflet, between the two guiding catheters. The guidewire shaft is shaped to

confine the electrical contact to the leaflet tissue (Fig. 6B). It is then further electrified under tension to lacerate the leaflet down the centerline (Fig. 6C). Following the successful leaflet incision, the TAVR procedure proceeds according to the standard protocol (Fig. 6D).

The BASILICA trial³² aims to demonstrate the safety and the feasibility of this technique. The results show that the primary endpoint of procedural success was met in 93% of patients. Leaflet traversal was successful in 35 of 37 (95%)

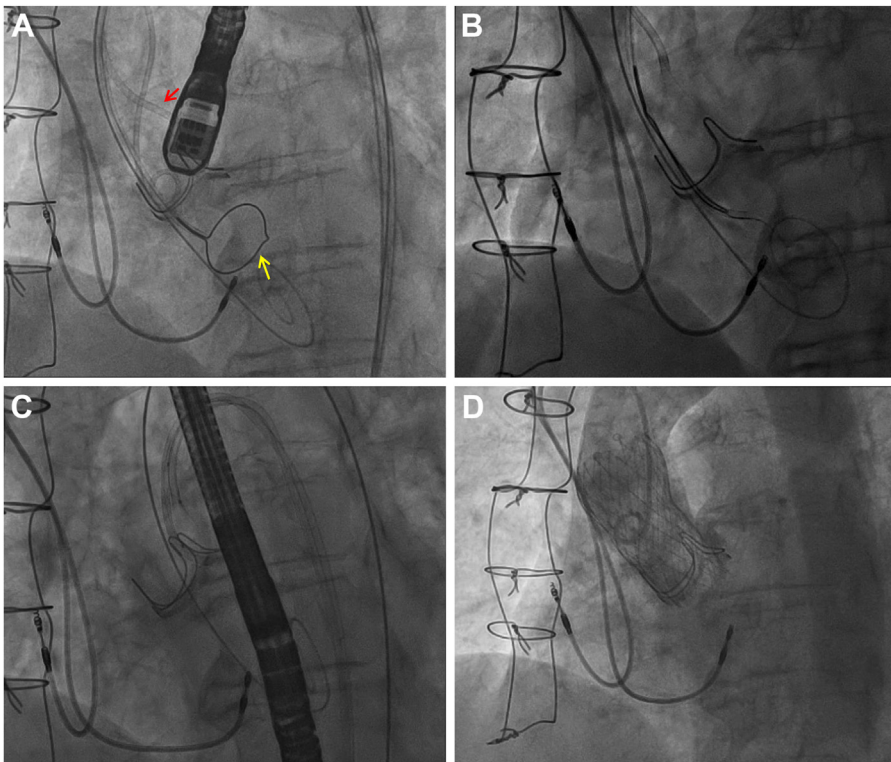


Fig. 8. BASILICA technique steps. (A) Leaflet basal puncturing with Astato 20 guidewire (ASAHI INTECC Co Ltd, Seto-shi, Japan) with support by microcatheter and guiding catheter (red arrow). An Amplatz Goose Neck snare is positioned in the LVOT (yellow arrow). (B) Traversed guidewire snaring and externalization. (C) Leaflet splitting with the electrified guidewire. (D) Final control with good result.

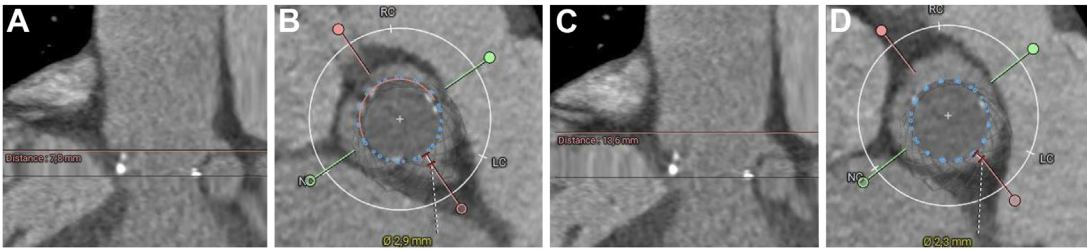


Fig. 9. Pre-TAVI cardiac CT scan of a degenerated stented bioprosthesis with high risk of LM occlusion. (A) Stretched longitudinal view showing the low takeoff of the LM (7.8 mm). (B) Transverse view with TAVI valve simulation (Evolut R 26 mm Medtronic, blue dashed circle) showing short LM VTC (2.9 mm). (C) Stretched longitudinal view showing a low STJ (13.6 mm). (D) Transverse view with TAVI valve simulation (Evolut R 26 mm Medtronic, blue dashed circle) showing short LM VTS (2.3 mm).

of target leaflets. Laceration was successful in all leaflets traversed. All subjects survived their procedure with successful implantation of the first TAVR device. There were no cases of coronary obstruction, reintervention, or surgery. In the two cases in which leaflet traversal was not successful, coronary stents were prepositioned, of which one was deployed after TAVR and the other removed due to low probability of obstruction on angiographic assessment after TAVR.

Stroke risk for BASILICA-TAVR needs to be assessed in larger prospective trials and registries.

Hemodynamic instability was uncommon and tolerated after BASILICA (7%), resolving rapidly after valve deployment.

Figs. 7 and 8 demonstrate a case of TAVR-VIV at high risk of LM occlusion treated with pre-emptive BASILICA technique before valve implantation.

ShortCut TECHNIQUE

A new dedicated transcatheter leaflet splitting device, the ShortCut device, is currently being evaluated globally in a prospective, multicenter, nonrandomized, single-arm, open-label clinical study to demonstrate the safety and effectiveness of the device.³³

The ShortCut (Pi-Cardia: ShortCut™ Catheter, First Dedicated Leaflet Splitting Solution) device is intended for dividing bioprosthetic aortic

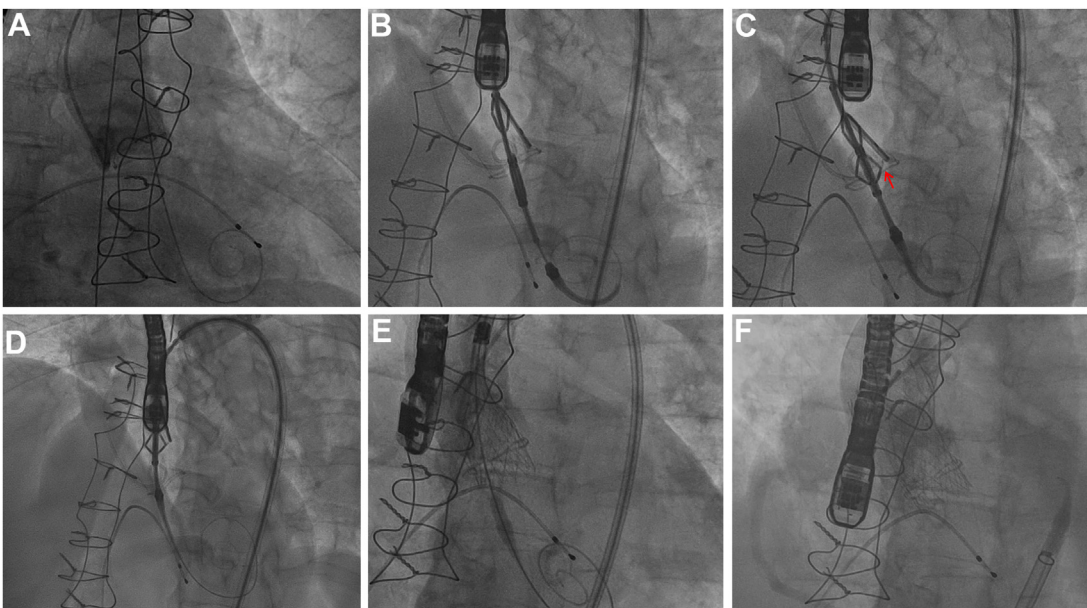


Fig. 10. Shortcut for LM protection steps. (A) Initial aortic angiography. (B) Left cusp isolation view and device positioning guided by fluoroscopy and TEE. (C) Device activation (exposition of the splitting element, red arrow). (D) Leaflet splitting. (E) TAVI valve deployment. (F) Final result with good position of the valve, no regurgitation, and patent LM.

valve leaflets in patients undergoing ViV-TAVR procedures, particularly those who are at risk of TAVR-induced CAO. The device consists of a splitting element (SE) that penetrates the leaflet in a controlled manner in order to perform leaflet splitting and a positioning arm (PA) that protects the SE throughout the procedure.

The ShortCut procedure is guided by fluoroscopy and transesophageal echocardiography. During the procedure, the catheter is introduced through a 16-Fr introducer sheath and advanced to the aortic valve over a preshaped guidewire. Once the device is properly aligned at the annular level, the PA is exposed and rotated toward the targeted leaflet. Once the desired position is obtained, the SE is activated, penetrating in a controlled manner the bottom of the leaflet from the ventricular side. The PA, situated on the aortic side of the leaflet, protects the surrounding tissue from any potential injury and acts as a cover for the activated SE. The leaflet is then split by gently retracting the catheter. At the end of the splitting sequence, the SE is deactivated and resheathed. If the splitting of a second leaflet is required, the PA can be rotated toward the targeted leaflet, and the procedural steps can be repeated. Following the conclusion of the procedure, the ShortCut catheter is resheathed and withdrawn, and an echocardiographic assessment is performed to visualize the leaflet split. After the THV is deployed, unobstructed coronary flow is confirmed by echo and angiography.

Fig. 9 shows a case with high-risk CT scan criteria for coronary occlusion in a TAVR-ViV procedure, and **Fig. 10** describes a step-by-step ShortCut procedure.

SUMMARY

Coronary obstruction is a rare but fatal complication of TAVR either in native valve or in ViV procedures. There are no clear recommendations on selecting patients requiring coronary protection techniques, nevertheless there are some studies describing anatomic predictive factors, especially CT scan criteria, to determine high-risk patients for CAO.

Many techniques have been described to treat or prevent this complication, starting by rescue PCI and the chimney stenting technique used since the beginning of the TAVR but this technique may lead to another problem, which is a difficult coronary access.

Nowadays, other evolving and promising techniques that are based on culprit leaflet laceration

using coronary angioplasty materials such as BASILICA or a dedicated device such as ShortCut prevent CAO and keep coronary access easier.

In summary, it is always better to lower the threshold of the use of coronary protection techniques in patients who underwent TAVR, because the mortality rate of this complication is very high once it occurs.

CLINICAL CARE POINTS

- Coronary occlusion post-TAVR is a fatal complication.
- To prevent this complication, a meticulous cardiac CT scan interpretation is mandatory.
- We should look to the coronary height, leaflet calcification, VTC, VTSTJ, and STJ height.
- It is better to have a low threshold to use preventive techniques (chimney stenting, BASILICA, ShortCut), especially in ViV procedures.

DISCLOSURE

The authors have nothing to disclose.

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