



# Method of coronary guide-catheter fixation for PCI in patients with previous transcatheter aortic valve implantation

## Abstract

**Purpose:** Percutaneous coronary interventions after transcatheter aortic valve implantation have been found to be associated with difficulty in guiding catheter cannulation.

**Methods and findings:** Fixation of the guide catheter to the aortic valve frame using a coronary guidewire and snare was demonstrated to be a simple and reliable method of increasing guide catheter stability.

**Keywords:** coronary stenting, guide catheter, aortic stenosis, the engage of guide catheter

**Abbreviations:** ICD: Implantable Cardioverter-Defibrillator, LAD: Anterior Descending, PCI: Percutaneous Coronary Interventions, TAVI: Transcatheter Aortic Valve Implantation

## Introduction

A 78-year-old male moderately overweight patient presented with chief complaints of chest pain, shortness of breath for the past 2 months.

Prior treatments include: Transcatheter Aortic Valve Implantation (TAVI) 3 years prior and ICD implanted 1 year prior due to the cardiac arrest. Normal function of the left ventricle and normal gradient of the aortic valve were revealed by echocardiography. However, coronary angiography showed the ostial stenosis of LAD (VIDEO 1).

## Methods and results

After insertion of the introducer, the guide catheter was advanced to the ostium of the

coronary artery through the closest aortic valve frame cell. Then a coronary wire was inserted through the guiding catheter and the aforementioned cell (VIDEO 2). It was then moved through another cell in the valve frame into the lumen of the ascending aorta. The distal end of this coronary wire was trapped by the snare, which had been delivered from a second arterial access, at the level of the arch or ascending aorta (VIDEO 3). The distal part of the coronary wire was gripped firmly throughout the Percutaneous Coronary Interventions (PCI) process. The snare was then fixed (VIDEO 4). This approach helps achieve reliable and stable fixation of the guide catheter.

Provisional stenting of the left main and the proximal part of the Left Anterior Descending

**Marat Aripov<sup>1\*</sup>,  
Abdurashid Mussaev<sup>2</sup>,  
and  
Gulzhaina Rashbayeva<sup>3</sup>**

<sup>1</sup>Department of Interventional Cardiology, National Research Center for Cardiac Surgery, Republic of Kazakhstan

<sup>2</sup>Catheterization Laboratory, National Research Center for Cardiac Surgery, Republic of Kazakhstan

<sup>3</sup>Department of Arrhythmology, National Research Center for Cardiac Surgery, Republic of Kazakhstan

\*Author for correspondence:  
dr.aripov@gmail.com

[https://drive.google.com/file/d/1S\\_nBtcoOsWl-BimCPhN3CtlY\\_ckYKaFP/view?usp=sharing](https://drive.google.com/file/d/1S_nBtcoOsWl-BimCPhN3CtlY_ckYKaFP/view?usp=sharing).

VIDEO 1. Compliance to AHA Guidelines.



<https://drive.google.com/file/d/12kWFv6RY7oQfi3sShI3-XOaR9BjB5VamU/view?usp=sharing>

**VIDEO 2. AP Projection of the LCA. Projection with the advancing wire through the guiding catheter and the frame cell into the lumen of the ascending aorta.**



[https://drive.google.com/file/d/1PILeNmDL8YiLjk10fGv8tiwuOAJYXl\\_k/view?usp=sharing](https://drive.google.com/file/d/1PILeNmDL8YiLjk10fGv8tiwuOAJYXl_k/view?usp=sharing)

**VIDEO 3. AP Projection. The distal end of this coronary wire was trapped by the snare.**



[https://drive.google.com/file/d/13V4Vco\\_Rqp-R7Gs8JuUQG0OpYxZswXPl/view?usp=sharing](https://drive.google.com/file/d/13V4Vco_Rqp-R7Gs8JuUQG0OpYxZswXPl/view?usp=sharing)

**VIDEO 4. Writing of LAD and Cx. Two coronary guidewires were inserted sequentially in the distal parts of the LAD and intermedia. Predilation with a 2.0-20.0 mm balloon of the distal left main and proximal parts of LAD was performed.**



[https://drive.google.com/file/d/1TZgpMSw-e\\_GKPMwYdcFg5NBAA5Bnu5pU/view?usp=sharing](https://drive.google.com/file/d/1TZgpMSw-e_GKPMwYdcFg5NBAA5Bnu5pU/view?usp=sharing)

**VIDEO 5. The coronary angiography after predilatation. A severe calcinosis of the bifurcation of the left main, LAD, and the 90° angle between them.**



(LAD) artery was performed without any challenges. Initial coronary angiography revealed severe calcinosis of the bifurcation of the left main, LAD, and the 90° angle between them, which could present difficulties for balloon and stent insertion. Two coronary guidewires were inserted sequentially in the distal parts of the LAD and intermedia (**VIDEO 5**). Predilation with a 2.0 mm-20.0 mm balloon at 12 atm of the distal left main and proximal parts of

LAD was performed, but success was minimal (**VIDEO 6**). For this reason, predilation with a 2.25-15.0 non-compliant balloon at 17 atm was performed and a Resolute Onyx stent 3.0 mm-22.0 mm was implanted in the left main and proximal part of LAD (**VIDEO 7**). Proximal optimization therapy with a 3.5-12.0 non-compliant balloon was performed as the next stage (**VIDEO 8**). The final result is shown in the **VIDEO 9**.

<https://drive.google.com/file/d/1YmzC CGDjexCXmClBet1bWY9n72RQMpc8/view?usp=sharing>

**VIDEO 6. Predilation. The kissing predilatation LAD and intermedia.**



<https://drive.google.com/file/d/1Y2F5tq57pRX1FI5S9J9MAZsadBAAbhKt/view?usp=sharing>

**VIDEO 7. The stenting. The advancing of the stent and placement in the left main and proximal part of LAD.**



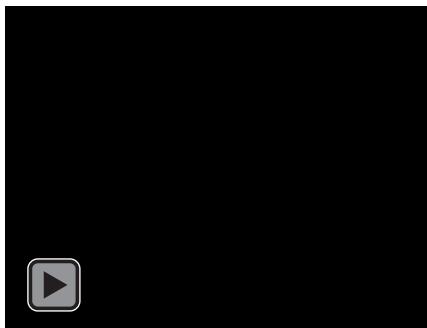
[https://drive.google.com/file/d/1Eqnsn4U4w9rs\\_NXXM6c2aO00UDrKC0Qz/view?usp=sharing](https://drive.google.com/file/d/1Eqnsn4U4w9rs_NXXM6c2aO00UDrKC0Qz/view?usp=sharing)

**VIDEO 8. AP view. Proximal optimization therapy with a 3.5-12.0 non-compliant balloon was performed.**



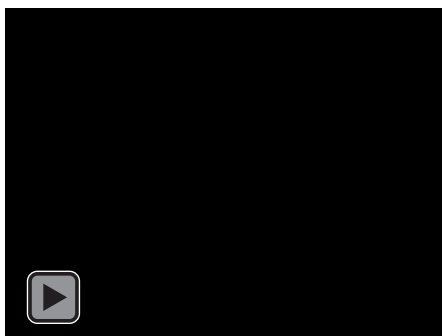
<https://drive.google.com/file/d/1P1o5lq4YTX YrflcZY5Ph9G9HfxC6N5Ej/view?usp=sharing>

**VIDEO 9. Final result. Final view after placement of the stent.**



<https://drive.google.com/file/d/1tldenz SCNuAQYNXotMazzsRWg6kDMOwm/view?usp=sharing>

**VIDEO 10. Echo. Apical view of the aortic valve.**



Echocardiography was performed after the procedure to assess the function of the aortic valve which did not reveal any damage of the flaps (**VIDEO 10**). The patient noted a significant improvement in his well-being and was discharged three days after the procedure.

---

### Discussion and conclusion

Coronary angiography and PCI will become increasingly required in patients after TAVI [1]. Several reports have shown that there are technical difficulties with coronary engagement, particularly in patients with Evolut [2,3]. This difficulty may be due to the following factors the frame waist is narrower than the aorta and there was more space between the frame and the coronary ostia, TAVI commissural post, bulky old leaflet. Some authors suggest the use of an Extension Catheter Guidion for stenting [4]. The most interesting finding in this case was that the frame can actually help in supporting the guiding catheter. This finding was unexpected and suggests that the fixation of the guiding catheter improve coronary engagement significantly after using this technique. A possible explanation for this benefit might

be during PCI treatment of the chronic total occlusion and complex stenosis. This method finding cannot be applied to patients after TAVI with other valve types.

The patient was seen 3 months following stenting. No clinical concerns were noted; the patient exhibited no initial symptoms and reported no complaints. In conclusion, fixation of the guide catheter to the aortic valve frame using a coronary guidewire and snare was demonstrated to be a simple and reliable method of increasing guide catheter stability.

---

### Learning objectives

Case; The clinical case described here a method of effective guide catheter fixation after TAVI. To obtain insure reliable support of guiding catheter for PCI after TAVI.

---

### Disclosures

Authors declare that they have no conflict of interest. No relationship with industry.

---

### Funding

There is no specific funding.

## References

1. Yudi MB, Sharma SK, Tang GH, et al. Coronary angiography and PCI after TAVR. *J Am Coll Cardiology*. 71, 1360-1378 (2018).
2. Diaz MA, Patton M, Valdes P, et al. A systematic review and meta-analysis of delayed coronary artery access for coronary angiography with or without Percutaneous Coronary Intervention (PCI) in patients who underwent Transcatheter Aortic Valve Replacement (TAVR). *Cardiovasc Interv Ther*. (2021).
3. Zivelonghi C, Lunardi M, Pesarini G, et al. Coronary artery disease in patients undergoing transcatheter aortic valve implantation. A single center registry on prevalence, management and immediate clinical impact. *Cor et Vasa*. 59, e23-e28 (2017).
4. Tanaka A, Jabbour RJ, Incidence LT, et al. Incidence, Technical Safety, and Feasibility of Coronary Angiography and Intervention Following Self-expanding Transcatheter Aortic Valve Replacement. *Cardiovasc Revasc Med*. 20, 371-375 (2019).