

Optical Coherence Tomography-Guided Nano-Culotte Stenting for Woven Coronary Artery Bifurcation Lesion

Woven Koroner Bifürkasyon Lezyonuna Optik Koherens Tomografi Kılavuzlu Nano-Culotte Stentleme

A 31-year-old male patient presented with non-ST-segment elevation myocardial infarction. Coronary angiography revealed a bifurcation lesion involving a bifid left anterior descending (LAD) artery with a woven coronary artery anomaly (Video 1) and a high obtuse marginal (OM) lesion. Both the LAD and septal LAD branches were successfully wired using a Fielder XT guidewire in combination with a Corsair microcatheter. Optical coherence tomography (OCT) imaging confirmed the presence of a woven coronary anomaly with thrombus formation in both branches and demonstrated that the guidewires had traversed separate microchannels (Figure 1 A, B, Video 2). Based on the OCT findings, percutaneous coronary intervention (PCI) was planned for the LAD. After confirming that the Fielder XT wires were in the distal true lumen of both branches, they were exchanged for 0.014-inch floppy guidewires.

Given the high risk of side branch occlusion with provisional stenting, a planned two-stent strategy using the Szabo technique was selected (Figure 2). After wiring and predilatation of both woven coronary bifurcation vessels (Figure 3A, Video 3), a 3.0 × 18 mm sirolimus-eluting stent was manually prepared outside the catheter (Figure 3B). The proximal strut was partially opened, the LAD wire was passed through the strut, and the strut was then re-crimped. The stent was advanced over the septal LAD wire until it was restrained by the LAD guidewire and subsequently implanted, minimizing the risk of LAD occlusion (Video 4).

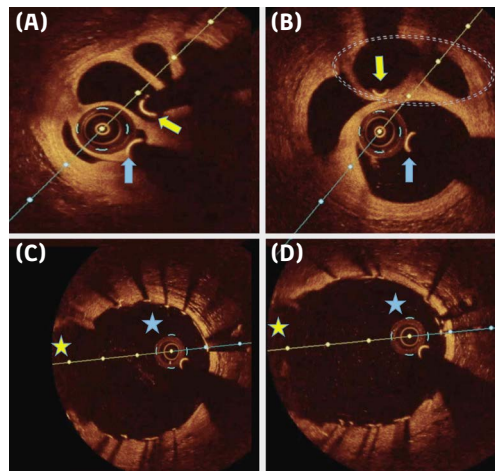


Figure 1. Optical coherence tomography (OCT) imaging. (A) Proximal LAD. (B) The branching point level (in the circle: septal LAD ostium). (C) Post-procedural imaging of the carina level. (D) Post-procedural imaging of the polygon of confluence (blue arrowhead/star: LAD wire, yellow arrowhead/star: septal LAD wire).

LAD, Left anterior descending artery.

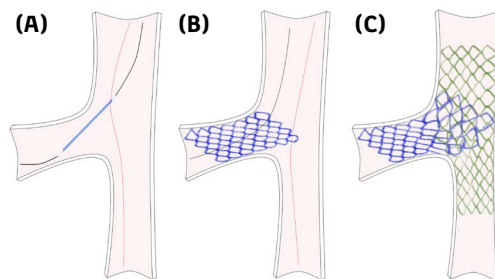


Figure 2. Stenting procedure with Szabo technique. (A) Stent positioning with the Szabo technique. (B) Side branch stent implantation. (C) Final stent configuration.

CASE IMAGE OLGU GÖRÜNTÜSÜ

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Received: August 14, 2025

Accepted: September 04, 2025

Cite this article as: Kahraman S, Çizgici AY, Sadıkoğlu K, Kalkan AK, Ertürk M. Optical Coherence Tomography-Guided Nano-Culotte Stenting for Woven Coronary Artery Bifurcation Lesion. *Türk Kardiyol Dern Ars.* 2025;53(7):545-546.

DOI: 10.5543/tkda.2025.83841



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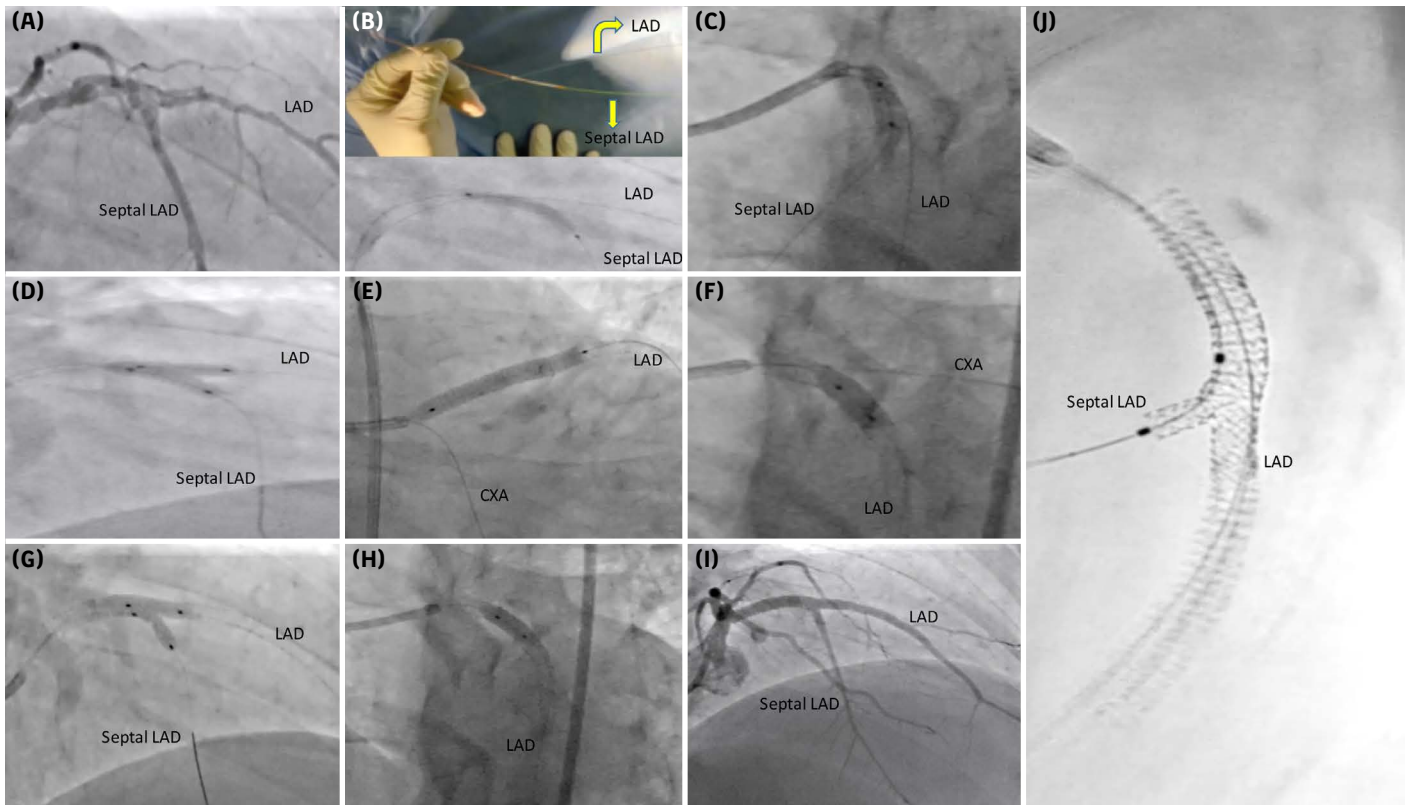


Figure 3. Percutaneous intervention of a woven coronary bifurcation lesion. (A) Woven coronary bifurcation lesion. (B) Septal LAD stent preparation and implantation with the Szabo technique. (C) The POT technique. (D) First KBD. (E) LAD stent implantation. (F) Second POT technique. (G) Second KBD. (H) Final POT. (I) Final angiographic imaging. (J) Stent enhancement imaging.

KBD, Kissing balloon dilatation; LAD, Left anterior descending artery; POT, Proximal optimization technique.

Proximal optimization technique (POT) was performed using a 4.5×8 mm non-compliant balloon (NCB) (Figure 3C), followed by kissing balloon dilatation (KBD) with 3.0×12 mm (septal LAD) and 3.5×12 mm (LAD) NCBs (Figure 3D). A 3.5×31 mm sirolimus-eluting stent was deployed in the LAD (Figure 3E). A second POT and final KBD were completed using the same balloon dimensions (Figure 3F, G). The procedure concluded with a final POT using a 4.5×8 mm NCB (Figure 3H, Video 5). Post-procedural OCT imaging confirmed optimal stent apposition and expansion (Figure 1 C, D, Video 6). Additionally, the OM lesion was treated with a 2.75×21 mm sirolimus-eluting stent (Video 7). The right coronary artery was also patent in the patient (Video 8).

Although a woven coronary artery is a rare congenital anomaly, performing a PCI on it alongside a bifurcation lesion is an extremely difficult procedure. This report demonstrates that OCT-guided bifurcation PCI using the Szabo technique is feasible and effective. To the best of our knowledge, this represents the first documented case of its kind.

Ethics Committee Approval: This is a single case report, and therefore ethics committee approval was not required in accordance with institutional policies.

Informed Consent: The authors confirm that informed consent was obtained from the patient for the use and publication of their case details and images in this manuscript.

Conflict of Interest: The authors report no financial or personal conflicts of interest related to this manuscript.

Funding: No funding was received for this study.

Use of AI for Writing Assistance: AI-assisted technologies were not used.

Author Contributions: Concept – S.K.; Design – S.K.; Supervision – A.K.K., M.E.; Resource – A.Y.Ç., K.S.; Materials – A.Y.Ç., K.S.; Data Collection and/or Processing – S.K.; Analysis and/or Interpretation – S.K., A.K.K., M.E.; Literature Review – S.K.; Writing – S.K.; Critical Review – S.K., M.E.

Peer-review: Internally peer-reviewed.

Video 1. Angiographic imaging of a woven coronary bifurcation lesion.

Video 2. Pre-procedural optical coherence tomography imaging of the left anterior descending artery.

Video 3. Wiring of both the left anterior descending artery (LAD) and septal LAD branches.

Video 4. Septal left anterior descending artery (LAD) stent preparation and implantation with the Szabo technique.

Video 5. Percutaneous coronary intervention of the woven coronary bifurcation lesion.

Video 6. Post-procedural optical coherence tomography imaging of the left anterior descending artery.

Video 7. Percutaneous coronary intervention of the obtuse marginal branch.

Video 8. Angiographic imaging of the right coronary artery.